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Institutional and Economic Development in a Limited Access Order of the Grand Duchy of Lithuania (1245-1795)

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Economics (S 004)

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INTRODUCTION

Relevance of the topic

The economics discipline has studied many determinants of growth and development. Among other factors, growth is found to be driven by financial development (e.g., Demetriades & Hussein, 1996; Calderón & Liu, 2003), human capital (e.g., Hanushek, 2013; Pelinescu, 2015), infrastructure (e.g., Esfahani & Ramirez, 2003; Farhadi, 2015), foreign direct investment (e.g., Borensztein, De Gregorio & Lee, 1998; Li & Liu, 2005), and innovation (e.g., Ulku, 2007; Hasan & Tucci, 2010). Political economists have highlighted the role of such determinants as political stability (e.g., Alesina *et al.*, 1996; Aisen & Veiga, 2013) and social cohesion (e.g., Whiteley, 2000; Chou, 2006). The full list of potential drivers of growth is barely exhaustible, but the resulting policy suggestions do not appear to have succeeded in making global standards of living more equal.

This is likely because many proximate causes of growth, like those described above, are themselves affected by an ultimate cause – institutions. Institutions comprise formal rules and informal norms that impact development through shaping economic, political, and social interactions (North, 1991). Put differently, institutions define “collective action in control, liberation and expansion of individual action” (Commons, 1931). Institutions are generally understood to be the ‘better’, the larger is the extent to which they can ensure the rule of law, secure property rights and eliminate the costs of participating in the economy.

This dissertation studies the link between institutional quality and economic development throughout the history of the Grand Duchy of Lithuania (1245-1795). It is relevant to examine this relationship in a new setting since it is established empirically by a vast amount of contemporary research (e.g., Acemoglu, Johnson & Robinson, 2002; Easterly & Levine, 2003; Rodrik, Subramanian & Trebbi, 2004; Tan, 2010; Michalopoulos & Papaioannou, 2013; 2014; Nawaz, 2015; Góes, 2016; Broadberry & Wallis, 2017; Acemoglu *et al.*, 2019; Shirley, 2025), including studies exploring historical contexts (e.g., Cantoni & Yuchtman, 2014; Dittmar & Meisenzahl, 2020; Bisin *et al.*, 2024). At the same time, a case study can offer more granular insights to this relationship over the long term. While Chang (2011) criticises institutional economics for its (over)reliance on heterogenous cross-country datasets, Shirley (2025) specifically encourages case studies as a potential solution to this problem. Multiple case studies have been conducted,

but they primarily focus on the present or recent history (see the literature review in chapter 2).

The case of Lithuania is particularly interesting, as between the 13th and 18th centuries, it recorded a unique diversity of politico-economic arrangements. Having emerged from ancient forests and swamps, the Grand Duchy of Lithuania (GDL) became Europe's last pagan empire among already-formed Christian states. Rather than contemporary neighbours, 13th-14th century Lithuania prompts comparisons with earlier medieval European polities, including 10-12th century Poland, Hungary, and Bohemia, or principalities of the Kyivan Rus' (Babinskas, 2022; Petrauskas, 2009; Rowell, 1994). Its institutional development during the 15th and 16th centuries also lagged behind most of Europe. Yet, as the GDL quickly developed written law, property rights, and parliamentary representation, historians have considered distinguishing this as a separate period of Lithuanian 'Europeanisation' that does not fit the traditional 'Antiquity-Middle Ages-Modernity' model (Bumblauskas, 2005: 140; Petrauskas, 2009). Finally, during the 17th and 18th centuries, the GDL was part of Europe's largest noble democracy – the Polish-Lithuanian Commonwealth – which enfranchised up to 7-8% of its population (Sliesoriūnas, 2015: 361; Augustyniak, 2016/2008: 246).

Research question, aim, and objectives

Addressing the central issue in institutional economics, the dissertation asks: was there a relationship between institutional quality and economic development *throughout the pre-industrial history of Lithuania*?

The aim is to answer this question by attaining the following objectives:

1. Select a theoretical framework suitable for studying the long-term development of the GDL and justify its selection.
2. Analyse the framework's impact on empirical literature to confirm its suitability and relate the dissertation to other studies.
3. Operationalise the theoretical framework in the form of a mixed methodology for evaluating the quality of institutional environments and historical development.
4. Apply the methodology to analyse the GDL's institutional quality, economic outcomes, and their relationship during the 13th and 14th centuries (from about 1245 to 1386).
5. Apply the methodology to analyse the GDL's institutional quality, economic outcomes, and their relationship during the dynastic union with Poland (1386-1569).

6. Apply the methodology to analyse the GDL's institutional quality, economic outcomes, and their relationship under the Polish-Lithuanian Commonwealth (1569-1795).
7. Assess the GDL's overall institutional development, economic outcomes, and their relationship between the 13th and 18th centuries.

Theoretical framework

This dissertation's methodology is based on a holistic concept of social orders, which, unlike precise quantitative metrics, captures both formal and informal aspects of the overall institutional environment. Broadly, social orders are collections of patterns that shape how societies limit and control violence (North, Wallis & Weingast, 2009: 1-3). The way in which societies address the issue of security determines how they construct institutions and gather into organisations to pursue common goals. Over time, by resulting in certain ways of behaviour, social orders form specific beliefs, expectations, and incentives for political and economic activity. Through influencing everyday decisions, these beliefs, expectations, and incentives ultimately impact long-term development.

North, Wallis and Weingast (2009) distinguish two main types of social orders – limited access orders (LAOs) and open access orders (OAOs). The dissertation primarily focuses on the former type, as prior to the 19th century, LAOs not only exclusively characterised the GDL, but also the rest of the world. Even today, LAOs contain about 85 percent of the global population (*Ibid.*: 13). At the same time, it is equally important to grasp the functioning of both types, as LAOs are defined in contrast to OAOs.

Like modern liberal democracies, OAOs guarantee security through state monopoly on violence, supported by strong institutions ensuring the accountability of police and military to the citizens. Open access institutions uphold equality through the universal rule of law, which also facilitates impersonal exchange, the functioning of independent and complex organisations, and innovative competition. In contrast, security in LAOs is provided by an elite made up of those capable of running organised violence, mobilising political support, and/or extracting economic rents. The members of such an elite commit to limiting violence to maintain their exclusive rents, resulting from privileges like property rights, access to productive resources, or legal protection of their persons and organisations. The fact that security depends on the preservation of rents means long-term stability of LAOs rests on the 'double balance' between limited access to politics and limited access to the economy.

While transitions from LAOs to OAOs generally happen as clear qualitative breaks, the LAOs themselves exist on a spectrum. The movement between the three ideal categories of LAOs delineating this spectrum – fragile, basic, and mature – is more gradual and fluid, albeit also representing qualitative changes in the institutional environment. Fragile LAOs lack a stable framework for limiting violence and can barely sustain the state itself, as the probability of violence increases with any change in the elite's composition. The resulting institutions cannot provide a stable environment for organisations. In basic LAOs, the state, its governance, and administrative procedures are durable beyond specific elite arrangements. They contain at least some public law, property rights for the elite, and can support elite organisations. The elite exerts a degree of impersonality in the form of shared beliefs, such as those based on class, sustaining relationships for longer periods and among larger groups than solely personal relationships. Mature LAOs improve on many elements of basic LAOs, additionally containing articulated private law and at least some protection for private organisations not directly associated with the elite.

In general, LAOs should be less advanced than OAOs because limited access results in limited political and economic competition, while the shortage of private organisations limits the division of labour, the dispersion of knowledge, innovation, and other benefits of cooperation. This lack of dynamism leaves LAOs more vulnerable to shocks.

Yet, the elite can still generate growth by strengthening and/or expanding its limited access institutions. 'Double balance' suggests that increasing stability and openness of the elite should incentivise expanding the pool of rents to reward its members for collaboration. Improving political collaboration and public administration enhances personal security, property rights, and the provision of shared goods like defence against external threats or infrastructure. Public and private law upholds elite agreements and enables peaceful and standardised dispute resolution. As a result, better security, administration, third-party enforcement, and shared goods incentivise productive, rather than extractive, organisations, which contribute to development. Furthermore, by threatening the existing elite arrangements, greater economic power of these organisations may further encourage more institutionalised ways of accommodating broader political interests.

The theory of North, Wallis, and Weingast (2009) is ideal for studying the GDL not only because LAOs represent virtually all pre-industrial polities, but also because it is more complete than alternative approaches to long-term development. Institutional economics is generally compatible with theories that emphasise the effects of geography, climate, and relative position in the

international economic order, as institutions still mediate these effects. Meanwhile, the social orders' framework already integrates the role of culture, including path dependence, beliefs, and generalised trust. The key concepts of the 'old institutional economics' literature, like growth-orientation, enforceable rules, and 'instrumental' institutions are also present in the social orders' framework. By considering the structure of the state, the rule of law, and political and economic openness, the framework similarly addresses state capacity and the inclusivity of institutions, advanced by more recent institutional economics theories.

Methodology and data

The case study of Lithuania implements a mixed methods approach. The first part of each empirical chapter analyses the GDL's institutional quality following a qualitative methodology derived from the LAO framework. This methodology operationalises the theory in a way that disentangles multiple interrelated dimensions of the overall institutional environment. Based on the findings of historiography and other related disciplines, the qualitative analysis classifies these dimensions and the whole social order along the spectrum of LAOs. The classifications and their evolution over time allow evaluating the resulting economic incentives and formulate hypotheses regarding the expected trends in economic development.

The second part of each empirical chapter evaluates historical economic outcomes using a combination of indicators available for each period. Facing the largest shortage of economic data for the 13th and 14th centuries, chapter 4 reconstructs the annual trend of wooden castles in ethnic Lithuania, arguing that it roughly reflected extensive growth, as the castles functioned as proto-towns and their trend does not correlate with the number of battles. This chapter also discusses the archaeological and related studies regarding people's health, town population, the expansion of agriculture, population density, the development of crafts, and the emergence of the first local coins.

Chapters 5 and 6 analyse two newly-constructed datasets on the annual number of known manors and church-building activities quantitatively. They implement structural breaks' tests that are relatively common in studies of long-term growth. In time-series data, structural breaks generally separate different growth regimes; thus, following the theoretical framework, the expectation is that the breaks should appear at about the same time as the changes in the GDL's categorisation as an LAO, identified by the qualitative analysis. Positive institutional development should be associated with accelerated trends in the founding of manors and church-building activities

and vice versa. Procedures developed by Bai and Perron (2003) and Kurozumi and Tuvaandorj (2011) allow estimating the most plausible structural breaks algorithmically, avoiding arbitrary selection of specific breaks to be tested.

In addition to the structural breaks' analysis, chapters 5 and 6 consider the descriptive statistics of several other indicators. Chapter 5 analyses the evolution of the health index, although the data are insufficient for the 17th and 18th centuries. Both chapters construct historical urbanisation rate, often used as a direct proxy of economic development, in present-day Lithuania at multiple points in time, producing a trend from 1200 to 1800. Finally, they analyse the first available GDP estimates for Lithuania and the GDL, produced through a machine-learning approach by Koch, Stojkoski, and Hidalgo (2024), while chapter 6 additionally estimates structural breaks in Poland's/Kraków's annual GDP per capita, constructed by Malinowski and van Zanden (2017).

Scientific novelty and main contributions

The scientific novelty of the dissertation rests on its contribution to several strands of literature. It can be summarised in two parts: the contribution to institutional economics and economic history in general, and the contribution to the economic history of the GDL (and Central Eastern Europe) in particular.

Most broadly, this dissertation contributes to the literature by exploring the relationship between institutional quality and economic development in a new historical setting. It largely reproduces the positive link found by the cross-country studies mentioned in the beginning. In addition, the dissertation expands the very small number of existing case studies applying the theory of North, Wallis, and Weingast (2009) to pre-industrial polities. The literature review in chapter 2 shows that the number of such applications might amount to single digits, as similar research is primarily focused on more contemporary history. Finally, whereas existing qualitative case studies usually prioritise the political sphere, this dissertation offers an attempt at a systematic application of the LAO framework that also takes into account the economic institutions and organisations, as well as their impact on politics (see chapter 3).

Regarding the specific case, this dissertation is the first to systematically apply an institutional economics framework to the GDL and the history of Lithuania. Based on two novel datasets of manors and church-building activities, chapters 5 and 6 are also the first to evaluate Lithuania's pre-industrial economic outcomes quantitatively. Albeit providing important descriptive and factual contributions, existing research on the GDL's political and economic history mostly follows a historiographic (or Marxist-

historiographic) approach (e.g., Baronas, Dubonis & Petrauskas, 2011; Jurginis, 1962; 1978; Łowmiański, 1931-2; Šalčius, 1998/1943-1957; Пашуто, 1959; Довнар-Запольскі, 1901; Ochmański, 1986; 1990; Kiaupa, 2018; Glemža, 2010; Šapoka, 1941a; 1941b). A few authors specifically explore the GDL's institutions, but they generally use other, either political *or* economic, theoretical frameworks, without linking institutions with economic outcomes (e.g., Norkus, 2007; 2018/2009; French, 1970; Millward, 1984; Petrauskas, 2003; Mączak, 2000/1994; Kowalski, 2013). Žiemelis (2006; 2011a; 2011b; 2011c) comes closest to this task over several papers on the 17th-18th centuries, but he does not rely on institutional economics systematically and primarily focuses on international trade. All these works are either already integrated into the modern historiography or directly referenced in the dissertation (see section 3.1).

Finally, by exploring the GDL, the dissertation also contributes to research on the history of (Central) Eastern Europe. There are several key works on Poland's historical development (Malinowski & Van Zanden, 2017; Malinowski, 2016; 2019; 2025), and the region has been particularly popular for drawing cases of contemporary LAOs (e.g., Toshkov, Dimitrova & Börzel, 2021; Keudel & Carbou, 2021; Flikke, 2021). The analysis of the GDL adds another previously unexplored case, particularly shedding more light on the region's pre-industrial institutional and economic development.

Statements presented for defence

The statements presented for defence follow the dissertation's objectives and reflect their corresponding results:

1. The long-term development of the GDL can be analysed using the social orders' framework for two main reasons. First, institutions generally mediate the effects of alternative determinants, including geography, climate, and countries' placement in the international order, while theory of North, Wallis, and Weingast (2009) already integrates culture through informal institutions. Second, the social orders' framework is more complete than other theories of institutions, as it similarly captures the main ideas of the 'old institutional economics' literature as well as more recent institutional frameworks that focus on state capacity, inclusivity, and state/society balance.
2. Existing literature reinforces the choice of the social orders' framework and highlights the novelty of the dissertation. While the theory of North, Wallis, and Weingast (2009) has been widely applied across multiple case studies and several quantitative analyses, only a few works examine

historical periods before the 19th century and no institutional economics frameworks have been systematically applied to Lithuania altogether.

3. The concept of LAOs can be operationalised for consistent application to multiple case studies by spreading it across the categories of institutional complexity, legal system, property rights, support of organisations, and the prevalence of impersonal relationships. Based on these categories, one can more precisely locate specific cases across the spectrum of fragile, basic, and mature LAOs. Meanwhile, the shortage of historical economic data can be overcome by using a combination of indicators. The changing trends in the building of castles, manors, and churches provide insights to extensive development, whereas the structural breaks' tests, applied to the latter two measures, are commonly used in studying long-term growth. Urbanisation and health data are other frequent proxies available for Lithuania, in addition to emerging estimates of GDP per capita and the findings of archaeological, anthropological, and related studies.
- 4a. During the 13th and 14th centuries (~1245-1386), the GDL remained a fragile LAO, but still achieved positive institutional development. Its political stability increased following the restriction of ruling privileges to the Gediminid dynasty and the integration of rival dukes into the elite by granting them administrative offices and family property rights. These changes incentivised land accumulation and productive activity, rather than extraction, which drove the military economy.
- 4b. Evidence of increasing density of wooden castles in ethnic Lithuania, the expansion of agriculture, increasing urbanisation and the appearance of first local coins indicates that institutional development coincided with extensive growth. At the same time, possibly due to population growth and inherent inequality of LAOs, health data does not show any increase in the average standard of living.
- 5a. During the dynastic union with Poland (1386-1569), the GDL became a basic LAO. By the 1490s, its elite fully shifted from the clan of warrior dukes to a corporation of landholding nobility, governing jointly with the grand duke. The GDL gradually developed a central administration, public law, collective decision-making in the Council of Lords, and shared beliefs among the leading nobles, while also entrenching their property rights that enabled manors to become the main economic organisations.
- 5b. Increasing trends of new manors, churches, and urbanisation from about the time of the institutional transition show that the environment of a basic LAO further encouraged productive agriculture. On the other hand, the growth mostly remained extensive, since it was concentrated among the

nobility – the GDL did not become more urbanised relative to the rest of Europe, and the health outcomes still did not improve.

- 6a. The PLC, including the GDL (1569-1795), initially improved the institutional environment and came close to a mature LAO. However, it started declining from the late 16th century. The PLC was no longer a basic LAO from the 1660s, as collective decision-making became increasingly ineffective, the legal system could not prevent or resolve elite disputes, property rights became fragmented in favour of wealthy magnates and their large organisations, while clientelism and corruption replaced the previously-emerging impersonal relationships. The PLC rebuilt its institutional quality with comprehensive reforms, but they only came at the end of its existence.
- 6b. The trends in analysed development indicators continued to move together with institutional quality during this period, but only to a limited extent. Some models of church-building activities estimate the expected structural breaks around the 1660s, and the urbanisation rate likely also declined from about this time. However, not all church-building models produce these results, and other measures paint a somewhat conflicting picture.
7. In sum, the case study of the GDL largely supports the central claim of institutional economics that there is a positive relationship between institutional quality and long-term economic development. It also supports the theory of North, Wallis, and Weingast (2009), which argues that although LAOs can develop by improving their elite institutions, the logic of limited access and ‘double balance’ result in this development being primarily extensive and accumulating among the elite.

1. THEORETICAL FRAMEWORK OF SOCIAL ORDERS AND DEVELOPMENT

The title of the book written by North, Wallis, and Weingast (2009) already hints at the central idea behind their framework – that the main purpose of social orders is limiting organised violence, including both its actual manifestation and threats of coercion. The way in which this purpose is achieved affects existing institutions and organisations. Societies gradually internalise their institutional environments through forming specific beliefs about the behaviour of others, which generate incentives for political and economic activity. Thus, the response to the problem of violence eventually influences long-term development.

The two main types of social orders – OAOs and LAOs – attempt to limit violence differently. This chapter presents them in more detail. It focuses particularly on LAOs, as they define the GDL throughout the whole analysed period and thus serve as the main theoretical concept of the dissertation. At the same time, OAOs can help to understand LAOs because both types of social orders are integral parts of the theory, and LAOs are defined in contrast to OAOs.

Following this broader introduction, the chapter outlines the main advantages of the social orders' framework over alternative determinants and institutional theories of long-term development.

1.1. Open access orders

OAOs provide a clear starting point, as they represent an ideal case of modern liberal democracies, comprising familiar concepts of elections, the universal rule of law, personal equality, etc.

OAOs address the issue of violence by granting a security monopoly to a Weberian state (North, Wallis & Weingast, 2009: 110-147). This monopoly faces regulation by strong institutions, restricting legitimate violence to military and police. These power structures are directly controlled by the government, which is itself accountable to citizens through open political competition. Political competition interacts with economic competition. Open economic competition erodes rents through relative absence of entry barriers, and in the absence of rent opportunities, there are no incentives for a privileged elite to form. Meanwhile, political competition preserves economic access, since it is not in the citizens' interests to vote for proponents of limited access. Over time, the latter outcome is achieved by widespread beliefs in favour of

equality and inclusion, formed endogenously in response to access-expanding policies and cemented by durable institutions.

Free market entry in OAOs facilitates impersonal exchange governed by rules rather than personal identities and privileges. Such an environment significantly reduces transaction costs and enables larger scale economic activity through ubiquitous organisations with their own legal identities. Coupled with the state that is focused on providing universal rule of law and public goods rather than elite privileges, economic and political competition nurtures creative destruction and innovation, ultimately fostering what North, Wallis and Weingast (2009) call ‘adaptive efficiency’ – societies’ general ability to deal with change and solve novel issues. Better adaptive efficiency of open access orders means that they exhibit more sustainable economic growth and are less susceptible to negative shocks.

1.2. Limited access orders

In LAOs, the key provider of security is the elite, consisting of those with the capacity for organised violence, such as military warlords or landed aristocracy (North, Wallis & Weingast, 2009: 30-106). The elite holds exclusive privileges like access to property rights and/or productive resources which generate economic rents – higher returns to inputs than under any alternative use. As the rents have to be extracted from the economy, the elite additionally includes people who can organise their production, such as businesspeople or political and community leaders. The latter figures can also act in mobilising political support, providing legitimacy to the state and the very existence of the elite. All members of the elite understand that they face similar incentives, and commit to acknowledge each other’s privileges, as well as keep them exclusive from outsiders, to preserve their premium returns. The violence specialists are interested in cooperation given that the rents are higher in the presence of peace, as the other members are more productive in their activities.

A key component of a limited access economy is that, contrary to this being a universal right in OAOs, the establishment of organisations is largely restricted to the elite. Through coordinated activity, organisations are platforms for augmenting individual productivity and pursuing larger and more complex projects. Effective organisations must function in an institutional environment where they can rely on external enforcement of contractual relationships both within and between organisations. Third-party enforcement is usually provided by the state. Thus, among the most valuable

sources of elite rents is the privilege to form organisations that the state will support.

The interplay between security, politics, and the economy results in what North, Wallis, and Weingast (2009) call 'double balance'. This means that the distribution and organisation of political power must be similar to that of economic power and violence potential so that there are no significant outsiders whose strength is not matched with corresponding material returns. In LAOs, the 'double balance' results from the concentration of power in the hands of the elite. Consequently, third-party enforcement necessary for organisations can only be available to those directly associated with the ruling coalition. This applies not only to businesses, but also to political parties and civil society organisations, meaning that for those without significant resources, there is very little room to provide checks on the state's activity and challenge the elite.

For ordinary citizens, the benefits from the control of violence in LAOs are realised through patron-client relationships. These informal networks tie people to certain members of the elite who can provide physical security, protect some property rights and pass down at least some economic opportunities due to their resources and connections. One example is a feudal relationship, where the lord protects his vassal, grants them a plot of land and some tools to work it, while requiring a share of output in return. At the level of the social order, patron-client networks shape the production, collection, and distribution of rents, which are essential for peaceful stability. In addition, the mutually deterring threats of violence are themselves structured around specific networks that the elite is interested in preserving.

In limited access societies dominated by patron-client networks, being or knowing someone is more important than merit or universal equality. This type of relationships is personal, as opposed to impersonal relationships, more characteristic to OAOs, where individuals assume roles based on what they do or what formal position they occupy. While in impersonal relationships, mutual trust is based on generally expected adherence to rules and their enforcement, people engaging in personal relationships simply trust the specific person. Considering that the most powerful organisations associated with the elite stem from exclusive privileges, their position in the social order correspondingly rests on the position of the patron within the elite. Meanwhile, the stability of the elite results from a horizontal commitment to limit violence, based on trust.

Over time, institutional environments entrench themselves through the formation of beliefs. In LAOs, ordinary citizens adjust to the fact that meaningful participation in economic or political life for them is unattainable.

Members of the elite at the top of organisations shaping such fields as religion or education further condition the people to subscribe to the status quo. Fewer opportunities for experimentation, less risk-taking, and weaker flow of ideas than under open access manifest themselves not only due to limited number of organisations, but also on an individual level. In the social context, this incentivises personal relationships since the best prospects of success or social mobility are provided by patron-client networks. Thus, an important component of LAOs is limited access culture that contributes to path dependence.

However, LAOs are by no means static. The elite only remains stable insofar as it can maintain the balance of power among its members. Changes in the external environment (e.g., related to natural resources, geopolitical shifts, new technologies) might lead to realignment of violence potential or abilities to mobilise the population for the production of rents. The winners from these changes are likely to demand a greater share of privileges and rents or to be included in the elite if they already do not belong to it. There are two main outcomes in such a situation – the elite either accepts the new reality, or opposes it, where violence becomes a possibility. Even in the absence of violence, the composition of the elite remains at least somewhat fluid, and it is very difficult to reduce this constant uncertainty.

It follows from various aspects of LAOs that one should expect them to be less developed than OAOs. The shortage of independent organisations constrains the benefits of cooperation, like the dispersion of knowledge, division of labour, and specialisation. North, Wallis, and Weingast (2009) call LAOs ‘schizophrenic’, in a sense that division of labour and specialisation are, in fact, beneficial for the elites as they increase rents, but at the same time, these advances can only be achieved in organisations. Since extending the support of organisations entails opening access and increasing the number of people receiving the (initially) same pool of rents, there is a trade-off between preserving a stable elite and pursuing development.

The fact that anything posing risk to the creation of rents also threatens the provision of security, leaves LAOs less able to adapt to external changes. The leaders of organisations cannot take advantage of all opportunities and have fewer available solutions to address new problems. Furthermore, as the economy is dominated by a limited number of large organisations, there is less competition. Large economic organisations are simultaneously political organisations, as they originate from politically-devised privileges and must contribute towards the maintenance of peaceful stability, which leads to less political competition. The organisations in OAOs can usually specialise in economic activities and make independent decisions, while flexibility in

politics is promoted by the marketplace of ideas. Against this comparison, the ultimate result of LAOs is less innovation and less creative destruction.

The transition from LAOs to OAOs takes place on the basis of moving towards impersonality. Although it marks a clear qualitative break and may happen rather quickly – even in decades, – the actual transition is subject to three necessary ‘doorstep conditions’ that take much longer to develop. These are the rule of law for the elite, the possibility to create perpetually-lived organisations, and consolidated control over the military. Yet, every condition must be achieved under the logic of limited access, and the transition only happens if the elite has enough incentives to convert its privileges to rights.

The movement towards these ‘doorstep conditions’ by strengthening and/or expanding elite institutions also makes it possible for LAOs to achieve development. ‘Double balance’ suggests that increasing stability and openness of the elite should incentivise expanding the pool of rents to reward its members for collaboration. Improving political collaboration and public administration enhances personal security, property rights, and the provision of shared goods like defence against external threats or infrastructure. Public and private law upholds elite agreements and enables peaceful and standardised dispute resolution. As a result, better security, administration, third-party enforcement, and shared goods incentivise productive and more complex organisations, with more extensive specialisation and division of labour. Furthermore, by threatening the existing elite arrangements, greater economic power of these organisations may further encourage more institutionalised ways of accommodating broader political interests. At the same time, greater stability of the elite should provide a more predictable and safer environment for economic activity.

Related to their sensitivity to external changes, the LAOs exist on a spectrum, delineated by the three ideal types – fragile, basic, and mature. The movement between them is somewhat fluid, albeit also representing qualitative changes in the institutional environment.

Fragile LAOs are the least sophisticated social orders. They lack a stable framework for limiting violence and can barely sustain the state itself. Specific individuals are essential for elite stability, and the probability of violence increases with any change in the elite’s internal balance or external shocks. The resulting institutions are simple and ad-hoc, as members of the elite cannot credibly commit to stable rules and laws when the balance of power is uncertain. Fragile LAOs struggle to develop durable public law. Such an environment cannot provide a stable environment for organisations. As it is equally beyond the existing state to create or enforce private law, the prevailing patron-client networks rely on their violence capacity to conduct

business or settle disputes. In both public and private law, the only available rules are simple and skewed in favour of the elite.

Having stabilised elite commitments, basic LAOs can maintain the state's organisational structure beyond specific elite arrangements. Their institutions are more complex than in fragile LAOs. The state's governance, administrative procedures, and such aspects as the elite, leadership succession and/or taxes are recorded in functioning public law. Clear rules are important for preventing violence since they establish the process for translating the elite's balance of power into rents and prescribe standard responses to shocks that may alter this balance. Although violence remains possible, members of the elite face less uncertainty. Public institutions allow the elite to legally establish semi-private organisations subject to third-party enforcement by the state. Productive organisations are essential for generating rents, while an organisation-friendly environment creates a degree of impersonality, as it benefits all elite equally. More structured relationships set up the elite to form shared beliefs, sustaining relationships for longer periods and among larger groups of people.

The key feature of mature LAOs is that their institutions are recorded in fully articulated private and public law. Private law entails a framework governing relationships enforced by the state solely between private individuals and/or organisations. Public law is more sophisticated than in basic LAOs, outlining the distribution of functions among multiple administrative offices, as well as being enforceable in courts. In addition, mature LAOs can support elite organisations outside the close control of the state. Public law recognises them as legal persons, rather than being directly tied with their leaders. This is inseparable from the legal recognition of intra-organisation agreements, functioning contract law, and a degree of formal protection from the state itself and other members of the elite. Over time, the rule of law for organisations evolves to the extent that, to a small degree, it can distinguish between private and public entities, sometimes even supporting perpetually-lived organisations with a clear identity separate from their original founders.

In general, this theoretical framework allows studying institutional environments in their entirety and provides a holistic way to capture both incremental and categorical institutional change along as societies move along the spectrum of fragile, basic, and mature LAOs. These concepts are further operationalised in section 3.1.

1.3. Comparative advantage of the social orders' framework

In addition to empirical evidence showing the primacy of institutions over most proximate causes of growth presented in the introduction, the case for applying the theory of social orders to study long-term development is twofold. First, the impact of other determinants, including geography, climate, and placement in the international order, is still mediated by institutions, while culture is already part of the framework. Second, the framework proposed by North, Wallis, and Weingast (2009) is more complete than alternative theories of institutions, as it simultaneously integrates their key elements as well, formulating clear holistic signposts of OAOs and LAOs. The following two sub-sections elaborate on the other theories of development and consider them against the social orders' framework.

1.3.1. Institutions vs. other explanations

One alternative driver of long-term development often dismissed in favour of institutional quality is geography. There is evidence that various features of geography have profound impact on health, productivity, and human capital, ultimately affecting institutions and economic growth. Diamond (1997) argues that institutions are largely the result of geography, as it determined the emergence of agriculture, the prevalent crops and animals, and how easily innovations or diseases could spread historically across different parts of the world. Gallup, Sachs, and Mellinger (1999) find significant effects of geographical differences on economic development via transport costs, disease burdens, and agricultural productivity. Negative impacts of geography have been particularly reported for Africa (Bloom & Sachs, 1998) and the tropical zone (Kamarck, 1976; Sachs, 2001; Masters & McMillan, 2001), as opposed to more temperate climates.

The main drawback of the geography hypothesis is that it is largely unchanging (Koyama & Rubin, 2022: 22). It cannot explain income differences over time, which is essential for a country case study. Empirical evidence indicates that institutions still impact the way in which the opportunities or constraints provided by geography are realised (Easterly & Levine, 2003; Rodrik, Subramanian & Trebbi, 2004; Michalopoulos & Papaioannou, 2014). To some extent, it is possible to change geography by, for instance, obtaining ports or resource-rich territories. Yet, the very ability to do so, either through conquest or acquisition, should probably depend on something else.

Climate is generally part of the geography hypothesis, but it does change over time, and climate variables produce significant within-country effects. Büntgen *et al.* (2011) and McCormick *et al.* (2012) highlight the association between warmer/wetter periods and the times of prosperity, and cooler/drier periods and the times of crisis in Europe during the past 2,500 years and before/after the Roman Empire. Waldinger (2022) finds that during the widely documented ‘Little Ice Age in Europe’ (1600-1850), lower temperatures negatively impacted growth through reduced agricultural productivity, also visible from higher grain prices, higher mortality, and slower urbanisation. An early 1770s case study of Switzerland and Czechia reconstructs how weather-related bad harvests increase grain prices, which then, in turn, generate social distress (Pfister & Brázdil, 2006). Cold weather is associated with more frequent conflicts, higher political instability, and even more frequent witch trials during the Renaissance (Iyigun, Nunn & Qian, 2017; Dell, Jones & Olken, 2012; Oster, 2004).

However, the political and economic impact of changing climate is still mediated by the existing institutions. Dell, Jones, and Olken (2012) focus specifically on poor countries, while the (very) long-run studies capture a higher share of historical periods when all countries were LAOs, likely insufficiently advanced to adapt to the changes using or building on existing technology. Pfister and Brázdil (2006) also highlight that the exact social outcomes of weather crises depend on the existing markets, governance, and relief opportunities. Burke, Hsiang, and Miguel (2015a; 2015b), who find an inverted U-shaped temperature-productivity relationship, particularly emphasise that the impact of exogenous shocks is determined by the ability to adapt. This clearly mirrors the concept of ‘adaptive efficiency’ that North, Wallis, and Weingast (2009) associate with OAOs. To the extent it is allowed by the data, the case study of the GDL (chapters 4-6) implements measures to control for the effect of climate change, primarily looking at existing measures in the context of Europe, which belongs to the same geographical zone and has generally experienced similar climate fluctuations.

A few researchers argue that economic outcomes are determined by external circumstances and the global division of labour, which impose constraints on internal development. The social orders’ framework has indeed received criticism for its sole focus on internal political economy (Gray, 2016). According to the dependency theory, peripheral economies are trapped in the role of commodity exporters, as they depend on external demand, price fluctuations, and price-based global competition, while high-value goods produced in the ‘centre’ are less sensitive to these circumstances (Prebisch, 1950; Singer, 1950; Frank, 1966; Cardoso & Faletto, 1979/1969). Whereas

the dependency theory primarily focuses on individual countries and Latin America, Wallerstein (1974) proposes a world-systems analysis of post-16th century global capitalism, where development similarly results from the countries' central, semi-peripheral, or peripheral economic placement. The placement itself is based on the shifting natural location of specific profitable activities fitting the global division of labour, which simultaneously influences domestic political structures. (Economic) historians have analysed the place of pre-industrial Poland and Lithuania in the European capitalist system (Malowist, 2010/1965; Žiemelis, 2006).

However, the authors focusing on the external constraints themselves provide clues how their theories can be reconciled with the theory of social orders. This is possible if one treats a country's international economic placement like geography – as an initial endowment, whose impact ultimately depends on how it is put to use or neutralised. The dependency theorists emphasise this through the promotion of import substitution as a way to escape the commodity exporter trap (Prebisch, 1950; Singer, 1950). Cardoso & Faletto (1979) argue in particular that domestic political arrangements mediate the outcome of dependency. Although his unit of analysis is the world-system, Wallerstein (1974) also argues that strong polities with high state capacity are necessary for occupying central positions and determining the global rules and regulations. Then, the theory of social orders should at least be able to explain the states' relative placements (see also chapter 2).

Finally, the literature provides a strong case in favour of culture. In general, this hypothesis holds that socially transmitted values and norms determine long-term development through shaping everyday behaviour and the actual functioning of formal institutions. Based on close historical analysis, Greif (1994; 2006) argues that culture impacts the selection of specific formal institutions, making some more viable than others depending on societies' beliefs (e.g. informal collective vs. formal third-party contract enforcement). McCloskey (2006; 2010; 2016) presents a theory claiming that modern economic growth has resulted from the spread of 'bourgeois virtues' – positive attitudes towards liberty, experimenting, and commerce, as well as increasing social status of merchants and entrepreneurs, which improve incentives for pursuing innovation. Similarly, Mokyr (2016) attributes modern European take-off to its intellectual culture that contributed to innovation through the spread of ideas, scientific inquiry, and people's willingness to explore nature. Meanwhile, Clark (2007) somewhat controversially claims that modern growth in pre-industrial England was the product of the nobility's gradual social descent, caused by its capacity to raise more children, which eventually

led to broader adoption of ‘middle-class values’, like thrift, industriousness, education, and peaceful behaviour.

Beyond these high-level theories, trust is probably the most widely studied cultural attribute. Researchers argue that a weak level of trust prevents collective action and the provision of public goods, while high societal trust enables wider cooperation beyond family networks and organisations, which lowers transaction costs (Banfield, 1958; Fukuyama, 1996). These claims are supported by empirical evidence (Guiso, Sapienza & Zingales, 2006; Algan & Cahuc, 2010; Tabellini, 2010). Other cultural traits, including attitude towards work and education, entrepreneurship, future-orientation, or individualism, are also linked to development (Gorodnichenko & Roland, 2017; Granato, Inglehart & Leblang, 1996; Jensen, 2010; Van Praag & Versloot, 2007).

The body of findings on culture is likely the reason why the theory of North, Wallis, and Weingast (2009) already incorporates its role. The authors build on Greif (2006) to explain path dependence through the formation of beliefs that, over time, make people subscribe to the existing institutions and render institutional change more difficult. The ‘bourgeois’ or any other virtues that have potentially spurred modern economic growth could be explained in the same way Rubin (2017) refutes the religion hypothesis. In pre-industrial Western Europe, growth-friendly virtues likely formed as new shared beliefs of a reconfigured elite that increasingly included people engaged in businesses. Meanwhile, generalised trust is a core element of impersonal relationships defining OAOs in contrast to LAOs. Institutions also play a strong role in the formation of cultural traits, as people try to adapt their behaviour to the existing incentives. Tabellini (2010) finds past formal institutions to influence informal institutions and cultural traits in the present. Thus, culture is part of what makes social orders represent the overall institutional environment, rather than just specific institutions.

Another culture-adjacent theory sees religion as the main determinant of prosperity, although it has been largely disproven. Weber (1905/1930) famously writes about the ‘Protestant work ethic’ and this religion’s asceticism incentivising discipline and rational enterprise. Contemporary Protestant countries indeed tend to be rich (Koyama & Rubin, 2022: 72), while Becker and Woessmann (2009) find the same tendency at the regional level studying 19th-century Prussia. However, they argue that Protestantism mainly affects growth through higher literacy and human capital, emanating from the emphasis on reading the Bible. Rubin (2017) shows that the printing press played a pivotal role in the spread of Protestantism. Where it took hold, the shift in the source of political legitimacy from religious authorities to

parliaments (often representing commercial interests) led to growth-enhancing policies in post-Reformation Europe (see also Koyama & Rubin, 2022: 73-79).

In sum, the arguments favouring other drivers of development than institutions are already incorporated or can be reconciled with the social orders' framework, introducing still more nuance, rather than making it unconvincing. Geography and climate theorists draw attention to the natural starting conditions, which, considering the institutions' mediating role, highlight the importance of adaptive efficiency for sustained development. The external forces' frameworks are the least present in the theory of social orders, but, like geography or climate, they can still be considered part of the initial endowments. Culture helps clarify the role of beliefs and informal institutions in the overall institutional environment.

1.3.2. Social orders vs. other institutional theories

Furthermore, North, Wallis, and Weingast (2009) simultaneously integrate the key concepts developed by the 'old institutional economics' school of thought and offer a more holistic approach compared to the more recent institutional theories.

'Old institutional economics' has provided several important ideas, although this school of thought has not formulated a theory that could be systematically applied to a case study. Veblen (1899, 1904) emphasises the importance of growth-oriented culture and markers of social status, as well as business strategies oriented towards long-term production, efficiency, and innovation, rather than short-term profit maximisation. Commons (1924; 1931) observes that capitalist markets can only function effectively if supported by enforceable rules, and that development depends on scaling these rules. Ayres (1944) argues specifically that growth results from 'instrumental' technology-oriented institutions overtaking the 'ceremonial' status- and privilege-based institutions. Finally, Myrdal (1957) highlights the self-reinforcing nature of economic trajectories that can only be (re)directed towards development by quality institutions. The social orders' framework captures these contributions by considering informal institutions, the legal system, (im)personal relationships, path dependence, and the 'double balance'.

Another stream of literature on how institutional quality affects long-term development highlights state capacity, although it is only part of the social orders' institutional environments. The concept of state capacity goes back at least to Weber (1919/2015), who structured it around the ability to control

violence and enforce rules. Somewhat similar to the ‘old institutional economics’ and the culture hypothesis, he argues that sustained growth requires a shift from personal to rational, rules-based administration to support impersonal markets through legal order, coordinated policy, and provision of public goods. ‘Weberianness’, representing the degree of meritocracy and availability of rewarding careers in public agencies, has been empirically linked with higher growth in developing countries (Evans & Rauch, 1999). Using the same dataset, Henderson *et al.* (2007) also find a positive effect on poverty reduction.

Besley and Persson (2009; 2010; 2011) construct a clear mechanism of long-term development, arguing that it results from the state’s continued investment in its capacity stock. If existing political institutions incentivise key decision-makers to invest in fiscal and legal capacity, these investments reinforce each other and lead to higher income through increasing availability of growth-friendly policies and better provision of public goods. Such returns induce further investment, creating a feedback loop akin to OAOs – more capable states also reduce violence and create more inclusive institutions. The positive impact of state (fiscal and administrative) capacity on long-term development and the provision of public goods is supported by empirical evidence (Dincecco & Prado, 2012; Dincecco & Katz, 2016; Acemoglu, García-Jimeno & Robinson, 2015).

While this theory is suitable for testing the ‘institutions -> development’ causality with panel datasets, it also does not consider as many dimensions of this relationship as the social orders’ framework, which is particularly important for a case study. For instance, a high level of state capacity can represent a liberal democracy as well as a capable autocracy, where the bureaucrats might primarily serve the interests of the elite and/or be part of the elite themselves (e.g., Johnson, 1982; Wade, 1990). The social orders’ framework can capture such cases through a broader set of classification, including the control of violence, political and economic access, and informal institutions. In some contexts, rather than simply reflecting ‘bad institutions’, low state capacity might help control violence (e.g., Muskett, 1997; Snyder & Duran-Martinez, 2009).

Probably the most popular institutional framework centres around the inclusivity of institutions (Acemoglu & Robinson, 2012). Similarly to OAOs, ‘inclusive’ institutions typically lead to development by promoting broad participation in the economy. They protect property rights, support the universal rule of law, rules-based political decision-making, and impersonal exchange. In contrast, ‘extractive’ institutions describe LAOs, as they are primarily designed to concentrate political power and generate rents for the

elite. Leading to weak property rights for non-elite population, selective law, and other obstacles to competition, extractive institutions suppress growth. This theory is very clear and grounded on the authors' extensive empirical work. They have studied the results of diverging colonial institutions, democratisation and regime transitions, and provided significant empirical support to the institutions' hypothesis over geography and culture (Acemoglu, Johnson & Robinson, 2001; 2002; 2005).

Nevertheless, the inclusive/extractive institutions' framework largely contains the same disadvantages. Albeit clear to operationalise, it mainly centres on the core dichotomy, whereas the social orders' framework not only outlines more types of LAOs, but, based on broader classification criteria, allows to consider the whole spectrum of intermediate or otherwise different cases. Being defined in terms of violence management, social orders also remain more suitable for explaining gradual changes or persistence of extractive institutions. Finally, the social orders' framework more explicitly models the 'institutions -> development' hypothesis through the role of organisations, connecting the overall environment to smaller changes, particularly suited to a case-level analysis.

A more recent theory of the 'narrow corridor' towards development is more holistic than the inclusive/extractive institutions' framework, considering politics on a matrix that measures the power of the state and the power of society (Acemoglu & Robinson, 2019). Political and economic development takes place when these two powers balance and constrain each other – grow within the 'narrow corridor'. An OAO-like institutional environment ('shackled Leviathan') occurs when the state is sufficiently strong to produce public goods and society is sufficiently strong to ensure that their provision is universal through the rule of law, organisation, and collective action. Importantly, this framework is more compatible with (limited) development within non-democratic environments.

Still, the state and societal power are difficult to pin down. While the relative strength of these powers is clear in case of the 'shackled Leviathan' and other types of 'Leviathans' outside the corridor (despotic – strong state, weak society; absent – weak state, strong society; paper – weak state and society), it is more difficult to interpret the middle part of the matrix. In particular, it is difficult to evaluate the institutional quality of politics within the corridor, but not yet (close to) 'shackled Leviathans', or compare different politics along a single axis. Murphy and O'Reilly (2023) operationalise the theory as a hypothesis that state/society balance leads to the improvement of both powers, but find little evidence, which *might* perhaps be due to selected measurement. The concepts of fragile, basic, and mature LAO seem more

advantageous for studying gradual development of the GDL, as they provide clear signposts of which features indicate smaller improvements, and which combinations of smaller improvements reflect categorical change.

Overall, North, Wallis, and Weingast (2009) provide a more complete theory than both the ‘old institutional economics’ and more recent literature. It is true that the holistic and endogenous nature of the social orders’ framework and less attention to formulating concrete testable predictions can be considered a disadvantage (Krul, 2018: 125-131, 229-237). Yet, the integration of various streams of literature is precisely what makes the theory capable of explaining development.

2. REVIEW OF THE SOCIAL ORDERS' EMPIRICAL LITERATURE

The fact that the social orders' framework has been widely applied using different empirical methodologies attests to its grasp of political and economic development. Quantitative studies generally focus on direct causality from institutions (key outcomes of social orders) to growth, while qualitative research pays attention to *how* institutions shape growth, their influence on political and economic incentives, and the general impact of violence management and rents. Table 2.1 summarises the studies that rely on North, Wallis, and Weingast (2009) based on the type of their methodology.

In addition to providing valuable insights for new studies, the overview of existing research exposes a few gaps. First, only a small number of qualitative case studies address historical periods before the Industrial Revolution. Second, many qualitative case studies are primarily interested in the violence management and its impact on the political system, despite North's, Wallis's, and Weingast's (2009) integration of economics into the theory. Quantitative methods are also significantly less popular among the framework's applications, with just one case study integrating econometrics (Malinowski, 2025). This paper is particularly important for understanding the history of the PLC and is discussed separately in chapter 6. While Eastern Europe is a popular region for drawing cases of LAOs, no research based on the social orders' framework has been conducted on (the Grand Duchy of) Lithuania.

Qualitative case studies comprise the most frequent application of the social orders' framework. North, Wallis, and Weingast (2009) themselves illustrate their argument by presenting several empirical examples and analysing how Britain, France, and the United States were the first to transition to OAOs. The original book was followed up by a collective volume specifically dedicated to applying the theory to developing countries (North *et al.*, 2012), ranging from a fragile LAO of DR Congo (Kaiser & Wolters, 2012) to the success story of South Korea (You, 2012). Together, the cases presented in this book confirm that in LAOs, the alternative reality without rents is violent chaos, rather than open economy, emphasising the elite's role in maintaining stability. They also show that LAOs are not static and worthy of more in-depth analysis across time, while the copycat institutions imported from OAOs do not work in the same way as in developed countries due to socio-cultural factors.

Table 2.1. Summary of empirical literature applying the theory of social orders.

Group	Paper	Country	Period
Quantitative studies	Kishtainy (2011)	multiple	19 th -20 th centuries
	Blaydes & Chaney (2013)	Western Europe & 'Muslim World'	~Medieval (7 th -15 th centuries)
	Gollwitzer Franke & Quintyn (2014)	multiple	contemporary
	Sun <i>et al.</i> (2015)	(firms in) China	contemporary
	van Bavel, Ansink, and van Besouw (2017)	formal model + multiple European	11 th -18 th centuries ^a
	Broadberry & Wallis (2017)	multiple	Medieval & modern (1270-1870)
	Kapás & Czeglédi (2018)	multiple	contemporary
	Malinowski (2025) ^b	Poland	16-18 th centuries
Qualitative studies	(chapters of) North <i>et al.</i> (2012)	multiple developing	20 th century
	Journal of Constitutional Political Economy, vol. 26(1)	Germany	19 th -20 th centuries
	East European Politics, vol. 37(1)	Eastern Europe	contemporary
	Keudel & Carbou (2021)	Ukraine	contemporary
	Shea & Jaroszewicz (2021)	Ukraine	contemporary
	Yakovlev, Sobolev & Kazun (2014)	Russia	contemporary
	Kluge & Libman (2018)	Russia	contemporary
	Kennedy (2017)	Russia	contemporary
	Yakovlev (2021)	Russia	contemporary
	Flikke (2021)	Russia	contemporary
	Schulmann & Galeotti (2021)	Russia	contemporary
	Von Holdt (2013)	South Africa	contemporary
	Byrd (2016)	Afghanistan	contemporary
	Hassan & Nazneen (2017)	Bangladesh	contemporary
	Wood (2015)	Bangladesh	contemporary
	Legiedź (2019a)	Taiwan	20 th century
	Legiedź (2019b)	Eastern Europe	contemporary
	Ademmer, Langbein & Börzel (2020)	post-Soviet states	contemporary
	Di Martino, Felice & Vasta (2019) ^c	Italy	19 th -20 th centuries
	Papaioannou & Dalrymple-Smith (2015) ^c	Nigeria	20 th -21 st centuries
	Schlueter (2014)	New Zealand & Uruguay	19 th -21 st centuries
	Esfahani & Gürakar (2014)	Iran & Türkiye	20 th -21 st centuries
	Lyne (2019)	Brazil, Chile & India	20 th century
	Zweynert (2011)	Germany	18 th -19 th centuries

Group	Paper	Country	Period
Qualitative studies on pre-industrial periods	Frankema & Masé (2014)	Haiti & Dominican Republic	late 18 th -20 th centuries
	Bogart (2017)	East India Company	17 th -18 th centuries
	Ober & Weingast (2018)	Sparta	ancient
	Herrmann-Pillath (2019)	Russia	18 th -21 st centuries
	Carugati, Ober & Weingast (2019)	Athens	ancient
	Young (2021)	Carolingian Empire	Medieval
	Malinowski (2025) ^b	Poland	16-18 th centuries
Institutional studies of pre-industrial Lithuanian economic history	-	-	-

^a van Bavel, Ansink, and van Besouw (2017) is not included among pre-industrial case studies, as the paper's main contribution is the formal model.

^b Malinowski (2025) is included twice, as it primarily applies a quantitative methodology, but also invokes the social orders' framework to yield insights to Polish economic history (see chapter 6).

^c Papaioannou and Dalrymple-Smith (2015) and Di Martino, Felice, and Vasta (2019) are classified as qualitative case studies due to their in-depth analysis of specific countries and primary reliance on descriptive statistics and correlations.

Separate from its authors, the social orders' framework has gained attention in at least two special issues of academic journals. One volume of the *Journal of Constitutional Political Economy* is dedicated to applying the theory to the 19th and 20th century developments in Germany. As highlighted in the introductory article by Webb and Zweynert (2015), this collective study also yields important insights. Wegner (2015) introduces the international sphere, arguing that competition with other countries nudged Germany towards modern capitalism in the first half of the 19th century. Grimmer-Solem (2015) notes that at the end of the 19th century, Germany achieved significant technological progress as an LAO, potentially challenging the framework's expectations in the shorter-run. Finally, arguing that interwar Weimar Germany was the first failed OAO, Reckendrees (2015) questions whether open political and economic access indeed always sustain each other.

Another special issue is published by *East European Politics*. Its contributors analyse the still-ongoing post-communist transition of the countries that have not joined the European Union (see the summary by Toshkov, Dimitrova & Börzel 2021). EU plays a prominent role in these studies, as they focus on the external influence of the EU and other actors. This collection of cases shows that outside actors have more options to undermine the transition to open access than to facilitate it, while their actions

might have unintended consequences beyond the social orders' immediate control. Legiedź (2019a) similarly observes the crucial impact of the EU and argues that the culture of 'Western values' helped some countries in the region become OAOs. Ademmer, Langbein, and Börzel (2020) focus on the instability in a group of countries caused by the temporary absence of double balance during the transition. Other case studies of the region include those concerning Ukraine (Keudel & Carbou, 2021; Shea & Jaroszewicz, 2021), while Russia has been subject to a particularly large number of analyses (Yakovlev, Sobolev & Kazun, 2014; Kluge & Libman, 2018; Kennedy, 2017; Yakovlev, 2021; Flikke, 2021; Schulmann & Galeotti, 2021).

There are also a few case studies outside collective volumes focusing on other regions. Von Holdt (2013) uncovers a situation in South Africa where elections are a platform mainly to compete for access to the state violence monopoly that helps secure economic rents. Similar unintended consequences of open access institutions are observed by Byrd (2016), who studies then-recent elections in a fragile LAO of Afghanistan. Papaioannou and Dalrymple-Smith (2015) observe that in Nigeria, pre-colonial institutional quality of its regions persisted during the colonial years, but this path dependence broke down during the general post-colonial instability. Hassan and Nazneen (2017), and Wood (2015) respectively analyse the impact of limited access logic on the development and civil society organisations in Bangladesh. Lyne (2019) argues that the necessity to generate rents for political stability according to the limited access logic was the main reason behind highly distortionary import substitution policies in the 20th-century Brazil, Chile, and India.

Describing an economically successful case, Legiedź (2019b) uses the framework to link Taiwan's democratic reforms and economic growth with security threats from China. Schlueter (2014) attributes the positive economic outcomes of New Zealand to its transition to an OAO, contrasting it with another settler economy Uruguay, which, at least until 2008, remained an LAO. Di Martino, Felice, and Vasta (2019) similarly explain Italy's regional divide, contrasting a persistent LAO in the south due to unchanging informal institutions with the gradual internalisation of open access institutions in the north. Esfahani and Gürakar (2014) attribute Türkiye's development of a more mature LAO, in part also helped by the EU, to its better economic outcomes compared to Iran. Finally, Mungiu-Pippidi *et al.* (2011) employ the framework in a large collective study of corruption. Its ten resulting lessons mainly reaffirm that what is considered 'corruption' in liberal democracies is simply how LAOs function, and that anti-corruption efforts in LAOs can only

work if they follow the limited access logic and consider the existing power dynamics.

The research presented above focuses on recent history, and beyond the mentioned special issue of the *Journal of Constitutional Political Economy*, there are only a few social orders-based papers considering earlier historic periods or a long-run perspective. Zweynert (2011) compares the early 19th century in Prussia and Southwestern Germany and finds support to the idea that political and economic access are inseparable and that monopoly on violence is a necessary condition for becoming an OAO. Frankema and Masé (2014) observe that, like in contemporary Eastern Europe, diverging outcomes of the Dominican Republic and Haiti since the late 18th-early 19th century can be explained by the interaction of their different types of LAOs and the international actors. Bogart (2017) studies the East India Company in England from 1600 to 1813 to show that in an LAO, political leadership changes can significantly impact investment simply due to the different relationships it has with the governments. Herrmann-Pillath (2019) studies property rights in Russia from the 18th century, refining the framework with Michel Foucault's ideas on power, ideas, and culture. Ober and Weingast (2018) apply the concept of LAOs to Ancient Sparta, while Carugati, Ober, and Weingast (2019) identify an open access transition in Ancient Athens based on alternative institutions to modern liberal democracies. Young (2021) stresses the possibility of openness in the pre-modern world under decentralised, yet highly hierarchical, rule in the Medieval Carolingian Empire.

Quantitative methodologies derived from the social orders' framework have been slightly more popular than pre-industrial case studies, but not nearly as popular as qualitative case studies. As van Bavel, Ansink, and van Besouw (2017) note, perhaps this is due to the abstract and holistic nature of the framework. These authors develop a formal model of LAOs which links rent appropriation with production. The model produces a high appropriation equilibrium, as despite stimulating production, lower appropriation discourages violence specialists from sticking to elite agreements. Van Bavel, Ansink, and van Besouw (2017) also introduce the distinction between top-down and bottom-up organisations, the latter of which can also, at least to some extent, act independently of the elite. Based on their model, the authors show that bottom-up organisations like guilds and self-governing towns played a crucial role in the pre-industrial development of Western Europe. These findings are important for understanding the relationship between institutional and economic development of the GDL in chapter 5.

Gollwitzer Franke and Quintyn (2014) test the social orders' framework directly, confirming that the quantitative measures of the three necessary

conditions for transitioning to an OAO – rule of law for the elite and consolidated control of the military – are associated with higher growth. Kishtainy (2011) identifies structural breaks in the 19th and 20th century relative GDP per capita to show that OAOs tend to grow in a more stable manner. Broadberry and Wallis (2017) provide further empirical support to the concept of adaptive efficiency, finding that long-run economic growth is primarily driven by lower incidence of negative shocks rather than stronger growth episodes. Meanwhile, Kapás and Czeglédi (2018) confirm empirically that in OAOs, economic freedom is essential for supporting political freedom. Also relying on structural breaks, Blaydes and Chaney (2013) show that feudal institutions were responsible for the divergence in economic outcomes between Christian and Islamic countries as early as the Middle Ages, which they deem consistent with the logic of LAOs. At the sub-national level, Sun *et al.* (2015) find that in areas of greater domestic economic openness, Chinese firms are more likely to report higher international sales and establish more foreign subsidiaries.

In sum, the literature confirms that North, Wallis, and Weingast (2009) provide a valuable tool to study institutions and development. The theory of social orders has been employed by multiple researchers, especially in case studies. However, the majority of existing case studies address recent history, primarily focus on political development, and refrain from econometric methods. As a result, this dissertation explores a new historical setting of the GDL, operationalises the framework to include the endogenous feedback between political and economic openness and incentives, and, besides the qualitative analysis of institutions, studies at least some development indicators quantitatively.

3. QUALITATIVE AND QUANTITATIVE METHODOLOGY

Despite the prevalence of existing case studies presented in the previous chapter, deriving an empirical methodology based on the social orders' framework poses a challenge, since, as mentioned, North, Wallis and Weingast (2009) do not develop clearly testable predictions. Krul (2018: 229-237) captures the holistic nature of the theory, writing that it embodies a tension between being rigorous and scientific, while including insights from other social sciences. It is therefore unsurprising that the case studies often emphasise different aspects of the framework depending on a specific setting.

The methodology implemented in this dissertation reflects an attempt to operationalise the theory in a way that would simultaneously preserve its interdisciplinarity and yield generic conclusions. The rest of this chapter describes a mixed methods approach, combining a qualitative study of LAOs with an analysis of long-term development. OAOs are less relevant for the case study of the GDL, as it remained an LAO throughout its existence, like the rest of the world before the Industrial Revolution (North, Wallis & Weingast, 2009). The evaluated institutional quality and its changes over time should generate expectations of the GDL's economic outcomes. The goal of the quantitative analysis is then to test these expectations using a collection of measures depending on the specific historical period.

3.1. Institutional analysis of limited access orders

Conceptually, the qualitative analysis is rather straightforward and consists of three steps: 1) synthesising the main research on the GDL; 2) organising these findings by their implications to the social orders' framework; 3) evaluating the GDL's institutional quality (Figure 3.1). The selection of research should not pose major problems, as priority is generally given to the leading scholars in historiography and related disciplines. Several books from the series commonly called *The Academic History of Lithuania* are used extensively as the main references (Baronas, Dubonis & Petrauskas, 2011; Kiaupienė & Petrauskas, 2009; Kiaupienė & Lukšaitė, 2013; Sliesoriūnas, 2015; Kiaupa, 2012; Kiaupa, 2018). In some cases, the studies informing the qualitative analysis are the only works on a specific topic.

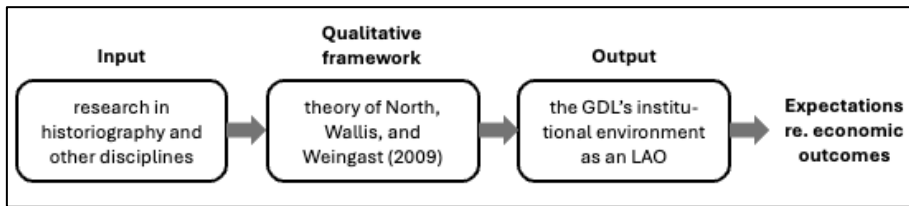


Figure 3.1. Conceptual implementation of the qualitative analysis in chapters 4-6.
Source: author.

Operationalising the theoretical framework rests on the distinction between the three ideal types of LAOs – fragile, basic, and mature (Table 3.1). On the one hand, they represent holistic institutional environments, whose various features are interrelated, and it is the combination of these features that produces political and economic incentives. On the other hand, LAOs exist on a spectrum, and disentangling their different aspects allows to capture more subtle and incremental institutional change. Following North, Wallis, and Weingast (2009: 30-106), LAOs can be evaluated according to their institutional complexity, legal system, prevalence of property rights, support of organisations, and the extent of impersonal relationships (see sub-section 1.2 for a more elaborate introduction of the ideal LAOs). Improvement in each of these five analytical categories reflects a categorical improvement in institutional quality. Increasing institutional quality should be broadly associated with better economic outcomes; thus, the overall hypothesis of the dissertation is that the GDL was the more developed, the more closely it resembled a mature LAO.

Table 3.1. Operationalisation of limited access orders.

LAO	Institutional complexity	Legal system	Property rights	Support of organisations	(Im)personality
Fragile	institutions simple and ad-hoc	no clearly-defined law, private and public inseparable	no clearly-defined property rights	only the state	only personalistic patron-client relationships
Basic	largely public law institutions, some durability	organisations governed by public law	property rights for the elite	state + orgs. Within the framework of the state	some shared beliefs among the elite
Mature	legal personality for orgs., third-party enforcement	articulated public and private law	legal protection for public and private property	orgs. Within + outside immediate control of the state	elite as an organisation of organisations

Source: author, based on North, Wallis, and Weingast (2009).

The analytical categories presented in Table 3.1 are applied in full in chapters 5 and 6, analysing the historical periods during which the GDL

changed its classification as an LAO. Chapter 4 does not strictly follow this operationalisation and is organised into slightly different sub-sections, as the GDL remained a fragile LAO throughout the whole analysed period. A deeper focus on the changes within a single category of an LAO addresses a criticism that the theory is too concerned with the differences *between* the types of societies (e.g., Polachek, 2012), whereas most other empirical studies based on North, Wallis, and Weingast (2009) also prioritise categorical changes of social orders.

3.2. Linking limited access orders with economic development

The exact strategy for evaluating the economic outcomes and their relationship with institutional development depends on available data. Lithuania fits the general tendency that the older is the historical period, the less quantitative information exists; thus, in addition to econometric methods, the dissertation relies on descriptive statistics and the findings of disciplines like archaeology and anthropology to evaluate development. Chapter 4, which analyses the 13th and 14th centuries, depends on low frequency indicators and secondary material evidence to the largest extent, although it also constructs and analyses a yearly trend of wooden castles.

From 1386, it is already possible to construct time series datasets of the number of manors and churches, and chapters 5 and 6 make the first attempt to analyse them. These datasets are used for algorithmically estimating structural breaks in the trends of construction and checking whether they correspond with qualitatively identified changes in the social orders. The results then considered in the context of other available data. The rest of this section elaborates on both the descriptive and structural breaks' approaches and presents the newly-constructed datasets on manors and churches.

3.2.1. Material evidence and descriptive statistics

Reliance on material evidence and descriptive statistics is a common way to evaluate development in historical contexts where the GDP and related indicators (e.g., agricultural productivity, prices, wages) are not available or available only intermittently. For example, Scheidel (2009) studies the Roman Empire by considering the number of shipwrecks, copper and lead pollution, consumption of meat, and body height. Baten and van Zanden (2008) relate book production to development through the formation of human capital. In their book on pre-industrial Netherlands, Prak and van Zanden (2023) also consider body height and the production of books, in addition to church

building. The presence or absence of correlation between such alternative measures and qualitatively identified changes in the Lithuanian LAO can give at least some indication whether the GDL's institutional and economic development evolved together.

In this spirit, chapter 4 considers the expansion of agriculture, population density, the evolution of crafts, and the emergence of the first Lithuanian coins. Its strongest evidence is the reconstructed trend in the density of wooden castles, which likely reflected economic expansion, as it was not correlated with the number of battles. At the same time, the expansion of the network coincided with the gradual institutional development within a fragile LAO.

Chapters 4 and 5 both consider the biological standard of living in the attempt to capture the economic outcomes of ordinary people. More specifically, they analyse health data, following multiple theoretical and empirical arguments in favour of evaluating historical development beyond the GDP estimates (e.g., Köpke & Baten, 2005; Craig, 2024).

Chapters 5 and 6 discuss the first available GDP per capita estimates, constructed using machine-learning algorithms. Koch, Stojkoski, and Hidalgo (2024) use the existing numbers in the Maddison Project Database (Bolt & van Zanden, 2024) and biographical data of famous individuals extracted from Wikipedia, additionally validating them on variables like urbanisation or urban church-building activity.

Finally, all three empirical chapters analyse town population and urbanisation. Many studies in economic history proxy economic prosperity with urbanisation or city growth (e.g., Acemoglu, Johnson & Robinson, 2002; see review by Hanlon & Heblich, 2022). The urbanisation trends are also important considering the distributional aspects of growth within the GDL, as the political dominance and property rights of the nobility from the 15th century privileged manors instead of towns. Meanwhile, van Bavel, Ansink, and van Besouw (2017) highlight the importance of generally more productive urban organisations in the contemporaneous development of Western Europe.

In sum, the shortage of direct economic measures and a diverse range of other indicators analysed in the literature justify this part of the dissertation's empirical strategy.

3.2.2. Estimation of structural breaks

The structural breaks' approach tests the relationship between institutional and economic development more directly. In general, the presence of a structural break in a time-series means that the data before and after the break

exert significantly different features, such as levels, trends, or variation. Discontinuities in economic data are usually treated as changes in the overall growth regimes. While this method cannot prove causality, statistically significant breaks at around the time of the GDL's transitions to different categories of LAOs would still point towards an association between institutional and economic development. This question remains relevant given the holistic nature of the LAO concept.

Structural breaks in the annual number of recorded manors should reflect significant economic changes, as in Lithuania, they were the main economic organisations since the 15th century (see chapter 5). In addition to hosting expensive residences, the manors engaged in agriculture, participated in markets and exports, funded churches, and developed small towns (Kiaupienė & Petrauskas, 2009: 93-95, 206). Although the manors varied in terms of their land quality, access to rivers and roads, and grain export market integration, their number must have at least loosely correlated with the size of the Lithuanian economy.

While manors may be both a cause and a consequence of institutional change, research in economic history uses buildings – especially churches – to study economic development rather commonly. Cantoni, Dittmar, and Yuchtman (2018) relate palaces, churches, and administrative buildings to fixed investments and wealth of the elite. Buringh *et al.* (2020) argue in favour of considering the construction of churches (particularly cathedrals) as a proxy of economic activity since they were usually expensive and required planning, management, and substantial labour inputs, creating economic multipliers. The authors show that church-building (in cubic metres) correlated with development indicators in pre-industrial Holland and England. Prak and van Zanden (2023) treat church-building as an index of economic activity in a detailed study of pre-industrial Netherlands. Based on the arguments of Buringh *et al.* (2020), Koch, Stojkoski, and Hidalgo (2024) use church-building activities to validate their historic GDP per capita estimations (see sub-section 5.2.4). Campbell (2008) additionally observes that the number of religious houses and parishes correlated with the size of the British and Irish economies.

In the GDL in particular, church buildings were less directly related to political aspects of the LAO. Especially since the 16th century, the nobles took over an increasing share of construction, often building churches in or around their manors (Ochmański, 1986). Thus, church-building activities should primarily reflect the financial capacity of the elite. Structural breaks' tests help to determine whether the founding of manors and church-building actually

became more or less intensive following categorical changes in the GDL's institutional environment.

Although the proposed method is not entirely causal, it is preferable over time-series regressions with institutional quality as an explanatory variable. Quantitative indicators frequently rely on subjective methodological choices and miss the nuances that can be picked up by case studies (Chang, 2011; Shirley, 2025). The qualitative analysis of the Lithuanian social orders is intended to be holistic and capture the interplay between political, economic and social institutions in terms of their generated incentives, rather than observed outcomes. Furthermore, both North, Wallis, and Weingast (2009) and this dissertation focus on long-term development and the general trends rather than yearly fluctuations and precise identification.

Structural breaks' tests are relatively common in the studies of long-term growth. Methodologies associating structural breaks in the GDP series with changes in institutions are implemented in studies like Kishtainy (2011), Blaydes and Chaney (2013), or Campos *et al.* (2020). Similar tests are used in papers on long-term growth that do not specifically focus on institutions (e.g., Wiedenhofer, Lenzen & Steinberger, 2013; Crafts & Mills, 2017).

Following the linear regression set-up with structural breaks proposed in Bai and Perron (2003), this sub-section estimates pure structural change models:

$$d_t = \mu_j + u_t, \text{ for } t = T_{j-1} + 1, \dots, T_j, \text{ where } j = 1, \dots, m + 1 \quad (1)$$

The dependent variable at time t (d_t), expressed in first differences, is the result of the mean difference characteristic to regime j (μ_j) and the error term u_t . The unknowns to be estimated are the parameters μ_j and the periods of m structural breaks at $T_1, \dots, T_m$ (separating $m+1$ growth regimes). This means that the model neither assumes the number nor the timing of the structural breaks – they are the result of the estimation. Figure 3.2 illustrates the main idea. The vertical dotted lines mark the structural breaks, whereas the horizontal dashed lines represent the average number of manors or church-building activities (μ_j) in the empirical estimations.

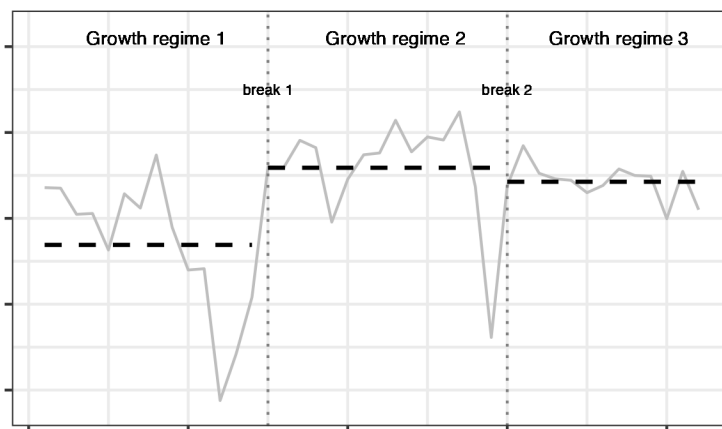


Figure 3.2. Illustration of structural breaks. Source: author.

These estimations are achieved by minimising the sum of squared residuals (SSR), for which Bai and Perron (2003) provide a dynamic programming algorithm, implemented in the ‘mbreaks’ package in R (Nguyen, Perron & Yamamoto, 2023). The algorithm first computes the SSR for each potential growth regime. Second, it determines the optimal number of breaks (m) via a series of SupF tests, sequentially checking if any possible regression with an additional break can improve the F statistic past a critical value (i.e. comparing all regressions with one break vs. the regression with 0 breaks; then, if necessary, comparing all regressions with two breaks vs. the best regression with one break, etc.). Finally, the algorithm selects the precise combination of $m+1$ growth regimes with the smallest SSR.

The package automatically imposes a trimming indicator of 0.15, making each growth regime contain at least 15% of the sample and the largest number of possible breaks equal to five. Given the modelled period of 215 years (1386-1600) in chapter 5 and 415 years (1386-1800) in chapter 6, the shortest possible growth regimes are 32 and 62 years respectively. The default trimming indicator ensures a sufficiently small number of potential breaks, while managing the risk of overvaluing very long-term trends (and their potential drivers) if shorter growth regimes are obscured. In chapter 5, 1600 is selected as an end-date to account for potentially lagged materialisation of development and/or delayed first entries of manors or churches into the historical record. However, chapter 6 stops in 1800 due to the GDL’s occupation and a strict change in the political regime.

3.2.3. Manors' dataset

The dataset used for estimating structural breaks in the number of manors is constructed from Semaškaitė (2010). The author describes more than 600 (remains of) manors in present-day Lithuania, most often including the earliest dates from which the manors were known (see Appendix A). The summary of these dates yields the total number of manors each year, which was steadily increasing. Yet, it is already evident from Figure 3.3 that the growth rate was not constant over time.

By default, the manors are assigned to the middle of their known intervals – for example, those founded ‘in the fifteenth century’ or ‘in the sixteenth century’ are assigned to 1450 and 1550. Since such cases of imprecise dating lead to clustering and impact the structural breaks, sub-sections 5.2.1 and 6.3.1 implement a robustness check, estimating the structural breaks over 10,000 simulated datasets. In these datasets, the founding dates are assigned within their known intervals randomly. The manors known from ‘the fifteenth century’ may become founded in any year from 1401 to 1500.

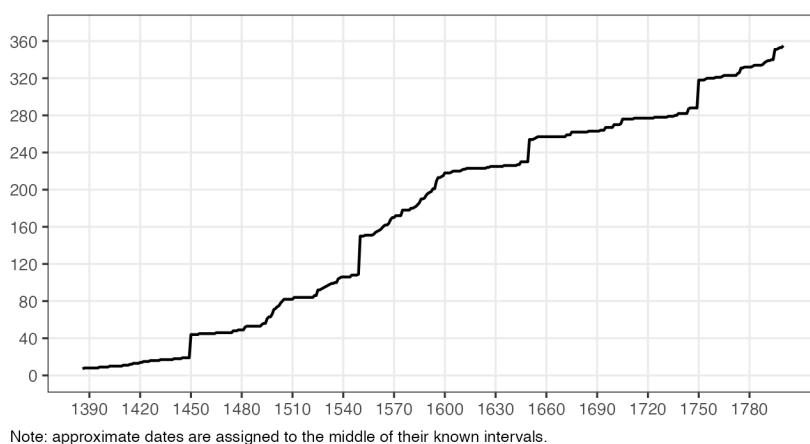


Figure 3.3. The number of known manors in present-day Lithuania. Source: author, data from Semaškaitė (2010).

Following the previous sub-section, the number of manors founded each year should capture the relative level of economic activity. At the same time, the dataset contains several limitations.

First, as Semaškaitė's (2010) descriptions are largely based on existing studies and historical sources, the known number of manors might reflect improvements in record-keeping and potentially institutions themselves, rather than expanding economy. However, given the endogeneity between

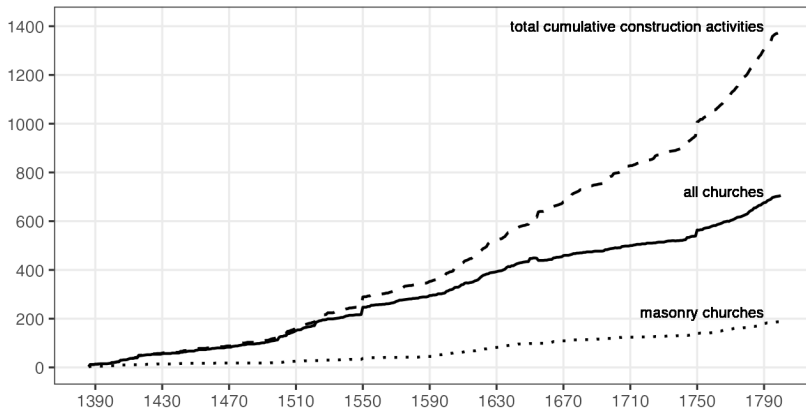
institutional and economic development, the resulting dataset remains relevant, especially in combination with other indicators.

The manors' dataset could also potentially suffer from survivor bias. According to Semaškaitė (2010), the total number of manors throughout history was close to 4,000; thus, it is possible that the owners of surviving manors were wealthier, making the data more representative of the lords, rather than the whole nobility. Nevertheless, to my knowledge, this book is the only source comprehensive enough to transform into annual data. The wealth dynamics of the core elite also remains a useful indicator of development in an LAO, especially because of the skewed land ownership.

Another obstacle to complete representativeness is the book's focus on present-day Lithuania, roughly including ethnic Lithuania and Žemaitija. Yet, limiting the geographical scope also provides an advantage, allowing to control for territorial change over time. Žemaitija was already part of the GDL before its full incorporation in the 1410s, and ethnic Lithuania was always the GDL's political and imperial centre. The manors founded in parts of modern Lithuania that were outside the GDL (mainly the Klaipėda region) are excluded from the dataset.

3.2.4. Churches' dataset

The dataset on churches is constructed in the same way as the manors' dataset. It is based on a list of over 1,000 churches of all Christian denominations, containing the dates of their first construction and subsequent rebuildings and renovations (Gimbutas, 1970; see Appendix B). Figure 3.4 depicts the evolution of the number of churches and total accumulated church-building activities. Even more so than manors, the number of church-building activities should represent the wealth of the elite and its ability to finance significant economic undertakings.



Note: approximate dates are assigned to the middle of their known intervals.

Figure 3.4. The total number of churches (solid line), the number of masonry churches (dotted line) and the number of all recorded construction activities (dashed line) in ethnic Lithuania. Source: author, data from Gimbutas (1970).

This dataset contains the same shortcomings, as it might simultaneously reflect improving record keeping, while still not covering all churches. Yet, while the specific dates of construction activities are assigned in the same way as the default founding dates of manors, the original list of churches is both larger and more precise (sections 5.2 and 6.3 detail the intervals of uncertainty depending on the time period). Regarding the dataset's geographical coverage, Gimbutas (1970: 218) specifically justifies focusing on the area of modern Lithuania for consistent comparisons over time. While his list is also likely to miss a share of the churches, it considers Lithuania at its widest 1920/23 borders, additionally including parts of Podlasie and Western Belarus.

A potential limitation exclusive to the churches' dataset may be that, unlike Buringh *et al.* (2020), it does not cover the size of the buildings. However, it does provide a split between wooden and masonry construction, capturing the scale of activities at least to some extent, in addition to technology and the cost of materials. Furthermore, Gimbutas (1970) provides a more granular record of first elevations, rebuildings, and renovations.

4. INSTITUTIONAL AND ECONOMIC DEVELOPMENT IN A FRAGILE LIMITED ACCESS ORDER OF LATE-MEDIEVAL LITHUANIA (1245-1386)

This chapter (with an adjusted introduction and minor changes) is published as:

Bureika, M. (2024). Institutions and development in a fragile limited access order of late-medieval Lithuania. *Journal of Institutional Economics*, 20(e40). <https://doi.org/10.1017/S1744137424000304>.

This chapter analyses institutional and economic development in the Grand Duchy of Lithuania (GDL) between 1245 and 1386. Although Duke Mindaugas accepted Christianity and became a king in 1253, successive coups restored paganism and resumed Lithuania's relative economic isolation. Meanwhile, the elite faced a threat from the Teutonic Order – an organisation of German knights seeking to convert Lithuanians to Christianity by conquest. The combination of inherited institutions, internal instability and external circumstances incentivised the elite to profit from organised violence, including expansion into Rus'. Its elite was internally unstable and bound by violence-based privileges, while inherited informal institutions could not support complex political, religious, or economic structures.

Late-medieval Lithuania provides an interesting case, as it still achieved some progress despite remaining a fragile LAO and lagging behind much of Europe. This progress illustrates that LAOs are situated along a continuous spectrum. While most empirical applications of the conceptual framework highlight changes between different categories of social orders, this paper focuses on developments within a single category, considering that categorisation is one of the criticisms of North, Wallis and Weingast (2009) (e.g., Polachek, 2012). Moreover, exclusive focus on a fragile LAO allows illustrating that changes in institutions, especially informal ones, can result from an incremental process as much as from a discrete switch between regimes.

The Lithuanian elite became somewhat more stable with the restriction of ruling privileges to the grand duke's family and the integration into the nobility of rival dukes, whose privileges became tied with loyalty to the core elite. The nobles became key figures in warfare and the emerging administration, eventually obtaining hereditary property rights. Further incentives for productive activity developed as the elite sought to finance its resistance against the Teutonic Order by accommodating Christian settlers and expanding trade and crafts. Following the conceptual framework, identified

changes in the social order raise a hypothesis that they should be followed by improving economic outcomes. Indeed, institutional development coincided with economic growth at the extensive margin, reflected by expanding agriculture, urbanisation, an increasing number of castles and the appearance of Lithuanian coins. However, as also expected from fragile LAOs, health data does not show increases in average living standards, potentially due to population growth and inequality.

4.1. General history of Lithuania (~1245-1386)

Lithuanian lands began attracting more attention in the chronicles of their neighbours in the 13th century, mostly in the context of battles (Kiaupa, Kiaupienė & Kuncevičius, 2000).¹ A treaty with the Principality of Volhynia was signed in 1219 by 21 Lithuanian dukes, either representing their lands directly or representing ruling families associated with these lands. The Lithuanian lands, often separated by ancient forests and swamps, functioned like small chiefdoms, whose dukes mainly profited from collecting taxes and organising raids into other territories. Foreign campaigns, occasional confrontations with the Golden Horde and the arrival of the Teutonic Order incentivised the Lithuanian dukes to join their lands into a confederation.

A state emerged after Mindaugas consolidated his power over rival dukes. His domain was located in Lietuva – the largest ethnic Lithuanian land between the rivers Nemunas and Neris, which gave the name to the Grand Duchy (Figure 4.1). While the shortage of historical sources somewhat obscures his assumption of power, Mindaugas was already called ‘the highest king’ in about 1245 and, at least loosely, controlled all of ethnic Lithuania. He also controlled the Black Rus’ and exerted significant influence over the Principality of Polotsk.

In 1253, Mindaugas reached a deal with the Teutonic Order to receive baptism and be crowned by the Pope in exchange for a large part of Žemaitija and parts of close Baltic lands that were not yet under his full control. Conversion to Christianity and failed military campaigns in Rus’ caused discontent among the Lithuanian elite, which at first pressured Mindaugas to renew the war against the Order, before eventually killing him in 1263. Mindaugas was replaced by Treniota, who was soon killed himself by the former king’s loyalists. In 1267, Mindaugas’ only surviving son Vaišelga entrusted the throne to his cousin-in-law, the Duke of Halych Shvarno.

¹ This book is used as the main source of Lithuania’s general history throughout this section.

Shvarno's rule was brief and not well-documented – he died in his homeland in 1269. The next grand duke Traidenis firmly re-established Lithuania's paganism.

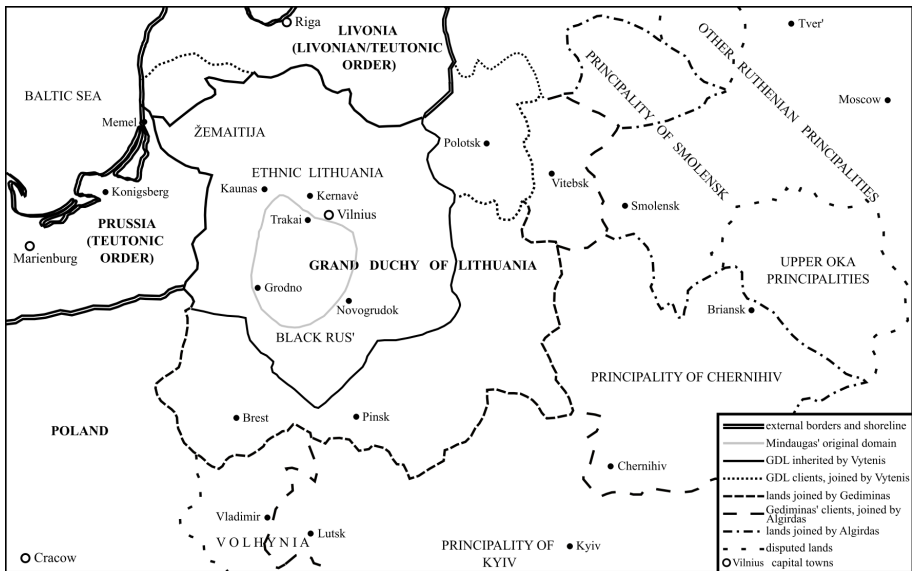


Figure 4.1. Map of the GDL in ~1245-1386. Source: author's reproduction based on Kiaupa, Kiaupienė & Kuncevičius (2000: 83, 58).

Traidenis died under obscure circumstances in 1282, followed by the similarly brief and poorly documented reigns of Daumantas, Butigeidis, and Pukuveras, during which the conflict with the Teutonic Order escalated. Nevertheless, the period marked the birth of a ruling dynasty, as Butigeidis and Pukuveras belonged to the same family. Pukuveras was succeeded by his son Vytenis, who ruled without interruption until 1316, successfully resisting the Germans and expanding into Rus'. Vytenis was followed by his brother Gediminas. He is considered the proper founder of the ruling dynasty since he fully consolidated his power within ethnic Lithuania and solidified the clan's superiority over other aristocrats. Gediminas died in 1341, leaving the throne to his son Jaunutis. Previously undistinguished, Jaunutis was quickly overthrown by his older brothers Algirdas and Kęstutis in anticipation of a Teutonic attack.

Algirdas became the grand duke in 1345 with the full support of the elite. Until about 1362, the Teutonic Order suffered from the Black Death, and Lithuania further expanded its Ruthenian territories. However, the Germans recovered and reached ever deeper into Lithuania, while other conflicts – with the Principality of Moscow in northeastern Rus' and with Poland in Volhynia – increasingly strained Lithuanian resources. Thus, in 1377, Jogaila (Jagiełło)

succeeded his father in a difficult situation, which he sought to resolve by considering conversion to Christianity. He signed a secret treaty with the Order that did not protect the lands of Kęstutis, prompting Kęstutis to oust him in 1381. Nevertheless, the consensus among the elite shifted towards ending the war, and Jogaila, backed by the Order and the citizens of Vilnius, returned to power in the next year.

Jogaila signed three further agreements with the Order, committing to adopt Christianity and give up a significant portion of Žemaitija. Yet, he did not ratify the documents, while Kęstutis' son Vytautas, who had escaped from captivity to Prussia, submitted to Jogaila in 1384. Jogaila and Vytautas feared that receiving Christianity from the Teutonic Order would threaten their sovereignty. Accepting Moscow's proposal to baptise Lithuania as Orthodox would have not only failed to end German aggression, but also removed the key distinction of the Lithuanian elite from the nobility in Rus'. The best option was accepting Christianity from Poland, which was Catholic and could provide military support. Furthermore, Poland searched for a new king, tempting Jogaila to fulfil his dynastic ambitions. Thus, the earliest period of the GDL's history ended with a dynastic union that Jogaila established in 1386.

4.2. Limited access order in late-medieval Grand Duchy of Lithuania

The reasons why late-medieval Lithuania was a fragile LAO are succinctly captured in a quote from Baronas, Dubonis, and Petrauskas (2011):

The early monarchy functioned not as a territorial state governed by institutions, but as a political entity based on personal relationships. The existence of such an entity required the elite to be directly tied by subordination, loyalty and friendship, while the political stability could be destroyed by the death of any specific ruler (300; author's translation).

Lithuania's categorisation as a fragile LAO is also evident from its history presented in the previous section. But stopping here would miss the conceptual framework's endogeneity.

The theory proposed by North, Wallis, and Weingast, (2009) encourages asking: why the fragile LAO in Lithuania functioned the way it did? Was there any institutional change? What economic incentives did the social order generate? (How) did these incentives feed back to institutions? To answer these questions, the application of the conceptual framework is organised into four themes, including the GDL's elite and its political, religious, and economic institutions. Organising the analysis thematically helps to make the

most of the limited factual information and capture the incrementality of the changes.

4.2.1. Elite

The main feature defining Lithuania as a fragile LAO was the instability of its elite. In the 1240s, the elite accepted Mindaugas' superiority, but it was loosely knit and consisted of competing princely dukes (Baronas, Dubonis & Petrauskas, 2011: 313-315). Their main rents resulted from ruling privileges and provided tax revenue, income from trade and military resources. Rents from Ruthenian territories were particularly important due to their initial economic superiority and existing traditions of paying tributes (Łowmiański, 1932: 328-370; Norkus, 2018: 334-370; Baronas, Dubonis & Petrauskas, 2011: 363). Mindaugas sought to build trust in the elite through personal ties – Daumantas of Nalšia married Mindaugas' sister-in-law, while Lengvenis, also of Nalšia, and Treniota of Žemaitija were nephews on his sister's side (Baronas, Dubonis & Petrauskas, 2011: 245-251; Jankauskas, 2015). Mindaugas' nephew on his brother's side Tautvilas was forgiven for mutiny and allowed to rule Polotsk. His son Vaišelga ruled the Black Rus' from Novogrudok.

Yet, this can barely be called Mindaugas' elite – the power and privileges of the regional dukes were not granted by the monarch, but stemmed from their families' independent authority in the lands of the Grand Duchy. Daumantas, Lengvenis, and Treniota inherited their positions from their fathers. Even including the three mentioned dukes, Mindaugas' family directly ruled fewer than half of the GDL's regions (Bumblauskas, 2005: 37). Therefore, Mindaugas' hold on power was limited, and pressure from the Teutonic Order meant that family ties did not prevent Daumantas and Treniota from organising the coup of 1263.

Ruling privileges retained their primary importance throughout the analysed period. Nevertheless, Mindaugas started the consolidation of power, continued by his successors, that eventually improved leadership stability by shifting the source of privileges to membership of the elite. Mindaugas forced the brothers Dučius, Milgerynas and Gineika to flee Nalšia, killed the Bulionis brothers from Šiauliai, and is alleged in the sources to have killed two pairs of unnamed cousins and nephews (Baranauskas, 2000: 206-207; Baronas, Dubonis & Petrauskas, 2011: 43). The dukes of Nalšia and Deltuva disappeared from the historical record as independent leaders following Vaišelga's revenge for his father's death, and in Žemaitija, no powerful dukes emerged to succeed Vykintas and Erdvilas (Baronas, Dubonis & Petrauskas,

2011: 43-47, 306). Even if some lands were not integrated as easily, regional dukes ceased to rival monarchs soon after the reign of Mindaugas.

Jankauskas (2015) notes that due to internal fights and warfare, the number of regional dukes in ethnic Lithuania significantly declined by the time Gediminas assumed power. Gediminas is generally recognised as the first grand duke to fully consolidate his authority. His supremacy was no longer questioned by anyone inside the GDL – other dukes acknowledged castle building, the settlement of empty territories and establishment of administrative units as his exclusive privileges (Baronas, Dubonis & Petrauskas, 2011: 282-283). Gediminas also received support from foreign allies (often secured through marriages of his daughters), and positioned himself as the natural ruler of the whole Grand Duchy in treaties and letters to Western European towns (Baronas, Dubonis & Petrauskas, 2011: 337-348; Rowell, 1994: 87-94). Internationally, Gediminas was recognised as equal to Christian princes (Rowell, 1994: 59-65).

Gediminas established the ruling dynasty because, unlike Mindaugas, he concentrated the ruling privileges within his family (Baronas, Dubonis & Petrauskas, 2011: 334-341). He was not only no longer challenged by the regional dukes, but also managed to distribute rents among his sons in a way that left them satisfied (Rowell, 1994: 236-237). Elite stability was among the reasons prompting Gediminas to divide ethnic Lithuania into the duchies of Vilnius and Trakai, the latter of which was held by an unknown family member before Kęstutis was appointed in 1337 (*Ibid.*: 66-69). Increasing Lithuanian presence in Rus' further expanded the ruling privileges available to Gediminids – almost all family members controlled Ruthenian lands (Baronas, Dubonis & Petrauskas, 2011: 334-358). Algirdas ruled Vitebsk; Narimantas held Polotsk, Pinsk, and Grodno; Karijotas ruled Novogrudok; Liubartas obtained Lutsk and Vladimir. Kyiv was similarly held by Gediminas' brother Teodoras. Ruthenian principalities were typically granted to married sons, distancing them from the Lithuanian aristocrats and weakening their claims to the throne. As Rowell (1994: 293) notes, the Gediminid elite was both sufficiently large to secure extensive rents in Rus' and sufficiently small to share them.

The nature of rents from military activities also changed. Initially, the integration of the regional dukes' armies into a structure subject to the grand duke was key for state-building (Baronas, Dubonis & Petrauskas, 2011: 313-315). Private armies still engaged in independent raids, as with Lengvenis' men in Livonia and Volhynia, but they could be relied upon during wars and strategic campaigns. Gediminas further expanded this practice by contracting the Lithuanian armies to neighbours that also fought the Teutonic Order,

including Poland, Riga, Pskov, and Novgorod (Rowell, 1994: 229-262). Foreign contracts helped to maintain good relations with other princes and ensure the soldiers' battle-readiness, while the Lithuanian dukes benefited from the spoils of war, including slaves.

Military activities remained a significant privilege, but became largely restricted to the Gediminid family and less critical for the regional dukes. In the second half of the 14th century, the regional dukes were noticeably less capable than in the mid-13th century (Jankauskas, 2015). Because the monarch needed to sign off on military campaigns, the armies of the regional dukes had become significantly weaker, if not obsolete, with their best-equipped regiments primarily convened for defence. Their independent activities became mostly confined to small-scale raids in the border territories and along trade routes.

Under Vytenis and Gediminas, regional dukes were gradually rewarded with administrative privileges and became heads of newly created districts around castles and estates (Jankauskas, 2015; Baronas, Dubonis & Petrauskas, 2011: 307-313; Petrauskas, 2002). The monarchs entrusted regional dukes to enforce their will, as they already possessed local personal networks. Additionally, the hold of important defensive castles was crucial for Gediminas' consolidation of power (Rowell, 1994: 59-61). Besides providing tax revenue and improving the grand duke's violence capacity, castles and estates generated rents that could be distributed to the regional dukes. As the district elders (castellans) likely already had family property rights, their positions could become hereditary (Baronas, Dubonis & Petrauskas, 2011: 311). Thus, the changing role of regional dukes contributed to the emergence of the nobility – a layer of the elite under the ruling family (Bumblauskas, 2005: 84-90; Rowell, 1994: 293).

District elders reduced the extent of the grand duke's itinerant rule, also reducing the demand for armed escorts (Baronas, Dubonis & Petrauskas, 2011: 258-259). This change eventually created another class of nobles. Starting from Gediminas, the monarchs began granting their escorts hereditary land to facilitate their preparations for war (Bumblauskas, 2005: 84). The lesser nobility emerged gradually through informal relationships during the 14th century, and war service was recognised as the nobility's formal distinction by Jogaila in 1387. The lesser nobility also included Ruthenians, who participated in military activities and whose support remained indispensable to their local Gediminid dukes (Rowell, 1994: 294-302). Yet, they remained outside the GDL's core elite since leading administrative positions in ethnic Lithuania were mostly occupied by locals, and Jogaila

formally recognised only the rights of Catholics as an incentive to conversion (Rowell, 1994: 291-295; Frost, 2015: 68).

Overall, there was an important difference in the Lithuanian elite on the eve of Jogaila's coronation in Poland, compared to the reign of Mindaugas. Although the elite was still bound by rents from ruling separate regions of the GDL, these privileges were now granted by the monarch to the dukes of the Gediminid dynasty, rather than the regional dukes whose power had originated outside the elite. Rents from military campaigns retained their importance only for the core elite. Regional dukes evolved into enforcers of the grand duke's will as local administrators, strengthening his position together with the lesser nobility. Despite the concentration of the ruling privileges in Gediminas' family, the emergence of both layers of nobility broadened the elite. The ruling dynasty distributed more privileges, including administrative positions and property rights, to more people and enjoyed broader support. The elite expanded from a single class of regional dukes to three classes of the ruling dynasty, the district elders and the lesser nobility.

These changes made the elite more stable, and fights for supreme power were increasingly contained within the ruling clan (Table 4.1). Leaving aside the conflict between Jogaila and Kęstutis and Jogaila's second tenure, the average uninterrupted rule of the Gediminids was 49 years (37 starting from Gediminas), compared to about 8 years before their ascension. Under the Gediminid dynasty, even forced leadership transitions were resolved more peacefully, as no overthrown leader was killed or left uncompensated. Algirdas allowed Jaunutis to rule the small Principality of Izyaslavl (Baronas, Dubonis & Petrauskas, 2011: 465). In 1381, Kęstutis installed Jogaila in Vitebsk, which he considered to be Jogaila's patrimony (*Ibid.*: 537). Only Kęstutis himself died in captivity during the counter-coup, although there is no clear evidence that he was killed (Kiaupa, Kiaupienė & Kuncevičius, 2000: 121).

Table 4.1. Leadership (in)stability in the 13th-14th century GDL.

Period	Ruler	Continuous tenure	Succeeded by	Violent exit?	Gediminid dynasty
1240s-1263	Mindaugas	~20	rival	+	
1263-1269	Treniota/Vaišelga/Shvarno ^a	2/3/2	rival/cousin-in-law/?	+	
1269-1282	Traidenis	13	?	?	
1282-1295	Daumantas/Butigeidis/ Pukuveras		son/brother/ son	?/-/-	
1295-1316	Vytenis	63	brother	-	
1316-1341	Gediminas		son	-	
1341-1345	Jaunutis		[brother]	[+]	
1345-1377	Algirdas	35	son	-	
1377-1380	Jogaila		[uncle]	[+]	
1380-1382	Kęstutis	2	[nephew]	[+]?	
1382(1392) -1430	Jogaila (Vytautas)	48	Jogaila's brother	-	

^a Two lines include multiple dukes due to their brief and poorly documented tenures.

^b [+] refers to transitions within the ruling family, where the losing rivals survived and were compensated.

Source: author's analysis.

4.2.2. Political institutions and structures

Despite improving elite stability, Lithuania's organisational and institutional structure remained weak. The monopoly on violence was not achieved even in the 1380s. The Teutonic Order posed an external challenge to the elite, also making it more difficult to consolidate power in Žemaitija, where the local dukes retained autonomy and Lithuanian castles were not fully integrated into the administrative network (Baronas, Dubonis & Petrauskas, 2011: 45-47). The hold on Ruthenian territories was equally soft – Norkus (2007) argues that Lithuania was able to capture them primarily due to the power vacuum left by the Golden Horde's invasions. Besides collecting taxes and sourcing craftsmen, traders, and warriors, the Lithuanian dukes did not interfere in the daily life of the locals, and the Ruthenian nobility retained a significant influence (Rowell, 1994: 294-302). Multiple dukes themselves converted to Orthodox Christianity, which had been present in the region for centuries.

The GDL's political institutions remained simple, including the emerging administration. There was no division of administrative labour or defined positions, except for the district elders who were responsible for organising defensive activities and distributing justice (Baronas, Dubonis & Petrauskas, 2011: 307-313). However, since law was exercised primarily through tradition, the elders remained illiterate (*Ibid.*: 331). Reliance on patron-client

networks also meant a decentralised tax system based on norms that had developed differently according to context-specific needs (*Ibid.*: 369-370). In the Ruthenian territories, at least some taxes and services were inherited from the Kyivan Rus', while in Lithuania, the obligations could differ between families of similar status. Žemaitija was no different in largely preserving its separate customs and faced lower taxation in return for military service (Norkus, 2018: 357-358).

No formal institutions existed even to manage leadership succession. Despite papal sanction, Mindaugas' plan to pass the crown to his son failed following his violent removal (Bumblauskas, 2005: 40). Although later rulers, starting with Pukveras, inherited their positions from brothers or fathers, clear rules of succession did not develop. The elite did not practise the primogeniture common elsewhere in Europe (Baronas, Dubonis & Petrauskas, 2011: 354). Without institutions ensuring the nomination of a ready candidate, succession rested on the leaders' personal choices. Gediminas considered Jaunutis a compromise candidate, while Jogaila was also not particularly powerful and relatively unknown to chroniclers before his ascent (Rowell, 1994: 281-283; Baronas, Dubonis & Petrauskas, 2011: 354). Even if the Gediminids managed to resolve conflicts within the family, designating successors by ad-hoc decisions made them more vulnerable.

The only political institution already present in the 13th century was an informal council that provided a forum for the grand duke to consider the opinions of the core elite and the nobility (Petrauskas, 2005a; 2005b). The grand duke's council evolved from tribal gatherings, supplementing the ruler's travels throughout the Grand Duchy, and gradually became more important with the development of castles, estates, and a permanent capital. Although the exact power dynamic between the grand duke and other members of the elite is somewhat unclear due to the confidentiality of the meetings, many pivotal decisions were likely made inside the council (Petrauskas, 2005a). Throughout the analysed period, the council remained largely unchanged, while its informal nature and composition based on personal relationships made it less sophisticated than Western European parliaments of the time (Petrauskas, 2005b). Nevertheless, it provided at least some structure to elite relationships.

A few changes also improved the GDL's fragile institutional environment. The most important one was that by concentrating the ruling privileges inside his family, Gediminas restricted the pool of potential successors. Unquestionable support for the dynasty became the unifying feature of the elite since it reduced uncertainty and provided continuity to the GDL as the property of a specific clan. The Gediminid dynasty became synonymous with

the state structure, thereby representing an informal institution in itself. With the clan retaining power throughout the 14th century, Gediminid dukes increasingly used common symbols (Baronas, Dubonis & Petrauskas, 2011: 353-355). Gediminas claimed to have been appointed by God (Rowell, 1994: 65), signalling a qualitative change in the understanding of the grand duke's role and implying legal authority, specifically to assign titles to lesser dukes. Following its de facto role, the ruling dynasty was cemented as an institution in Jogaila's formal privilege of 1387, where he emerged as the supreme owner of the GDL in public law, with the nobles obtaining the right to their patrimonies only by the permission of the grand duke (Baronas, Dubonis & Petrauskas, 2011: 282-283). The nobility thus became personally invested in the Gediminids retaining their power.

Gediminas further improved the state's administrative structure by establishing a permanent capital. While Mindaugas constantly travelled to collect taxes and impose his rule through physical presence, Traidenis was the first grand duke to have a more regular residence in Kernavė (Baronas, Dubonis & Petrauskas, 2011: 322-327). The town's expansion improved his security and created a place for the concentration of economic resources, but Kernavė would be somewhat sidelined by Vilnius. Initially a village, Vilnius was purposefully developed in the 1290s to strengthen the power of Pukuveras and Vytenis (Girlevičius, 2016). Gediminas built two castles in the town, and in 1323, it already appeared in his letters to Western Europe as the capital (Rowell, 1994: 72). Inheriting the capital as their personal domain should have given future leaders a stronger hold on power.

A permanent capital likely contributed to the introduction of new taxes, such as tithes, that appeared with emerging administration (Gudavičius, 2002; Baronas, Dubonis & Petrauskas, 2011: 258). Throughout the 14th century, the network of castles and estates, originally important for housing the travelling monarchs, expanded significantly (Baronas, Dubonis & Petrauskas, 2011: 43-47, 367-369). With the integration of regional dukes into the nobility, a permanent capital made space for the castles and estates to start shaping regional centres and become the main places for collecting taxes and organising labour and war duties. These functions, as well as their defensive potential, made castles and estates akin to the *villae regis* of early-medieval kingdoms in England (Rowell, 1994: 59-61). Albeit decentralised, simple and informal, the emerging administration marked an improvement in comparison to the 13th century.

In sum, the Lithuanian elite achieved greater stability not simply because the Gediminids defeated their rivals, withstood the Teutonic attacks and resolved the leadership turnover. Greater stability was also the result of

institutional change. With the changing nature of the ruling privileges, the state's organisational structure rested on the ruling dynasty, and in the context of customary law, the acceptance of the clan's rule became a central political institution. As the rents resulting from administration, military service, and property rights were granted by the ruling family, the nobility developed an increasing interest in the Gediminids remaining in power.

4.2.3. Religion

Paganism differentiated Lithuania from the rest of Europe and provided a pretext for the Teutonic crusades. However, it was a necessary condition for the grand dukes' legitimacy.² Regional dukes opposed Mindaugas' baptism, which may have itself been aimed at receiving support from Livonia in internal fights (Kiaupa, Kiaupienė & Kuncevičius, 2000: 59-60). Traidenis' return to paganism and the reluctance of later leaders to baptise reflect the elite's traditional preferences. Žemaitija, already autonomous, was even more staunchly pagan, and baptism would have blurred the key difference between Lithuania and the Teutonic Order. For a long time, the net benefits of Christianity were unclear, while the Church would have required separate taxes, likely coming at the expense of the elite's income (Jurginis, 1978: 18-20). Furthermore, with multiple territories in Rus' still up for grabs, it was easier for pagan dukes to baptise as Orthodox and obtain local legitimacy than would have been the case if they were Catholic (Frost, 2015: 24-25).

However, the pagan religion could not support the grand dukes in their consolidation of power or distribution of rents (Rowell, 1994: 118-148; Laužikas, 2013a). In the absence of written culture, paganism was decentralised and not inherently conducive to a common authority or ideology. The GDL's Ruthenian regions and Žemaitija therefore retained their cultural distinctiveness. In contrast to Christianity, paganism could not provide public goods like education and healthcare or run monasteries that might have increased rents. There were attempts to centralise paganism, although as Bumblauskas (2005: 94) implies, Lithuania first needed state structures to be able to maintain the clergy. As a fragile LAO, Lithuania was unable to support a religious organisation. Yet, paganism also did not create a path dependence that would have prevented the elite's transition to Christianity once the structure of rents and external circumstances changed.

² See Rubin (2017) on how religion-based political legitimacy impacted economic incentives throughout history.

The LAO became organised around the Gediminid dynasty, which gradually replaced religion as the source of leadership legitimacy. The elite could now use religion more instrumentally. From at least the time of Gediminas, the grand dukes were increasingly interested in Christianity, which was necessary for improving trade and the capacity of local crafts. Ongoing war with the Teutonic Order required additional sources of income and high-quality defence infrastructure. Western Europeans were banned from trading with pagans, while the required expertise in crafts was sought from skilled Christian settlers (Rowell, 1994: 189-207). Vytenis had already invited Franciscan friars to preside over a Catholic church in Novogrudok to improve his relationship with Western Europe and serve German merchants (*Ibid.*: 58). By the time Gediminas built a central pagan shrine in Vilnius, three Christian churches had already been constructed for German and Ruthenian immigrants (*Ibid.*: 65).

Paganism and Christianity co-existed until the benefits of Christianity became more important for the elite's survival. The grand dukes initially hesitated to baptise as they could use Christianity to their advantage without accepting the religion for themselves (*Ibid.*: 197-228). Bumblauskas (2005: 124) argues that every Lithuanian ruler tried to convert: not only Mindaugas, but also Vytenis in 1298, Gediminas in 1323 and 1343, and Algirdas and Kęstutis in 1349, 1351, 1358 and 1373. However, it is debatable whether these attempts were genuine – grand dukes repeatedly reneged on their promises after receiving their sought-after diplomatic concessions (Baronas, 2019). The 1380s disturbed this balance – the increasingly difficult war against the Teutonic Order required additional resources, while further conquests in Rus' were unlikely due to emergent Moscow and the declining number of Gediminid dukes (Frost, 2015: 24-25). Thus, Jogaila chose the union with Poland.

While the grand dukes in the 13th century could not abandon paganism if they wished to remain in power, Jogaila received support for his move. Vytautas and Jogaila's brothers who had not inherited Ruthenian principalities – Vygantas, Karigaila, and Švitrigaila – quickly switched to Catholicism (Frost, 2015: 4). They could only expect rents if the Lithuanian elite survived. The nobility likely supported the second attempt at baptism for similar reasons. Given that the nobles no longer profited from the military economy as they had in the 13th century, they expected to receive the same rights possessed by their Polish counterparts as a result of Jogaila's coronation. Indeed, the formal privilege of 1387 granted at least similar rights, including free and hereditary disposition of land in exchange for taxes and military service (Baronas, Dubonis & Petrauskas, 2011: 282-283).

4.2.4. Economic institutions

Formal extension of property rights to the nobility in 1387 responded to an existing demand. Yet, as violence-based rents remained significant, this demand took long to coalesce. The key economic institution in late-medieval Lithuania was the allod – family-owned property rights, established in customary law (Baronas, Dubonis & Petrauskas, 2011: 251, 273). Allods were common in early Central European states, and in contrast to Eastern Slavic territories, allods allowed peasants to retain their farms (Babinskas, 2022; Baronas, Dubonis & Petrauskas, 2011: 255-257). Peasants working their own land led to only small-scale agriculture and weak incentives for its expansion for the elite (Babinskas, 2022; Baronas, Dubonis & Petrauskas, 2011: 367-368). In the 13th century especially, violence-based rents incentivised the elite to primarily focus on the war economy. Paganism also did not encourage the broader societal trust and impersonal relationships necessary for gathering into organisations (Laužikas, 2013a).

The peasants' farms were dedicated to personal consumption, and agriculture was generally unproductive (Baronas, Dubonis & Petrauskas, 2011: 97-99, 134). Its primary organisational system was shifting cultivation, while crop rotation was irregular (Šalčius, 1998: 15-17; Baronas, Dubonis & Petrauskas, 2011: 121-123). As the case of Dubingiai in Eastern Lithuania illustrates, further obstacles to crop rotation resulted from the elite's inability to prevent the violent campaigns of the Teutonic Order (Laužikas, 2013b). Besides contributing to the instability of the local population, the invaders stole cattle, and peasants could not save up for better tools like iron ploughs. Furthermore, patron-client networks were not universal and based on different local traditions (Baronas, Dubonis & Petrauskas, 2011: 273-284). While peasants paid various in-kind taxes, donated gifts, and gathered for large activities (like building castles, roads, and bridges), they were not generally obliged to carry out services in nobility-owned lands. For instance, rather than working in manors, peasants often made up the nobles' protective entourages (*Ibid.*: 248).

Incentives for non-agricultural activity were similarly limited. Initially, Lithuanian merchants depended on the elite, mostly fulfilling its orders (Baronas, Dubonis & Petrauskas, 2011: 261). The elite was more interested in the organisation of violence. Its armed bandits regularly marched into neighbouring lands and attacked merchants on commercial roads at least since the late 12th century (*Ibid.*: 267-268, 138-140). Particularly profitable was the export of slaves, who were sourced by capturing peasants during the raids. Many independent gangs existed as well, and the elite tolerated them as long

as they did not directly act against the elite's interests (*Ibid.*: 267-273). The elite was reluctant to limit the activities of independent bandits fearing that they might opt for the protection of the Teutonic Order. Instead, the Lithuanian elite protected the gangs itself and benefited when they raided Prussia or Livonia. This way, the elite prioritised its own security over the general control of violence and commerce.

Like political development, changes in economic incentives were related to the consolidation of ruling privileges and the emergence of the nobility. While allodial land belonged to the family and tenured land was granted only for a limited time, the nobles naturally sought to maximise its exploitation without much regard for preserving quality (Machovenko, 2011). The gradual introduction of hereditary property rights to district elders and the lesser nobility in the 14th century allowed them to accumulate land. This made it possible to engage in larger-scale agriculture and acquire rents from more productive activities. Rents from the manor economy started appearing at the end of the 14th century – around the time when Jogaila formally established the property rights of the nobility in public law in 1387 (Baronas, Dubonis & Petrauskas, 2011: 284-286).

The redefinition of property rights according to political hierarchy increased access to land for those who had access to other resources required for its development. Early feudal relationships with peasants emerged as some became serfs by pawning their farms following events like natural disasters or bankruptcy (Bumblauskas, 2005: 90). The presence and protection of the nobility improved the peasants' food and personal security, while farms around castles and estates could achieve at least some specialisation, distributing peasants among activities such as forestry, beekeeping, fishing, or horsekeeping (Baronas, Dubonis & Petrauskas, 2011: 126-127, 256-258).

Banditry became an obstacle to commerce as it conflicted with Gediminas' plans to modernise Vilnius and attract skilled colonists (Baronas, Dubonis & Petrauskas, 2011: 270). In the 14th century, Lithuania signed at least five treaties with both branches of the Teutonic Order that granted security to travelling merchants (Mažeika, 1994). In the treaty of 1338, Lithuanian merchants were considered equal to Germans and Ruthenians, although there were also mentions of merchants still belonging to Gediminas and his elite (Baronas, Dubonis & Petrauskas, 2011: 262). At the same time, the promises of protection made in 1338 were weaker than those in 1323, signalling a non-trivial influence of the bandits (*Ibid.*: 271-272). Attempts to facilitate trade are again present in the 1367 treaty, where gangs were explicitly prohibited from travelling through areas designated safe to Livonian merchants, as enforced

by the local nobility. Mažeika (1994) finds it possible that the trade with the Order, in fact, significantly financed the war.

The evolution of crafts also reflects the elite's political goals and changing institutional environment. Demand for craftsmen increased with the necessity to build masonry castles and Gediminas' efforts to establish Vilnius as a permanent capital (Kiaupa, Kiaupienė & Kuncevičius, 2000: 78-79). Traces of the life and work of craftsmen are mostly found in and around major castles, where local production complemented imports and direct orders from towns like Riga (Baronas, Dubonis & Petrauskas, 2011: 264-265, 129-131). Alongside masonry construction, foreign craftsmen significantly contributed to the advancement of such industries as jewellery and pottery (*Ibid.*: 130-133). Even more importantly, skilled immigrants brought an inflow of capital and tax revenue, while the diversion of Livonian and Western European colonists from joining the Teutonic Order provided additional benefits (Malowist, 2010; Baronas, Dubonis & Petrauskas, 2011: 133-134). Eventually, the security that merchants and craftsmen received from the elite became an improvement in informal property rights, especially in (castle-)towns.

4.2.5. Institutional change and economic incentives

In sum, it is clear that late-medieval Lithuania was a fragile LAO. To answer the question raised at the beginning of this section, the GDL functioned the way it did because its elite's relationships were entirely personal and prone to conflicts, while the monopoly on violence remained distant. Political institutions were informal and the state was unable to support complex political, religious, or economic structures. Paganism was a necessary condition for leadership legitimacy, but did not specifically help in consolidating authority. Lithuanian agriculture was defined by small farms dedicated to personal consumption, with the elite mostly profiting from violence-based privileges. Taken together, the features that made Lithuania a fragile LAO should have provided obstacles to economic development.

The second guiding question asks if Lithuania experienced institutional change. It did, and moved closer to being a basic LAO (Table 4.2). The elite became more stable with the concentration of ruling privileges within the grand duke's family and the integration into the nobility of regional dukes, whose status became dependent on supporting the ruling dynasty. Administrative and military service was increasingly rewarded with hereditary fiefs, creating a pathway for land accumulation and making it a more attractive source of rents than the organisation of raids. The nobility

began forming a more pronounced demand for legal property rights that, together with the increasing necessity to finance the war against the Teutonic Order, opened opportunities to accommodate Christianity and transition from paganism.

The third guiding question helps to outline the changes in economic incentives. Administrative privileges and rents attached to military service created new classes of the elite and granted more productive streams of income than they had when the elite only comprised regional dukes. Stronger property rights improved access to land for those who had the means to invest and engage in larger-scale agriculture. Finally, addressing the fourth question, the realignment of economic rents alongside the political hierarchy fed back to political stability and improved the 'double balance'. With better security and increasing contact with Christians, local traders had more freedom to engage in market competition rather than just relying on the elite. Craftsmen were necessary in castles and could also learn from the immigrants and associate themselves with merchants.

Thus, throughout the analysed period, the conditions for productive activity in the GDL improved. The main hypothesis addressed in the next section is that Lithuania's economic outcomes should have been improving as well.

Table 4.2. Changes in the Lithuanian LAO throughout the 14th century.

	Before Gediminas (~1245-1316)	After Gediminas (~1316-1386)
Elite	• Consisted of competing regional dukes; • ruling privileges tied to independent local authority; • frequent leadership turnover.	• Consisted of the ruling dynasty and the nobility; • ruling (and administrative) privileges tied to the elite; • conflicts contained inside the ruling family, leadership turnover less frequent.
Political institutions and structures	• The grand duke's council as the only informal institution.	• Simple administration around capital and castle districts; • acceptance of Gediminids as an informal institution regulating elite privileges.
Religion	• Pagan religion decentralised and primarily used for political legitimacy.	• Paganism gradually less important as a political institution; • accommodation (and eventual acceptance) of Christianity for political and economic benefits.
Economic institutions and incentives	• Family allods based on customary law encouraged small-scale agriculture; • the elite's incentives skewed towards extractive (vs. productive) activities.	• Improving property rights, incentives for land accumulation and larger-scale agriculture; • improving security, structure, and specialisation in trade and commerce (esp. in the capital and castle districts).

Source: author's analysis.

4.3. Development outcomes

Testing whether the economic outcomes of late-medieval Lithuania were associated with its institutional development presents a challenge. Neither approximate GDP estimates nor their inputs exist, while historians acknowledge the shortage of primary sources for establishing basic facts. Therefore, this section mainly synthesises available secondary evidence, which is common in historical settings without economic data (see section 3.2).

Evidence on Lithuania's economic development is mixed, but generally supports North, Wallis, and Weingast (2009). Malowist (2010) argues that in the 13th and 14th centuries, Eastern Europe lagged behind Western Europe both in production and trade. Within Eastern Europe, Lithuania belonged to the least developed region, situated between Rus' and Central Poland. Material evidence confirms the poor quality of life. According to data from a graveyard in Kernavė, average life expectancy ranged from about 20.5 to 28.5 years (Baronas, Dubonis & Petrauskas, 2011: 79). The health index of this site (comprising stature, illness, and trauma) ranks seventh out of 10 European excavations analysed by Steckel and Kjellström (2019), on average dated between 1200 and 1400. Average life expectancy in 14th-16th century Alytus

equalled about 27.8, roughly the same as recorded in another graveyard dated to the 5th and 6th centuries (Jankauskas, 1995; Baronas, Dubonis & Petrauskas, 2011: 79). No long-term improvements could be sustained due to high child mortality – only about two-thirds of children survived, while about half of all people reached the age of 20. Many women also died in childbirth.

From the 12th to the 14th century, the average height diminished by about 5 centimetres, likely as a result of food shortages brought about by wars and colder climate (Česnys & Balčiūnienė, 1988; Jankauskas, 1995; Baronas, Dubonis & Petrauskas, 2011: 80). The especially slow growth of children between the ages two and five (compared to a modern cohort), as well as delayed puberty, are similarly attributed to poor nutrition and environmental conditions (Šereikienė & Jankauskas, 2004). Jatautis, Mitokaitė, and Jankauskas (2011) find that about 60% of Vilnius' population suffered from anaemia, also related to earlier deaths. In 13th-14th century Polotsk, *cribra orbitalia* – a condition associated with anaemia – was present in more than 30% of adults and 55% of children (Yemialyanchyk, 2020). Steadily poor health outcomes are consistent with the expectation that fragile LAOs should be underdeveloped.

Still, as the GDL made progress in building institutions, it achieved some material advances. One is the expansion of agriculture. Analysing communities living in similar geographic environments, as well as changes in the share of forests and bodies of water, Matulionis (1930) estimates that the total share of cultivated fields in ethnic Lithuania rose from 25% in 1200 to 30% in 1300 and 37% in 1400. A review of archaeobotanical studies by Grikpēdis and Motuzaitė Matuzevičiūtė (2020) finds the variety of cultivated crops also to have expanded during the 13th and 14th centuries.

Historiography generally agrees on an upward fertility-driven trend in population density (Jatautis, 2018: 195-200). Matulionis (1930) finds that the population density rose from 9 people per km² in 1200 to 12 people in 1300 and 16 people in 1400, although these numbers are considered too high. Pakštas (1968a) calculates the GDL's population density to have remained stable at 2 ppl/km² in 1263, 1341 and 1377, only rising to 2.5 ppl/km² in 1430. However, he argues that ethnic Lithuania was always denser than the annexed territories, estimating its population density in 1260 at 2.8 ppl/km² (Pakštas, 1968b). In 1430 (the only year for which regional numbers are provided), Pakštas (1968a) calculates that the population density in ethnic Lithuania increased to 6 ppl/km², compared to 2.25 ppl/km² in the rest of the GDL (2.9 ppl/km² excluding the Tatar regions).

The most widely supported work of Šešelgis (1988) estimates the population density in ethnic Lithuania in the early 13th century at 3.2 ppl/km²,

rising to 4.2 ppl/km² in 1410. While Šešelgis considers (1988) ethnic Lithuania smaller than Pakštas (1968a), his figures translate to the total population increasing from 207,100 to 277,100. The existing data are insufficient to compare the population density growth between the 13th and 14th centuries and check whether institutional development might have shifted the trend during the analysed period. Direct comparison would nevertheless be difficult as the second half of the 14th century saw the Teutonic Order intensifying its campaigns. However, it is clear that the population of ethnic Lithuania grew despite the war, providing at least some indication of continued economic expansion.

Increasing population density is mirrored by evidence of urbanisation. Archaeologists document a significant growth of Vilnius during the 14th century (Katalynas & Vaitkevičius, 2001; Katalynas, 2006). As Vytenis and Gediminas increasingly settled in the capital, they created demand for the period's most advanced technology (Baronas, Dubonis & Petrauskas, 2011: 325-327). Material findings show that in the 1320s, the Lower Castle was renovated following Western European standards, including the expansion of settlements and infrastructure, such as wooden roads (Valionienė, 2019: 155-164). Vilnius continued to expand throughout the 14th century, and the distribution of household ceramics reveals its most intensive development in the third quarter of the 14th century. Valionienė (2019) shows that in this period, the town experienced a transformation and became relatively independent of the castle. Almost all roads that shaped Vilnius' later neighbourhoods formed already between 1350-1375.

In addition to archaeological evidence, approximate estimates in the database of the historic population of European towns confirm Vilnius' upward trajectory (Buringh, 2021). Having started at the bottom of the distribution with about 1,000 inhabitants in approximately 1200, Vilnius was already more populous than the median European town in 1300 (Figure 4.2). There were still about 130 larger towns in 1400, but since 1200, Vilnius had grown seven times (from ~1,000 to ~7,000 people). The estimates for Kaunas are stable at about 1,000 inhabitants, although archaeological findings suggest that its population density in the second half of the 14th century was increasing (Bertašius, 2016).

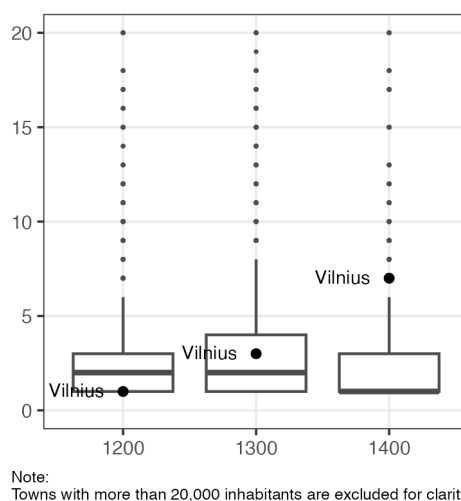


Figure 4.2. The distribution of towns in Europe by the number of inhabitants (in thousands) in 1200, 1300 and 1400. Source: author, data from Buringh (2021).

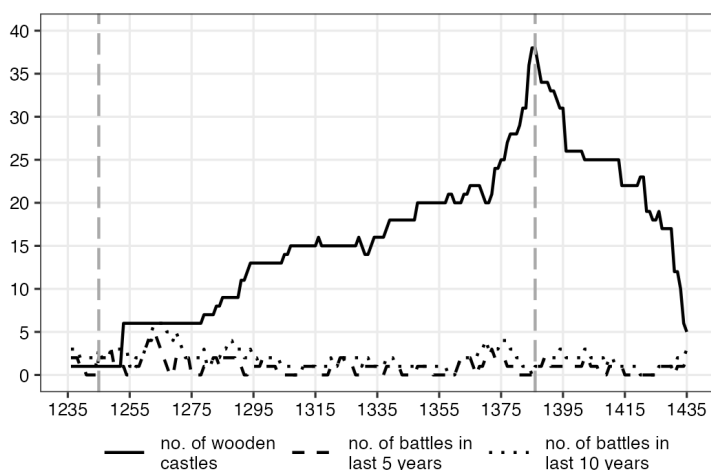
Buringh's (2021) estimates do not include Kernavė, which was likely comparable to Vilnius and had about 2,000-3,000 inhabitants in the 14th century (Baronas, Dubonis & Petrauskas, 2011: 68). The 13th and 14th centuries were the most prosperous for this town, with many luxury items imported from Rus' and simpler production dated to this period (Vėlius, 2005; Vitkūnas, 2006). Kernavė was primarily oriented towards trade, crafts, and defence rather than agricultural activity, and organised similarly to Ruthenian towns. A significant part of its production was made for export. Kernavė was the only place in Lithuania with evidence of specialisation, physical sorting (of stone workers, jewellers, smiths, and potters) and mass-production of similar goods, indicating production for the market (Bumblauskas, 2005: 62). Goods to and from Kernavė could travel to Riga, Rus', and, to a lesser extent, Western Europe.

Economic growth might be further inferred from the expanding network of Lithuanian castles. Castles were not built solely for defence, but also to serve as political and administrative centres, while material evidence reflects their economic importance. Castles had greater population density, more immigrants, hosted more trades, and provided storage for crops (Zabiela, 2016; Stančikaitė *et al.*, 2008). Archaeological findings show that Vilnius Lower Castle expanded since the second half of the 13th century and was densely populated in the 14th century (Kitkauskas, 2001). Stančikaitė *et al.* (2008) confirm the expansion of agricultural activity on the site until the mid-14th century. Although agricultural activity decreased somewhat in the second half of the century, this might be attributed to Vilnius' expansion beyond the

castle borders. At the site of Impiltis castle (1050-1250), agricultural and other human activity significantly declined after it was destroyed, despite a settlement continuing to exist there until 1400 (Stančikaitė *et al.*, 2009). Skomantai hillfort in Žemaitija also recorded intensifying agricultural activity from the mid-13th century, potentially including crop rotation, before decreasing in the early 14th century with the destruction of its castle (Stančikaitė *et al.*, 2013).

Given the evidence of their economic role, it is logical to expect a higher number of castles to result in a larger economy, regardless of their original purpose. Baranauskas' (2003) summary of wooden castles in ethnic Lithuania that were important enough to have been mentioned in written sources allows to roughly estimate their relative number over time. Excluding the 15 castles mentioned only once, the number of recorded castles grew from six during Mindaugas' coronation in 1253 to 13 in 1300 and to 20 in 1350 (Figure 4.3). The number of important wooden castles peaked at 38 in 1385, in addition to seven masonry castles also built during the 14th century. Although the figures are likely imprecise, they reveal an upward trend. While wooden castles did start disappearing following the defeat of the Teutonic Order, they still played an important economic role in the 14th century. Their multi-purpose nature is reflected by the complicated correlation between their number and the number of battles against foreign armies. Furthermore, after the analysed period, a share of the wooden castles developed into manors (Volungevičius, 2012).

Another testament to expanding market relations is the appearance of Lithuanian coins, replacing silver ingots that were difficult to partition (Baronas, Dubonis & Petrauskas, 2011: 153-156). Although debates about the precise dating of the first low-denomination coins have not been settled, they almost certainly appeared in the second half or the end of the 14th century (Ruzas, 2015: 45). Terleckas (2002) argues that the production of Lithuanian coins began before baptism – they were necessary for the silver tax (often considered to have appeared before baptism), which was universal and paid in monetary form. Moreover, people were already familiar with foreign coins and there was no shortage of skilled jewellers, while the Lithuanian coins had a unique design. Researchers nevertheless agree that the first low-denomination coins were the result of expanding activity during the 14th century.



Notes:

1. The figure goes beyond 1245-1386 to illustrate the unique role of castles during this period.
2. Pearson correlation between no. of wooden castles and no. of battles in last 1-20 years ranges from -0.1 to -0.34. Between 1245 and 1386, the coefficient ranges from -0.13 to -0.43.

Figure 4.3. The number of wooden castles in ethnic Lithuania and the number of battles fought by the grand dukes' armies in the last 5-10 years. Source: author, data from Baranauskas (2003; 2020).

In short, the synthesis of secondary evidence produces a twofold picture. It is clear that life expectancy and health outcomes in the GDL remained poor, and the economy did not deliver a good quality of life to the broader population. At the same time, the expansion of the castle network and cultivated fields, increasing population density, and urbanisation, as well as the usage of money, can be associated with improving specialisation and expanding markets.

How can economic development be reconciled with steadily poor health outcomes? The most likely explanation is that while the overall economy expanded, there was no per capita growth. In other words, the Lithuanian LAO could still only support a Malthusian economy. Building on the classical writings of Thomas Malthus, multiple scholars argue that pre-industrial growth was constantly matched by population increases, preventing any significant long-term gains in average living standards (Clark, 2007; Galor & Weir, 2000).

The described economic advances point to growth at the extensive margin rather than technological progress. Although agriculture covered more land, it remained largely based on shifting cultivation. In practice, insufficient productivity growth is reflected by the lack of increase in cattle height (Piličiauskienė & Blaževičius, 2018), or the fact that Lithuanians continued to primarily consume turnips and other less nutritious root vegetables despite the growing variety of crops (Česnys & Balčiūnienė, 1988; Griķpēdis &

Motuzaitė Matuzevičiūtė, 2020). Non-agricultural production still represented a negligible share of the total. Jatautis (2018: 199-243) tentatively confirms the existence of the Malthusian trap with an analysis of burial data.

The failure of greater crop diversity to improve the average person's diet also suggests that development was felt by only a minority of the population. This makes sense, given that inequality and the elite's privileged access to the economy are important features of LAOs. Analysing data from several archaeological sites, Jankauskas (2003) finds a significantly higher incidence of a medical condition associated with obesity among high-status individuals, attributing the result to their higher consumption of calories. Buringh's (2021) data may reflect regional inequalities as the population of Ruthenian towns, including Polotsk, Vitebsk, Grodno, and Brest, declined during the 14th century (although their decline might have allowed the GDL to annex their principalities in the first place).

Thus, the seemingly contradictory conclusions regarding the development of late-medieval Lithuania do not dispute the conceptual framework. Evidence of economic development is compatible with steadily poor health outcomes since it took place at the extensive margin. Economic growth likely did not exceed population growth and was primarily experienced by the upper classes. While North, Wallis, and Weingast (2009) expect fragile LAOs to be underdeveloped, as was the GDL, they should improve by expanding elite rents. Even if the existing data are insufficient to establish causality in the strict economic sense, recorded material advances at least coincided with (and were related to) the institutional changes that improved the stability of the elite and increased its incentives for productive activity.

4.4. Concluding remarks

Late-medieval Lithuania provides another case illustrating how institutional environments affect long-term development. As a fragile LAO, Lithuania was ruled by an unstable elite, its political institutions could not support complex organisations, while the elite's economic incentives were skewed towards extraction and the war economy. Although ensuring leadership legitimacy, paganism isolated the GDL from trading with Western Europe. These features indicate that late-medieval Lithuania should have been relatively underdeveloped, and studies of people's life expectancy and health support this expectation.

At the same time, this paper illustrates that LAOs are not static. Despite limited changes in formal institutions, the consolidation of power and the concentration of ruling privileges within the Gediminid dynasty altered the

informal institutional environment. The ruling clan started forming an administration around castle districts. Administrative privileges and war service were coupled with hereditary property rights, incentivising competing regional dukes and lesser nobility to support the ruling family. Consequently, the elite became more robust against external challengers and somewhat more stable internally, while the political role of paganism weakened. Property rights, better security, and accommodation of Christianity improved incentives to engage in productive activity. These changes raise the hypothesis that the GDL's economy should have improved.

Contrary to health outcomes, historical evidence shows some positive economic development, represented by expanding land cultivation, urbanisation, an increasing number of castles and the emergence of Lithuanian coins. These findings do not contradict the evidence of people's health since they only reflect expansion at the extensive margin. During the analysed period, the population likely grew at least as fast as the economy, suggesting that the GDL operated in the Malthusian trap, where per capita gains can only be temporary. Development was also distributed unequally.

Therefore, the case of a fragile LAO in late-medieval Lithuania supports the conceptual framework proposed by North, Wallis, and Weingast (2009). It supports the theory from a static perspective, as the average living standards were generally poor and stagnant. From a dynamic perspective, the GDL's overall economy expanded in parallel with its institutional development, as reflected in the main hypothesis.

5. INSTITUTIONAL AND ECONOMIC DEVELOPMENT DURING THE TRANSITION TO A BASIC LIMITED ACCESS ORDER (1386-1569)

This chapter (with an adjusted introduction and minor changes) is published as:

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This chapter studies the institutional and economic history of the Grand Duchy of Lithuania (GDL) between 1386 and 1569. In 1386, the Lithuanian grand duke Jogaila (Jagiello) became the king of Poland and accepted Christianity, gaining an ally that helped alleviate an external military threat from the Teutonic Order. Conventional wisdom and popular culture consider that the GDL reached its highest power and prosperity under Vytautas the Great (1392-1430), who defeated the Order alongside Jogaila's Polish army and turned the GDL into the largest European polity. With ethnic Lithuania as the centre, it had fully incorporated Žemaitija, expanded into Rus', and connected the Baltic and the Black Sea. As the GDL no longer fought for survival, its internal balance of power started more intensively shaping institutions.

The subsequent transformation of its political leadership from a clan of warriors to landholding nobility makes the GDL an interesting case of institutional development, which also took place later than in Western and Central Europe. After only emerging among ancient forests and swamps in about 1245 and becoming the very last European polity to baptise in 1386, the GDL lagged in developing written language and law, property rights, and parliamentary representation. Yet, observing existing achievements elsewhere in Europe, it attained these institutional milestones rather quickly. But how significant was the overall institutional improvement?

The first part of the chapter argues that during the fifteenth and sixteenth centuries, the GDL improved its institutions and gradually transitioned from a fragile LAO to a basic LAO. It did so not only by reaching the mentioned institutional milestones. More broadly, the restriction of the monarch's power, developing public law, and the emergence of the main political organisations – the Council of Lords and the parliament – created a political community bound by shared beliefs. Public law also facilitated the development of individual property rights and improved their enforcement. Helped by relative peace and the end of economic isolation from Western Europe, these changes

shifted economic incentives towards land accumulation and productive activity, instead of extraction that drove the fourteenth-century military economy.

In theory, this institutional improvement should have been accompanied by accelerated economic development (see chapter 1). However, while the GDL improved its institutions, the geopolitical situation deteriorated in favour of the Principality of Moscow, reflecting that it could not raise sufficient military financing. During the second part of the fifteenth century, Moscow annexed independent Ruthenian principalities, proceeding to take the GDL's first eastern territories. The GDL continued to shrink until losing Smolensk in 1514, when it became almost two times smaller than at its territorial peak (Norkus, 2018: 315). The cultural upturn of the sixteenth century, commonly associated with humanist ideas and Renaissance architecture, was again interrupted by the Livonian War. Eventually, the GDL was forced to deepen its ties with Poland and ceased to exist as a fully separate political entity after entering into the Polish-Lithuanian Commonwealth in 1569. These events might potentially cast doubt on the positive association between institutional and economic development.

The second part of the chapter relies on a combination of indicators to show that institutional development *did* coincide with better economic outcomes in the GDL. Using two newly-constructed annual datasets (see section 3.2), it identifies significant structural breaks in the trends of new manors and church-building activities around the time of the institutional transition. However, the accelerated spread of manors and churches primarily reflects improving fortunes of the elite, who drove these processes, while townspeople faced restrictions on urban businesses and peasants became increasingly tied to their land and status. Although urbanisation increased, the GDL did not become more urbanised relative to the rest of Europe. Interpolated GDP per capita estimates and health indicators stagnated, suggesting that the average standard of living did not improve. Therefore, this case study is another example where development within the logic of limited access was insufficient to provide broader-based growth, even if elite rents increased.

5.1. Evolution of the limited access order

The GDL clearly evolved from being a fragile LAO during the analysed period. At the beginning of the dynastic union with Poland, its core elite was the Gediminid dynasty, led by Jogaila (Baronas, Dubonis & Petrauskas, 2011: 338, 356-358). His brothers and relatives ruled semi-independent regions of the country. A few Ruthenian principalities further from ethnic Lithuania were

appanage duchies of local dynasties (Kiaupienė & Petrauskas, 2009: 68-73). Rents from the ruling privileges remained generated by tax revenue and military resources, with some gains starting to appear from trade and agriculture (Baronas, Dubonis & Petrauskas, 2011: 313-315, 260-286). These gains were shared by granting informal property rights to the nobles, whose political support was essential for internal stability, but all political decisions were made by the ruling dynasty.

This elite arrangement unravelled when Jogaila moved to Poland and installed his brother Skirgaila to rule Lithuania from Vilnius. Skirgaila could not consolidate his authority over other dukes and nobles and was defeated by his cousin Vytautas (Kiaupa, Kiaupienė & Kuncevičius, 2000: 126-127). According to a treaty signed in 1392, Vytautas regained the duchy of Trakai and other lands previously owned by his father, and was allowed to rule the GDL on Jogaila's behalf. As the removal of Skirgaila also illustrates, the warrior clan that made up the GDL's core elite was bound entirely by personal relationships and loyalty (chapter 4). Its other institutions were simple and barely persisted over changes in membership, while there were no established political or economic organisations. Before baptism, the GDL also had no written law or written property rights.

By the 1490s, the GDL's elite became significantly more open to the nobility, made up of the aristocracy and the gentry. The aristocrats, who held allodial property rights and gradually came to be called 'lords', descended from regional dukes of ethnic Lithuania and comprised approximately 1% of the nobility (Petrauskas, 2003: 56, 74-102). The aristocrats occupied informal offices of district elders, representing the grand duke in localities centred around castles and estates. The gentry emerged as a privileged group during the fourteenth century by gathering landholdings through benefices granted for war service (Frost, 2015: 69). In total, the nobles constituted about 6-9% of the population (Kiaupa, Kiaupienė & Kuncevičius, 2000: 223-224).

The institutional progress towards sustaining the collaboration of a broader elite is evident in all five areas of the operationalised LAO framework that structures the remainder of this section (Table 5.1). The GDL's institutions became more complex with the development of central administration and decision-making increasingly based on consensus and procedures. The noble elite gradually developed written public law and a legal system with specialised courts. This movement from personal/family towards collective authority was key to supporting the main political organisations and building state continuity. A greater degree of impersonality is represented by the nobles' shared beliefs and an increasing role of their social personas in determining elite status. Property rights improved as they were recorded

beyond occasional privileges, separated from the family, and enforced. As a result, manors emerged as the main economic organisations. This institutional development should have made the GDL more hospitable to productive activity, market interactions, and economic development.

Table 5.1. The evolution of the GDL as a limited access order.

Period: grand duke(s) ^a	Institutional complexity	Legal system	Property rights	Support of organisations	(Im)personality
1316-1392: Gediminids	fragile	fragile	fragile	fragile	fragile
1392-1430: Vytautas	fragile	fragile	fragile/basic	fragile/basic	fragile/basic
1430-1440: multiple	fragile	fragile	fragile/basic	fragile/basic	fragile/basic
1440-1492: Casimir	fragile/basic	fragile/basic	basic	basic	basic
1492-1506: Alexander	basic	basic	basic	basic	basic
1506-1548: Sigismund	basic	basic	basic	basic	basic
1548-1569: S. Augustus	basic	basic/mature	basic	basic	basic/mature

^a The time periods represent the reigns of the listed dukes.

Source: author's analysis.

5.1.1. Institutional complexity

Vytautas laid the foundation for more complex institutions necessary to sustain a basic LAO by redefining the elite. Seeking to consolidate power, he accelerated the shrinking of the Gediminid dynasty and removed cousins Švitrigaila, Kaributas, Vladimir, and Teodoras from Vitebsk, Severny Novgorod, Kyiv, and Podolia (Kiaupa, Kiaupienė & Kuncevičius, 2000: 127-132). Several dukes also died during the Battle of Vorskla that unsuccessfully ended Vytautas' expansion into the Golden Horde's territories. He replaced his relatives with the closest allies and in-laws from the noble aristocracy (Petrauskas, 2003: 173). Besides his brother Žygimantas, there were barely any Gediminid outsiders left, while regional leadership positions were lucrative rewards to those who had supported Vytautas against Jogaila. Since the aristocrats lacked legitimate claims to supreme power, the core elite was no longer automatically entitled to ruling privileges, and political appointment became more important than ducal descent. The aristocracy started playing an increasing role in the grand duke's council (his informal advisory forum) already from the late fourteenth century (Petrauskas, 2005).

Vytautas rewarded the aristocrats with administrative offices, usually accompanied by land grants (Petrauskas, 2003: 202-208). He created the palatinates of Vilnius and Trakai, each comprising multiple districts and headed by palatines (Kiaupienė & Petrauskas, 2009: 66). Other new offices included the land marshal, court marshal, castellan, and court treasurer

(Petrauskas, 2003: 310-329). Another source of state continuity was Vytautas' professional court that included a chancery, dedicated to drafting public documents and keeping archives (Kiaupa, Kiaupienė & Kuncevičius, 2000: 158-159). Court service allowed skilled gentry to participate in some settings of the grand duke's council and provided limited opportunities to ascend to administrative offices (Kiaupienė & Petrauskas, 2009: 262-273; Petrauskas, 2005).

The aristocrats' influence continued to grow after Vytautas' death. They elected Švitrigaila as the grand duke, but Žygimantas quickly implemented a coup with the help of the local opposition and the Polish nobility (Kiaupa, Kiaupienė & Kuncevičius, 2000: 195-200). This was at least in part because of Švitrigaila's introduction of Ruthenian outsiders into the elite (Kiaupienė & Petrauskas, 2009: 390-394; Norkus, 2018: 320-321). Švitrigaila had amassed support during his exile in Rus', while Žygimantas' supporters had obtained their administrative offices under Vytautas and likely sought to preserve their rents. Then, despite having just emerged from a five-year civil war, the aristocrats, including the palatines of Vilnius and Trakai, backed the killing of Žygimantas to avoid being replaced by him.

The election of Jogaila's thirteen-year-old second son Casimir stabilised the situation (Kiaupa, Kiaupienė & Kuncevičius, 2000: 201-204), after which the aristocrats evolved as a political class mostly peacefully. Some regional elites rebelled against their appointed governors, but these conflicts did not escalate beyond the reinstatement of Jogaila's nephew to Kyiv and some legal concessions to Žemaitijan and Podlasian nobles (Frost, 2015: 188-190; Kiaupienė & Petrauskas, 2009: 397-398). After his brother Władysław died in battle, Casimir issued a privilege committing to preserve the GDL's separate legal status in return for supporting his Polish coronation (Kiaupienė & Petrauskas, 2009: 317). Later, the aristocrats also helped Casimir eliminate his potential rivals by replacing the dukes in Kyiv and Volhynia (*Ibid.*: 68).

Casimir's prolonged absences from Lithuania facilitated the expansion of central administration (Kiaupienė & Petrauskas, 2009: 287). There is a record already in the 1440s of the state chancellor, the grand hetman, and potentially the state treasurer (Petrauskas, 2003: 310-321). The office hierarchy started to develop, headed by the palatine of Vilnius (*Ibid.*: 65). By the mid-fifteenth century, the grand duke's council evolved into the Council of Lords – a political organisation comprising the top nobility of mostly aristocrats (Petrauskas, 2005). Afterwards, the Council gained increasing executive powers and started convening independently.

The cooperation between the grand duke and the lords (aristocrats) improved elite stability, as it had not developed clear rules of succession.

Petrauskas (2003: 194) argues that Casimir's productive relationship with the lords was exactly the reason behind the peaceful elevation of Alexander. Alexander's reign marked a further shift towards an organisational state structure, as there were no more significant appanages within the GDL (Frost, 2015: 296; Norkus, 2018: 323). He got by with granting only limited privileges to the remaining dukes in small principalities, while the Council refused to grant Kyiv to his brother Sigismund. Thus, as the nobility-based elite, developing administration, and the Council replaced entirely personal rule, the GDL's institutional environment became more durable and characteristic of a basic LAO.

This elite balance became relatively stable. After Alexander died of illness, Sigismund, elected in his place, issued a privilege committing to coordinate all political decisions with the Council and acknowledging its equal judicial role (Kiaupienė & Petrauskas, 2009: 436-437). Yet, military pressures and competition for the offices fuelled disagreements between the leading lord families (Radvila/Radziwill and Goštautas/Gasztold), which Sigismund exploited to balance the Council with Jewish state treasurers and an Orthodox palatine of Trakai (*Ibid.*: 422-424; Frost, 2015: 406-409). He also strengthened his position by recovering a significant part of his domain in Poland and, together with his wife Bona Sforza, implementing land audits in the GDL to verify the lords' property rights (Frost, 2015: 363-366, 424-425).

The structure of the state, governed by the grand duke and the Council, was recorded beyond occasional privileges in the Lithuanian Statute (Frost, 2015: 420). The Statute was the GDL's first proper legal code, for which the lords obtained Sigismund's permission in exchange for confirming his son Sigismund Augustus as the next grand duke before the actual succession (*Ibid.*: 411). The Council already existed for almost a century, and the Statute confirmed its members' superior status compared to other nobles based on their administrative positions (Kiaupienė & Lukšaitė, 2013: 125-128). The Statute also strengthened the legal basis for the nobles' property rights and the grand duke's commitment to preserve their sovereignty (*Ibid.*; Machovenko, 2011).

Elite and state continuity progressed further with increasing frequency of broader parliamentary assemblies and the gradual inclusion of the gentry into the political community (see the sub-sections on organisations and (im)personality). Eventually, this progress resulted in the legal and administrative reform that equalised the privileges of the gentry and the lords, created a single-tiered elite, and institutionalised the parliament consisting of elected local representatives (see the sub-section on the legal system). This

political system, fully defined in The Second Statute of 1566 and only amended later, structured the GDL until 1795.

5.1.2. Legal system

Another tenet of a basic LAO – public law – gradually emerged with the development of central administration and an increasing number of written documents under Casimir (Kiaupa, Kiaupienė & Kuncevičius, 2000: 192). When Jogaila issued the first written privileges, common law remained prevalent and legal authority was vested in the district elders and the grand duke (Kiaupienė & Petrauskas, 2009: 325-326). Demand for its codification arose due to confusion among the mounting number of formal privileges, including those granted to specific regions (Kiaupa, Kiaupienė & Kuncevičius, 2000: 192). Casimir made the first attempt to codify existing punitive practices and court procedures by publishing a short legal code in 1468 (Kiaupienė & Petrauskas, 2009: 320-321).

Another key development was the subjection of the grand duke to public law, delimited by the privileges of Casimir and Alexander. While Casimir's privilege, where he acknowledged the GDL's separate legal identity, formalised the consultation system, Alexander legally committed to seeking the Council's agreement on decisions like designating the top officers or expending the state treasury, which also became separate from the grand duke's personal finances (Frost, 2015: 304-305; Kiaupa, Kiaupienė & Kuncevičius, 2000: 158, 162). Machovenko (2015) argues that the 1492 privilege legalised the de facto situation that formed after 1447 and was the first step towards achieving the separation of powers.

Improving legal system allowed the state to function without the presence of the monarch. As officials could act independently, Alexander reduced itinerant rule, restoring the status of Vilnius as the capital (Kiaupienė & Petrauskas, 2009: 73-74, 430-431). Emerging parliamentary assemblies hosted the grand duke's court (*Ibid.*: 321-325). It still heard the highest-level cases, but court sessions became regular, with the councillors replacing Alexander if he was absent. A separate branch of the grand duke's court emerged to deal with land disputes. The latest legal practices and rulings were recorded and started being kept in state archives. Increasing state capacity is also reflected by a further increasing number of written documents, engagement in international diplomacy, and growing specialisation within the chancery (*Ibid.*: 426-431). Such a legal system contributed to the GDL's transition to a basic LAO.

Noble family ties and local patron-client networks still played an important role in distributing and enforcing justice on the ground (Petrauskas, 2003: 134-135). However, these same ties fostered shared beliefs among the lords, who expressed them by commissioning the publication of two new sets of chronicles (Frost, 2015: 412-418; Kiaupa, Kiaupienė & Kuncevičius, 2000: 188-190). Dated before 1519 and between 1519-1525, the chronicles discussed the political idea of the GDL and the lords' role within it, also expressing demand for further codification of public law (Kiaupa, Kiaupienė & Kuncevičius, 2000: 191). Radvila and Goštautas families ended their conflict in the 1520s, as they sought to finalise the Lithuanian Statute (*Ibid.*: 212).

The Statute conveyed the shared beliefs and synthesised the accumulated formal privileges (Machovenko, 2015). It became the central document that every court in the GDL was obliged to possess, quickly translated from Ruthenian to Latin and Polish (Kiaupienė & Lukšaitė, 2013: 124). The Statute significantly surpassed earlier documents, reflecting the human capital accumulated among the administrative elite (Frost, 2015: 418-420). It confirmed the GDL's existing borders and claimed to contain the law governing all Catholic and Orthodox citizens within these borders, while bypassing the union with Poland (Kiaupienė & Lukšaitė, 2013: 128-129). It also enshrined the grand duke's commitment to preserve the GDL's sovereignty, as well as the superior status of the Council (*Ibid.*: 125-128). Another part of the Statute introduced land officials, appointed by the lords from among the gentry, to run local courts (*Ibid.*: 200-201). These positions were not filled for more than two decades, but provided impetus for further reforms.

The parliament of 1564 created a two-tier court system (Kiaupienė & Lukšaitė, 2013: 203-204). The first tier comprised three types of local courts. Officials of the castle court remained appointed by governors, but those of the land and chamber courts, primarily dedicated to solving property disputes, were elected by the local nobility. Crucially, the lords also became subject to these courts, making them equal to the gentry. The grand duke's court now served as an appellate court. The legal changes were complemented by an administrative reform, which divided the GDL into 13 regions and 30 districts, each with its court and local parliament that elected representatives to the general assemblies. As a result, the GDL replaced its feudal court system and personalistic definition of nobility with a territorial one (*Ibid.*; Kiaupienė & Petrauskas, 2009: 222). These changes were recorded in the Second Statute and became part of the GDL's *de facto* constitution (Machovenko, 2015).

5.1.3. Property rights

Family property rights replaced ruling privileges and military campaigns as the main source of elite rents following Jogaila's privilege of 1387, when they were first formally expanded beyond the ruling dynasty (Frost, 2015: 69-70). Although initially mostly restricted to the aristocracy, the property rights were enshrined beyond occasional documents in the 1413 Union Treaty of Horodło, which also admitted select Lithuanian families to Polish heraldic clans (*Ibid.*: 115). Besides inherited domains, the aristocracy exercised its property rights by gathering the grand dukes' donations and claiming unsettled lands (Kiaupienė & Petrauskas, 2009: 76-79). These privileges gradually created magnate families with extensive property, including Radvila, Goštautas, and Kęsgaila. The gentry participated in Vytautas' campaign of 'internal colonisation' of forests, the GDL's eastern regions, and western borderlands that became safe following the Order's defeat (*Ibid.*: 374-375). These nobles found their place in the patron-client networks of the aristocracy or developed their own estates (Petrauskas, 2003: 203-207, 130).

Under prolonged peace and a diminishing military economy, Casimir continued granting the nobility additional benefices (Kiaupienė & Petrauskas, 2009: 287). Besides giving the nobles judicial authority in their estates, the 1447 privilege transferred to them the peasants' services previously owed to the grand duke (*Ibid.*: 318; Machovenko, 2011). The gentry were also typically granted to the lords together with the benefices (Frost, 2015: 307; Petrauskas, 2003: 206-207). Thus, even if a part of the gentry directly served him rather than the lords, a two-tier property structure emerged, bringing the GDL closer to feudalism (Frost, 2015: 307; Petrauskas, 2003: 206-207; Machovenko, 2011). This was already characteristic of a basic LAO.

Allodial property rights remained tied to the family, but the expansion of central administration and Christianity nudged the lord families towards an internally vertical structure and individualisation of property (Petrauskas, 2003: 114-130). As state offices were individual, the lords had to limit potential feuding to preserve their domains. Meanwhile, the Church popularised the passing of inheritance through testaments. Following these changes, manors started being apportioned to specific lords, creating the basis for individual property rights to the manors that grew out of family domains. Family domains were supplemented by benefices and colonised lands, which were individual, but subject to their supreme owner – the grand duke.

An informal norm allowing to freely exploit or sell a third of the domain without family consent was written down at the end of the fifteenth century (Petrauskas, 2003: 111, 120). Two-thirds of the domain could be mortgaged,

but this restriction still protected the family, as proof of property ownership was required to confirm one's noble status (Machovenko, 2011). The right to sell a third of the domain was included in the First Statute, while all family-related property restrictions were eventually abolished in the Second Statute.

From the 1520s, Sigismund's and Bona's land reform further clarified the property rights. Before the reform, peasant holdings were widely scattered, leading to small and inefficient plots mainly suitable for subsistence (French, 1970). The reform instructions formalised the peasants' obligations, replaced a part of services with monetary rents, and mandated the establishment of serf-operated folwarks on fertile lands (Kiaupienė & Petrauskas, 2009: 444-445). Having bought extensive Lithuanian estates, Bona imitated Podlasian nobles and reorganised her personal holdings to a standardised three-field system with proper crop rotation by the late 1540s (Frost, 2015: 424-426). The property rights were also enforced, as the royals confiscated holdings from the lords for which they could not provide proof.

Sigismund Augustus sought to continue his parents' success, mandating the survey of his holdings in 1547 and following up 10 years later (Frost, 2015: 426-430). He converted his estates in the western half of the GDL to a hide system, where new three-field plots of about 23.5 hectares were created. During this process, he continued confiscating unlawfully obtained land from the lords, while the gentry perceived the reform as mostly fair and allowing them to consolidate their scattered holdings. Labour rents and cash taxes were determined according to land quality. By 1566, Augustus managed to reorganise nearly all of his domain in central and western Lithuania.

The reform gradually subjected free peasants to *corvée* labour. The 1547 instructions prohibited peasants from selling their farms, and by 1557, the nobles' property rights were enforced directly (Kiaupa, Kiaupienė & Kuncevičius, 2000: 165-166; Kiaupienė & Lukšaitė, 2013: 186-189). Gigliotti (2009) argues that peasants were subjected to *corvée* in response to inflation, while Millward (1982) shows that labour rents lowered the costs of peasant supervision. The economic arguments and the lack of peasant resistance cast doubt on some claims that the reform introduced an unproductively oppressive system (Frost, 2015: 428-429). Additionally, the 1557 reform freed the slaves, who used to make up the main workforce in manors, granting them small plots under similar conditions (French, 1970; Machovenko, 2002a).

5.1.4. Support of organisations

Political and economic organisations also established themselves before the 1490s. The GDL's political development was directly tied to the Council.

Gathering up to several dozen aristocrats, it was the first political organisation based not on kinship ties, but on the nobles' administrative positions (Kiaupienė & Lukšaitė, 2013: 169; Petrauskas, 2005). Albeit still informal, it replaced the Gediminid dynasty and made the first step towards dissociating leadership continuity from a single family (Rowell, 1997). The Council helped the lords collaborate on a more impersonal basis, replacing dynastic loyalty with membership of a political community, and provided a platform to nurture their shared beliefs (Petrauskas, 2003: 188-195). These features of the main political organisation reflect the functioning of a basic LAO.

During the sixteenth century, the parliament coalesced as another political organisation. Initially, the lords organised broader assemblies alongside the Council (Petrauskas, 2005). After the 1492 assembly, where the gentry from all regions were invited for the first time, all key decisions were confirmed during these assemblies. The parliament's importance grew with deteriorating geopolitics and the constant need for taxation, as the GDL lost its first eastern territories in 1494 (Frost, 2015: 346; Kiaupienė & Petrauskas, 2009: 438). The 1507 assembly already included a significant number of the gentry. In 1512, Sigismund started ordering local assemblies, tasked to reach agreements before the full parliaments (Kiaupienė & Lukšaitė, 2013: 176-179). The 1534 and 1538 assemblies followed impersonal rules on who should participate, while in general, the parliament gradually developed a name (*Seimas*) and written procedures (Petrauskas, 2005). Finally, the 1564-1566 reforms institutionalised territorial representation (Kiaupienė & Lukšaitė, 2013: 204).

As property rights became the main source of rents, manors replaced castles as the main economic organisations. Among many castles that became superfluous after defeating the Order, some were converted into manors directly (Volungevičius, 2012). Dubonis (2001) claims that manors started producing grain surpluses in the mid-fifteenth century. During this time, persistent land accumulation, mainly resulting from lucrative administrative offices, had already created magnate families with extensive property (Kiaupienė & Petrauskas, 2009: 76-79). The share of land owned by the nobility could have increased from less than 20% in the late fourteenth century to about 65% in 1528, while in the sixteenth century, the lords possibly held 18-30% of this land (Ochmański, 1990: 100-101, 124). Their wealth was a natural outcome of the 'double balance' between their political and economic power.

The role of manors in providing elite rents only strengthened with participation in the grain trade, led by Sigismund himself, whose land reform increased the share of cultivated royal domain and redistributed it towards more fertile land (French, 1970). Between the early 1490s and the 1550s, the

amount of grain exported through Danzig, where the Lithuanian produce constituted a fair share, increased three to four times (Пичета, 1917/1958: 54). Growing trade increased the grain prices and incentivised further agricultural activity, although existing profit opportunities and inflation discouraged economic diversification or investment in the proto-industry (Gigliotti, 2009).

By 1588, the second part of the reform increased Sigismund Augustus' revenues up to four times (Frost, 2015: 427-428). The 1557 hide law incentivised the creation of folwarks, which primarily farmed grain for sale and export, and developed small towns to support the manors (Kiaupienė & Lukšaitė, 2013: 188). The reorganisation of scattered plots facilitated internal colonisation, reclamation of forests, organisation of collective work, and significantly expanded crop rotation (*Ibid.*; French, 1970; Millward, 1982). Lithuanian nobles and the Church, already participating in the reform through land exchanges, quickly followed suit and similarly reorganised their own estates (French, 1970; Frost, 2015: 428).

However, neither the town communities nor bottom-up urban organisations or businesses possessed equal privileges. After Vilnius obtained self-governing rights in 1387, the freedom of towns seemed to have been expanding, with Magdeburg Law granted to Brest, Trakai, and Kaunas (Kiaupa, Kiaupienė & Kuncevičius, 2000: 171). Yet, only Medininkai in Žemaitija and two or three towns in Podlasie became self-governing during Casimir's long rule (Kiaupienė & Petrauskas, 2009: 108). Lithuanian exports seemingly only accelerated in the 1480s – about two decades after Poland captured Danzig (Dubonis, 2001; Samsonowicz, 1999). The main exports (grain, flax, timber) also suggest that Lithuanian towns did not develop a significant industry. Meanwhile, the local traders restricted foreign merchants by legally forcing them to deal through intermediaries (Kiaupienė & Petrauskas, 2009: 110-111).

Alexander extended self-governing rights to multiple towns outside ethnic Lithuania, including Polotsk, Grodno, and Kyiv (Kiaupienė & Petrauskas, 2009: 428). He sought to profit from new trade tariffs and centralised management of customs houses, mortgaging their income for fixed loans (*Ibid.*: 114-115). Industry in ethnic Lithuania also progressed, as the first guild of goldsmiths was established in 1495, followed by those of tailors, locksmiths, and others (*Ibid.*: 309). However, it remains unclear whether the monopolistic guilds were a positive development, as crafts and informal organisations like brotherhoods already existed (Machovenko, 2002b). These developments might reflect nothing more than Alexander's attempts to raise taxes. He continued requiring foreign merchants to deal through local intermediaries and had temporarily expelled the professional Jewish

community, possibly due to his debts (Kiaupienė & Petrauskas, 2009: 110-112, 217-218; Šedvydis, 2022).

Although the grain trade should have benefited towns, the evidence seems limited. Those who profited from the rising prices were more willing to purchase imports than invest in domestic industry, where inputs were also getting more expensive (Gigliotti, 2009). Sigismund issued fewer self-governance privileges than Alexander, and towns did not become important for his political regime (Kiaupienė & Petrauskas, 2009: 428-429). Small towns, hosting local markets and taverns, proliferated instead, but they remained closely attached to the countryside (Kiaupa, 2001).

The nobility excluded the townspeople from the elite (Machovenko, 2002a). The representatives of Vilnius were the only ones participating in the parliament as observers (Kiaupienė & Lukšaitė, 2013: 183). Persistent special jurisdictions – town areas directly subject to governors or Church law – limited the existing self-governance and tax income (Kiaupienė & Petrauskas, 2009: 307). When the nobles lobbied against customs duties in the 1550s, they only confirmed exemptions in the parliament for themselves (Kiaupienė, 2005). The Second Statute abolished all tariffs on the nobles' own production, while purchased goods remained taxed. Sigismund Augustus introduced excise taxes on the produce of mills and taverns, collected by the nobles, and from 1569, merchants became subject to additional tariffs (Tyla, 2012: 20-24). Thus, the development of manors came at the expense of towns.

5.1.5. (Im)personality

By extension, the development of more complex institutions, the legal system, property rights, and political and economic organisations introduced a degree of impersonality. When Vytautas replaced the ruling family with the aristocracy, membership of the elite started being at least partially defined by social personas associated with administrative offices. Following the emergence of the Council, the lords could soon engage in foreign relations collectively as a group, which reflects the existence of their shared beliefs (Petrauskas, 2003: 190-195). Aristocratic families already cultivated personal relationships, as manifested by friendship, collaboration, and marriages between them spanning multiple generations (*Ibid.*: 52-53, 181-186).

The lords understood themselves as a class and tried to establish their position at the top of the elite in public law. They outlined their shared beliefs and ideological legitimacy in the chronicles, formulating the political idea of the GDL as separate from Poland and governed jointly by the grand duke and the lords (Frost, 2015: 412-418; Kiaupa, Kiaupienė & Kuncevičius, 2000,

188-190). Such shared beliefs are a key feature of basic LAOs. Besides discussing state history, the chronicles advanced a legend of the Lithuanians' Roman origins and expressed demand for further codification of public law (Kiaupa, Kiaupienė & Kuncevičius, 2000: 191). The First Statute, which realised this demand, solidified the lords' superior status to the gentry (Frost, 2015: 420).

Another process fostering impersonality was the broadening of the elite. Initially, it did not include the nobles from the GDL's periphery, as Jogaila had restricted property rights to Catholics, and the 1413 treaty prohibited Orthodox Christians from occupying central offices (Frost, 2015: 68, 120-121). However, slowly-emerging Catholicism was at best a weak source of leadership legitimacy even in ethnic Lithuania (Kiaupienė & Petrauskas, 2009: 200-201). Švitrigaila's support in Rus' during the civil war also signalled that Ruthenians had to be included, as there was a risk of them seeking equal privileges elsewhere (Frost, 2015: 166-168). Žygimantas thus issued a privilege equalising the rights of Orthodox nobles to those of the Catholics, except the eligibility for offices in ethnic Lithuania (*Ibid.*: 175-176). From the mid-fifteenth century, Ruthenians worked as scribes and treasurers, with more people gradually reaching lord-level positions (*Ibid.*: 317-318; Kiaupienė & Petrauskas, 2009: 212).

The inclusion of Ruthenians continued as part of the increasing political involvement of the gentry (Kiaupa, Kiaupienė & Kuncevičius, 2000: 208). At first, the gentry participated in parliamentary assemblies as spectators, but they were important for disseminating information, and the assemblies provided opportunities for social learning (Kiaupienė & Petrauskas, 2009: 438; Petrauskas, 2005). By the 1540s, the gentry developed political awareness and began to actively participate in the parliament (Kiaupienė & Lukšaitė, 2013: 178-179). During the 1544 assembly in particular, multiple ordinary nobles issued a collective proposal very similar to the 1560s legal reform. They asked the grand duke to create joint elective courts for the whole nobility, and continued to articulate their demands for equality with the lords afterwards.

The Ruthenian nobility increasingly felt a common purpose with the Lithuanian gentry towards obtaining broader privileges, while the Lithuanians often knew the Ruthenian language, tolerated Orthodoxy, and were open to mixed marriages (Frost, 2015: 308-313; Petrauskas, 2003: 149-150). Eventually, besides the legal and administrative reforms, Sigismund Augustus' privilege removed all religion-based restrictions on administrative offices, at least formally opening the political competition to all nobles (Kiaupienė & Lukšaitė, 2013: 199). These concessions were virtually

unavoidable, seeking to ensure the Ruthenian nobles' loyalty during the war against Moscow.

5.2. Institutional development and economic outcomes

Using a combination of indicators, this section tests the hypothesis that the GDL's economic outcomes improved when it became a basic LAO. The theoretical framework relates different development trajectories specifically with categorical transitions, considering that various aspects of institutional change are interrelated, and it is their combination that affects the incentives generated by the social orders. Thus, significant changes in economic outcomes occurring at the time of the GDL's upgraded institutional categorisation in the 1490s would suggest that these events were indeed related.

Sub-sections 5.2.1 and 5.2.2 test this timing by identifying structural breaks in the annual number of recorded manors and churches, which serve as proxies for economic activity. This methodology is described in more detail in sub-section 3.2.2. In theory, the transition to a basic LAO should incentivise the founding of manors due to an increased level of personal security and the security of property rights, as well as the appearance of supporting infrastructure. Manors did become the main economic organisations in the GDL, since, following the distribution of land to the nobility, public law reduced the risk of expropriation. Church buildings are less directly related to political aspects of the LAO and primarily reflect the financial capacity of the Church and the elite.

Other frequent proxies of development considered in this section are town population and urbanisation. For the GDL, these measures are intermittent and approximate, but allow for analysing the main trends to provide a fuller picture of the economic outcomes. Sub-section 3.2.1 provides the reasons behind this choice, but in general, the variables are particularly important, given that the political dominance and property rights of the nobility incentivised manors at the expense of towns. Thus, the economic uptick related to the GDL's transition to a basic LAO should have been positive, but limited.

Finally, this section considers general living standards, which should reflect broader economic outcomes beyond elite-driven extensive growth. It looks into interpolated estimates of GDP per capita, but due to the indirect nature of these figures, it also analyses health data.

5.2.1. Manors

The dataset used for estimating structural breaks is described in sub-section 3.2.3.

Table 5.2 presents the estimated structural breaks and the average numbers of new manors during the resulting growth regimes. The main model (Model 1a), which follows the sequential testing algorithm of Bai and Perron (2003) (seq), yields two structural breaks. These results indicate that the manor economy started to expand around the mid-fifteenth century (adding 0.93 new manors per year on average) and accelerated further around the mid-sixteenth century (with about 2.16 new manors annually). For comparison, another testing algorithm based on optimising a modified Bayesian Information Criterion (Kurozumi & Tuvaandorj, 2011) (KT) yields three structural breaks in 1449, 1505, and 1549 (Model 1b). Two breaks are the same as in Model 1a, with a more granular split of the period between 1450 and 1549.

Table 5.2. The average number of newly-established manors per year in periods separated by structural breaks.

Model 1a new manors		Model 1b new manors		Model 2a new manors per 1 mn ppl	
1386-1449 ^{ab}	0.188 (0.039) ^c	1386-1449	0.188 (0.039)	1386-1449	0.655 (0.136)
1450-1549	0.930 (0.145)	1450-1505	1.143 (0.285)	1450-1549	2.620 (0.406)
1550-1600	2.157 (0.299)	1506-1549	0.659 (0.160)	1550-1600	4.734 (0.654)
		1550-1600	2.157 (0.299)		
Algorithm	seq	Algorithm	KT	Algorithm	seq

^a All structural breaks are estimated by the algorithms.

^b The structural breaks estimated through the sequential procedure are significant at <5% level.

^c Standard errors are robust.

Source: author's calculations, data from Semaškaitė (2010) and Šešelgis (1988).

Model 2a has a slightly modified dependent variable – it estimates new manors per 1 million people. This variable is calculated using the population of present-day Lithuania from Šešelgis (1988), having interpolated the annual data from his original estimates (207,100 in 1200; 277,100 in 1410; 432,250 in 1569; 806,500 in 1653). The numbers for 1200 and 1410 are widely accepted by historians, while those for 1569 and 1653 mainly rely on synthesised and adjusted estimates based on written sources. This series also seems to be the only one available both before 1386 and after 1600.

Model 2a contains the same structural breaks as Model 1a, and generally, the growth trend of manors is increasing. Yet, the estimated structural breaks do not occur around the 1490s. All models capture the break in 1449, almost corresponding with Casimir's acceptance of the Polish crown, and the break in 1549, close to Sigismund Augustus' continued land reform. However, these two breaks also correspond with the mid-century marks, suggesting that the results might be disproportionately affected by the construction of the data (see sub-section 3.2.3 and Appendix A). More than half (52.9%) of the manors in the dataset are only known to have been founded in a specific time interval, rather than a precise date. The average interval of uncertainty over the whole dataset is 40.9 years. By default, these manors are assigned to have been founded in the middle or their known intervals. In particular, there are 24 manors founded 'in the fifteenth century' and 33 manors founded 'in the sixteenth century'.

This situation can be addressed by implementing a robustness check – assigning specific founding dates within known intervals on a random basis. For example, instead of equating the fifteenth century to 1450, the randomly assigned date could fall between 1401 and 1500. Table 5.3 presents the resulting structural breaks over 10,000 simulated datasets, implementing the random assignment process for all manors with uncertain dating, while the models remain the same. The most frequently occurring structural breaks are now clustered just before 1492 – close to the GDL becoming a basic LAO. At least one structural break in the years 1480-1492 results from 94.6% of Model 1a estimations, 89.4% of those of Model 1b, 93.5% of Model 2a, and 91.6% of Model 2b. The most frequent estimates of Model 1a are depicted by Figure 5.1.

Table 5.3. The frequency of structural breaks in the trends of newly-established manors per year, where their founding dates are randomly assigned within known intervals.

Model 1a new manors (seq)		Model 1b new manors (KT)		Model 2a new manors per 1 mn ppl (seq)		Model 2b new manors per 1 mn ppl (KT)	
Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count
1491	4,742	1491	3,719	1491	4,396	1491	3,930
1490	2,653	1490	1,907	1490	2,312	1490	2,106
1489	770	1481	538	1481	1,336	1481	1,229
1481	606	1489	513	1489	615	1489	546
1488	295	1488	190	1480	364	1480	351
other	934	other	3,133	other	977	other	1,838

Source: author's calculations, data from Semaškaitė (2010).

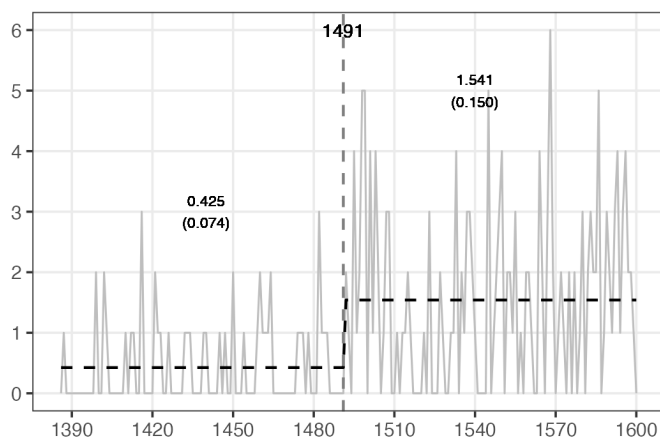


Figure 5.1. The most frequent result of Model 1a, estimating new manors in present-day Lithuania per year, where their founding dates are assigned randomly within known intervals. Source: author's calculations, data from Semaškaitė (2010).

Additional robustness checks in Appendix C reinforce the suggestion that these structural breaks might reflect real change. Exogenous events directly unrelated to institutional development, like the grand dukes' deaths or important battles in ethnic Lithuania, generally do not yield statistically significant structural breaks. These OLS models are estimated over 10,000 simulated datasets, following the same procedure of assigning precise founding dates of manors within known intervals.

5.2.2. Churches

The dataset on churches is constructed in the same way as the manors' dataset and described in sub-section 3.2.4.

Table 5.4 presents the modelling results using the initial dataset, where imprecise years are assigned to the middle of their intervals. The original list of churches is significantly more precise than the descriptions of manors, as 22.2% of all church-building activities are dated at an interval, with an average uncertainty of only 11.3 years. The main model (Model 3a), estimating the number of all construction activities (newly-built, rebuilt, and renovated churches) through the sequential procedure, yields a structural break in 1493. While before this date, only about 1 church was built, reconstructed, or renovated per year, it was 2.55 churches afterwards. Model 3b estimates a similar break in 1499 via the KT algorithm, in addition to the breaks in 1417 and 1550. The faster growth regime before 1417 can be explained by initial Christianisation, and the break in 1550 mirrors the results concerning manors.

Model 4a, which considers just the newly-built churches (without reconstruction and renovation activities), yields a structural break in 1491, again close to those of Models 3ab. Conversely, a different structural break in the trend of rebuilt and renovated churches suggests that reconstructions did not drive increasing church-building after the GDL's institutional transition. The dependent variable of Model 6b is the number of newly-built, rebuilt, and renovated churches per 1 million people, constructed using the population interpolated from Šešelgis (1988). The sequential procedure does not identify statistically significant structural breaks, but the KT method yields the same breaks as those of Model 3b.

The robustness exercise, presented in Table 5.5, confirms that the structural breaks are concentrated in the 1490s. This is especially the case for Model 3a, whose results are additionally illustrated by Figure 5.2. In general, there is at least one break in the 1490s in 99.9% of all estimations of Models 3a-5b. Thus, the data on the construction of churches suggest that Lithuania's institutional development indeed coincided with its economic expansion. The most frequent structural breaks come exactly when the GDL became a basic LAO.

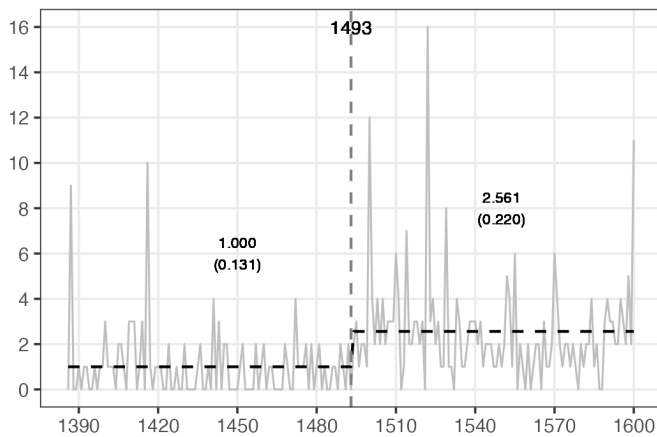


Figure 5.2. The most frequent result of Model 3a, estimating newly-built, rebuilt, and renovated churches in Lithuania per year, where the construction dates are assigned randomly within known intervals. Source: author's calculations, data from Gimbutas (1970).

Table 5.4. The average number of newly-built, and newly-built and rebuilt/renovated churches per year in periods separated by structural breaks.

Model 3a newly-built, rebuilt, & renovated churches		Model 3b newly-built, rebuilt, & renovated churches		Model 4a newly-built churches		Model 5a rebuilt & renovated churches		Model 6b built/rebuilt/renovated churches per 1mn ppl	
1386-1493 ^{ab}	1.000 (0.126) ^c	1386-1417	1.469 (0.331)	1386-1491	0.934 (0.127)	1386-1521	0.096 (0.029)	1386-1417	5.325 (1.197)
1494-1600	2.551 (0.406)	1418-1499	0.878 (0.102)	1492-1600	1.936 (0.309)	1522-1600	0.734 (0.173)	1418-1499	2.679 (0.303)
		1500-1550	3.275 (0.760)					1500-1550	8.391 (1.863)
		1551-1600	1.900 (0.260)					1551-1600	3.931 (0.486)
Algorithm	seq	Algorithm	KT	Algorithm	seq	Algorithm	seq	Algorithm	KT

^aAll structural breaks are estimated by the algorithms.

^bThe structural breaks estimated through the sequential procedure are significant at <5% level.

^cThe standard errors are robust.

Source: author's calculations, data from Gimbutas (1970).

Table 5.5. The frequency of structural breaks in the trends of newly-built, and newly-built and rebuilt/renovated churches per year, randomly assigning construction dates within known intervals.

Model 3a built/rebuilt/renov. Churches (seq)		Model 3b built/rebuilt/renov. Churches (KT)		Model 4a newly-built churches (seq)		Model 4b newly-built churches (KT)		Model 5a built/rebuilt churches (seq)		Model 5b built/rebuilt churches (KT)		Model 6a built/reb./ren. Ch. per 1mn ppl (seq)		Model 6b built/reb./ren. Ch. per 1mn ppl (KT)	
Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count
1493	6,162	1417,1497, 1529	4,276	1493	2,507	1417,1497, 1529	5,494	1509	4,282	1509	3,235	1493,1529	3,710	1417,1497, 1529	7,463
1499	1,831	1417,1497, 1529,1568	1,519	1497	1,908	1417,1493, 1526	2,344	1521	2,633	1443,1494, 1528,1565	1,518	1493	3,356	1417,1493, 1529	614
1497	1,761	1417,1497, 1529,1565	1,261	1497,1529	1,554	1417,1496, 1529	827	1517	978	1443,1489, 1521,1553	883	1499,1531	928	1417,1494, 1529	467
1491	192	1417,1493, 1529	412	1491	1,248	1420,1497, 1529	200	1508	477	1443,1489, 1521,1565	863	1493,1526	802	1420,1497, 1529	267
1497,1529	34	1417,1494, 1529	329	1493,1526	1,131	1421,1497, 1529	193	1502	468	1443,1489, 1521,1554	585	1499	652	1421,1497, 1529	255
other	20	other	2,203	other	1,652	other	942	other	1,162	other	2,916	other	552	other	934

Source: author's calculations, data from Gimbutas (1970) and Šešelgis (1988).

Table 5.6 and the robustness check in Appendix D additionally show that Reformation-induced religious competition was not a significant confounding factor. The structural breaks in the church-building trend remain concentrated in the 1490s, even after removing the 43 Protestant churches and excluding the period after Martin Luther's Theses of 1517 from the dataset. It is restricted to pre-Reformation years to eliminate the potential increase in Catholic and Orthodox church-building as a counter-reformist response. Another exercise in Appendix D, similar to the one performed regarding manors, confirms that exogenously-selected years do not produce statistically significant structural breaks in the church-building trends.

Table 5.6. The average number of newly-built, and newly-built/rebuilt/renovated Catholic and Orthodox churches per year in periods separated by structural breaks before 1517.

Model 3a newly-built, rebuilt, & renovated churches		Model 3b newly-built, rebuilt, & renovated ch.		Model 4a newly-built churches		Model 5a rebuild & renovated churches Too few reconstructions and renovations before 1517	Model 6b built/rebuilt/renov. Ch. per 1mn ppl	
1386-1498 ^{ab}	1.035 (0.124) ^c	1386-1416	1.516 (0.336)	1386-1498	0.965 (0.120)		1386-1416	5.497 (1.222)
1499-1517	2.842 (0.456)	1417-1493	0.792 (0.096)	1499-1517	2.632 (0.451)		1417-1493	2.457 (0.294)
		1494-1517	2.625 (0.405)				1494-1517	7.089 (1.097)
Algorithm	seq	Algorithm	KT	Algorithm	seq		Algorithm	KT

^a All structural breaks are estimated by the algorithms.

^b The structural breaks estimated through the sequential procedure are significant at <5% level.

^c The standard errors are robust.

Source: author's calculations, data from Gimbutas (1970).

5.2.3. Urbanisation

Urban development can be evaluated using the estimates of town population from Buringh (2021). Between 1400 and 1600, the database includes six towns in ethnic Lithuania. Their average number of inhabitants was increasing throughout the period: from about 2,200 in 1400, to about 4,667 in 1500, and to about 6,333 in 1550, exceeding the size of an average European town. A large part of this increase was driven by Vilnius, whose population grew from 7,000 in 1400 to 20,000 in 1500, and to 40,000 in 1600. In 1600, Vilnius was jointly the 33rd largest town in Europe (48th in 1550), up from the joint 158th place in 1400.

Adding the estimates for towns in present-day Belarus and Ukraine that belonged to the GDL, Figure 5.3 paints a broader picture. The majority of the GDL's towns (22 of 38) gained more inhabitants during the sixteenth century than during the fifteenth century, almost half (13) gained the same number of inhabitants, and only three towns gained fewer. The population of 18 towns grew faster during the sixteenth century than during the fifteenth century in percentage terms; 12 towns registered the same growth, and 8 towns registered slower growth. Generally, the average town size in the GDL increased from ~1,444 to ~2,875, although it remained consistently below the European average.

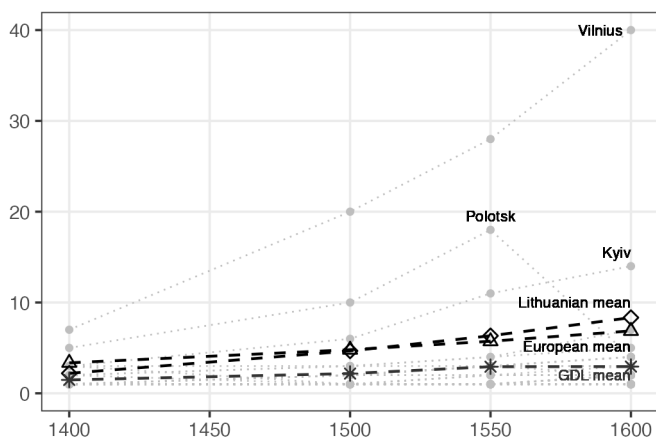


Figure 5.3. The number of town inhabitants in the GDL (in thousands). Source: author, data from Buringh (2021).

The total population based on Šešelgis (1988) allows obtaining Lithuania's urbanisation rate. It almost doubled from 4% to 7.7% between 1400 and 1500, and increased further to 9.2% in 1550, before slightly declining to 8.8% in 1600. This evolution seems in line with the jump in new manors and church-building from the 1480s/1490s, as well as the slowing church-building trend after 1550.

However, the calculated urbanisation rate is very approximate. Historiography considers Lithuania to have been poorly-urbanised and alludes to lower urban development than in Poland (Kiaupienė & Petrauskas, 2009: 85-103, 300-301). Combined with the total population from the Maddison Project Database (Bolt & van Zanden, 2024), Buringh's (2021) estimates yield Poland's urbanisation rate at 6.6% in 1500 and 8.2% in 1600. These numbers are slightly lower, but ethnic Lithuania represents the most urbanised part of the GDL. A fairer comparison is with the Kraków region, for which Malinowski (2016) provides more precise estimates of 3% in 1500 and about

7% in 1578, considering towns of 10,000 or more inhabitants. This measure for Lithuania in 1500 is still higher at 5.5%, but converges with Poland's 1578 urbanisation rate in 1600.

The calculated estimates also do not contradict the higher urbanisation of Western Europe (see Appendix E for the underlying statistics). When the other countries' estimates are based on Buringh (2021) and Bolt and van Zanden (2024), Lithuania's urbanisation rate (7.7->8.8%) ranks 14th among 21 European countries both in 1500 and 1600, far below the Netherlands (32.1->36%), Portugal (25.2->33.7%), or Belgium (30.9->27.7%). Thus, Lithuania did become more urbanised, but, as expected from van Bavel, Ansink, and van Besouw (2017), this process was limited. These numbers may also overestimate the economic development of the entire ethnic Lithuania, as Vilnius alone contained the majority of its urban population. Meanwhile, Norkus (2018: 293-294) insists that Vilnius grew primarily because of its political, rather than economic, significance, while sub-section 5.1.4 describes the obstacles to urban activities.

5.2.4. Overall living standards

The first machine learning-based GDP per capita estimates for the GDL cast further doubt on the apparent economic expansion leading to higher average living standards. From 1400 to 1500, the GDP per capita of present-day Lithuania was stable at 1,510 USD (constant 2011 PPP) (Koch, Stojkoski & Hidalgo, 2024). It decreased to 1,361 USD in 1550, further declining to 1,347 USD in 1600. Estimates for present-day Belarus and Ukraine produce similar trends (Ukraine's growth between 1550 and 1600 being less relevant, as it was joined to Poland in 1569) (Figure 5.4).

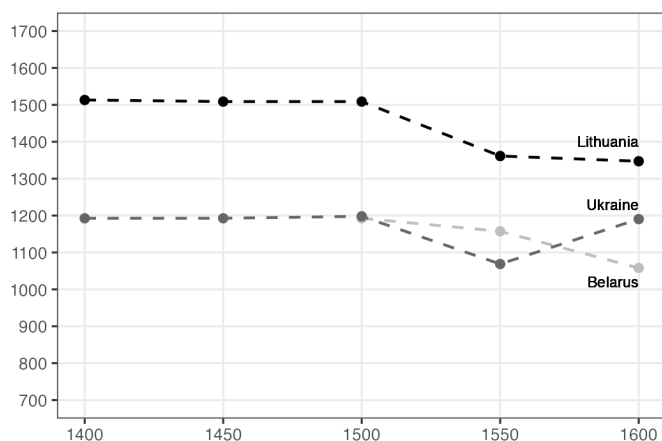


Figure 5.4. Interpolated historic GDP per capita (USD, constant 2011 PPP). Source: author, data from Koch, Stojkoski, and Hidalgo (2024).

These figures also do not reflect broader economic growth. Yet, despite Koch's, Stojkoski's, and Hidalgo's (2024) model being generally accurate, the numbers for the GDL cannot be accepted unequivocally. Eastern Europe is underrepresented in the Maddison Project Database, on which the model is trained. The indirect nature of the estimates might be mitigated by putting them into the European context, although this comparative exercise shows similar results (Figure 5.5). The GDL's economy declined compared to the European average, with the largest decline between 1500 and 1550 – specifically when it had transitioned to a basic LAO. The trend is similar relative to the richest European economies.

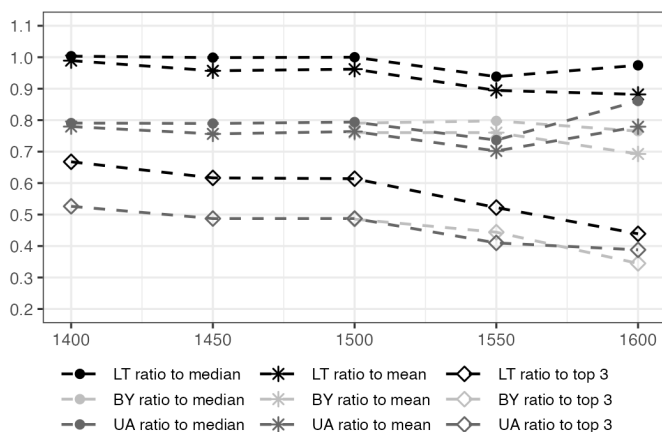


Figure 5.5. The ratios of interpolated GDP per capita to the median, average, and top 3 richest European countries (right). Source: author, data from Koch, Stojkoski, and Hidalgo (2024).

Another measure that mirrors a declining trend in GDP per capita is health. Based on reports on skeletal remains, Steckel and Kjellström (2019) have calculated the health index, comprising morbidity indicators like stature, trauma, cardiovascular and dental health. Among the analysed European excavations, there are nine in Lithuania, on average dated between 1425 and 1600. Figure 5.6 shows the evolution of the health index in these sites. There was a noticeable decline until about 1550, with the health index improving again around 1596. However, the 1596 estimate is from a single burial site, which is also an outlier in terms of trauma. With this component removed from the index, the health trend continued to decrease. Stagnant or worsening health is found by other anthropological studies (Jankauskas, 1995; Jatautis, 2018).

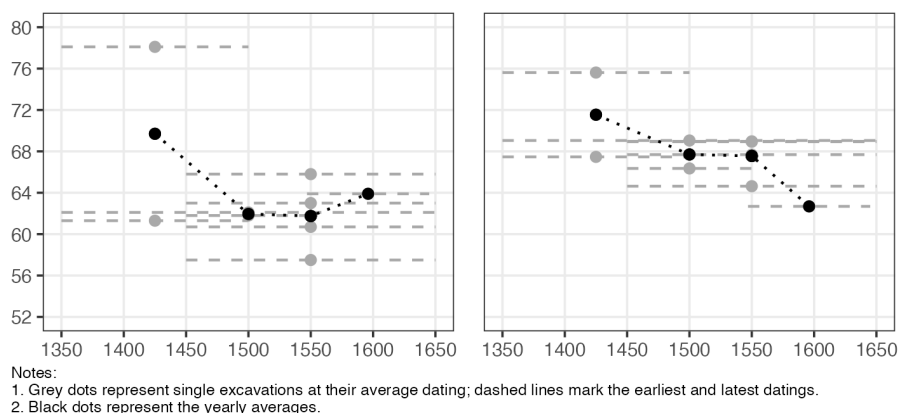


Figure 5.6. The average health index of Lithuanian burial sites including (left) and excluding the trauma component (right). Source: author, data from Steckel and Kjellström (2019).

In general, the GDP per capita and health data suggest that for an average Lithuanian in the fifteenth and sixteenth centuries, the quality of life declined despite improving institutions, the accelerated founding of manors, and the accelerated church construction. Is it possible that the economic outcomes only improved for the elite? Using indirect evidence, chapter 4 of this dissertation argues that in the two earlier centuries, the Lithuanian economy expanded at the extensive margin and per capita gains were eroded by population growth.

Figure 5.7 paints a similar picture. Multiplying the Lithuanian GDP per capita estimates of Koch, Stojkoski, and Hidalgo (2024) by the population interpolated from Šešelgis (1988), one can estimate the total GDP trend. It was increasing throughout the period, although at the slowest pace between 1500

and 1550, and at the highest pace from 1550 to 1600. This evolution of total GDP differs from that of manors and churches, the number of which grew faster throughout the whole sixteenth century.

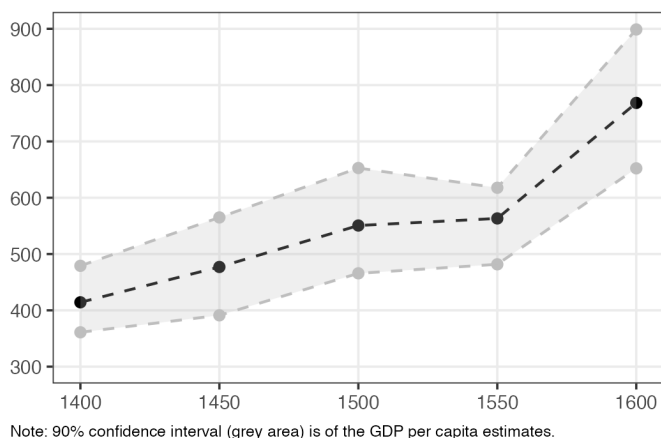


Figure 5.7. Calculated total GDP of present-day Lithuania (constant 2011 USD, in millions). Source: author, based on GDP per capita from Koch, Stojkoski, and Hidalgo (2024) and population from Šešelgis (1988).

Two explanations are possible. The first one is that both data sources are probably too approximate to yield reliable total GDP estimates. However, if the data were correct, the slow growth between 1500 and 1550 could potentially indicate that there was no relationship between institutional change and economic development, or that it at least did not outweigh the impact of external factors like climate. The post-1550 growth might reflect the outcomes of the land reform. In any case, the evidence currently remains too sparse to evaluate the validity of the total GDP data.

Taken together, the data on manors, churches, town population, GDP per capita, and health point in the direction of Malthusian growth, where technological change was insufficient to sustain per capita gains, even if the total economy and elite rents expanded.

5.3. Concluding remarks

In sum, conventional wisdom is correct to attribute great achievements to Vytautas and the sixteenth century. By reformulating the elite, Vytautas kickstarted the GDL's institutional transition, as the state gradually became a corporation of landowners, rather than warrior clans. The nobility restricted the grand duke, developed public law, and created the main political organisation – the Council of Lords. Emerging collective governance helped

the development of property rights and improved the incentives to engage in productive activity, which is reflected by the accelerated founding of new manors.

In the 1490s, the GDL became a basic LAO, and its cultural upturn is evidenced by more intensive church-building that likely resulted from the wealth generated by the elite. These data suggest that the relationship between institutional and economic development did exist in the GDL. The increase in construction activities exactly corresponds with the institutional transition. Although structural breaks are insufficient to prove causality, higher extensive growth resulting from a categorical change between fragile and basic LAOs is expected by the theoretical framework.

On the other hand, as urban businesses still faced many restrictions and peasants were increasingly tied to their land and status, urbanisation grew slowly, and interpolated GDP per capita and health indicators stagnated. This discrepancy between the evidence likely reflects the inherent inequality of LAOs. Even if they can improve institutions and broaden the elite, the 'double balance' primarily results in improving outcomes for those in power. While the transition from a fragile towards a mature LAO is necessary for seeking sustainable development, the logic of limited access cannot deliver it equitably.

Institutional change can also potentially explain the GDL's territorial decline. The lords might not have addressed the geopolitical shifts in the second half of the fifteenth century because they no longer resembled a military elite (Kiaupienė, 2005). As their new rents came from overtaking the royal domain, they, in fact, prospered as a result of military shortages. Having lost material incentives for engaging in warfare, they became reluctant to supply soldiers and expected to outsource this issue to the grand duke. Meanwhile, the basic LAO was not (yet) sufficiently advanced to collectively raise finances for contract soldiers through institutionalised decision-making. Therefore, while improving limited access institutions made the Lithuanian elite more stable and richer, they did not necessarily foster its security.

6. INSTITUTIONAL AND ECONOMIC DEVELOPMENT IN THE POLISH-LITHUANIAN LIMITED ACCESS ORDER (1569-1795)

This chapter continues to analyse the GDL's institutional environment and its relationship with the country's economic outcomes. Yet, compared to the previous two chapters, it is not limited to the GDL itself, but more broadly focuses on the Polish-Lithuanian Commonwealth (PLC), which the GDL entered following the 1569 Treaty of Lublin. This arrangement was not only unique because it transcended the previous dynastic union and created an entirely new polity from two existing ones. Whereas the rest of Europe drifted towards bureaucratic centralisation and absolutism, the PLC rested on noble democracy, extending privileges to up to 7-8% of its population (Sliesoriūnas, 2015: 361; Augustyniak, 2016: 246). Nevertheless, although the PLC chose to defend its parliamentarism and elective monarchy for more than two centuries, its institutional quality does not reflect relatively wide political access.

Being the first to apply the LAO framework, Malinowski (2025) shows that the PLC's ability to sustain collective decision-making deteriorated due to the emergence of a narrow oligarchic elite within the broader nobility. As only a handful of magnate families gained autonomy and less wealthy nobles became dependent on their patronage, the internal commitment mechanism that sustained consensus in the unanimity-based parliament (Sejm; Seimas) deteriorated. The clients were used to exercise the liberum veto, paralysing parliamentary sessions, and the elected monarch was too weak to personally mediate the elite's internal conflicts or enforce political contracts. Malinowski (2025) argues that this case challenges the prevailing new institutionalist view that parliaments and limited monarchs typically lead to better institutional quality and positive economic outcomes. Instead, he urges shifting the discussion to constraining the power of any members of the elite.

While broadly sharing Malinowski's (2025) conclusions, this chapter offers a still more nuanced view. Applying the theory of North, Wallis, and Weingast (2009) in the same systematic way as in chapter 5, it tracks the decline of the PLC's overall institutional environment. Having started as a basic LAO with elements of a mature LAO, the Commonwealth regressed into the fragile LAO territory not only because of the breakdown of political collaboration, but also because this breakdown was enabled and supplemented by parallel sociopolitical processes. Political collaboration is just part of the institutional complexity, together with stagnant administration and

persistently low state capacity. The dual and incoherent legal system became increasingly unable to prevent or solve disputes systematically. Property rights became fragmented, favouring large organisations of the magnates, while the resulting clientelism further eroded the impersonal relationships necessary to sustain the law and collective decision-making. Last gasp reforms briefly returned the PLC on the path towards maturity, but they were eventually overpowered.

In addition, this chapter looks into the institutional and economic development of the PLC from the perspective of the GDL, connecting this account with the earlier Lithuanian history. As chapter 5 discusses, the magnate families did not emerge solely within the PLC – many of them date back to the GDL's previous political system driven by the Council of Lords, which was almost equal in power to the grand duke, and its members' economic power. For a long time, the lords were above the nobility. A broader parliament including the gentry became more important during the 16th-century wars, and their equal status was only institutionalised by the 1564-66 legal/administrative reforms and the Second Statute. These reforms followed the model of Poland, where the parliament balanced the king since the 15th century (see Malinowski, 2019), and which was the more significant blueprint for the PLC. Thus, it appears that the PLC's institutional environment did not start a new process of oligarchisation, but rather reversed the expansion of political access in the GDL.

Following North, Wallis, and Weingast (2009), the chapter formulates and tests the hypothesis that the PLC's economic outcomes declined after it ceased being a basic LAO around the 1660s. Keeping the focus on the GDL, it extends the analysis of structural breaks in the trends of new manors and church-building, using the newly-compiled datasets presented in chapter 3. Similarly to chapter 5, this chapter also discusses the GDL's urbanisation and GDP per capita, supplemented by the Polish estimates.

This combination of indicators lends some support to the hypothesis, although the evidence is more mixed than in the previous two chapters. Some models do show a decreased pace of church-building from about the same time as the institutional transition, and the estimates of urbanisation rate are largely consistent with this finding. However, the other indicators are less straightforward. The structural break in the trend of new manors might appear earlier due to their political role, while the GDP data, which somewhat reproduce the post-1660s decline, are likely overestimated, although the other models of church-building activities that do not yield the expected results are more difficult to interpret.

6.1. Historical context

Initially, upon electing the first joint monarch Henri Valois in 1573, the PLC appeared to continue the earlier political progress of Lithuania and Poland. Valois could only assume his throne on the condition of signing two contracts with the nobility (Kiaupienė & Lukšaitė, 2013: 240-245). The Henrician Articles recorded his commitments to respect the electoral nature of his position, only declare war or peace if permitted by the senate, and only introduce new taxes or conscription if permitted by the parliament, which should be convened at least every two years. The Articles became the standard section of all future contracts, called *pacta conventa*. Signed by every successor, these documents strengthened public law, even though Valois himself left the PLC after just four months to take over the French throne.

Elected following a two-year interregnum, the second Polish-Lithuanian monarch Stephen Bathory faced a renewed war between the GDL and Moscow, which had prompted the full union in the first place (Kiaupienė & Lukšaitė, 2013: 262-266). Yet, helped by successful collaboration with the Lithuanian elite to raise taxes in the GDL and the Poles' eventual persuasion after Moscow invaded Livonia, Bathory managed to improve the military and organise effective defence. He took back Polotsk that had been lost in 1563, signed a treaty that stabilised the geopolitical situation, and following the death of Czar Ivan IV, even considered an offensive campaign. However, such a move did not receive support among the Polish nobility, and Bathory died before he could implement his plan.

Political collaboration started breaking down after the 1588 election of Sigismund Vasa. He was eligible for the throne as the Swedish prince and Sigismund Augustus' nephew, but soon lost elite support in both countries (Sliesoriūnas, 2015: 421, 427). The Polish-Lithuanian nobility was not pleased with Vasa's discussions of possibly giving up the throne to Ernest Habsburg, while in Sweden, his uncle Charles took over his inherited throne by force. In 1609, Sigismund Vasa restarted the war against Moscow, conquering Smolensk, Starodub, and Chernihiv, but the campaign cost significant resources (*Ibid.*: 434-442). Sweden attacked the PLC in 1617, while it simultaneously had to deal with the Ottoman response to Cossack raids in the south and manage the deposition of the Duke of Courland. Unable to maintain a sufficiently capable army, by 1629, the PLC suffered major territorial losses, including Riga – a key Baltic port, particularly important for the GDL. Sweden crossed into ethnic Lithuania, which saw enemy troops for the first time in almost two centuries.

Ladislaus Vasa, who replaced his father in an unchallenged election in 1632, managed to raise taxes in the parliament and reconquer Gdańsk and several other Prussian towns from Sweden (Sliesoriūnas, 2015: 442-457). Despite the fact that the Polish gentry blocked future campaigns, Ladislaus sought to provoke a war against the Ottoman Empire by financing the Cossack movement in Zaporizhia. They ended up rebelling against the PLC, Ladislaus died soon afterwards, and the GDL again relied on its separate assemblies to raise taxes before waiting for new leadership and joint parliaments.

Six years following his election in 1648, Ladislaus' older son John Casimir faced Moscow's occupation of Minsk, Kaunas, Grodno, and Vilnius (Sliesoriūnas, 2015: 453-480). Troops raided the GDL for more than five years, including the relocation of urban craftsmen and the confiscation of manors, while Sweden invaded Livonia and Poland. Against this backdrop, Janušas and Boguslavas Radvila (Janusz and Boguslaw Radziwiłł) – successive heads of a leading Lithuanian magnate family – signed treaties allying the GDL with Sweden and carving out their personal duchies. These plans did not materialise, as the PLC found support against the Swedes in Moscow, Crimea, and Brandenburg. The PLC returned to its pre-war borders and signed another treaty with Moscow in 1667, but John Casimir abdicated his throne following unsuccessful illegal attempts to transfer power to the Prince of Condé.

A local lord Michał Korybut Wiśniowiecki ascended with a broad-based reactionary support among the gentry (Sliesoriūnas, 2015: 480-484). Yet, the most influential Polish magnates backed the French candidate, and Wiśniowiecki's opponents started organising almost immediately following his election. In 1671, the Polish military, headed by Jan Sobieski, entered Warsaw to pressure the king despite looming Ottoman invasion, while about forty other senators asked for French intervention (*Ibid.*: 489-494). The 1673 parliament resulted in a political resolution of the conflict, but the lack of previous coordination had already put the PLC in a difficult situation, as it lost Podolia, Bratslav, and a part of Kyiv region. Wiśniowiecki died on the eve of the PLC's largest victory in the Battle of Chotyn, and the 1676 truce confirmed the Ottomans' gains.

The showing at Chotyn earned electoral support to Sobieski (Sliesoriūnas, 2015: 494-501, 521). He ended an alliance with the Habsburgs, hoping to take back the Duchy of Prussia from Brandenburg and turn it into his personal domain. This would have ideally secured the succession for his son, but could have sparked a confrontation with Moscow. Sobieski signed two secret treaties, obtaining financial and military support from France and Sweden, while the truce with the Ottoman Empire freed his troops to start a new war.

However, Sobieski's plan did not materialise, as the Lithuanian lords preferred continued peace with Moscow and pushed for an alliance, while the Polish magnates instead negotiated with the Ottomans. Eventually, the PLC extended the truce with Moscow, made up with the Habsburgs, and Sobieski died in 1696 without having achieved his goals.

The Elector of Saxony Friedrich Augustus Wettin (Augustus II) overturned the subsequent election by defeating the Prince of Conti (Sliesoriūnas, 2015: 521-572). Aborted plotting of a counter-coup by the GDL's leading lords – the Sapiehas – gave the impetus for the Lithuanian nobility to gather troops and settle their grievances with the family. After multiple lords joined the cause, the Sapiehas lost the 1700 Battle of Valkininkai, Michał Franciszek Sapieha was violently killed, and the confederates ('republicans') briefly assumed governmental and legal power in the GDL. In response, the Sapiehas helped Sweden conquer Courland, before its troops reached Kaunas and Vilnius. Their march towards Kraków was unsuccessful, but another group of Polish nobles announced the elevation of Poznań's governor Stanisław Leszczyński. Sweden raided Western Lithuania and Saxony, enforcing this transition, but Augustus II achieved a victory at Poltava in 1709, leading to his reinstatement. This agreement, alongside other reforms, was swiftly ratified in the 1717 Silent Parliament, watched over by Moscow's troops.

In 1733, Augustus II's succession was contested by his son and Leszczyński, also backed by France (Kiaupa, 2018: 614-619). Russia,³ Prussia, and Austria had signed agreements to block any move towards hereditary monarchy in the PLC, but were unable to agree on a single candidate. Thus, the 'election' ended in favour of Augustus III when Russia entered with more than 70,000 troops, while the magnates feared a larger intervention and Leszczyński could not raise resistance. Augustus III managed to fill the main political offices with his supporters. However, mostly remaining in Saxony, he failed to develop an allied faction in the parliament (*Ibid.*; Kiaupa, Kiaupienė & Kuncevičius, 2000: 320-321). Almost all parliamentary sessions during his reign ended indecisively without any military or political reforms.

A local magnate Stanisław August Poniatowski was the second leader in a row, whose ascension was enforced by the Russian military, this time against the faction supporting Augustus III's son and the existing political system (Kiaupa, 2018: 627-644). Although he belonged to the reformist faction, Catherine II selected Poniatowski as an easily controllable client. Russia

³ Moscow is referred to as Russia from 1721 when it established an empire.

manipulated the conservative faction to assemble a confederation against the reformist leaders – the Chortorysky family – and made sure that the 1767 parliament preserved the veto, kept the monarch’s right to the main political appointments, and reopened public offices to non-Catholics. The Bar Confederation organised resistance, framing it as a defence of Catholicism and against Russia, but was defeated by 1772. A joint invasion of Russia, Prussia, and Austria, settled this defeat by annexing parts of the PLC.

The two decades following the first annexations saw efforts by the reformists and Poniatowski to fix the political system, including the adoption of the Constitution (see sub-section 6.2.2), but the balance of power had tilted towards Russia. The sidelined conservative leaders organised the 1792 Targowica Confederation backed by Russian troops that later merged into broader campaigns directed against the reforms (Kiaupa, 2018: 661-674). Yet, this rebellion became meaningless when the secret agreement between Russia and Prussia came to light. The 1793 parliament annulled the Constitution, reduced the army, and essentially cancelled all reforms. Russia and Prussia did not withdraw their troops, while a widespread uprising failed mainly due to disagreements between the Polish and Lithuanian leadership. The PLC was parcelled out and fully incorporated into the neighbouring empires in 1795.

6.2. Evolution of the limited access order

The high-level history, presented in the previous section, illustrates the PLC’s (geo)political decline, but it does not quite capture its underlying institutional elements. The LAO framework allows showing that many events were likely related to the fact that the quality of the Polish-Lithuanian institutions looks better on paper than in practice, which became increasingly evident over time. By the second half of the 18th century, the PLC even acquired features of a fragile LAO, albeit still formally possessing its relatively democratic set-up. Table 6.1 outlines the gradual institutional decline that took place in all five areas defining LAOs, while the next sub-section analyses each element of this decline separately. Attempted reforms during the final decades of its existence, described in sub-section 6.2.2, could have reversed this trend, but internal and external resistance prevented the changes from taking root.

Table 6.1. The evolution of the PLC as a limited access order.

Period: PLC monarch(s) ^a	Institutional complexity	Legal system	Property rights	Support of organisations	(Im)personality
1569-1587: S. Augustus, H. Valois, S. Bathory	basic	basic/mature	basic/mature	basic	basic/mature
1588-1648: Sigismund and Ladislaus Vasa	basic	basic	basic	basic	basic
1648-1668: John Casimir Vasa	basic/fragile	basic/fragile	basic/fragile	basic/fragile	basic/fragile
1669-1696: M. K. Wiśniowiecki and J. Sobieski	basic/fragile	basic/fragile	fragile	basic/fragile	fragile
1697-1764: Augustus II and Augustus III Wettin	basic/fragile	basic/fragile	basic/fragile	basic/fragile	fragile

^a The time periods represent the reigns of the listed monarchs.

Source: author's analysis.

6.2.1. Institutional reversal

As the elite collaboration in the PLC broke down, its institutions became less complex, its legal system – less capable of solving disputes, and its property rights – fragmented in favour of the magnates. These outcomes likely negatively contributed to the functioning of political and economic organisations, and more broadly, obstructed the development of impersonal relationships. Without proper third-party enforcement and the general lack of security, it is difficult to expect improving access to the economy or improving incentives for productive activity. The rest of this sub-section elaborates on these developments that dragged down the PLC towards a fragile LAO.

6.2.1.1. Institutional complexity

The central state organisation gradually became simpler, since without having established the monopoly on violence, it became too weak to prevent conflicts and make the elite follow standard procedures. The decline of political collaboration went together with violently contested elections, stagnant administration, and persistently low state capacity.

Leadership transitions resorted to violence despite the fact that the first few elections following Sigismund Augustus' death were respected (Kiaupienė & Lukšaitė, 2013: 235-240, 245-258). Sigismund Vasa already fought Maximilian Habsburg in early 1588 (Sliesoriūnas, 2015: 419-424). Although his sons Ladislaus and John Casimir were elected smoothly, all later elections turned problematic. Wiśniowiecki's election was the first to attract significant resistance, led by the head of Polish military. After Sobieski assumed power,

he was himself opposed by the Lithuanian military leaders, who actively tried to stop him from attacking Moscow (*Ibid.*: 497-498). Augustus II secured the throne by defeating the Prince of Conti in an armed stand-off. The victories of Augustus III and Poniatowski were altogether decided in presence of Russian troops (Kiaupa, 2018: 614-615, 629-630).

An increasing number of high-profile elite conflicts is captured by more frequent extra-parliamentary confederations. Having gathered in Poland since before the PLC, these collective movements acting in defence of noble rights were enshrined in the Henrician Articles (Jędruch, 1998: 132-134; Sliesoriūnas, 2015: 36-37). Confederated parliaments could adopt legislation by majority rule and were sometimes used peacefully to disable the veto, but extra-parliamentary confederations and rebellions resulted from conflicts. Three were formed under the Vasas, and the number only grew later (Jędruch, 1998; Table 6.2). Following Wiśniowiecki's election that faced resistance from Sobieski, the 28 years of their rule saw at least two extra-parliamentary confederations. There were at least nine confederations under the Wettins, including the one directed against the Sapieha clan.

Table 6.2. The number of extra-parliamentary confederations and rebellions in the PLC by monarch.

Monarch	Number of confederations and rebellions	Average number of confederations and rebellions per year
Sigismund Augustus (1569-1572)	0	0
Henri Valois (1573-1574)	0	0
Stephen Bathory (1575-1587)	1 ^a	0.08
Sigismund Vasa (1588-1632)	2	0.04
Ladislaus Vasa (1632-1648)	0	0
John Casimir Vasa (1648-1668)	1 ^b	0.05
Michał Korybut Wiśniowiecki (1669-1674)	2	0.33
Jan Sobieski (1674-1696)	0	0
Augustus II Wettin (1697-1733)	9 ^c	0.24
Augustus III Wettin (1733-1764)	0	0
Stanisław August Poniatowski (1764-1795)	7 ^d	0.22

^a The rebellion after Bathory's death is attributed to him, as the nobility could not agree on a successor following his reign.

^b The 1655 Tyszowce confederation is not counted because it gathered in resistance to Sweden.

^c The 1733 and 1734 confederations are attributed to Augustus II, as they fought for his potential successors.

^d The final uprising in resistance to the occupations is not counted.

Source: author's analysis based on Jędruch (1998: 137-138, 85-86).

The GDL's elite preserved some of its own collaboration by maintaining separate political structures. Yet, these structures gradually disappeared, and

it is arguable whether this path dependence was a positive contributor towards the PLC's political system. Lithuanian assemblies convened regularly and were particularly important for coordinating electoral positions, foreign policy, and even raising taxes (Sliesoriūnas, 2015: 34-35). Until the 18th century, 26 high-level Lithuanian convocations were planned, out of which 21 actually took place in Vilnius (Lulewicz, 2006; 2009). Records exist of 17 general regional parliaments, dedicated to coordinating the Lithuanian position. Spontaneous ad-hoc meetings were an even more frequent tool of political collaboration, with at least 42 taking place. Gradually, various Lithuanian assemblies became increasingly rare and/or merged with confederation-related meetings, although regional sessions within the PLC's parliamentary framework replaced them to some extent (Sliesoriūnas, 2015: 36-37).

However, the declining success of parliamentary assemblies is commonly used in the literature to illustrate the breakdown of elite collaboration. Even before the liberum veto became institutionalised in the mid-17th century, nine parliamentary sessions ended without decisions as a result of disagreements between the Vasas and the nobility (Figure 6.1; Sliesoriūnas, 2015: 145-146). Later (excluding the period of attempted reforms), the share of decisive sessions decreased further, most notably from the reigns of Wiśniowiecki and Sobieski (Table 6.3). The nobility opposed Augustus II's reforms directed at increasing his power and strengthening the PLC's ties with Saxony (*Ibid.*: 562-565). During the physical absence of Augustus III, who mostly stayed in his homeland, competing magnate families altogether interrupted almost every session (Kiaupa, 2018: 621-626). Under the Wettins, the sessions also became noticeably shorter.

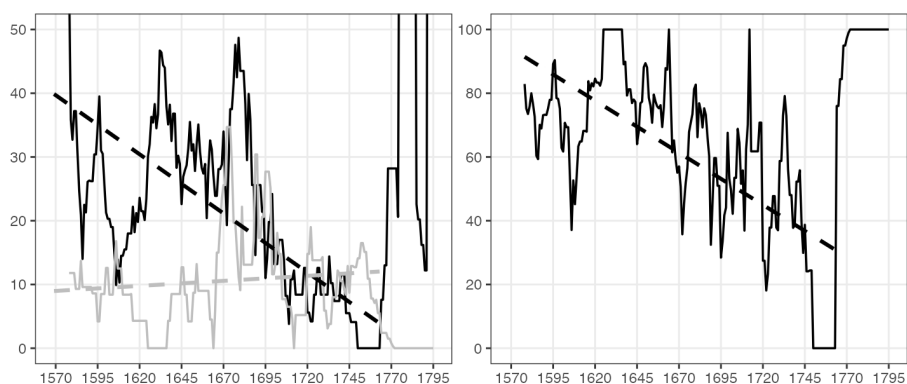


Figure 6.1. The average number of days spent in conclusive (black) and inconclusive sessions (grey) of the Polish-Lithuanian parliament over the last 10 years (left), and the share of days spent in conclusive sessions (right). Source: author based on Konopczynski (1948).

Table 6.3. The frequency of the Polish-Lithuanian parliament sessions, their duration, and outcomes by monarch.

Monarch	Avg. duration (days)	Total sessions	Conclusive sessions	Inconclusive sessions	Concl. sessions' share (%)
S. Augustus (1569-1572)	121.33	3	2	1	66.67
H. Valois (1573-1574)	0	0 ^a	0	0	0
S. Bathory (1575-1587)	41.00	8	5	3	62.5
S. Vasa (1588-1632)	37.56	36	30	6	83.33
L. Vasa (1632-1648)	35.50	14	11	3	78.57
J. C. Vasa (1648-1668)	41.11	19	12	7	63.16
M. K. Wiśniowiecki (1669-1674)	51.60	5	2	3	40.00
J. Sobieski (1674-1696)	79.64	11	5	6	45.45
Augustus II Wettin (1697-1733)	31.42	19	8	11	42.11
Augustus III Wettin (1733-1764)	23.93	15	2	13	13.33
S. A. Poniatowski (1764-1795)	223.50	12	11	1	91.67

^a Convocation, electoral, and coronation sessions held during interregna are excluded for all monarchs.

Source: author's analysis based on Konopczynski (1948).

The PLC could not have significantly developed its administrative structure to sustain the state if its elite was unable to agree on what the state should look like. The main central offices (treasurers, marshals, and hetmans), which had emerged before the PLC, kept representing their own national elites and preserved separate internal hierarchies (Kiaupienė & Lukšaitė, 2013: 230; Sliesoriūnas, 2015: 20). The GDL not only kept its separate law, but also exclusive legal rights for Lithuanian citizens to occupy its administrative offices and manage its public estates, although the offices became informally more open to Poles in the 18th century (Sliesoriūnas, 2015: 20-21; Kiaupa, 2012: 80). Even the common parliaments issued constitutions dedicated

specifically to the GDL-related matters (Sliesoriūnas, 2015: 27-28). Alongside the fact that the chanceries, treasuries, and militaries remained separate, it could be argued that Poland and Lithuania did not create a unified polity altogether (Kiaupienė & Lukšaitė, 2013: 229-230).

Local administration also did not progress much further from the 16th-century reforms that had created the offices of chamberlains, marshals, and local court administration (Kiaupienė & Lukšaitė, 2013: 203-204; Sliesoriūnas, 2015: 92). In the GDL, these new offices largely replaced the network of district elders who used to represent the grand dukes, but now lost their authority among the nobles (Sliesoriūnas, 2015: 93-95; Kowalski, 2013: 110). The rest of the administrative space was filled by the lords' estates, which expanded their state-like apparatuses, including courts, economic administrations, and private militias from the late 16th century (Kowalski, 2013: 242-243). These developments allowed building local zones of influence on national politics, steering the election of district parliament delegates, court officials, and Tribunal deputies (*Ibid.*: 113; Mączak, 2000: 143, 146). Some administrative tasks were taken over by the Church. Catholic parishes, including in non-Catholic parts of the GDL, were responsible for compiling tax registers, informing about conscription, organising primary education, and even collecting taxes (Sliesoriūnas, 2015: 94-95; Kiaupa, 2012: 128; Kiaupa, 2018: 498-500).

The administrative system geared towards private estates did not develop a proper specialisation or meritocracy. Ministerial positions of the grand hetman and field hetman provided significant informal influence by allowing to pressure other nobles via the collection of military taxes and stationing troops on their land (Sliesoriūnas, 2015: 485-487, 513-515). Meanwhile, the hetmans had to finance their staff from their own income, restricting the access to this office, limiting its continuity, and encouraging extra-legal means of exercising influence (*Ibid.*: 176). Such a system possibly also contributed to the allocation of military officers' positions primarily through patronage and outright payoffs (*Ibid.*: 193-194; Kiaupa, 2018: 375-376). Parliamentary control of the treasury remained weak, especially when the assemblies were short and inconclusive (Sliesoriūnas, 2015: 187-189). Instead of being permanent, tax collectors were elected in district parliaments, creating a conflict of interest. The access to the treasurer's office also remained limited, as it was often obtained through purchase (Kiaupa, 2018: 331). By the 18th century, the weakening of the central authority led to the magnates becoming the main intermediaries in distributing local and legal offices (Mączak, 2000: 143, 146).

Another reflection of the PLC's low state capacity was its inability to build a fiscal state. Because the GDL and Poland had initially financed the First Northern War (1559-1570) through the monarch's loans and the pooling of resources, their fiscal system came to be dominated by extraordinary taxes (Guzowski, Łopatecki & Poniat, 2022). This task became even more difficult in an increasingly fragmented parliament. Malinowski (2025) shows that the tax revenue collected in the Commonwealth remained consistently below that of Western Europe. And almost all these taxes financed the military, which nonetheless remained far below contemporary standards both in terms of quantity and quality (Sliesoriūnas, 2015: 195-196; Kiaupa, 2018: 366-371). Although the necessity to increase military capabilities was constantly included in the district parliament instructions, initiatives of permanent taxes usually sparked protests (Sliesoriūnas, 2015: 189-190; Kiaupa, 2018: 386-387). Only the 1717 parliament provisioned a standing army in the GDL and confirmed taxes that were later continued informally, but these changes did not lead to significant military improvements (Sliesoriūnas, 2015: 174; Kiaupa, 2018: 339-340, 366).

6.2.1.2. Legal system

Despite starting from a solid basis, the PLC's legal system was increasingly unable to prevent elite disputes and resolve them through standardised procedures. The union treaty defined a political system embedded into public law – a single monarch was to be elected according to parliamentary procedures, foreign policy had to be decided collectively, and the nobility's property rights were jointly applicable throughout Poland and Lithuania (Kiaupienė & Lukšaitė, 2013: 226). The monarchs' contracts with the nobility – *pacta conventa*, including the Henrician Articles – subjected them to the state and its legal authority.

However, in practice, the monarchs after Bathory did not always follow the law. There were multiple instances of their extra-legal activity, like Sigismund Vasa entering the war with Sweden, John Casimir Vasa plotting his succession, Jan Sobieski provoking the Cossack rebellion to attack Moscow, etc. The main syntheses of Lithuanian historiography describe an increasing number of serious breaches of public law by the monarchs (Table 6.4; see also the expanded lists in Appendix G). The nobility was generally no better, often dealing directly with foreign powers. The episodes of 1655-6, when a large elite faction signed treaties with Sweden, carving out personal duchies for Jonušas and Boguslavas Radvila, are particularly serious illustrations of internal disputes. After the breaches peaked under Augustus II,

public law might have held for a period because of prolonged peacetime and the fact that Augustus III was barely present in the PLC.

Table 6.4. The number of explicit breaches of public law reported in the main syntheses of Lithuanian political history.

Monarch	Breaches by monarchs	Breaches by nobles	Total breaches	Avg. breaches per year
S. Augustus (1569-1572)	0	0	0	0
H. Valois (1573-1574)	1	0	1	0.50
S. Bathory (1575-1587)	0	0	0	0
S. Vasa (1588-1632)	1	3	4	0.09
L. Vasa (1632-1648)	2	0	2	0.12
J. C. Vasa (1648-1668)	4	9	13	0.62
M. K. Wiśniowiecki (1669-1674)	0	1	1	0.17
J. Sobieski (1674-1696)	3	2	5	0.22
Augustus II Wettin (1697-1733)	12	7	19	0.51
Augustus III Wettin (1733-1764)	2	1	3	0.09
S. A. Poniatowski (1764-1795)	4	8	12	0.38

Source: author's analysis based on Sliesoriūnas (2015), Kiaupa (2018), and Kiaupa, Kiaupienė, and Kuncevičius (2000).

This evidence comes in addition to the more frequent confederations and rebellions, described previously, which equally reflect the elite's readiness to use violence. The resolutions of high-profile conflicts that did occur were usually political, rather than legal. Six 'pacification' parliaments (in 1589, 1673, 1698, 1699, 1735, and 1736) were specifically dedicated to dispute resolution (Konopczynski, 1948).

Besides the general inability to collaborate, the PLC's public law was not fully effective, as it competed with national public law, especially that of the GDL. Continuing the history of its de facto constitutions, the Lithuanian elite adopted the Third Statute in 1588 – almost two decades into the union. Preserving separate shared beliefs based on the national distinction, the Statute reaffirmed the GDL's own borders, military, treasury, and courts (Andriulis *et al.*, 2002: 120-123). It remained the primary public, civil, and criminal legal code of the Lithuanian nobility until 1795. On the one hand, the Statute's existence and longevity, also used for reference in Poland, Courland, and Moscow, reflect the relative sophistication of the PLC's legal system (Sliesoriūnas, 2015: 155). On the other hand, it strengthened the Lithuanian elite as a political faction, eventually making political and legal reforms more difficult.

The GDL had reformed its courts in the 1560s following the Polish model, but the two systems remained largely separate. The first instance courts comprised the castle, land, chamber, and, from 1697, fiscal courts, the latter

three electing their judges from among the nobility (Sliesoriūnas, 2015: 168-171). Both in Lithuania and Poland, the Supreme Tribunals were established in the late 1570s as the highest appellate courts, also headed by elected deputies and taking over this task from the monarch (Kiaupienė & Lukšaitė, 2013: 258-259). In 1726, the Supreme Tribunals absorbed the Treasury Tribunals, which dealt with tax litigation (Sliesoriūnas, 2015: 162-168). There were also two separate royal courts – referendary and assessorial – dedicated to cases involving the state domain and its subjects, and various conflicts regarding nobility and town privileges. Among the PLC-wide royal courts, the relational court assessed appeals from the Commonwealth’s fiefs and the assessorial court.

Formally, the establishment of the Tribunals completed the separation of legislative, executive, and legal branches of power (Andriulis *et al.*, 2002: 159). Yet, in practice, the legal system resulted in confusion, rather than specialisation. Multiple legal sources, including the Third Statute in the GDL, parliamentary constitutions (laws), royal privileges, Magdeburg law, confessional law, and manorial rules coexisted, while different social groups were subject to separate courts, with the pathway of appeals not fully clear (Kiaupa, 2018: 295, 300-303). The courts also differed in the definition of their target groups (social vs. territorial) (Stankevič, 2013: 68). Some courts, like the Treasury Tribunal, were temporary or at least started as such. Several courts had overlapping jurisdictions.

The practical functioning of the courts was negatively affected by underdeveloped administration. The most acute problem faced by all courts was the difficulty of enforcing rulings, as they did not possess a dedicated police (Andriulis *et al.*, 2002: 174, 182). Although the district-level courts were supposed to rely on the collective efforts of the local nobility, the nobles were generally reluctant to act against their peers. The decisions of the Lithuanian Tribunal were enforced through the same land and castle courts and thus also not particularly effective (*Ibid.*; Stankevič, 2013: 246-258). The district-level courts were understaffed, elected judges only worked part-time, and the main land courts only gathered for three sessions per year (Andriulis *et al.*, 2002: 172; Kiaupa, 2018: 303-305). The Tribunal was more professional and employed legal services, but also gathered only up to four times per year and travelled between different locations (Andriulis *et al.*, 2002: 181-182). It remained strained beyond capacity even after the 1764 reform, while the number of unaddressed cases kept accumulating, partly due to the ineffective lower courts (Stankevič, 2013: 324, 329-331). At the same time, personal connections could accelerate the legal process due to the persistence of a privileged case register.

Administrative shortcomings provided a gateway for corruption and political interference. Most importantly, Tribunal judges did not receive a salary (Stankevič, 2013: 127-128). Analysing contemporary memoirs, Wierzchowiecka (2008) observes that material gifts to Tribunal judges became particularly widespread from the end of the 17th century – roughly at the time when the elite's disregard of public law also picked up (see Table 6.4). Subsequent prohibitions and oaths against bribery proved ineffective, while disclosure and prosecution of corruption could become a political tool (*Ibid.*; Stankevič, 2013: 128-129, 302-311). The Tribunal, as well as district-level courts, were often politicised to the extent that political competition within the Tribunal and district parliaments (esp. during confederations and interregna) prevented the election of judges (Kiaupa, 2018: 303, 307-310). It did not help that the validation procedure of the Tribunal's electoral outcomes kept changing and remained unclear (Stankevič, 2013: 87-96). In general, high workload and legal ambiguities allowed wealth and connections to play an important role in determining legal outcomes. Thus, as especially reflected in the GDL, the PLC's legal system was primarily advanced on paper, but faced increasing obstacles.

6.2.1.3. Property rights

While property rights remained the main source of elite rents, they became less secure for the gentry. Before the union, in the GDL, the source of the nobility's property rights was essentially the grand duke, who had fully consolidated hereditary authority (see chapters 4 and 5). Family property rights were confirmed with each formal privilege in exchange for loyalty, assistance in governance, and, most importantly, participation in defence. Individual property rights were enshrined in the Second Statute. Such a system worked because the grand dukes granted and enforced the property rights, and managed conflicts as undisputed heads of the elite. At the same time, the Jagiellonian dynasty's hereditary possession of the grand duke's title empowered them to balance the nobility and provide external security of property rights in Poland, where their elected position was more precarious (Frost, 2015: 147-148, 412-413).

This structure gradually broke down – the sources of the property rights and their security switched from the grand dukes' privileges and the dynastic union to the Lublin agreements and the Henrician Articles, in which the elected monarchs committed to preserve the existing property rights of the whole nobility. From this moment, property rights exclusively became the outcome of the nobles' horizontal agreement. In such a system, the nobles

remained connected to the central state through taxes, determined by themselves in the parliament, in return receiving internal and external security through collective mechanisms (Kowalski, 2013: 324).

The security of horizontally-defined property rights had to be ensured by the fiscal state and its paid army and functioning courts. However, the previous two sub-sub-sections describe the shortage of the PLC's central state capacity. Elected monarchs were significantly weaker than before the union. They did not possess significant rents within the PLC, apart from the royal 'table economies' and overland customs, and were legally prohibited from purchasing new property altogether (Sliesoriūnas, 2015: 424). This lack of financial rewards also at least partially explains the monarchs' occasional disregard of the public law and the nobility's interests, like the Vasas' attachment to the Swedish throne and alliances with the Habsburgs, Sobieski's attempts to obtain Prussia, or Augustus II's incursion into Livonia (*Ibid.*: 416-418). Their personally motivated involvement in costly wars likely further contributed to the diminishing trust in their authority and the state.

The weakness of the central state encouraged fragmentation through the build-up of independent political authority by the lords/magnates. Malinowski (2025) argues that because of this increasing independence, the wealthiest magnates gradually lost their incentives to cooperate with the rest of the elite and maintain the state. They had already accumulated large amounts of land, and the succession of wars in the mid-17th century provided further opportunities to expand their estates and, over time, extract rents privately. Having developed private militias comparable to the state military, they became confident about defending their estates and/or being able to directly negotiate with foreign powers (*Ibid.*; Rakutis, 2008). Increasing concentration of administrative offices further augmented their income, especially through the supervision rights over royal estates, and increasing rents allowed to accumulate more clients (Malinowski, 2025). Meanwhile, the central state proved increasingly unable to solve intra-elite disputes (as the clients would veto important legislation) or, due to the lack of permanent fiscal capacity, increase private rents or provide public defence.

Thus, the factual source of property rights shifted from the state to the individual capacity of the nobles. This meant that for the gentry, the property rights became less secure, as they did not possess the same violence and legal capacity within their estates. They either had to rely on an insufficiently capable state or on the protection of magnates. More stable in their wealth and presence, accepting patronage and protection directly from the magnate families became more attractive than horizontal and fair political participation (Mączak, 2000: 143, 171). According to the conceptual model of Malinowski

(2025), a large part of the gentry lost their incentives for cooperation because they became dependent on the lords and gained neither significant private rents, nor security from the state. Gradually, the change in the property rights' structure should have worsened the incentives for productive activity for a large part of the elite.

On the other hand, the magnates remained dependent on the state, as they kept seeking administrative offices with their additional rents, violence capacity, and/or status (Kowalski, 2013: 389, 40-43; Augustyniak, 2016: 63). The independence of their estates also had limits, as not all properties were directly connected. The laws of the PLC still prevailed elsewhere and in disputes between magnates. Even the most extensive estates did not generally develop their separate identity and never became subjects of international law, while the ducal titles of some magnates were only nominal. Because of this, it is unlikely that they lost the interest in the central state completely, but rather leveraged the horizontal institutions to compete for influence in the absence of a strong monarch. During the final period of the PLC's existence, a share of the magnates probably would not have gathered a reformist faction or participated in the uprisings against Russia, had they not held any interest in the state.

In any case, the new property rights' system did not benefit anyone apart from the wealthiest nobles, including towns. In the GDL, the towns faced the same obstacles to their independence like before the union, even if the number of their self-governing privileges grew (Figure 6.2). Their property rights were inferior by design, as they were granted by the ultimate landowners (either the monarch/state or private lords), while the towns did not obtain any significant political representation until 1791 (Kiaupa, 2018: 654). Despite being technically free, town dwellers remained subject to land taxes, while appointed noble administrators at least formally remained the towns' highest officers (Sliesoriūnas, 2015: 227-235; Kiaupa, 2018: 106-107). A major source of their growth – immigration – was limited because contrary to Western Europe, the Polish-Lithuanian towns could not guarantee personal freedom. They were required to report all temporary residents, and the manors actively sought to keep and retrieve their peasants. The magnates were also able to use their violence capacity to pressure merchants for favourable deals (Mączak, 2000: 147).

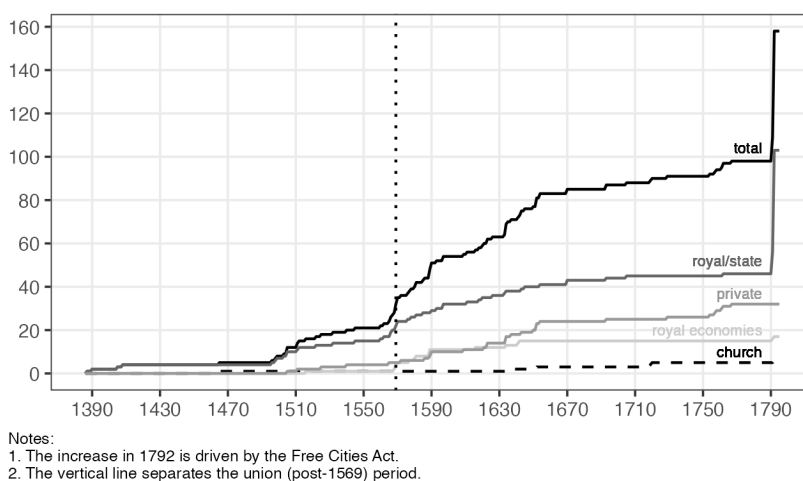


Figure 6.2. The number of self-governing towns in the GDL by ownership. Source: author based on Kiaupa (2012: 135-139).

Many private towns were not fully independent, having developed around the magnates' estates (Sliesoriūnas, 2015: 232-233). The magnates further encroached on royal towns by purchasing property and developing urban residences that could become subject to the law of the nobility, thus avoiding any taxes or obligations to the town community (*Ibid.*: 107-108). Such purchases increasingly happened during the 17th and the first half of the 18th century, especially in places that hosted political assemblies and the Tribunal, like Vilnius, Grodno, Minsk, and Novogrudok. In the mid-18th century, Vilnius alone hosted about 40 lords' palaces, 40 urban manors, 30 monasteries, and 10 churches (Kiaupa, 2018: 125-126). The change in the property rights' regime negatively affected the development of independent organisations.

6.2.1.4. Support of organisations

Following the changes discussed so far, the limits to the PLC's capacity to support political and economic organisations gradually became more apparent. They manifested in political competition turning increasingly informal and economic competition – increasingly concentrated.

Building on existing national traditions, especially that of Poland, the joint parliament was indeed a relatively sophisticated political organisation. After incorporating Livonia in the early 17th century, the lower house contained 170 delegates (48 from the GDL) elected in district parliaments, while the Senate comprised >140 permanent members (28 from the GDL), who held the most important administrative offices (Sliesoriūnas, 2015: 144-145; Kiaupa, 2018:

258). The parliament followed clear rules-based procedures. Its regular assemblies took place every two years, preceded by standard calls from the monarch and district elections, and then following a standard agenda from the opening mass to the final confirmation of the 'constitution' (Sliesoriūnas, 2015: 146-148). These 'constitutions' were published and incorporated into the PLC's legal practices. The parliament also decided on taxes, noble conscriptions, confirmed administrative appointments, and coordinated foreign policy, especially after mandating the monarch to seek approval for warfare (*Ibid.*; Kiaupa 2018: 259).

Yet, the parliament's diminishing effectiveness is apparent from the use of the veto and the growing share of inconclusive sessions. This political vacuum was partially filled by the Senator Council – a semi-informal organisation of about 16-34 senators, originally supposed to advise the monarch between parliamentary assemblies (Sliesoriūnas, 2015: 148-152). It increasingly took over their role in the 18th century. Repeated inconclusive sessions increased the influence of the most powerful officers and ministers, including the hetmans, (vice-)chancellors, marshals, and treasurers (Kiaupa, 2018: 274), somewhat resembling the GDL at the turn of the 16th century. The positions of the grand hetman and the field hetman were particularly coveted among the top magnates, growing in influence during periods of frequent warfare while the troops remained standing (*Ibid.*: 280; Sliesoriūnas, 2015: 483-486, 513-515). Important political battles also took place within the district parliaments, turning the Tribunal elections into bidding wars that the magnates fought through their clients, rather than institutionalised competition (Kiaupa, 2018: 303, 307-310). Similarly informal collective decision-making was expressed by the confederations.

The evolution of economic incentives is well-reflected by the GDL's manors, which retained their position as the main source of elite rents (see chapter 5) while becoming less accessible. The nobility held almost all land – according to the 1667 census, it privately owned about 67.2% of the GDL (Sliesoriūnas, 2015: 106-110). Another 28.2% became *de facto* private following the death of Sigismund Augustus, as the royal domain was converted into public state economies and largely leased out to the lords (*Ibid.*; Kiaupa, 2018: 476-477). By 1588, the land reform initiated by Augustus and his parents had already increased the state economies' income fourfold, encouraging the nobility to mirror the changes (Frost, 2015: 424-428).

The manors were particularly lucrative because they could draw free labour from the peasants, as formally established in the GDL by the Second Statute. At least according to the 1790 land census, about two-thirds of peasants were subject to *corvée*, while only about 26% primarily paid cash

rents (Kiaupa, 2012: 154-155). In the 18th century, the peasants were usually required to work for the manor 3 days per week, in addition to in-kind tributes, ad-hoc activities (like collecting harvest, repairing roads and mills, or the transportation of goods), tributes to the church, and, from 1717, state taxes (Kiaupa, 2018: 172-180). The primary type of peasant obligations depended on the geographical location of the estates and their access to markets like Prussia or Vilnius (Kiaupa, 2012: 154-155), but the general prevalence of *corvée* and the attachment of peasants to their land restricted a large majority from full participation in the economy.

Such incentives resulted in a simple economy. Initially, large landowners specialised in grain and timber products, the latter becoming especially important due to cooling climate and grain prices (Sliesoriūnas, 2015: 236-237, 111-114). From the 17th century, flax and hemp, produced by smaller landowners, also began to comprise a larger share of Lithuanian exports through Riga – the GDL's main port (*Ibid.*: 236-237; Žiemelis, 2011b). Nevertheless, forestry, which required wide waterways, prevented the development of smaller rivers and infrastructure like dams, bridges, and water mills (Sliesoriūnas, 2015: 114-115). Rural industry was generally sparse (Kiaupa, 2012: 168-169). Significantly more frequent were taverns and inns, proliferating from the mid-17th century, as export demand in Western Europe declined (*Ibid.*; Žiemelis, 2011c). The first rural factories only started appearing in private estates towards the mid-18th century, when the most valuable forests had been exhausted (Glemža, 2010: 70-72; Sliesoriūnas, 2015: 111-115). Yet, the grain prices rebounded, and its exports picked up again, together with the expansion of *corvée* (Žiemelis, 2011b; 2011c).

The fact that the GDL primarily remained an exporter of commodities negatively affected the towns (Glemža, 2010: 50, 64). They could not develop as specialised intermediaries, since the nobles remained the only ones exempted from the customs duties on the produce of their manors or imported (luxury) goods for personal use (Sliesoriūnas, 2015: 235-236; Glemža, 2010: 58). Urban production was simple, dedicated to the local market, and exported rarely (Kiaupa, 2018: 94-95). Albeit organising in guilds, urban craftsmen usually worked alone and without extensive specialisation, while urban factories (mainly mills) remained rare (Glemža, 2010: 68; Kiaupa, 2018: 92). The alcohol industry, dependent on local monopoly privileges, played a similarly prominent role, although from the 18th century, the production was also increasingly taken over by the manors (Glemža, 2010: 48; Sliesoriūnas 2015: 237-238).

Meanwhile, the agricultural activity became concentrated among the largest estates. Poorer nobility started facing weaker incentives to develop

their own estates following the shift in the property rights' regime and the 1650s' Deluge (Glemža, 2010: 49). Their work for the magnates particularly intensified from the late 17th century, often driven by necessity and taking the form of patron-client relationships (*Ibid.*; Sliesoriūnas, 2015: 221-222). While a large share of nobles in the GDL never had any dependent peasants, the 1790 census puts this number at 59.8%, with the land ownership skewed towards a few wealthiest families (Kiaupa, 2012: 233-235). Poniat, Guzowski, and Liedke (2024) estimate that the wealth Gini index within the nobility potentially reached as much as 0.92, having increased from 0.77-0.87 since 1528. The Gini index for income inequality in 1790 census was 0.51, with the top 0.1% and 0.01% appropriating 21% and 7% of all earnings (Malinowski & Wroński, 2025). The figures for the whole PLC were 17% and 7% respectively.

Furthermore, the breakdown of collective decision-making stifled market integration and increased transaction costs. Malinowski (2020) shows a clear negative correlation between the number of PLC-wide economic regulations adopted in the Parliament and rye price gaps between Polish towns (including Prussian Königsberg, which, following Riga, was the second main port for Lithuanian exports; Žiemelis, 2011b). Domestic market integration was especially crucial since despite their impact on the general organisation of the largest manors, exports constituted only up to 5% of Poland's and the GDL's overall economies (Žiemelis, 2011a; 2011b). Nevertheless, political collaboration did not even result in unifying the length and weight measurements (Glemža, 2010: 65).

Thus, the economic competition in the GDL and the PLC was limited and markets – inefficient. On top of that, accelerated concentration from the second half of the 17th century allowed the magnates to build greater political influence, providing more resources that could be directed to the clients. The prevalence of patron-client relationships reached their apogee during the 18th century (Mączak, 2000). Political support was expected not only from those who held the managerial positions within the estates, but also from the substantial number of landless and poor gentry who represented their patrons in district parliaments merely in exchange for food and drink (Glemža, 2010: 49; Mączak, 2000: 219). Meanwhile, as Malinowski (2025) shows, weakening monarchs became almost compelled to consistently give out administrative appointments to the same richest families. These families then became the main intermediaries for the advancement of less wealthy nobles (Mączak, 2000: 146). Such an alignment of economic and political power clearly reflects the 'double balance'.

6.3.1.5. (Im)personality

The final element in the PLC's institutional decline was its diminishing capacity to sustain impersonal relationships. Dysfunctional collective decision-making, lacking legal capacity, and unfinished national, social, and religious integration prevented impersonality at the macro level. Pervasive patron-client networks kept protection and most career opportunities personal at the micro level.

The breakdown of collective and rules-based politics is clear from the decreasing share of decisive parliament sessions and the entrenchment of clientelism in the district parliaments. As the magnates increased their power and the monarch became weaker, political decisions became the result of personal relationships between a handful of the richest families, and, like the episodes of extra-legal dispute resolutions illustrate, these personal relationships were fragile. Yet, a fragmented legal system made personal relationships significantly more attractive for everyone. Finally, the enforcement of property rights became more dependent on the personal capacity of specific lords, rather than an impersonal capacity of the state.

As the structures of Lithuanian and Polish elites were initially very different, national path dependence created obstacles to social cohesion. Despite greater inclusion of the gentry, the lords dictated political decisions in the GDL, whereas the Polish system was more strongly driven by consensus among the broader nobility (Kiaupienė & Lukšaitė, 2013: 238). Having become part of a more inclusive political system, which built directly on the Polish parliament (Sliesoriūnas, 2015: 18), the Lithuanian lords sought to preserve their influence. Until the 18th century, their diverging priorities manifested in the Lithuanian assemblies and convocations, which often addressed matters related to Moscow, as well as separate sessions during the parliamentary assemblies, alongside those of Greater and Lesser Poland (Lulewicz, 2009; Sliesoriūnas, 2015: 34-35). Even at the very end of the Commonwealth, at least a part of the Lithuanian magnates clung onto their separate legal system and exclusive access to rents in the GDL by pushing against Poniatowski's reforms (Kiaupa, 2018: 649-651).

Both elites grew closer only throughout the 18th century, but this process did not entirely eliminate national differences. The Lithuanian and Polish nobilities increasingly cultivated personal relationships, intermarried, dealt in land, and occasionally worked in each other's manors (Kiaupa, 2012: 70). Political factions started aligning across ideological, rather than national, lines, especially when the Chortorysky, Wiśniowiecki, and other magnate families of mixed heritage rose to prominence (*Ibid.*: 80-81; Sliesoriūnas,

2015: 53-54). Another factor bringing the two elites together was the Polish language. Polish gradually spread in the GDL's administrative work, until the 'coequation' law legally mandated legal scribes to use Polish instead of Ruthenian (Sliesoriūnas, 2015: 48-51). It became the primary language of both nobilities, although Lithuanian shared beliefs persisted even in Polish, while the Lithuanian and Ruthenian languages survived among the peasants and bilingual gentry (Kiaupa, 2012: 70-71, 271-289).

The roll-back of religious freedoms prevented the emergence of new rival groups to the original magnates, ensuring a narrower elite. Initially, successful counter-reformation and firmer entrenchment of Catholicism in the GDL had helped to bring it closer to Poland, while the general tolerance of all religions had been recorded in the Third Statute (Sliesoriūnas, 2015: 257-274). The 1596 Brest Union created a Greek Catholic (Uniate) Church, attracting the majority of Orthodox Christians, whose hierarchy had been diluted following the transfer of Ukrainian territories to Poland (*Ibid.*: 298-303). Yet, the wars with Sweden prompted the Polish-Lithuanian nobility to reverse the opening of their political system. The 1632 parliament outlawed the building of protestant churches in royal towns, and by the late 17th century, these restrictions were interpreted to include reconstructions and repairs (*Ibid.*: 275-288). Other parliaments banned conversions from (Uniate) Catholicism, and made Catholicism a requirement for the monarch. The 1717 Silent Parliament prohibited non-Catholics from obtaining public offices and managing public estates, and expanded the prohibition of the protestants' public worship to private estates. Finally, in 1733 and 1736, protestants were barred from being elected as parliament representatives or Tribunal judges, while the 1768 Cardinal Laws further reaffirmed Catholicism as a state religion (*Ibid.*; Kiaupa, 2012: 68-69).

Another natural obstacle to impersonality were the patron-client networks. Mączak (2000: 12-18) defines patron-client networks prevalent in the PLC and elsewhere as lasting personal bonds, where the stronger partner provides patronage and protection in exchange for services and loyalty. Repeated favours, like organising voting groups in the district parliaments, can be upward-looking, as the client seeks career and social advancement. Such relationships are evident in the hetmans' distribution of military offices to their protégés, or in the judges' favourable treatment of political allies (Kiaupa, 2018: 375-376; Stankevič, 2013: 276, 311). Dependent relationships, where the client has not much to offer besides, for example, their vote, are mainly directed at preserving their noble status or surviving, as was the case of impoverished landless nobles (Mączak, 2000: 18, 219). Gradually, due to their superior wealth, political influence, and the lack of competition from

towns, the magnate courts could perform many functions typical of the royal courts, further strengthening their local networks: education, elite socialisation, and credit guarantees (*Ibid.*: 293-294). Such an influence weakened the nobles' collective authority and the state's ability to function as an organisation.

On top of internal factors, existing opportunities to profit from illicit dealings with foreign powers further discouraged efforts to build a social order based on collective procedures. The main Lithuanian syntheses of political history indicate numerous instances of the nobles receiving bribes for expected political activity or using direct foreign support during internal conflicts (Table 6.5; see the expanded list in Appendix H). And this list only focuses exclusively on the corruption related to foreign powers. One can also find multiple references to systemic corruption and the detrimental impact of foreign interference on the PLC's capacity to achieve reforms (Kiaupa, Kiaupienė & Kuncevičius, 2000: 258-259, 266). In particular, during the period between 1697 and 1763, Jędruch (1998: 156) attributes as many as 25 vetoes out of 28 to foreign interference. Therefore, by 1764, the PLC's elite became significantly narrower, likewise reducing the extent of impersonality.

Table 6.5. The number of explicit instances of corruption related to foreign powers by the PLC's elite, as reported in the main syntheses of Lithuanian political history.

Monarch	Instances of foreign-related corruption (incl. subsequent interregna)	Average instances per year
Sigismund Augustus (1569-1572)	0	0
Henri Valois (1573-1574)	0	0
Stephen Bathory (1575-1587)	0	0
Sigismund Vasa (1588-1632)	0	0
Ladislaus Vasa (1632-1648)	0	0
John Casimir Vasa (1648-1668)	4	0.19
Michał Korybut Wiśniowiecki (1669-1674)	0	0
Jan Sobieski (1674-1696)	5 (7)	0.22 (0.30)
Augustus II Wettin (1697-1733)	6 (8)	0.16 (0.22)
Augustus III Wettin (1733-1764)	6 (7)	0.19 (0.22)
Stanisław August Poniatowski (1764-1795)	4	0.13

Source: author's analysis based on Sliesoriūnas (2015), Kiaupa (2018), and Kiaupa, Kiaupienė, and Kuncevičius (2000).

6.2.2. Failed attempts at reforms

Had they been successful, reforms undertaken during the last three decades of the PLC's existence could have returned it closer to a mature LAO (Table 6.6). Poniatowski and reformist-led parliament proposed restricting the veto right after assuming power (Kiaupa, 2018: 629, 632). They improved

administration by establishing four new political organisations – the Lithuanian and Polish Treasury and War Commissions, – dedicated to their legally-outlined areas of competence and accountable to the parliament (*Ibid.*: 333-339, 382-386). They relied on a paid bureaucracy, with the Lithuanian Treasury Commission employing 1,000-2,000 workers, including lawyers, scribes, soldiers, and over 700 customs officers (*Ibid.*; Šmigelskytė-Stukienė, 2019). These organisations were also part of the legal reforms, which tried to redirect cases from the Tribunals to lower and specialised courts (Stankevič, 2013: 324). Finally, the parliament actively tried to raise revenue, reforming the management of state economies and adjusting taxes on infrastructure, alcohol, and Jewish businesses, although failing to abolish the nobles' exemptions from customs duties or increase the hearth (wealth) tax (Kiaupa, 2018: 342-344).

Table 6.6. The evolution of the PLC as a limited access order.

Period: PLC monarch(s) ^a	Institutional complexity	Legal system	Property rights	Support of organisations	(Im)personality
1569-1587: S. Augustus, H. Valois, S. Bathory	basic	basic/mature	basic/mature	basic	basic/mature
...	...	...	...	...	...
1697-1764: Augustus II and Augustus III Wettin	basic/fragile	basic/fragile	basic/fragile	basic/fragile	fragile
1764-1795: Stanisław August Poniatowski	basic/mature	basic	basic	mature	basic/mature

^a The time periods represent the reigns of the listed monarchs.

Source: author's analysis.

These changes already affected institutional complexity, the legal system, and the support of organisations, but further reform attempts met strong resistance. Poniatowski's initiative to unify the Polish and Lithuanian commissions was opposed by the magnates. Instead, the 1768 parliament passed the Cardinal Laws that entrenched the existing dual political system and, upon Russian demands, preserved the veto and returned political rights to non-Catholics (Kiaupa, 2012: 68-69). Although the latter development increased political openness, its primary goal was to increase the number of easily controllable clients (Kiaupa, 2018: 635). Resistance thus erupted in the Bar Confederation, which framed its struggle as a defence of Catholicism and resistance to Russia (Kiaupa 2018: 635-644). The movement spread across the PLC and continued until 1772, but was eventually defeated, ending in the joint invasion by Russia, Prussia, and Austria. Many local assemblies were

demoralised or manipulated into electing pro-Russian delegates, and, despite some opposition, the parliament ratified the occupations.

However, Poniatowski and the reformists used the same confederated 1773-1775 parliament, where the veto was suspended, to centralise governance and further streamline decision-making (Kiaupa, 2018: 644-647). The parliament founded the Permanent Council as a new PLC-wide executive body, later granting it control over the military, commissions, and ministerial offices. Poniatowski used the Council to restructure the tax system and increase the number of troops. The only commission not subject to Council was the Education Commission. An achievement in itself, it was the first commission covering the entire PLC and the first central educational authority in Europe. However, further unification of Polish and Lithuanian institutions remained largely unimplemented. As Russia exhibited significant influence on the Council, the day-to-day politics during the next decade were dictated by cooperation and compromise between the Council, the monarch, and Russia, while nobles generally opposed centralisation. Because of this dynamic, the historiography's assessment of the Council is not uniform (Kiaupa, Kiaupienė & Kuncevičius, 2000: 332).

Two divergent paths of organisational reforms further highlight the dualism within the elite. Antanas Tyzenhauzas (Antoni Tiesenhaus), appointed by Poniatowski to oversee the state economies, doubled down on expanding centralised large-scale agriculture based on the peasants' labour services (Kiaupa, 2018: 208-210). Although he also developed mills and urban factories, they were inefficient and their production expensive, while the state economies largely became exploitative and detrimental to surrounding towns (*Ibid.*; Glemža, 2010: 70-72). Seeking to profit from increasing agricultural demand in Western Europe, other conservative nobles implemented similar reforms, increasing taxes and services (Glemža 2010: 48). Others took a more liberal path, like vice-chancellor Joachim Litawor Chreptowicz, who abolished labour services altogether, redistributed his land, and expanded cash rents (Kiaupa, 2018: 210-213). Bishop Paweł Ksawery Brzostowski went further and relied on cash rents completely, also lowering taxes, lifting the peasants' trade restrictions and educating them of superior farming methods (*Ibid.*; Glemža 2010: 50). Pre-Constitution district parliament instructions even contemplated widespread abolition of services, but these calls met similar attempts to intensify them (Kiaupa, 2018: 233).

The PLC would have come closest to a mature LAO, had it been able to internalise the reforms achieved by the 1788-1792 parliament, which concerned all main institutional dimensions. Russia's involvement in wars against the Ottoman Empire and Sweden, alongside an alliance with Prussia,

emboldened the parliament to dismantle the Council and (formally) expand the army (Kiaupa, 2018: 652-654). The parliament restructured local administration through civil-military commissions, replaced the Council's departments with new commissions, and adopted measures like capital punishment for accepting bribes. It tied the participation in local parliaments with land ownership, trying to remove the political access from the most vulnerable nobility. At the same time, the 'Free Cities Act' granted royal town citizens personal freedom and property rights, compensating the mentioned reduction of the elite. Maćzak (2000: 229) finds the widespread political awakening during this period difficult to explain, while Šmigelskytė-Stukienė (2019) argues that more than two decades under the commissions and the Council nurtured a new class of civil servants, providing an alternative to (but not entirely replacing) clientelism.

The most important product of the Four-Year Parliament was the Government Act, commonly known as the Constitution of 3 May 1791. It entirely redefined the PLC, increasing its institutional complexity, reforming public law, and expanding political and economic access. Drafted with input from Poniatowski and reformist leaders, the Constitution received support from more than half of both Polish and Lithuanian representatives (Kiaupa, 2018: 654-657). It replaced the system dominated by the nobles with a hereditary constitutional monarchy grounded in the separation of powers: legislative (represented by the parliament), executive (the king and the Guard of Laws), and judicial (courts). The Constitution abolished the veto and confederations and expanded the parliament to include town representatives. The first four articles defined the social structure, guaranteeing religious freedom, reaffirming noble rights, and incorporating the Free Cities Act. While not yet including the peasants, the Constitution started redefining the political community beyond the nobility.

Yet, the actual transformation to a constitutional monarchy proved too difficult, as the changes threatened many existing interests (Kiaupa, 2018: 657-668). Although 27 out of 33 Lithuanian local assemblies expressed loyalty to the Constitution, there was also opposition among the gentry. Even those Lithuanians who supported the reforms rejected the unitary state, insisting on preserving the Lithuanian law, treasury, and parliamentary representation. These demands led to several political compromises and ultimately an addendum, adopted later in the year, affirming the federal structure of the PLC. It guaranteed equal representation in joint commissions, preserved Lithuania's Treasury Commission and Treasury Court, and upheld its parity with Poland. Meanwhile, the conservative nobles sought to restore

the previous political system altogether, turning to Russia for help, which ultimately resulted in the PLC's dissolution.

Given the long political impasse and subsequent failures by the PLC to reinforce its army, fiscal capacity, and administrative structure, Butterwick (2001) finds the occupations to have been the more natural outcome than successful reforms. Yet, it remains difficult to access their actual impact – the general progress in getting to the point of adopting the Constitution suggests that the institutional environment did improve during the last three decades.

6.3. Institutional development and economic outcomes

Prompted by an external shock that accelerated the institutional decline, the PLC ceased being a basic LAO during the reign of John Casimir Vasa. This categorical change happened as political collaboration broke down, the nobles turned opportunistic and started increasingly disregarding the law, the property rights became fragmented, political and economic competition – dominated by the nobles, and impersonal relationships threatened by spreading clientelism. Considering these developments and their collective impact on economic incentives, one should expect to find an associated decline in the PLC's development outcomes. Following the LAO framework (see section 1.2), poorer legal enforcement, security of property rights, and incentives to agree on investment in shared goods and cultivate impersonal relationships should all produce negative effects on growth through disrupting organisations.

Therefore, this section tests the hypothesis that the PLC's development trend decreased at the same time when it lost the full set of features of a basic LAO in about the 1660s. Continuing the analysis of the previous two chapters, the testing mainly focuses on the GDL for comparability and preservation of the Lithuanian perspective. First, sub-sections 6.3.1 and 6.3.2 extend the identification of structural breaks in the time-series of new manors and church-building activities. Sub-section 6.3.3 looks into the urbanisation data, including that of Poland. Finally, sub-section 6.3.4 analyses the first available (interpolated) estimates of GDP per capita and conducts the structural breaks' tests on Malinowski's and van Zanden's (2017) figures for Poland. Yet, the number of excavations recorded by Steckel & Kjellström (2019) are insufficient to consider the health index like in chapter 5.

6.3.1. Manors

The methodology for estimating structural breaks in the trend of new manors per year is described in sub-section 3.2.3, while this sub-section also employs the same dataset based on the manors' descriptions by Semaškaitė (2010). Although the dating of the more recent manors should be more certain, the accuracy of the full 1386-1800 dataset remains similar compared to the one used in sub-section 5.2.1. 41.4% of manors are known to have been founded or first mentioned at a specific date, rather than at an interval (vs. 47.1% in the smaller dataset). The average interval of uncertainty is 43.6 years, or 37.3 years without the most extreme values dated at intervals of >99 years (vs. the average uncertainty of 40.9 years in the smaller dataset).

Table 6.7 presents the structural breaks estimated in the default dataset, where the specific founding years of each manor are assigned to the middle of the known intervals (see the dataset in Appendix A). The main model (Model 1a), estimated by the sequential testing algorithm of Bai and Perron (2003) (seq), is not particularly informative, as it only yields a single structural break in 1449 – the same as using the smaller dataset (see Table 5.2 for comparison). Models 1b and 2b yield more breaks by optimising a modified Bayesian Information Criterion (Kurozumi & Tuvaandorj 2011; KT), but they do not correspond with the expected changes in growth regimes in the 1490s and 1660s, and are therefore similarly questionable.

Table 6.7. The average number of newly-established manors per year in periods separated by structural breaks.

Model 1a new manors		Model 1b new manors		Model 2a new manors per 1 mn ppl	
1386-1449 ^{ab}	0.188 (0.039) ^c	1386-1449	0.188 (0.039)	1386-1449	0.655 (0.136)
1450-1800	0.957 (0.168)	1450-1536	0.931 (0.165)	1450-1536	2.660 (0.465)
		1537-1600	1.844 (0.631)	1537-1600	4.069 (1.515)
		1601-1662	0.629 (0.378)	1601-1675	0.819 (0.396)
		1663-1737	0.307 (0.097)	1676-1737	0.574 (0.208)
		1738-1800	1.190 (0.481)	1738-1800	1.606 (0.792)
Algorithm	seq	Algorithm	KT	Algorithm	seq

^a All structural breaks are estimated by the algorithms.

^b The structural breaks estimated through the sequential procedure are significant at <5% level.

^c Standard errors are robust.

Source: author's calculations, data from Semaškaitė (2010) and Šešelgis (1988).

Here, like in section 5.2, it is also essential to estimate the models over a number of simulated datasets. Assigning the specific founding years of manors randomly allows eliminating the bias resulting from many similar dating intervals. In addition to 24 manors founded 'in the 15th century' and 33 manors founded 'in the 16th century', the full dataset respectively contains 20 and 26 manors dated just at the '17th' and '18th' centuries. In the default dataset used in Table 6.7, these intervals correspond to 1450, 1550, 1650, and 1750, whereas the simulated datasets randomly assign specific founding dates to each manor individually, at least preventing the unlikely clustering at the mid-century marks and other proxies for common dating intervals (see the clustering in Figure 3.3).

Table 6.8 and Figure 6.3 summarise the most frequently estimated structural breaks over 10,000 simulated datasets. Model 1a generally produces two structural breaks – one in about the 1480s (similar as with the smaller dataset; see Table 5.3) and one at the turn of the 17th century. The results of Model 1b are essentially the same, with another break in ~1737. Models 2a and 2b yield very similar structural breaks when considering the average yearly number of new manors per 1 million people, where the annual population is based on the estimates of Šešelgis (1988) (Appendix F describes the construction of the population data).

Table 6.8. The frequency of structural breaks in the trends of newly-established manors per year, where their founding dates are randomly assigned within known intervals.

Model 1a new manors (seq)		Model 1b new manors (KT)		Model 2a new manors per 1 mn ppl (seq)		Model 2b new manors per 1 mn ppl (KT)	
Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count
1481, 1599	1,180	1491, 1599, 1737	1,381	1491, 1599	2,112	1491, 1599	608
1491, 1599	931	1490, 1599, 1737	739	1490, 1599	1,132	1490, 1599	344
1490, 1599	496	1491, 1599, 1736	401	1481, 1599	633	1491, 1596	222
1477, 1599	436	1491, 1598, 1737	377	1491, 1598	598	1491, 1599, 1671	199
1480, 1599	372	1491, 1600, 1737	311	1491, 1600	440	1481, 1599	198
other	6,585	other	6,791	other	5,085	other	8,429

Source: author's calculations, data from Semaškaitė (2010).

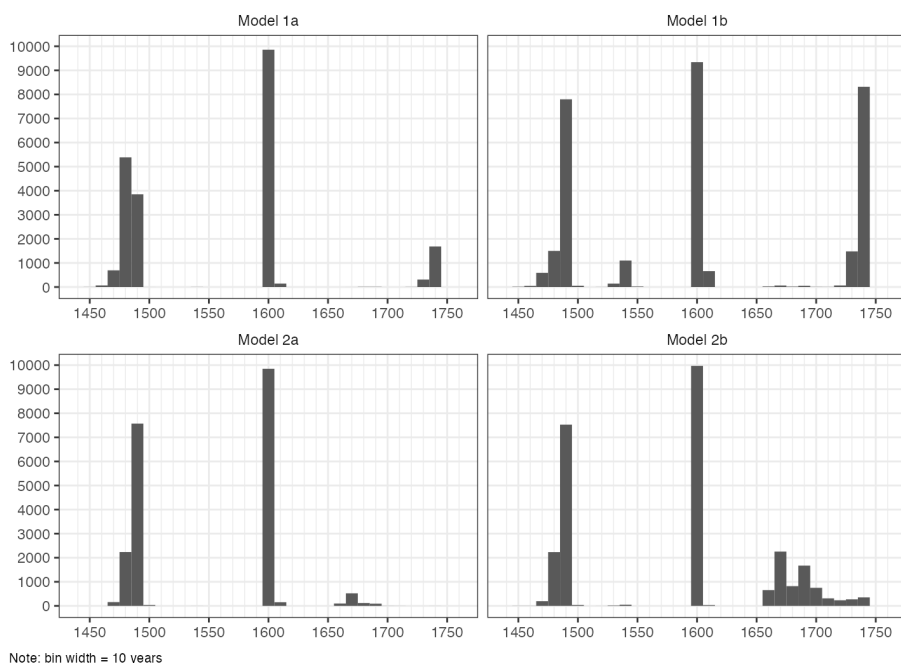


Figure 6.3. The frequency distribution of the structural breaks, estimated by the models using 10,000 simulated manors' datasets.

In general, the structural breaks in the trends of new manors point towards worse development outcomes from the 17th century. A structural break in between 1595 and 1605 appears in 98.6% of all estimations of Model 1a, 93.4% of the estimations of Model 1b, 98.5% of the estimations of Model 2a, and 99.7% of those of Model 2b. However, such a timing is not expected given that the PLC ceased being a basic LAO later. Since the manors were not strictly economic, but also political/administrative organisations, perhaps it is

possible that their trend is endogenously related to institutional development. While not resulting in a categorical change, the PLC's institutional environment still deteriorated during the reigns of Sigismund and Ladislaus Vasa. An additional break in the 1730s, present in 97.2% of all estimations of Model 1b, is expected even less. It is mainly produced by the KT algorithm, which often yield more breaks in general, although the historiography does qualitatively recognise an economic recovery since about the 1730s (Kiaupa, 2018: 485; see also the next sub-section).

In any case, the most frequently estimated breaks in the trends of new manors do not fully correspond to the hypothesis. According to an exemplary estimation of Model 1a shown in Figure 6.4, only 0.35 manors per year were founded in ethnic Lithuania before 1481, later increasing to 1.48, and decreasing again to 0.69 after 1599. Figure 6.5 depicts the most common Model 2a, which estimates a yearly average of new 1.26 manors per 1 million before 1491, 3.68 between 1492 and 1599, and 1.05 from 1600.

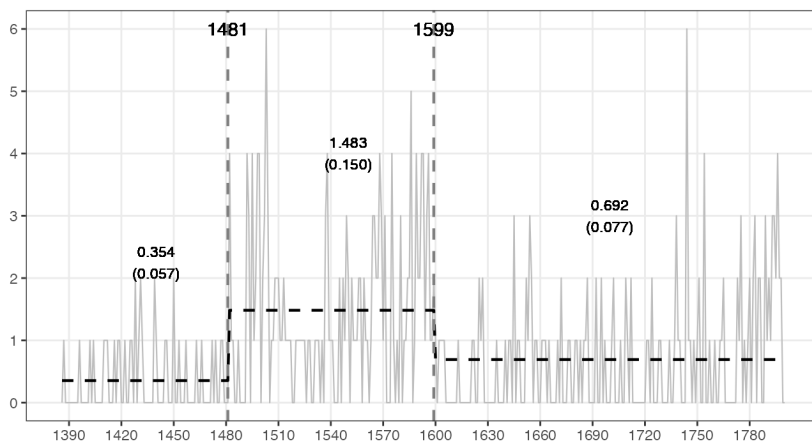


Figure 6.4. The most frequent result of Model 1a, estimating new manors in present-day Lithuania per year, where their founding are randomly assigned within known intervals. Source: author's calculations, data from Semaškaitė (2010).

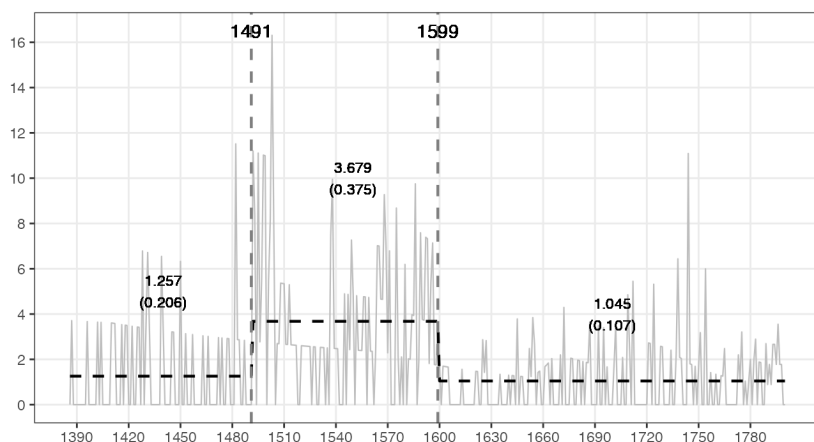


Figure 6.5. The most frequent result of Model 2a, estimating new manors per capita in present-day Lithuania per year, where their founding are randomly assigned within known intervals. Source: author's calculations, data from Semaškaitė (2010).

6.3.2. Churches

Like the analysis of manors, this sub-section relies on the full dataset presented in sub-section 3.2.4 to estimate the structural breaks in the trend of church-building activities in ethnic Lithuania. It is based on a list compiled by Gimbutas (1970), which yields more precise information than the manors' descriptions. Expanded with more recent entries, 82% of all church-building activities now have a precise date, while the average uncertainty of those dated at an interval is 8.1 years (compared to 77.8% and 11.3 years in the smaller dataset; see sub-section 5.2.2).

Table 6.9 provides the structural breaks in the trend of church-building activities resulting from the initial dataset, where the activities dated at an interval are assigned to its middle value (e.g. '17th century' results in 1650, '18th century' – in 1750, etc.). Generally, all models estimate the break in the 1490s, reflecting the GDL's earlier transition to a basic LAO. However, Models 3a and 3b, which consider the average number of built, rebuilt, and renovated churches per year, do not produce a break in the 1660s, instead picking up an even faster church-building trend from 1739. Among the Models 5a and 5b, estimating the trend in church-building activities per 1 million people, only the one resulting from the KT algorithm yields a break in 1649 – but, contrary to the expectations, the trend after this date becomes faster.

The real development outcomes could be obscured by the reconstructions and renovations resulting from intensive warfare on the Lithuanian soil, which happened particularly in the 1650s. Models 4a and 4b that consider just the

newly-built churches do yield a structural break in 1651. Additional estimations over 10,000 simulated datasets, where uncertain dating of church-building activities are assigned within known intervals randomly (Table 6.10 and Figure 6.6), lend further support to these results. 97.2% and 97.3% of all estimations of Models 4a and 4b contain breaks in the 1640s, close to the PLC's institutional regress. Yet, such breaks are absent from Models 6a and 6b, and the sequential testing algorithm does not yield any breaks at all. While this outcome could result from the shortcomings of interpolated yearly population estimates and their interactions with the measurement errors in the manors' dataset, it might also mean a true absence of a break. Therefore, Models 4a and 4b at best provide partial support to the hypothesis, whereas the break in 1738 merits a separate discussion at the end of the sub-section altogether.

Table 6.9. The average number of newly-built, and newly-built and rebuilt/renovated churches in Lithuania per year in periods separated by structural breaks.

Models 3ab ^a newly-built, rebuilt, & renovated churches		Model 4a newly-built churches		Model 4b newly-built churches		Model 5a rebuilt & renovated churches per 1 mn ppl		Model 5b rebuilt & renovated churches per 1 mn ppl		Model 6b newly-built churches per 1 mn ppl	
1386-1499 ^{bc}	1.044 (0.12) ^d	1386-1491	0.934 (0.127)	1386-1499	0.974 (0.119)	1386-1499	3.422 (0.432)	1386-1493	3.330 (0.450)	1386-1493	3.145 (0.447)
1500-1738	3.226 (0.273)	1492-1650	2.226 (0.241)	1500-1650	2.265 (0.249)	1500-1800	7.028 (0.545)	1494-1555	7.741 (1.612)	1494-1555	6.273 (1.253)
1739-1800	7.855 (0.923)	1651-1738	1.159 (0.139)	1651-1738	1.159 (0.139)			1556-1649	5.022 (0.502)	1556-1738	2.913 (0.224)
		1739-1800	3.274 (0.400)	1739-1800	3.274 (0.400)			1650-1738	6.714 (0.814)	1739-1800	3.949 (0.592)
								1739-1800	9.621 (1.445)		
Algorithm	seq/KT	Algorithm	seq	Algorithm	KT	Algorithm	seq	Algorithm	KT	Algorithm	KT

^a The results of Models 3a (sequential algorithm) and 3b (KT algorithm) using the default dataset are identical.

^b All structural breaks are estimated by the algorithms.

^c The structural breaks estimated through the sequential procedure are significant at <5% level.

^d The standard errors are robust.

Source: author's calculations, data from Gimbutas (1970) and Šešelgis (1988).

Table 6.10. The frequency of structural breaks in the trends of newly-built, and newly-built and rebuilt/renovated churches per year, randomly assigning construction dates within known intervals.

Model 3a built/rebuilt/renov. Churches (seq)	Model 3b built/rebuilt/renov. Churches (KT)	Model 4a newly-built churches (seq)	Model 4b newly-built churches (KT)	Model 5a built/reb./ren. Ch. per 1 mn ppl (seq)	Model 5b built/reb./ren. Ch. per 1 mn ppl (KT)	Model 6a newly-built ch. per 1 mn ppl (seq)	Model 6b newly-built ch. per 1 mn ppl (seq)
Break(s) Count	Break(s) Count	Break(s) Count	Break(s) Count	Break(s) Count	Break(s) Count	Break(s) Count	Break(s) Count
1499, 1597, 1738 3,277	1499, 1738 4,416	1497, 1642, 1738 1,335	1499, 1642, 1738 1,575	1499, 1738 3,026	1493, 1555, 1654, 1738 3,607	no breaks 9,999	1493, 1555 6,478
1499, 1599, 1738 2,103	1493, 1593, 1655, 1738 718	1493, 1642, 1738 1,282	1497, 1642, 1738 1,138	1493, 1738 1,836	1493, 1555, 1654, 1737 2,181	1626 1	1529 1,499
1493, 1588, 1738 1,083	1493, 1591, 1655, 1738 542	1493, 1646, 1738 665	1499, 1646, 1738 759	1499, 1737 1,786	1493, 1555, 1738 1,553		1526 590
1499, 1588, 1738 740	1493, 1597, 1738 426	1497, 1646, 1738 592	1499, 1647, 1738 587	1497, 1738 1,213	1493, 1555, 1737 858		1491, 1555 287
1499, 1591, 1738 676	1493, 1599, 1738 252	1493, 1647, 1738 587	1499, 1648, 1738 544	1493, 1737 1,085	1491, 1555, 1654, 1738 167		1496, 1558 237
other 2,121	other 3,646	other 5,539	other 5,397	other 1,054	other 1,634		other 909

Source: author's calculations, data from Semaškaitė (2010) and Šešelgis (1988).

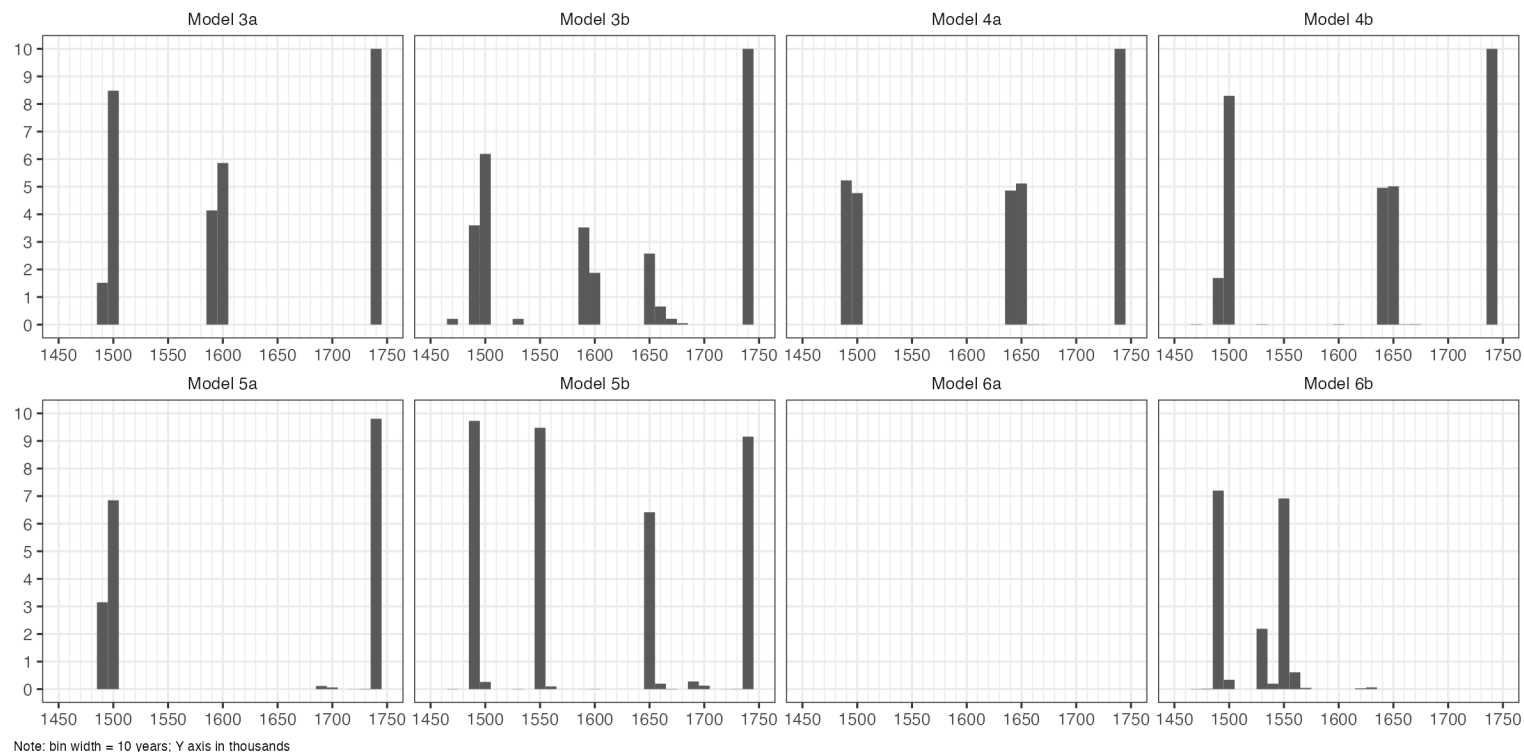


Figure 6.6. The most frequently estimated structural breaks in the trends of church-building activities in Lithuania by Models 3a-6b, where the construction dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

Figure 6.7 depicts the most frequent estimation of Model 3a, illustrating that the total number of new church-building activities constantly kept increasing. In contrast, Figure 6.8 shows that the trend of just the newly-built churches slowed after 1642. There were about 2.35 new churches constructed per year in ethnic Lithuania between 1497 and 1642, but only 1.33 from 1643 to 1738, before the trend rose again (see the discussion later in the sub-section).

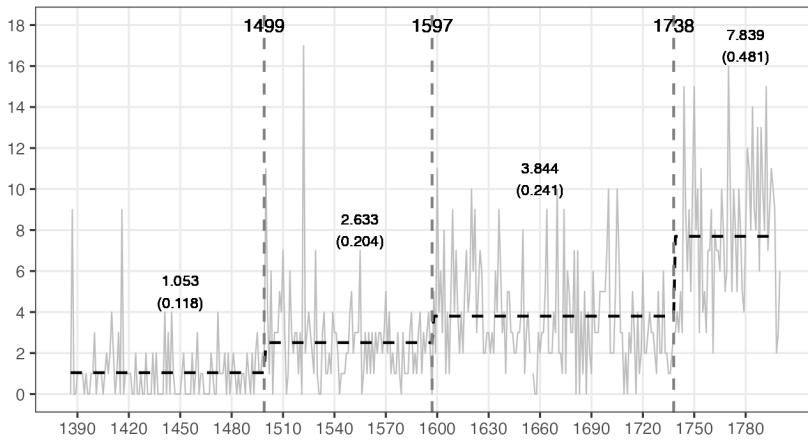


Figure 6.7. The most frequent result of Model 3a, estimating newly-built, rebuilt, and renovated churches in Lithuania per year, where the construction dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

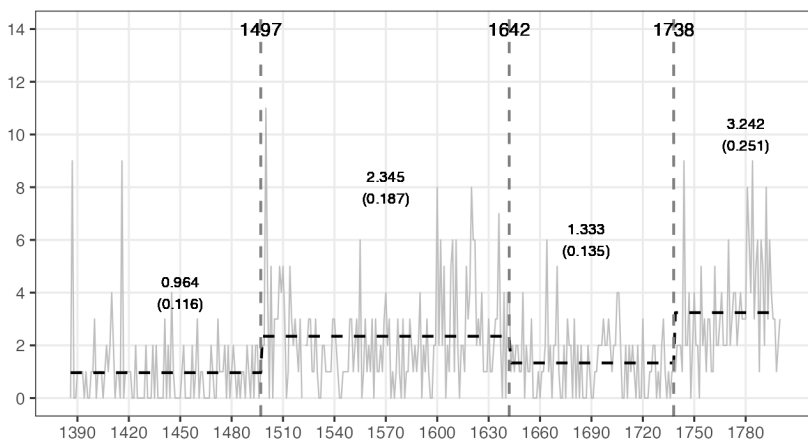


Figure 6.8. The most frequent result of Model 4a, estimating just the newly-built churches in Lithuania per year, where the construction dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

It may also be the case that the trends analysed so far reflect the changes in the quantity, but not in the quality, of the churches. Whereas the majority of churches in Lithuania remained wooden, in 1600, the number of masonry churches had passed 50, and their share increased from ~18.2% to ~26.5% during the 17th and 18th centuries (see Figure 3.4). Ignoring this development could limit the extent to which the data reflect the wealth and spending of the elite. To address such a possibility, Table 6.11 provides the modelling results using the default dataset, and Figure 6.9 and Table 6.12 summarise the robustness check over 10,000 simulated datasets only containing semi-randomly dated masonry churches.

The interpretation of these results is also complicated. 99.3% of all estimations of Model 7b produce structural breaks in the trend of all masonry construction activities in the 1670s, but this is only the case for 50.9% of the estimations of Model 7a. Model 8b, concerning only newly-built and newly-converted masonry churches, also estimates a break between 1660 and 1675 in 99.9% of the simulated datasets, but Model 8a does not pick up any meaningful breaks through the sequential procedure. This is also the case regarding Models 9a and 10a. Some, albeit not many (28.3%), runs of Model 9b also produce a break in the trend of newly-built or converted masonry churches per 1 million people from 1660 to 1675. Meanwhile, 1676 is the most frequent break in the trend of newly-built masonry churches per 1 million people in the case of Model 10b.

In sum, a share of the models fail to reject the hypothesis that the PLC's development trend decreased from about the 1660s, but, generally, their support remains only partial. Figure 6.10 illustrates the most common Model 7b, which yields somewhat expected results concerning the trend of all masonry construction activities. Similarly, Figure 6.11 depicts the most frequent estimation of the annual number of new masonry churches per 1 million people (Model 10b).

Table 6.11. The average number of newly-built, and newly-built and rebuilt/renovated masonry churches in Lithuania per year in periods separated by structural breaks.

Model 7a built/rebuilt/renovated masonry churches		Model 7b built/rebuilt/renovated masonry churches		Model 8a built/converted masonry churches		Model 8b built/converted masonry churches		Model 9a ^a built/converted ma- sonry ch./1mn ppl		Model 10b ^a newly-built mason- ry ch. per 1mn ppl	
1386-1591 ^{bc}	0.238 (0.046) ^d	1386-1494	0.138 (0.036)	1386-1591	0.209 (0.036)	1386-1499	0.149 (0.037)	1386-1591	0.597 (0.101)	1386-1676	0.564 (0.074)
1592-1676	1.059 (0.105)	1495-1591	0.351 (0.087)	1592-1800	0.727 (0.065)	1500-1591	0.283 (0.062)	1592-1800	1.085 (0.092)	1677-1800	0.335 (0.076)
1677-1738	0.548 (0.083)	1592-1676	1.059 (0.105)			1592-1664	0.890 (0.098)				
1739-1800	1.661 (0.199)	1677-1738	0.548 (0.083)			1665-1737	0.342 (0.063)				
		1739-1800	1.661 (0.199)			1738-1800	0.984 (0.132)				
Algorithm	seq/KT	Algorithm	seq	Algorithm	KT	Algorithm	seq	Algorithm	seq	Algorithm	KT

^a Models 9b (KT algorithm) and 10a (seq algorithm) produce no structural breaks.

^b All structural breaks are estimated by the algorithms.

^c The structural breaks estimated through the sequential procedure are significant at <5% level.

^d The standard errors are robust.

Source: author's calculations, data from Gimbutas (1970) and Šešelgis (1988).

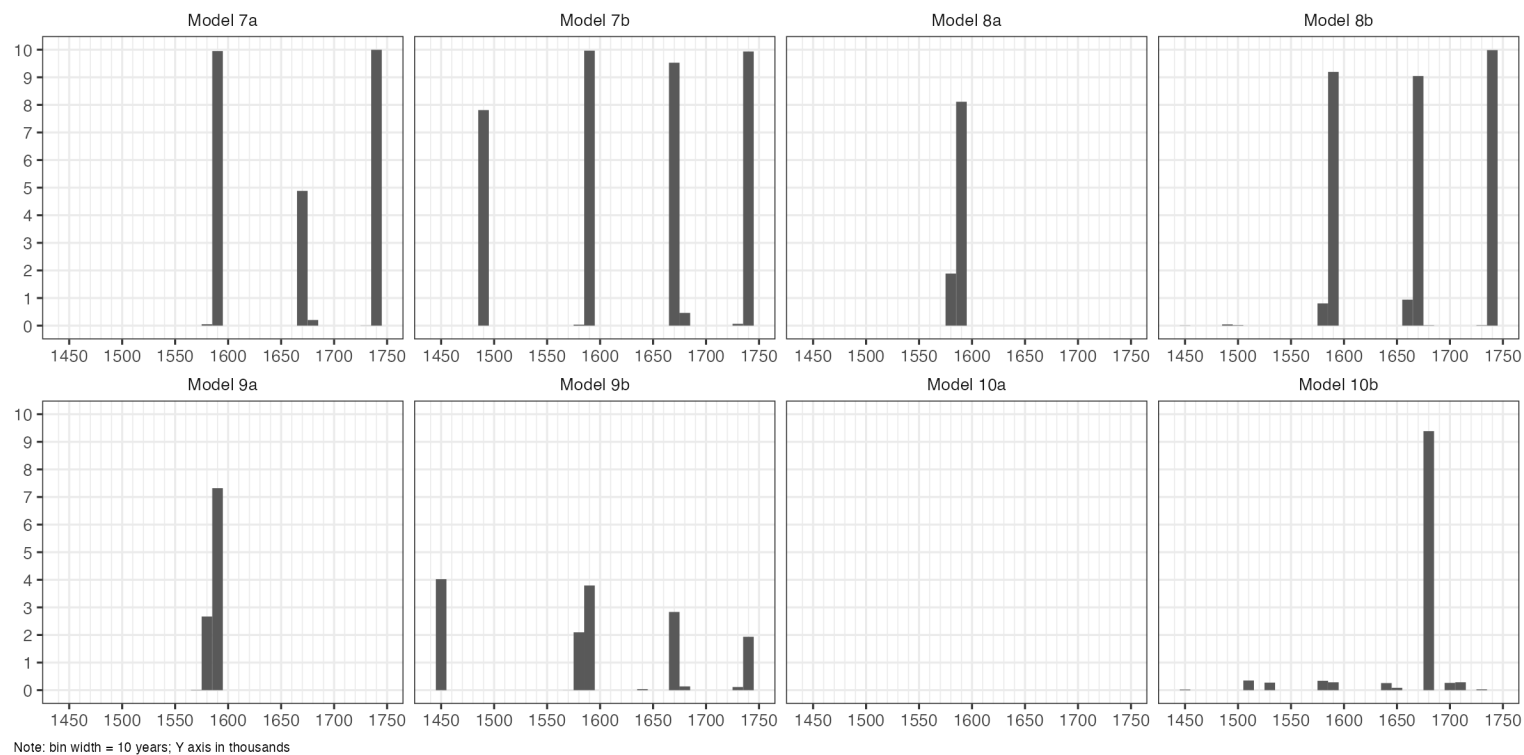


Figure 6.9. The most frequently estimated structural breaks in the trends of masonry church-building activities in Lithuania by Models 7a-10b, where the construction dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

Table 6.12. The frequency of structural breaks in the trends of newly-built, and newly-built and rebuilt/renovated churches per year, randomly assigning construction dates within known intervals.

Model 7a built/reb./ren./ masonry ch. (seq)		Model 7b built/reb./ren./ masonry ch. (KT)		Model 8a built/converted masonry ch. (seq)		Model 8b built/converted masonry ch. (KT)		Model 9a built/conv. Masonry ch./1mn ppl (seq)		Model 9b built/conv. Masonry ch./1mn ppl (KT)		Model 10a newly-built mason- ry ch./1mn ppl (seq)		Model 10b newly-built mason- ry ch./1mn ppl (seq)	
Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count	Break(s)	Count
1591, 1738	4,364	1494, 1591, 1670, 1738	5,974	1591	7,233	1591, 1669, 1737	6,652	1591	7,005	no breaks	4,107	no breaks	10,000	1676	9,093
1591, 1670, 1738	3,594	1591, 1670, 1738	1,373	1583	1,562	1591, 1664, 1737	854	1583	2,104	1447, 1591, 1669, 1737	1,193			1704	264
1591, 1674, 1738	592	1494, 1591, 1674, 1738	746	1588	880	1583, 1669, 1737	608	1582	324	1591	1,126			1510, 1583, 1645, 1713	252
1588, 1738	232	1588, 1670, 1738	350	1582	256	1588, 1669, 1737	539	1588	315	1447, 1583	862			1526, 1588, 1676	239
1591, 1676, 1738	198	1494, 1591, 1670, 1736	262	1581	50	1591, 1674, 1737	479	1581	197	1447, 1591, 1669	571			1510, 1583, 1647	31
other	1,020	other	1,295	other	19	other	868	other	55	other	2,141			other	121

Source: author's calculations, data from Semaškaitė (2010) and Šešelgis (1988).

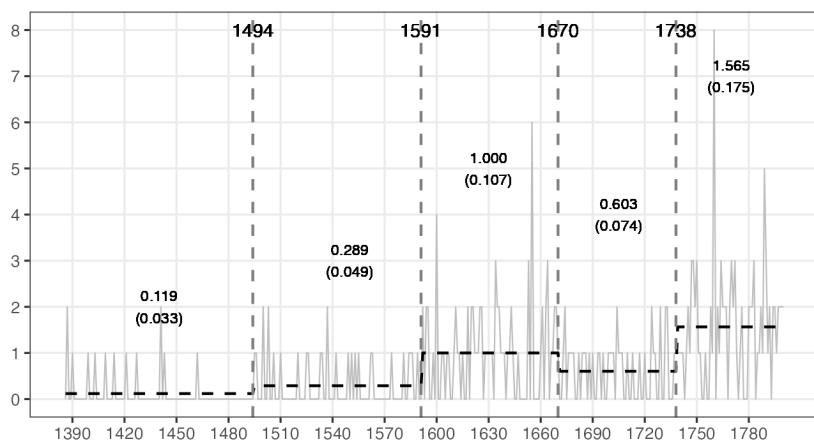


Figure 6.10. The most frequent result of Model 7b, estimating construction activities of masonry churches in Lithuania per year, where the dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

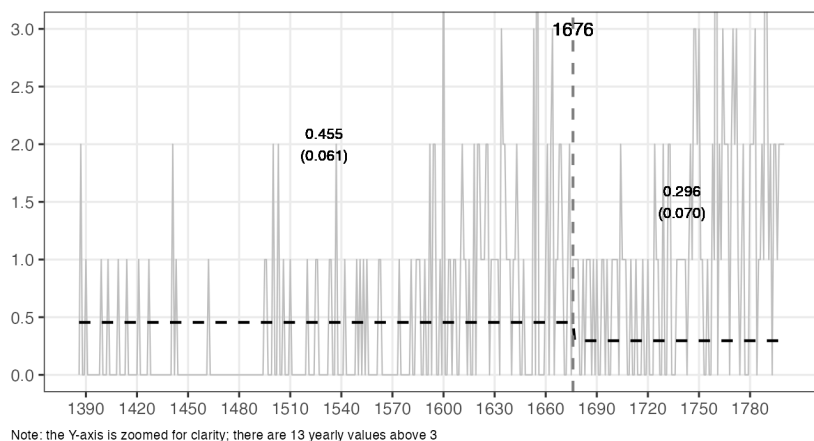


Figure 6.11. The most frequent result of Model 10b, estimating the number of newly-built masonry churches in Lithuania per 1 million people per year, where the construction dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

The structural breaks in 1737-1738, estimated by the majority of models and simulations, deserve a separate discussion, as they are not associated with an institutional transition. They do not fit the theoretical framework, or at least reflect it less directly. The historiography does give some descriptive hints about accelerating economic development in the second half of the 18th century (e.g., Kiaupa, 2018: 485), related to a period of peace and increasing export demand from Western Europe. Perhaps, together with the possible impact of the reforms (see sub-section 6.2.2), this demand might explain the

accelerated church-building, given that churches were usually funded by rich nobles, and grain exports – the domain of the magnates – grew precisely in the later 18th century (Žiemelis, 2011b).

This possibility can be tentatively examined by looking at historical grain prices compiled by Allen (2001). Figure 6.12 illustrates that the costs of rye, barley, and wheat in Western European cities were (weakly) correlated with the number of new churches in the GDL. North, Wallis, and Weingast (2009) highlight that because of the LAOs' sensitivity to external changes, episodes of rapid growth are not only possible, but even likely, especially if they result from increasing commodity prices. At the same time, the availability of higher rents due to grain demand might have lowered incentives for political reforms.

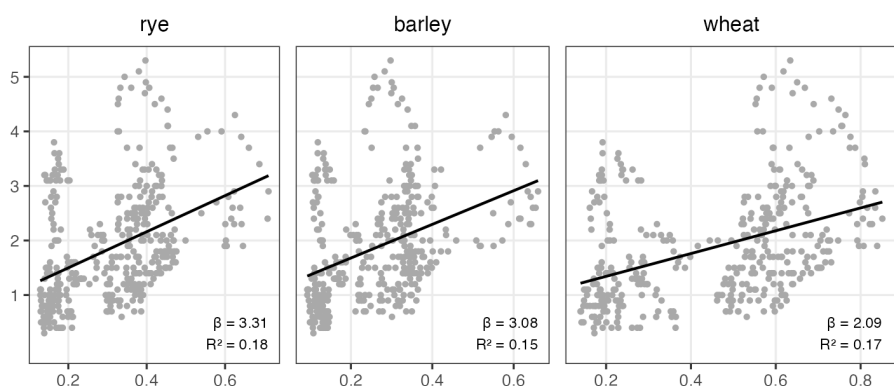


Figure 6.12. The relationship between the 10-year moving averages of grain prices in Western Europe (grams of silver; x-axis) and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

Figure 6.13 depicts the relationship between the church-building activities and price gaps between Western European and Polish cities (as proxy for the Lithuanian ones). This picture is admittedly less clear-cut, yet it also points towards at least the largest price gaps being correlated with higher numbers of new churches. Thus, external demand may have indeed increased rents without positive changes in the social order, although this likely needs to be tested in more depth. Appendix I provides more details on Allen's (2001) data used in the figures, as well as city-crop splits.

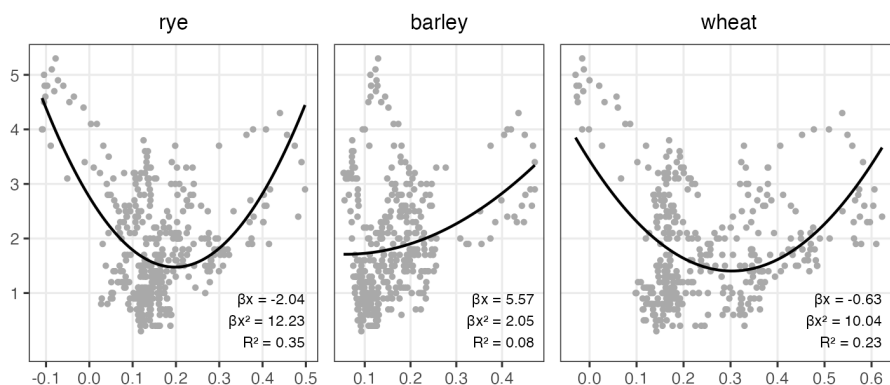


Figure 6.13. Relationship between the 10-year moving averages of grain price gaps between Western Europe and Poland (x-axis) and new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

6.3.3. Urbanisation

The dataset by Buringh (2021), which provides urban population of towns containing more than 1,000 people, extends into the 17th and 18th centuries. These data, as illustrated by Figure 6.14, show that following sustained growth from 1400 to 1600, the average size of six included ethnic Lithuanian towns started decreasing. It first declined only slightly from 8,333 to 8,166, but the decline accelerated in about 1650, with the largest drop between 1700 and 1750 (7,666 $\rightarrow$ 5,000) and a rebound after that. Including the Belarusian towns to obtain the numbers for the whole GDL does not change the dynamic. On the other hand, the towns in Poland grew continuously from 1700.

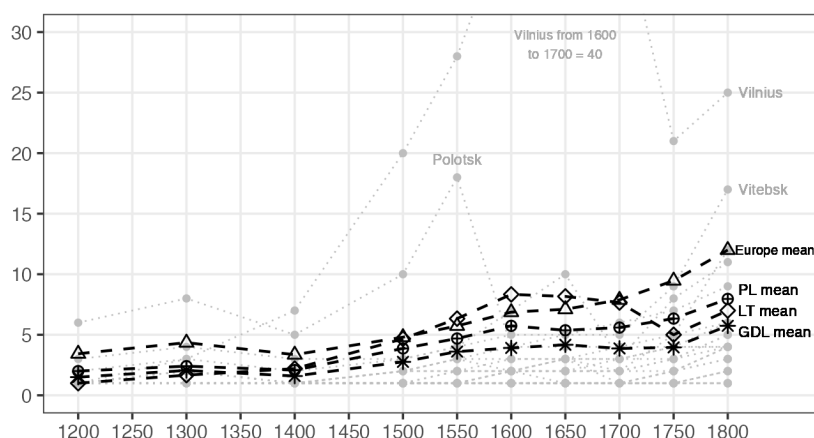


Figure 6.14. The number of town inhabitants in the GDL (in thousands). Source: author, data from Buringh (2021).

Rough estimates of Lithuanian urbanisation rate, combining the data from Buringh (2021) with the population estimates based on Šešelgis (1988) provide further evidence of post-1600 decline (Figure 6.15). However, the urbanisation rate decreased the most from 1600 to 1650 and briefly recovered again in 1700. It is somewhat difficult to interpret this result in the context of the expected decline from about the 1660s, since the 1650 estimate might be related to the Deluge. Besides this, the urbanisation rate does seem to have declined sharply after 1600, like expected. By 1800, it dropped more than twice from 8.6% in 1600 to 3.7%. Poland's trend, calculated using the population data from the Bolt and van Zanden (2024), also reversed from the 17th century (Figure 6.16).

It is notable that the Lithuanian urbanisation rate did not increase after 1750, contrary to the accelerated trends in the founding of manors and church-building. This result potentially suggests that the increase in the absolute town population resulted mainly from population growth, rather than the countryside's increasing capacity to support people not engaged in agriculture. Such an outcome would again reflect the Malthusian dynamic (see sections 4.3 and 5.2), which is logical, given that new manors and churches were financed by the rich elite.

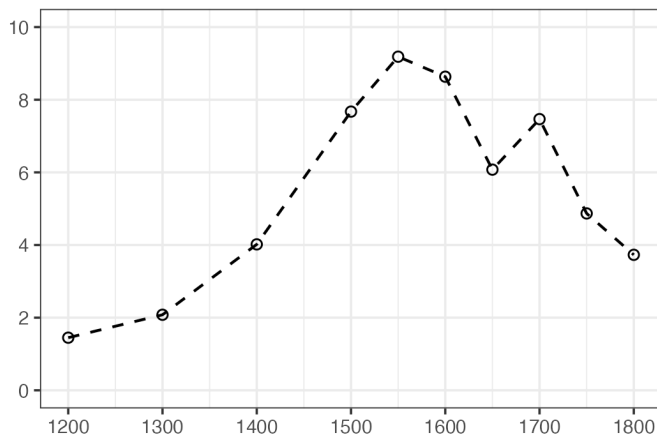


Figure 6.15. Calculated urbanisation rate in Lithuania. Source: author, data from Buringh (2021) and Šešelgis (1988).

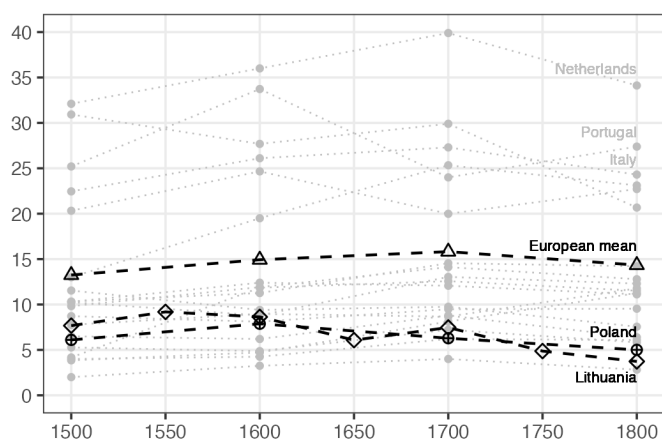


Figure 6.16. Calculated urbanisation rate of Lithuania and Poland in the European context. Source: author, data from Buringh (2021), Šešelgis (1988), and Bolt and van Zanden (2024).

Kiaupa (2012: 180-181) also provides population estimates for several towns in the GDL based on the 1775 and 1790 hearth censuses. Among those with over 1,000 inhabitants, the list includes 16 towns in the present-day Lithuania, 27 towns in Belarus, and 7 towns in Podlasie. Since the estimated population of Vilnius is much lower (11,430 in 1790 vs. 25,000 in 1800) and the list contains more small towns, the average Lithuanian town size according to these numbers was 2,047 in 1775 and 2,606 in 1790. The average town in Belarus contained 2,711 and 3,560 people respectively, yielding the GDL averages of 2,473 and 3,205 inhabitants.

Combining the Lithuanian numbers with the total population yields the urbanisation rate of 3.1% in 1775 and 3.7% in 1790. The latter estimate is almost exactly the same as the one based on town population from Buringh's (2021) dataset. The increase recorded during this time could potentially be associated with the reforms, although this is certainly not robust evidence of their impact.

In general, the urbanisation estimates provide some support to the hypothesis that the GDL's (PLC's) economic outcomes declined from about the 1660s. At the same time, like in the previous two sub-sections, the data are not granular enough and the results – not straightforward enough – to yield a definite conclusion.

6.3.4. GDP

The machine learning-based GDP estimates by Koch, Stojkoski, and Hidalgo (2024), introduced in sub-sections 3.2.1 and 5.2.4, show an entirely

different picture than the other measures of development (Figure 6.17). According to these estimates, the GDP per capita of present-day Lithuania continued declining until 1650. Chapter 5 argues that the growth probably slowed despite the GDL's transition to a basic LAO because better institutions primarily rewarded the elite. It financed the accelerated founding of manors and churches after ~1490, but the GDP per capita and health measures reflect the outcomes for the broader society. Here, it is similarly difficult to explain the rebound of growth in 1700. Furthermore, the Lithuanian GDP per capita potentially grew almost twofold from 1,119 USD (constant 2011 PPP) to 2,040 USD in 1800, surpassing all earlier levels. The overall trend of these estimates remains the same in comparison to the largest and average European values (Figure 6.18), while the Belarusian GDP per capita also has a different trend than expected.

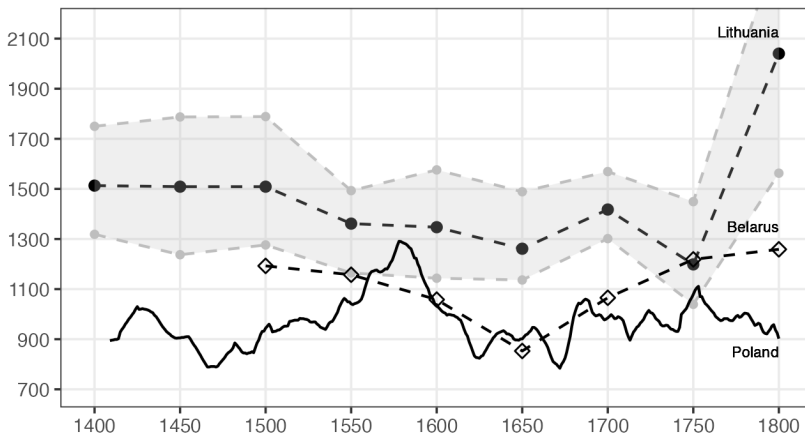


Figure 6.17. Interpolated historic GDP per capita (USD, constant 2011 PPP).
Source: author, data from Koch, Stojkoski, and Hidalgo (2024).

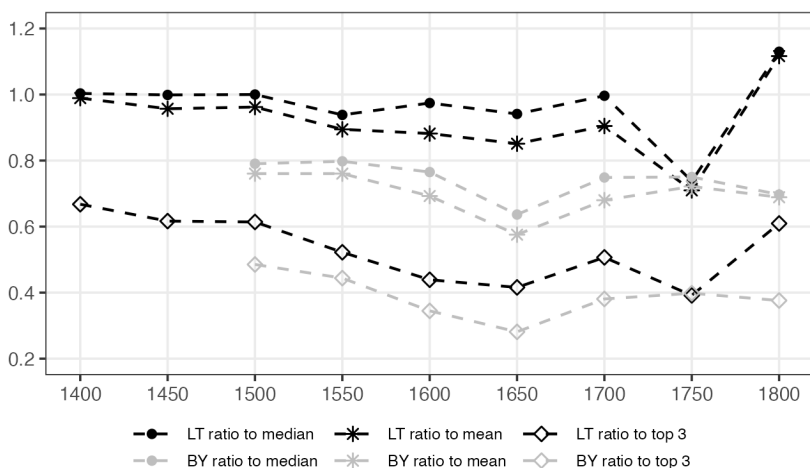


Figure 6.18. Ratios of interpolated GDP per capita to the median, average, and top 3 richest European countries. Source: author, data from Koch, Stojkoski, and Hidalgo (2024).

At the same time, the trend of total GDP, calculated combining the data from Koch, Stojkoski, and Hidalgo (2024) and Šešelgis (1988) largely corresponds with the expected post-1660 decline (Figure 6.19). This picture points to a break in extensive growth, similar to the observed in chapter 5. It also suggests that the increase in GDP per capita from 1650 to 1700 is likely related to the drop in population after the Deluge. Nevertheless, the jump in total GDP between 1750 and 1800 is higher than any previous growth. Similarly to the case of new manors and churches, perhaps this change is driven by increasing grain prices (see the discussion in sub-section 6.3.2).

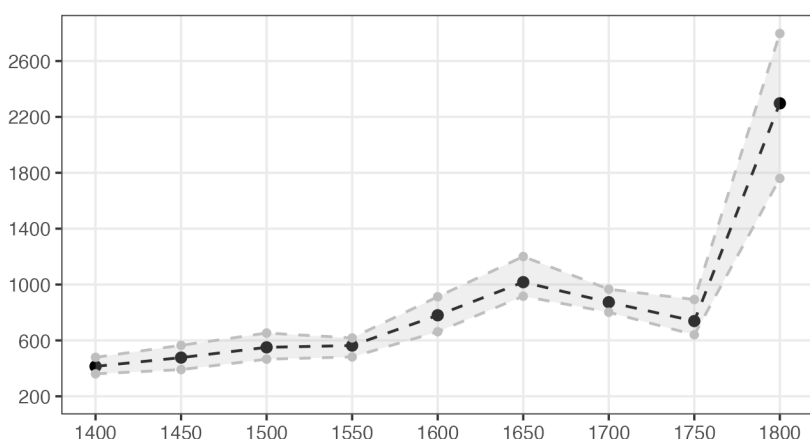


Figure 6.19. Calculated total GDP of present-day Lithuania (constant 2011 USD, in millions). Source: author, based on GDP per capita from Koch, Stojkoski, and Hidalgo (2024) and population from Šešelgis (1988).

It also remains possible that the data are not entirely accurate. As chapter 5 observes, the estimates are generated using a machine-learning approach based on present-day borders, while Eastern Europe is underrepresented in the Maddison Project Database, where the existing GDP anchors are taken from. One of those anchors is the Polish GDP per capita, based on the Kraków region and carefully constructed by Malinowski and van Zanden (2017). Despite the fact that this region was one of the richest in Poland, the average Lithuanian and Belarusian estimates are almost consistently higher. Recent PLC-wide estimates for 1790 based on the hearth census show that this comparison is probably incorrect (Malinowski & Wroński, 2025). Their authors put the GDL's estimates below the Polish ones, while arguing that the PLC was the poorest country in Europe (Table 6.13). Thus, the machine learning-based GDP cannot be given the same weight as the data on manors, churches, or urbanisation.

Table 6.13. GDP per capita estimates in the PLC in 1790 (constant USD, 2010 PPP).

Territory	GDP per capita
Grand Duchy of Lithuania	563
PL-LT Commonwealth	602
Kraków	740
Małopolska	676
Wielkopolska	709
Mazowsze	725

Source: Malinowski and Wroński (2025).

Finally, it is important to look more closely at Poland's/Kraków's GDP per capita estimates. From the long-run perspective, after having reached a peak in 1578, the Polish GDP per capita declined and remained at roughly the same level throughout the 17th and 18th centuries. While the sequential testing procedure does not find any significant structural breaks, Table 6.14 summarises those estimated by the KT algorithm. Considering a longer time-series from 1410, the Polish GDP per capita growth on average remained negative until 1672, and was only slightly positive until 1800 (Figure 6.20). The model based on a post-1569 series additionally identifies a break in 1753, splitting roughly the same positive and negative growth rates before and after this date, although with a high standard error. There was generally no sustained growth, as expected from LAOs with low urbanisation.

Table 6.14. The average yearly growth of Poland's (Kraków's) GDP per capita growth during separate periods.

Model 11		Model 12		Model 13	
Poland's/Kraków's GDP p. c. growth (1410-1800)		Poland's/Kraków's GDP p. c. growth (1569-1800)		Poland's/Kraków's total GDP growth (1569-1800)	
1410-1471 ^a	-0.198 % (0.288) ^b	1569-1672	-0.379 % (0.264)	1569-1672	-0.184% (0.267)
1472-1578	0.465 % (0.179)	1673-1753	0.442 % (0.437)	1673-1753	0.841 (0.414)
1579-1672	-0.524 % (0.242)	1754-1800	-0.437 % (0.230)	1754-1800	-0.019 (0.231)
1673-1800	0.119 % (0.291)				
Algorithm	KT	Algorithm	KT	Algorithm	KT

^a All structural breaks are estimated by the algorithms.

^b Standard errors are robust.

Source: author's calculations, data from Malinowski and van Zanden (2017) and Bolt and van Zanden (2024).

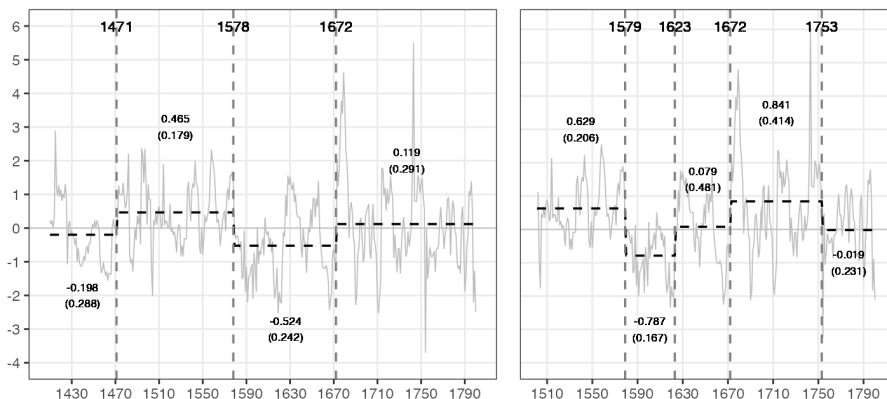


Figure 6.20. Poland's/Kraków's GDP per capita growth rate and Model 11 (left), and total GDP growth rate and Model 13 (right). Source: author, based on Malinowski and van Zanden (2017), and Bolt and van Zanden (2024).

Table 6.14 and the right-hand side of Figure 6.20 also show the structural breaks' model of Poland's/Kraków's total GDP, obtained using interpolated population estimates from the Maddison Project Database (Bolt & van Zanden, 2024). These calculations are rough, as there are only four population data points for 1500, 1600, 1700, and 1820. Yet, this trend is different than expected by the hypothesis, as the growth rate seems to have increased from the 1670s, rather than decreased, which is again difficult to explain solely by the impact of the PLC's institutional transition. Perhaps a more detailed study is necessary, focusing specifically on economic development and including

potential exogenous drivers like grain prices to the equation, given the LAOs' general sensitivity to external shocks.

6.4. Concluding remarks

Overall, this chapter confirms that the PLC is an interesting case of institutional and economic development. Despite increasingly resembling a mature LAO in the beginning and formally retaining a noble democracy, its institutional quality almost consistently declined. This decline is captured by the breakdown of political collaboration and rules-based collective decision-making, the inability to prevent and legally solve elite disputes, the fragmentation of property rights, the concentration of political and economic competition, and diminishing incentives to sustain impersonal relationships. Prompted by an external geopolitical shock, in about the 1660s, the PLC even regressed from being a basic LAO. This finding is largely consistent with that of Malinowski (2025), illustrating the importance of studying the overall institutional environments in addition to their individual dimensions.

The evidence concerning the main hypothesis that the PLC's economic outcomes mirrored its institutional decline is mixed. Some models indicate an easing in church-building activities from around the time it was no longer a basic LAO, while the estimates of urbanisation rate mainly point in the same direction. However, not all models of church-building trends reproduce the same results, the founding of new manors slowed down earlier, and available GDP data are somewhat conflicting.

On the one hand, the earlier decrease in the trend of new manors may also capture some institutional decline, and the more complex picture painted by the other indicators could be related to the challenges facing the construction of historical data. On the other hand, these complications might suggest that the hypothesis is incorrect. Yet, even if the PLC's institutional quality and economic outcomes did not always move in the same direction, this possibility would not automatically invalidate the social orders' framework. It remains possible that the mixed results simply reflect the PLC's low adaptive efficiency and sensitivity to external shocks, especially grain prices, that might have at times outweighed the weak institutional environment.

Considering these challenges, further work remains to be done to uncover the relationship between institutional and economic development in the GDL and the PLC definitively. This chapter offers some evidence in favour of its existence, which can potentially be strengthened by subsequent studies and better data.

CONCLUSION

In sum, this dissertation supports the central claim of institutional economics that there is a positive relationship between institutional quality and long-term economic development. It contributes to the literature by showing that this link largely existed in the GDL. Throughout more than six centuries, periods with ‘better’ institutional environments incentivising rules-based collaboration, more complex organisations, and impersonal relationships are broadly associated with better economic outcomes. Table 7.1 summarises the GDL’s institutional and economic development.

Table 7.1. Summary of the GDL’s institutional and economic development throughout its history (~1245-1795).

Years	Institutional quality (type of LAO)	Expected economic outcomes	Estimated economic outcomes	Support of the theory	Dissertation chapter
~1245~1320s	very fragile	poor	poor	full	chapter 4
~1320s-1390s	fragile	some improvement	some improvement	full	chapter 4
1390s-1490s	advanced fragile	significant elite-centred improvement	significant elite-centred improvement	full	chapter 5
1490s-1660s	basic	significant elite-centred improvement	significant elite-centred improvement	full	chapter 5 (&6)
1660s-1760s	advanced fragile	significant decline	some evidence of decline	limited	chapter 6
1760s-1795	~basic				

Source: author’s analysis.

Chapter 4 argues that from its inception in about 1245 until 1386, the GDL remained a fragile LAO, but achieved gradual institutional improvement. The GDL was a fragile LAO because its elite privileges rested on violence capacity, and it could not support complex political, religious, or economic structures. At the same time, the Lithuanian elite became somewhat more stable, as it restricted the ruling privileges to the grand duke’s family and co-opted previously rivalling dukes by integrating them into the nobility and granting them hereditary property rights. Together with the accommodation of Christian settlers and targeted expansion of trade and crafts to finance resistance against the Teutonic Order, the property rights incentivised productive activity. Extensive growth is evidenced by an increasing number of castles, expanding agriculture and urbanisation, and the appearance of Lithuanian coins, although health data show stagnant average living standards.

Analysing the period between 1386 and 1569, chapter 5 shows how the GDL gradually became a basic LAO. As its elite shifted from the clan of dukes

to the nobility, the GDL developed a central administration and written public law. Political decision-making increasingly followed procedures and rested on collective, rather than personal, authority of the Council of Lords. Developing shared beliefs among the nobility and an increasing role of social personas reflect the emergence of impersonal relationships, while property rights were also recorded beyond occasional privileges and separated from the family. Helped by relative peace and the end of isolation from Western Europe, manors became the main economic organisations, incentivising agriculture and land accumulation over extraction.

Algorithmically-identified structural breaks in the trends of new manors and church-building activities indicate that extensive growth accelerated around the time of the institutional transition. Yet, despite increasing urbanisation rate, the GDL did not become more urbanised relative to the rest of Europe, while urban businesses faced restrictions and peasants became increasingly tied to their land and status. Health indicators continued to stagnate, as did interpolated GDP per capita estimates.

While preserving the Lithuanian focus, chapter 6 expands the analysis to the Polish-Lithuanian Commonwealth (PLC). It shows that having been close to a mature LAO, the PLC started declining from the late 16th century, and by the 1660s, it was no longer even a basic LAO. Its institutional decline comprised the breakdown of political collaboration and rules-based decision-making, increasing inability to prevent and solve elite disputes, the fragmentation of property rights in favour of wealthy magnates, more concentrated competition, and higher prevalence of clientelism and corruption. The institutional environment briefly recovered during the reform push in the last three decades of the PLC's existence, but these efforts were cut short by foreign invasions.

Development indicators lend partial support to the hypothesis that the PLC's growth trend should have decreased around the 1660s. Some models produce the expected structural breaks in church-building activities, and the estimated urbanisation rate largely follows the same trajectory. However, the evidence is generally mixed. Other models of church-building activities yield different breaks, the founding of new manors decelerated earlier than expected, and the analysed Polish and Lithuanian GDP estimates provide somewhat conflicting results.

Nevertheless, the latter qualification does not necessarily contradict North, Wallis, and Weingast (2009). The dissertation also supports their framework specifically, illustrating that LAOs can develop by strengthening and/or expanding their elite institutions, but this development primarily accumulates among the elite. While the analysis of the 13th-16th centuries results in this

conclusion directly, more mixed results during the 17th and 18th centuries could potentially reflect the LAOs' low adaptive efficiency and sensitivity to external shocks, especially grain prices, the impact of which is challenging to capture with the available data.

The shortage of a fully definitive answer to whether the link between institutional quality and economic outcomes existed throughout the whole history of the GDL is among this study's limitations. Another limitation is that even for the 13th-16th centuries, where this relationship likely did exist, the findings are not causal. Chapter 4 primarily analyses material evidence and descriptive statistics, and, albeit combined with the qualitative analysis of institutions, the structural breaks' methodology is also not causal by itself. Finally, the newly-constructed datasets on the number of manors and church-building activities might potentially capture improving record-keeping or suffer from survivor bias.

Yet, the dissertation still advances the existing research. First, the dissertation contributes to institutional economics and economic history by studying the link between institutional and economic development in a new setting and expanding the very small number of existing case studies that apply the social orders' framework to pre-industrial polities. Second, it provides the first attempt to systematically apply an institutional economics framework among the research on Lithuanian history, linking it with the two novel datasets. These efforts can at least serve as a starting point for future studies, including those more specifically dedicated to the 17th- and 18th-century economy and the improvement of historical economic data.

Beyond the future research areas directly related to its main contributions, the dissertation offers a holistic view on institutional change both between and within the different types of LAOs, highlighting its often gradual and informal nature that is difficult to measure with standardised datasets. This view is reflected in the attempt to operationalise the LAO framework across five inter-related dimensions to help classify the overall institutional environments within the spectrum more precisely. The methodology applied in this dissertation is potentially applicable to other case studies, especially those concerning pre-industrial history and long historical periods, in addition to the theory's popularity presented by the literature review.

Finally, the case study of the GDL not only highlights the importance of studying the control of violence within the elite, but also more generally illustrates the heterogeneous role of external security. Whereas the institutional development contributed to both internal and external security during the 13th and 14th centuries, the shift in economic incentives under a basic LAO made security part of the trade-off between maximising rents and collectively

financing the military. The nobility's choice to focus on the manor economy may have resulted in a path dependence that prevented the build-up of state capacity and the development of the fiscal state, eventually making it more optimal for individual magnates to seek security privately. Pivotal reforms took place when the internal support of the status quo and external pressures had already accumulated beyond the capacity of the existing state and institutional environment.

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APPENDIX A. THE LIST OF KNOWN MANORS IN PRESENT-DAY LITHUANIA BEFORE 1800

Table A1. The list of known manors in present-day Lithuania, founded or first mentioned before 1800.

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Abromiškės	1571	1571	1571	1571
Adakavas	18th c. last quarter	1776	1800	1788
Adomynė	18th c. start	1701	1710	1705
Akademija (Dotnuvos dvaras)	1545	1545	1545	1545
Aknystos	1538	1538	1538	1538
Alanta (Naujasodis)	14th c. end (Vytautas)	1392	1400	1396
Alantės	1569	1569	1569	1569
Aleksandravėlė	17th c.	1601	1700	1650
Aleksandrija	1760	1760	1760	1760
Alovė	15th c.	1401	1500	1450
Antalina	18th c. end	1791	1800	1795
Antanašė	18th c.	1701	1800	1750
Antanavas	18th c.	1701	1800	1750
Antašava	1595	1595	1595	1595
Antaviliai	17th c.	1601	1700	1650
Antazavė	1560	1560	1560	1560
Anykščiai	1440	1440	1440	1440
Apytalaukis	1371	1371	1371	1371
Aradninkai	16th c.	1501	1600	1550
Ariogala (Čėkuva)	16th c. middle	1545	1555	1550
Aristava	1371	1371	1371	1371
Arnionys	16th c. (Sigismund)	1506	1544	1525
Arvydai (Bezdonys)	16th c. (Sigismund)	1506	1544	1525
Aštrioji Kirsna	16th c.	1501	1600	1550
Aukštadvaris (Panevėžio r.)	1550	1550	1550	1550
Aukštadvaris (Trakų r.)	16th c. start	1501	1510	1505
Aukštoji Freda	17th c. 2nd half	1651	1700	1675
Babtnas (Žemaitkiemis)	16th c.	1501	1600	1550
Bagdoniškis	17th c. middle	1645	1655	1650
Baisogala	1539	1539	1539	1539
Balbieriškis	15th c. end - 1502	1491	1502	1496
Baltadvaris	15th c.	1401	1500	1450
Barklainiai	1604	1604	1604	1604
Bartkuškis	1533	1533	1533	1533
Bartninkai	18th c. 2nd half	1751	1800	1775
Batakiai	1503	1503	1503	1503
Beinorava	18th c. end	1791	1800	1795
Belazariškis (Vosiliškis)	1712	1712	1712	1712
Beržėnai	15th c.	1401	1500	1450
Bijotai	16th c. (< 1558)	1501	1558	1529
Bijutiškis	1478	1478	1478	1478
Bikuškis	1482	1482	1482	1482
Biliūnai	16th c. 2nd half (1592?)	1551	1592	1571
Biržuvėnai	14th c.	1301	1400	1350
Bistrampolis	15th c. end	1491	1500	1495
Bivyčiai	17th c. - 18th c.	1601	1800	1700
Blinstrubiškiai	16th c. end	1590	1600	1595

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Branduoliškiai (Aukštasis Gelgaudiškis)	17th c. start	1601	1700	1650
Brėviškiai	18th c. middle	1745	1755	1750
Bubiai	18th c. - 19th c. intersection	1795	1805	1800
Būdvietis	1744	1744	1744	1744
Buivydiškės	1593	1593	1593	1593
Buivydžiai	1537	1537	1537	1537
Bukantė	16th c.	1501	1600	1550
Bukonys	16th c.	1501	1600	1550
Bukta	1569	1569	1569	1569
Bulakavas	1550	1550	1550	1550
Burbiškiai	1672	1672	1672	1672
Burbiškis (Anykščių r.)	17th c.	1601	1700	1650
Burbiškis (Radviliškio r.)	1692	1692	1692	1692
Butautai	1750	1750	1750	1750
Čedasai	1499	1499	1499	1499
Česukai	16th c. 1st half	1501	1550	1525
Čiobiškis	18th c. end	1791	1800	1795
Cirkliškis	18th c. end	1791	1800	1795
Dabikinė	1554-1571	1554	1571	1562
Daigučiai (Aukštutinė Kulva)	16th c. 1st half	1501	1550	1525
Daniliškis	16th c.	1501	1600	1550
Darbėnai	16th c.	1501	1600	1550
Daudžgiriai	18th c.	1701	1800	1750
Daugirdiškės	1545	1545	1545	1545
Daumantiškiai	1654	1654	1654	1654
Didieji Grūžiai	1586	1586	1586	1586
Didvyžiai (Geištariai)	18th c.	1701	1800	1750
Didžiadvaris	15th c.	1401	1500	1450
Didžiadvaris (Didždvaris)	16th c. end - 17th c. start	1590	1610	1600
Dubingiai	1334	1334	1334	1334
Dūkštas (Dūkšteliai)	15th c.	1401	1500	1450
Dusmenys	1523	1523	1523	1523
Dvaralis (Petriškė)	16th c. 2nd half	1551	1600	1575
Džiuginėnai	16th c. 1st half	1501	1550	1525
Gedučiai	18th c.	1701	1800	1750
Gelgaudiškis	1567	1567	1567	1567
Gelučiai	1791	1791	1791	1791
Gėluva	1549-1551	1549	1551	1550
Geručiai (Glebava)	16th c. 2nd half	1551	1600	1575
Gilvyčiai	1635	1635	1635	1635
Gintališkė	15th c.	1401	1500	1450
Gintarai	16th c.	1501	1600	1550
Glitiškės	1483	1483	1483	1483
Gornostajiškės	18th c. end	1791	1800	1795
Griežė	17th c.	1601	1700	1650
Gruzdžiai	1586	1586	1586	1586
Gubernija	1655 / 1753	1655	1753	1704
Gulbinėnai	18th c.	1701	1800	1750
Ilguva	1583	1583	1583	1583
Impoliai	18th c.	1701	1800	1750
Jakiškiai	16th c.	1501	1600	1550
Janapolis	18th c.	1701	1800	1750

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Jašiūnai	1402	1402	1402	1402
Jasnagurka	18th c. - 19th c. start	1701	1810	1755
Jasonys	1744	1744	1744	1744
Jieznas	1492	1492	1492	1492
Jokūbavas	1776 - 1779	1776	1779	1777
Jonėnai	15th c. end	1491	1500	1495
Joniškėlis	18th c. middle	1745	1755	1750
Jotainiai	1564	1564	1564	1564
Jotaučiai	17th c.	1601	1700	1650
Jundeliškės	16th c. end	1590	1600	1595
Juodiškiai	16th c.	1501	1600	1550
Jurbarkas	16th c. 1st half	1501	1550	1525
Jurdonys	16th c.	1501	1600	1550
Jutkoniai	1653	1653	1653	1653
Kairėnai	1596	1596	1596	1596
Kaišiadorys	1531	1531	1531	1531
Kalnaberžė	17th c. 1st half	1601	1650	1625
Kaltanėnai	1511	1511	1511	1511
Kalvarija	1655	1655	1655	1655
Kapėnai	1795 - 1800	1795	1800	1797
Kašučiai	15th - 16th c.	1401	1600	1500
Katauskiai	1584	1584	1584	1584
Kauno m. dvarelis	1627	1627	1627	1627
Kaušiadala	18th c.	1701	1800	1750
Kavarskas	1535	1535	1535	1535
Kazitiškis	18th c.	1701	1800	1750
Kazokinė	1738	1738	1738	1738
Kėdainiai	1445	1445	1445	1445
Kelmė	15th c.	1401	1500	1450
Kernavė (Kriveikiškis)	17th c. 2nd half	1651	1700	1675
Kiaunoriai	16th c.	1501	1600	1550
Kiduliai-Kaimelis	16th c.	1501	1600	1550
Klovainiai (Krivaičiai)	17th c.	1601	1700	1650
Kretinga	1532	1532	1532	1532
Krikštėnai	1745	1745	1745	1745
Kruopiai	b/w 1555-1571 and 1786?	1555	1571	1563
Kudrėnai	1549	1549	1549	1549
Kurėnai	1783	1783	1783	1783
Kurkliai 2nd	18th c. middle	1745	1755	1750
Kurniškės	1590	1590	1590	1590
Kuršėnai	1564	1564	1564	1564
Kurtuvėnai	1498	1498	1498	1498
Kvesai	16th c.	1501	1600	1550
Kvietiškis	18th c. start	1701	1710	1705
Lančiūnava	16th c. (S. Augustus)	1544	1572	1558
Lapės	1591	1591	1591	1591
Lapgiriai	16th c.	1501	1600	1550
Laukžemė	17th c.	1601	1700	1650
Laviškis	1672	1672	1672	1672
Leipalingis	1503	1503	1503	1503
Lelionys	1589	1589	1589	1589
Leliūnai	17th c.	1601	1700	1650
Lentvaris	16th c.	1501	1600	1550

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Leonopolis	16th c. - 1721	1501	1721	1611
Liberiškis	1595	1595	1595	1595
Linkavičiai (Linkaučiai, Slabada)	1585	1585	1585	1585
Linkuva	16th c.	1501	1600	1550
Liškiava	15th c. 2nd half	1451	1500	1475
Liubavas	16th c. (1554; S. Augustus)	1554	1572	1563
Liukonys	18th c. start	1701	1710	1705
Lyduokiai	1499	1499	1499	1499
Maišiagala	17th c.	1601	1700	1650
Malgūžiai	18th c.	1701	1800	1750
Mardasavas	1508-1514	1508	1514	1511
Markučiai	14th c.? 1540?	1301	1540	1420
Markutiškiai	1744	1744	1744	1744
Martagailiškis	1645	1645	1645	1645
Masališkės	1528	1528	1528	1528
Mažučiai	18th c. 2nd half	1751	1800	1775
Meikštai	18th c.	1701	1800	1750
Mirabelis	15th - 17th c.	1401	1700	1550
Mitriūnai	18th c.	1701	1800	1750
Mockai (Mockava)	1744	1744	1744	1744
Mozūriškės	18th c.	1701	1800	1750
Mukuliai	18th c.	1701	1800	1750
Mūro Strėvininkai	1598	1598	1598	1598
Musninkai	1422	1422	1422	1422
Narvydiškis	15th c.	1401	1500	1450
Naudvaris	16th c.	1501	1600	1550
Navasodai	16th c. end	1590	1600	1595
Nedzingė	1575	1575	1575	1575
Nemėžis	1426	1426	1426	1426
Noliškis	1298?	1298	1298	1298
Noriūnai	1559	1559	1559	1559
Norviliškės	1586	1586	1586	1586
Obeliai	18th c. end	1791	1800	1795
Onuškis	1499	1499	1499	1499
Paaudruvė	18th c.	1701	1800	1750
Paberžė	1793	1793	1793	1793
Pabiržė (Balandiškiai)	1645	1645	1645	1645
Padvariai (Pabaiskas)	15th c.	1401	1500	1450
Paežeriai (Vilkaviškio r.)	1460-1470	1460	1470	1465
Pajuodupė	18th c.	1701	1800	1750
Pajuostė (Pajuosčiai)	16th c.	1501	1600	1550
Pajūris	1498	1498	1498	1498
Pakėvis	1685	1685	1685	1685
Pakiaunys	18th c.	1701	1800	1750
Pakiršiny	>1498?	1498	1510	1504
Pakruojis	16th c.	1501	1600	1550
Palanga	1527	1527	1527	1527
Palėvėnė (Paulionka)	16th c. - 17th c.	1501	1700	1600
Paliesiai	18th c. end	1791	1800	1795
Paliesius	18th c. (<1763)	1701	1763	1732
Paliūniškis	1595	1595	1595	1595
Palonai	1582	1582	1582	1582

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Palukštys	1775	1775	1775	1775
Pamūšis (Linkuvos sen.)	1599	1599	1599	1599
Pamūšis (Pašvitinio sen.)	18th c.	1701	1800	1750
Pamūšis (Ukmergės r.)	1596	1596	1596	1596
Pandėlys	17th c.	1601	1700	1650
Panemunė (Biržų r.)	1645	1645	1645	1645
Panemunė (Druskininkų r.)	1508 or 1567	1508	1567	1537
Panemunės pilis	16th c.	1501	1600	1550
Panemunis	16th c. - 17th c. intersect.	1595	1605	1600
Paneriai	18th c.	1701	1800	1750
Panevėžiukas	16th c. (<1546)	1501	1546	1523
Paobelis (Tulpiakiemis)	1567	1567	1567	1567
Papilio įtvirtinta dvarvietė (Zomkelis)	1561	1561	1561	1561
Papilys	1568	1568	1568	1568
Paragiai	18th c. end	1791	1800	1795
Pašatrija	1584	1584	1584	1584
Pasimniai	17th c.	1601	1700	1650
Pavandenė (Sakelių dvaras)	16th c. (<1560)	1501	1560	1530
Pavermenys	17th c.	1601	1700	1650
Pavirinčiai	16th c. end	1590	1600	1595
Pavirvytis	18th c. 2nd half	1751	1800	1775
Pažaislis	17th c. 2nd half	1651	1700	1675
Pesčiai (Leliūnai)	18th c.	1701	1800	1750
Peteša	1498	1498	1498	1498
Pienionys	15th c. end	1491	1500	1495
Pilaitė	16th c.	1501	1600	1550
Plateliai	15th c.	1401	1500	1450
Plebergas	1586	1586	1586	1586
Plinkšės	16th c.	1501	1600	1550
Plonėnas	1613	1613	1613	1613
Plungė	1565	1565	1565	1565
Pociūnai	15th c.	1401	1500	1450
Prienai	1502	1502	1502	1502
Pučkoriai	16th c.	1501	1600	1550
Punžionys	15th c.	1401	1500	1450
Račkiškė	15th c.	1401	1500	1450
Radviloniai	<1800	1780	1800	1790
Raguvėlė	17th c.	1601	1700	1650
Raipolis	17th c.	1601	1700	1650
Rasiai	1738	1738	1738	1738
Raudondvaris (Kauno r.)	1410	1410	1410	1410
Raudondvaris (Nemenčinės sen.)	17th c.	1601	1700	1650
Raudondvaris (Radviliškio r.)	1789	1789	1789	1789
Raudondvaris (Vilniaus r.)	1764	1764	1764	1764
Raudonė	16th c. - 1600	1501	1600	1550
Rėkyva	1605	1605	1605	1605
Renavas	1589	1589	1589	1589
Riečiai	18th c. end - 19th c. start	1791	1810	1800
Rietavas	1588	1588	1588	1588
Rindaugai	1828-1829 or 1645	1645	1828	1736
Ritinė	Vytautas' times? 16th c.?	1392	1600	1496
Ročiškė	17th c. - 18th c.	1601	1800	1700

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Rodai II	1416	1416	1416	1416
Rodomislė	17th c.	1601	1700	1650
Rokiškis	1499	1499	1499	1499
Rudamina (Lazdijų r.)	1537-1538	1537	1538	1537
Rudamina (Vilniaus r.)	1377	1377	1377	1377
Salamiestis	1580	1580	1580	1580
Šalčininkai	15th c. (>1410)	1410	1500	1455
Šalčininkėliai	1553	1553	1553	1553
Saločiai	18th c.	1701	1800	1750
Salos	1450	1450	1450	1450
Sapiegų rūmai	17th c.	1601	1700	1650
Šateikiai	1568	1568	1568	1568
Šaukėnai	15th c.	1401	1500	1450
Šaukotas	1575	1575	1575	1575
Savičiūnai	1754	1754	1754	1754
Semeliškės	15th c. end	1491	1500	1495
Šešuolėliai II	1782	1782	1782	1782
Šešuoliai	1450	1450	1450	1450
Šiaulėnai	1492	1492	1492	1492
Siesikai	1492-1517	1492	1517	1504
Šilelis	16th c. end	1590	1600	1595
Siponys	16th c. or 19th c. end - 20th c. start	1501	1910	1705
Sirutiškis	18th c. start	1701	1710	1705
Skaistakalnis	1765	1765	1765	1765
Skaraitiškė	1643	1643	1643	1643
Skaruliai	1592	1592	1592	1592
Skemai	17th c. - 18th c.	1601	1800	1700
Skrebiškis	1798	1798	1798	1798
Skuodas	1568	1568	1568	1568
Šlapaberžė (Kvintos dvaras)	15th c.	1401	1500	1450
Šlavėnai	1596	1596	1596	1596
Smalvos	1580	1580	1580	1580
Stanislava	16th c. 2nd half	1551	1600	1575
Stanislavavas	1775	1775	1775	1775
Staniūnai	18th c. end	1791	1800	1795
Stasiūnai (Vladikiškės)	17th c. end	1691	1700	1695
Staškūniškis	16th c.	1501	1600	1550
Stelmužė	17th c. (1650 church)	1601	1700	1650
Stemplės	1695	1695	1695	1695
Sudervė	1493	1493	1493	1493
Sudota	17th c.	1601	1700	1650
Šumskas	16th c. start	1501	1510	1505
Suviekas	1596	1596	1596	1596
Sužionys	18th c.	1701	1800	1750
Svėdasai	1503	1503	1503	1503
Švėkšna	15th c.	1401	1500	1450
Šventorkalnis, dvaro kalva	15th c.	1401	1500	1450
Šventupė (Vidiškiai)	15th c.	1401	1500	1450
Sviatošinas (Kriūkai)	1589	1589	1589	1589
Svirnai I	1593	1593	1593	1593
Tabariškės	17th c. end	1691	1700	1695
Tarnava	16th c. 2nd half	1551	1600	1575
Taujėnai	16th c.	1501	1600	1550

Manor ^a	Year (entry) ^b	First year	Last year	Default year ^c
Tauragė	15th c. 2nd half	1451	1500	1475
Tendžiogala	1559	1559	1559	1559
Terespolis	18th c. end	1791	1800	1795
Trakų Vokė	18th c. end	1791	1800	1795
Triliškės	1744	1744	1744	1744
Troškūnai (Smėlynė)	1789	1789	1789	1789
Tryškiai	1537	1537	1537	1537
Tuskulėnai	17th c. middle	1645	1655	1650
Ukrinai	1585	1585	1585	1585
Upytė	16th c.	1501	1600	1550
Utena	1492-1506	1492	1506	1499
Užpaliai	15th c.	1401	1500	1450
Užventis	15th c.	1401	1500	1450
Vadaktai (Radviliškio r.)	16th c. middle	1545	1555	1550
Vadaktėliai	1773	1773	1773	1773
Vaiguva	15th c.	1401	1500	1450
Vaikutėnai	1774	1774	1774	1774
Vainėžeris	1724	1724	1724	1724
Vaitkuškis	16th c.	1501	1600	1550
Valkininkai	14th c.	1301	1400	1350
Varputėnai	1590	1590	1590	1590
Vasaknos	1482	1482	1482	1482
Vašuokėnai	1593	1593	1593	1593
Veisiejai	1501	1501	1501	1501
Veluona	1501	1501	1501	1501
Vepriai	16th c.	1501	1600	1550
Verčiai	1387	1387	1387	1387
Vėžaičiai	1588-1632	1588	1632	1610
Vidiškės	18th c.	1701	1800	1750
Vievis	17th c.	1601	1700	1650
Vilkaviškis	1773	1773	1773	1773
Vinkšnupiai	1410s	1410	1419	1414
Viršužiglis	17th c.	1601	1700	1650
Vyžuonėlės	18th c.	1701	1800	1750
Vyžuonos	16th c.	1501	1600	1550
Žagarė	18th c.	1701	1800	1750
Žaiginys	16th c. middle	1545	1555	1550
Zalavas	16th c. middle	1545	1555	1550
Žasliai	1432	1432	1432	1432
Žeimiai	15th c.	1401	1500	1450
Žemaitkiemis	1482	1482	1482	1482
Žemoji Panemunė	16th c.	1501	1600	1550
Žibuliai (Ilgižiai)	1568	1568	1568	1568
Žiežmariai	1495	1495	1495	1495
Žižmauka (Žižmava)	16th c.	1501	1600	1550
Žvirgždė	15th c.	1401	1500	1450

^a The manors, which are present in the original description, but were not within the GDL at the time of their founding are excluded. Those without any clues about their founding dates are also excluded, as they are not part of the analysis.

^b This column represents the original founding date mentioned in the description.

^c Default year represents the middle of the interval between the first year and the last year when the manor was likely founded according to the original entry in the description.

Source: author, original manor descriptions from Semaškaitė (2010).

APPENDIX B. THE LIST OF CHURCHES BUILT IN PRESENT-DAY LITHUANIA BEFORE 1800

Table B1. List of churches in Lithuania (within its widest 1920/23 borders), built or first mentioned before 1800.

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
1		1380	1320	1440																1745	1745	1745	1812	1812	1812				1440	1440	1440
2		1350	1345	1355	1414	1414	1414	1781	1781	1781										1533	1533	1533							1350	1345	1355
3		1387	1387	1387	1636	1636	1636	1800	1800	1800																			1399	1399	1399
4		1387	1387	1387	1427	1427	1427	1655	1655	1655										1737	1737	1737	1826	1826	1826				1427	1427	1427
5		1387	1387	1387	1667	1667	1667	1797	1797	1797	1904	1904	1904																1387	1387	1387
6		1387	1387	1387	1770	1770	1770																						1770	1770	1770
7		1387	1387	1387	1704	1704	1704	1850	1850	1850	1934	1934	1934																		
8		1387	1387	1387	1589	1589	1589	1655	1655	1655	1760	1760	1760																1760	1760	1760
9		1387	1387	1387	1655	1655	1655	1842	1842	1842																			1387	1387	1387
10		1387	1387	1387	1525	1501	1550	1874	1874	1874										1705	1705	1705									
11		1387	1387	1387	1525	1501	1550	1675	1651	1700	1775	1751	1800	1810	1810	1810				1932	1932	1932							1810	1810	1810
12		1402	1391	1413	1788	1788	1788	1920	1910	1931																					
13	°	1390	1390	1390	1550	1501	1600																						1390	1390	1390
14		1392	1392	1392	1551	1551	1551	1782	1782	1782										1804	1804	1804	1922	1922	1922				1551	1551	1551
15		1393	1393	1393	1862	1862	1862																						1862	1862	1862
16		1398	1398	1398	1443	1443	1443	1852	1852	1852																			1443	1443	1443
17		1399	1399	1399																1669	1669	1669	1819	1819	1819				1399	1399	1399
18		1350	1301	1400	1441	1441	1441	1550	1501	1600										1679	1679	1679	1726	1726	1726	1748	1748	1748	1350	1301	1400
19		1400	1400	1400	1525	1501	1550	1729	1729	1729	1916	1916	1916																1916	1916	1916
20		1400	1400	1400	1677	1677	1677																								
21		1400	1400	1400	1618	1618	1618																						1618	1618	1618
22		1403	1403	1403	1758	1758	1758													1839	1839	1839	1928	1928	1928				1403	1403	1403
23		1406	1406	1406	1706	1706	1706													1892	1892	1892	1937	1937	1937				1706	1706	1706
24		1407	1407	1407	1563	1563	1563													1928	1928	1928							1563	1563	1563
25		1409	1409	1409	1717	1717	1717													1926	1926	1926							1409	1409	1409
26		1410	1410	1410	1780	1780	1780	1899	1899	1899										1921	1921	1921							1899	1899	1899
27		1410	1410	1410	1534	1534	1534	1905	1905	1905																					
28		1410	1410	1410	1655	1655	1655																								
29		1411	1411	1411	1529	1529	1529													1771	1771	1771									
30		1411	1411	1411	1510	1510	1510	1804	1804	1804	1900	1900	1900																1900	1900	1900
31		1413	1413	1413	1648	1648	1648	1840	1840	1840	1920	1920	1920																1840	1840	1840
32		1414	1414	1414	1529	1529	1529	1779	1779	1779																					
33					1747	1747	1747													1414	1414	1414	1919	1919	1919				1747	1747	1747
34		1416	1416	1416	1550	1545	1555	1675	1651	1700	1934	1918	1950																1918	1918	1918
35		1416	1416	1416	1550	1545	1555	1695	1691	1700	1857	1857	1857	1930	1930	1930													1930	1930	1930

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rm1_d	rm1_f	rm1_l	rm2_d	rm2_f	rm2_l	rm3_d	rm3_f	rm3_l	m_d	m_f	m_l
36		1416	1416	1416	1613	1613	1613	1745	1745	1745	1918	1918	1918																1918	1918	1918
37		1416	1416	1416	1550	1545	1555	1675	1651	1700	1817	1817	1817	1886	1886	1886															
38		1416	1416	1416	1495	1495	1495	1638	1638	1638	1745	1745	1745	1807	1807	1807				1911	1911	1911									
39		1416	1416	1416	1575	1551	1600	1744	1744	1744																					
40		1416	1416	1416	1663	1663	1663													1729	1729	1729	1776	1776	1776				1663	1663	1663
41		1416	1416	1416	1550	1545	1555	1675	1651	1700	1796	1796	1796	1882	1882	1882				1866	1866	1866							1882	1882	1882
42		1416	1416	1416	1550	1545	1555	1675	1651	1700	1817	1817	1817																		
43		1403	1388	1418	1884	1884	1884													1496	1496	1496							1403	1388	1418
44		1419	1419	1419	1472	1472	1472	1750	1750	1750	1896	1896	1896																1896	1896	1896
45		1420	1420	1420	1550	1545	1555	1695	1691	1700	1824	1824	1824	1897	1897	1897													1897	1897	1897
46		1421	1421	1421	1660	1641	1680													1817	1817	1817							1421	1421	1421
47		1418	1416	1421	1644	1644	1644													1930	1930	1930							1419	1416	1421
48		1424	1424	1424	1744	1744	1744	1898	1898	1898										1622	1622	1622									
49		1424	1424	1424	1679	1679	1679	1777	1777	1777	1905	1905	1905																1905	1905	1905
50		1431	1426	1436	1524	1524	1524	1791	1791	1791	1910	1907	1914																1911	1907	1914
51		1430	1430	1430	1522	1522	1522	1675	1651	1700	1795	1791	1800	1901	1901	1901													1901	1901	1901
52		1430	1430	1430	1609	1609	1609	1668	1668	1668																			1668	1668	1668
53		1436	1436	1436	1544	1544	1544	1675	1651	1700	1819	1819	1819																1819	1819	1819
54		1441	1441	1441	1537	1537	1537																						1441	1441	1441
55		1436	1436	1436	1575	1551	1600	1718	1718	1718	1829	1829	1829																1829	1829	1829
56		1441	1441	1441	1575	1551	1600	1705	1701	1710	1787	1787	1787	1864	1864	1864															
57		1441	1441	1441	1774	1774	1774													1674	1674	1674							1939	1939	1939
58		1443	1443	1443	1595	1591	1600	1752	1752	1752	1923	1923	1923																		
59		1443	1443	1443	1605	1601	1610	1773	1773	1773																					
60		1445	1445	1445	1510	1510	1510	1809	1809	1809																			1809	1809	1809
61		1445	1445	1445	1595	1595	1595													1775	1751	1800	1880	1880	1880				1595	1595	1595
62		1446	1446	1446	1625	1625	1625	1700	1700	1700										1879	1879	1879									
63		1405	1401	1410	1770	1770	1770													1655	1655	1655	1894	1894	1894				1405	1401	1410
64		1405	1401	1410	1522	1522	1522	1625	1601	1650	1820	1820	1820																		
65		1405	1401	1410	1695	1691	1700	1930	1930	1930																			1930	1930	1930
66		1405	1401	1410	1503	1503	1503	1695	1691	1700	1857	1857	1857																1857	1857	1857
67	°	1405	1401	1410	1575	1551	1600	1705	1701	1710																					
68		1405	1401	1410	1514	1514	1514	1663	1663	1663	1898	1898	1898							1912	1912	1912							1663	1663	1663
69		1450	1401	1500	1593	1593	1593	1725	1701	1750	1832	1832	1832	1907	1907	1907															
70		1450	1445	1455	1616	1616	1616	1650	1650	1650	1750	1750	1750	1807	1807	1807	1844	1844	1844										1844	1844	1844
71		1451	1451	1451	1637	1637	1637																						1637	1637	1637
72		1452	1452	1452	1686	1686	1686	1886	1886	1886																			1886	1886	1886
73		1452	1452	1452	1653	1653	1653													1909	1909	1909							1653	1653	1653
74		1457	1457	1457	1781	1781	1781																								
75		1457	1457	1457	1550	1501	1600	1623	1623	1623	1641	1641	1641	1760	1760	1760				1925	1925	1925							1760	1760	1760

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
76		1459	1459	1459	1902	1902	1902													1700	1700	1700							1902	1902	1902
77		1460	1460	1460	1595	1595	1595	1750	1745	1755	1902	1902	1902																1902	1902	1902
78		1460	1460	1460	1595	1591	1600	1725	1701	1750	1925	1925	1925																1925	1925	1925
79		1462	1462	1462	1769	1769	1769													1903	1903	1903							1462	1462	1462
80		1463	1463	1463	1697	1697	1697	1887	1887	1887										1928	1928	1928							1887	1887	1887
81		1468	1468	1468	1616	1616	1616	1787	1787	1787																			1787	1787	1787
82		1468	1468	1468	1628	1628	1628	1825	1825	1825																					
83		1469	1469	1469	1525	1525	1525	1677	1677	1677										1549	1549	1549	1794	1794	1794				1525	1525	1525
84		1472	1472	1472	1695	1695	1695	1799	1799	1799										1570	1570	1570							1799	1799	1799
85		1472	1472	1472	1600	1600	1600													1764	1764	1764	1932	1932	1932				1600	1600	1600
86		1472	1472	1472	1605	1601	1610	1785	1785	1785																			1785	1785	1785
87		1473	1473	1473	1655	1655	1655	1795	1791	1800	1848	1848	1848																1848	1848	1848
88		1474	1474	1474	1605	1601	1610	1750	1745	1755																					
89		1476	1476	1476	1847	1847	1847													1542	1542	1542	1898	1898	1898						
90		1475	1475	1475	1674	1674	1674	1860	1860	1860																			1860	1860	1860
91		1476	1476	1476	1625	1601	1650	1793	1793	1793																					
92		1450	1401	1500																											
93		1478	1478	1478	1605	1601	1610	1750	1745	1755																					
94		1478	1478	1478	1605	1601	1610	1768	1768	1768	1897	1897	1897																1897	1897	1897
95		1480	1480	1480	1670	1670	1670	1749	1749	1749										1880	1880	1880									
96		1481	1481	1481	1754	1754	1754	1908	1908	1908										1872	1872	1872							1908	1908	1908
97		1481	1481	1481	1832	1832	1832																						1832	1832	1832
98		1486	1486	1486	1763	1763	1763																								
99		1487	1487	1487	1670	1670	1670	1915	1915	1915										1838	1838	1838							1915	1915	1915
100		1489	1489	1489	1625	1601	1650	1775	1751	1800	1919	1919	1919																		
101		1489	1489	1489	1625	1601	1650	1903	1903	1903																			1903	1903	1903
102		1490	1490	1490	1529	1529	1529	1682	1682	1682	1853	1853	1853																1853	1853	1853
103		1492	1492	1492	1625	1601	1650	1775	1751	1800																					
104		1492	1492	1492	1680	1680	1680	1789	1789	1789	1900	1900	1900																1789	1789	1789
105		1494	1494	1494	1927	1927	1927																						1927	1927	1927
106		1494	1494	1494	1787	1787	1787													1886	1886	1886							1787	1787	1787
107		1495	1495	1495	1650	1650	1650	1775	1751	1800																					
108		1495	1495	1495																1624	1624	1624							1495	1495	1495
109		1477	1459	1495	1610	1610	1610	1852	1852	1852																			1852	1852	1852
110		1497	1497	1497	1749	1749	1749	1905	1905	1905										1616	1616	1616							1905	1905	1905
111	*	1498	1498	1498																											
112		1498	1498	1498	1667	1667	1667													1879	1879	1879	1912	1912	1912						
113		1499	1499	1499	1631	1631	1631	1655	1655	1655																			1631	1631	1631
114		1500	1500	1500	1713	1713	1713	1868	1868	1868																			1868	1868	1868
115		1500	1500	1500	1624	1624	1624	1655	1655	1655	1778	1778	1778																		

	id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
	116		1496	1492	1501	1529	1529	1529																								
	117	*	1500	1500	1500	1636	1636	1636	1655	1655	1655	1910	1910	1910																		
	118		1500	1500	1500	1668	1668	1668																						1500	1500	1500
	119		1500	1500	1500	1600	1600	1600													1927	1927	1927							1600	1600	1600
	120		1500	1500	1500	1781	1781	1781	1906	1906	1906										1846	1846	1846							1906	1906	1906
	121		1500	1500	1500	1605	1601	1610	1721	1721	1721	1853	1853	1853																1853	1853	1853
	122		1500	1500	1500	1625	1601	1650	1775	1751	1800	1884	1884	1884																		
	123		1500	1500	1500	1680	1680	1680	1730	1730	1730	1809	1809	1809							1866	1866	1866	1928	1928	1928						
	124		1500	1500	1500	1837	1837	1837	1909	1909	1909																			1500	1500	1500
	125		1500	1500	1500	1747	1747	1747	1900	1900	1900																			1900		
	126		1515	1500	1530																									1515	1500	1530
	127		1505	1501	1510	1581	1581	1581													1613	1613	1613	1902	1902	1902				1505	1501	1510
	128		1501	1501	1501	1625	1601	1650	1775	1751	1800										1935	1935	1935									
	129		1492	1484	1501	1759	1759	1759	1793	1793	1793	1930	1930	1930																		
	130		1501	1501	1501																1772	1772	1772									
	131		1501	1501	1501	1662	1662	1662	1852	1852	1852	1905	1905	1905																1905	1905	1905
	132		1503	1503	1503																1873	1873	1873							1503	1503	1503
	133		1505	1503	1507	1629	1629	1629	1781	1781	1781	1877	1877	1877																1877	1877	1877
	134		1503	1503	1503																1673	1673	1673							1503	1503	1503
	135		1503	1503	1503	1611	1611	1611	1863	1863	1863										1925	1925	1925							1611	1611	1611
	136		1505	1505	1505	1812	1812	1812																						1812	1812	1812
	137		1506	1506	1506	1748	1748	1748																						1506	1506	1506
	138		1507	1507	1507	1771	1771	1771	1910	1910	1910																			1910	1910	1910
	139		1507	1507	1507	1770	1770	1770																								
	140		1507	1507	1507	1695	1691	1700	1900	1900	1900	1915	1915	1915																1900	1900	1900
	141		1508	1508	1508	1610	1610	1610	1852	1842	1862																			1852	1842	1862
	142		1523	1508	1538	1770	1770	1770																								
	143		1508	1508	1508	1625	1625	1625	1672	1672	1672	1744	1744	1744	1924	1924	1924				1896	1896	1896						1924	1924	1924	
	144		1509	1509	1509	1766	1766	1766																								
	145		1509	1509	1509	1650	1645	1655	1775	1751	1800	1907	1907	1907																1907	1907	1907
	146		1509	1509	1509	1742	1742	1742	1803	1803	1803	1900	1900	1900																1900	1900	1900
	147		1510	1510	1510	1550	1550	1550	1591	1591	1591	1758	1758	1758																		
	148		1510	1510	1510	1692	1692	1692	1853	1853	1853										1736	1736	1736							1853	1853	1853
	149		1510	1510	1510	1685	1685	1685													1881	1881	1881							1510	1510	1510
	150		1511	1511	1511	1655	1655	1655													1884	1884	1884									
	151		1510	1510	1510	1625	1625	1625													1812	1812	1812	1921	1921	1921				1625	1625	1625
	152	°	1511	1511	1511	1776	1776	1776																								
	153		1513	1513	1513	1598	1598	1598	1850	1801	1900																			1598	1598	1598
	154		1514	1514	1514	1518	1518	1518	1650	1645	1655	1795	1791	1800	1857	1857	1857													1857	1857	1857
	155		1514	1514	1514	1566	1566	1566	1765	1765	1765	1899	1899	1899							1929	1929	1929							1765	1765	1765

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
156		1514	1514	1514	1725	1725	1725	1929	1929	1929										1655	1655	1655	1915	1915	1915	1929	1929	1929	1725	1725	1725
157		1514	1514	1514	1650	1601	1700	1758	1758	1758																			1758	1758	1758
158		1514	1514	1514	1777	1777	1777	1873	1873	1873																					
159		1515	1515	1515	1637	1637	1637	1766	1766	1766	1897	1897	1897																1766	1766	1766
160		1515	1515	1515	1785	1785	1785	1892	1892	1892																			1892	1892	1892
161		1516	1516	1516	1596	1596	1596	1617	1617	1617	1674	1674	1674							1724	1724	1724	1924	1924	1924				1674	1674	1674
162		1517	1517	1517	1720	1720	1720	1887	1887	1887																			1887	1887	1887
163		1517	1517	1517	1695	1691	1700	1901	1901	1901																			1901	1901	1901
164		1518	1518	1518	1629	1629	1629													1923	1923	1923							1629	1629	1629
165		1519	1519	1519	1744	1744	1744	1880	1880	1880																			1880	1880	1880
166		1520	1520	1520	1752	1752	1752	1852	1852	1852																			1852	1852	1852
167		1520	1520	1520	1695	1691	1700													1813	1813	1813									
168		1520	1520	1520	1845	1845	1845													1764	1764	1764	1918	1918	1918				1520	1520	1520
169		1522	1522	1522	1534	1534	1534	1912	1912	1912										1695	1691	1700							1534	1534	1534
170		1522	1522	1522	1676	1676	1676	1805	1801	1810	1915	1915	1915																1915	1915	1915
171		1522	1522	1522	1619	1619	1619	1784	1784	1784	1822	1822	1822																1822	1822	1822
172		1522	1522	1522	1700	1700	1700	1880	1880	1880	1905	1905	1905																1905	1905	1905
173		1522	1522	1522	1614	1614	1614	1855	1855	1855										1930	1930	1930							1855	1855	1855
174		1522	1522	1522	1916	1916	1916													1649	1649	1649	1795	1795	1795						
175		1522	1522	1522	1862	1862	1862	1906	1906	1906										1723	1723	1723							1906	1906	1906
176		1522	1522	1522	1592	1592	1592													1670	1670	1670	1812	1812	1812				1592	1592	1592
177		1522	1522	1522	1575	1575	1575	1661	1661	1661										1794	1794	1794							1661	1661	1661
178		1522	1522	1522	1671	1671	1671	1795	1791	1800																					
179		1522	1522	1522	1674	1674	1674	1874	1874	1874																					
180		1522	1522	1522	1675	1651	1700	1823	1823	1823																					
181		1522	1522	1522	1675	1651	1700	1815	1815	1815	1904	1904	1904																1815	1815	1815
182		1524	1522	1526	1626	1626	1626	1775	1751	1800	1895	1895	1895																1895	1895	1895
183		1522	1522	1522	1768	1768	1768													1907	1907	1907	1930	1930	1930						
184		1537	1522	1552	1617	1617	1617	1750	1745	1755	1903	1903	1903																1903	1903	1903
185		1523	1523	1523	1622	1622	1622	1842	1842	1842	1918	1918	1918																1842	1842	1842
186		1523	1523	1523	1605	1601	1610																						1605	1601	1610
187		1524	1524	1524	1675	1651	1700	1818	1818	1818										1930	1930	1930									
188		1524	1524	1524	1698	1698	1698	1906	1906	1906										1829	1829	1829							1906	1906	1906
190		1525	1525	1525	1767	1767	1767	1817	1817	1817																			1817	1817	1817
191		1505	1501	1510	1596	1596	1596	1725	1701	1750	1912	1912	1912																1912	1912	1912
192	*o	1505	1501	1510	1752	1752	1752																						1752	1752	1752
193		1505	1501	1510	1620	1620	1620	1750	1745	1755	1908	1908	1908																1908	1908	1908
194	*	1505	1501	1510	1574	1574	1574																						1574	1574	1574
196	*	1505	1501	1510	1806	1806	1806	1836	1836	1836										1918	1918	1918									
197		1526	1526	1526																1760	1760	1760							1526	1526	1526

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
198		1526	1526	1526	1675	1651	1700	1899	1899	1899										1812	1812	1812									
199		1526	1526	1526	1675	1651	1700	1795	1791	1800	1899	1899	1899																1899	1899	1899
200		1528	1528	1528	1605	1605	1605	1655	1655	1655																			1655	1655	1655
201		1529	1529	1529	1663	1663	1663	1921	1921	1921																					
202		1529	1529	1529	1756	1756	1756	1910	1910	1910																			1910	1910	1910
203		1529	1529	1529	1642	1642	1642													1804	1804	1804	1905	1905	1905				1642	1642	1642
204		1533	1533	1533	1769	1769	1769	1903	1903	1903																			1903	1903	1903
205		1534	1534	1534	1568	1568	1568	1829	1829	1829																			1829	1829	1829
206		1535	1535	1535	1762	1762	1762																						1762	1762	1762
207		1536	1536	1536	1656	1656	1656													1872	1872	1872									
208		1537	1537	1537	1638	1638	1638	1825	1825	1825																			1537	1537	1537
209		1539	1539	1539	1637	1637	1637	1777	1777	1777	1782	1782	1782	1882	1882	1882													1882	1882	1882
210		1539	1539	1539	1566	1566	1566	1850	1801	1900										1748	1748	1748									
211		1539	1539	1539	1740	1740	1740													1923	1923	1923									
212		1540	1540	1540	1640	1640	1640	1790	1790	1790										1864	1864	1864							1790	1790	1790
213		1540	1540	1540	1751	1751	1751													1606	1606	1606							1901	1901	1901
214	*	1540	1540	1540	1786	1786	1786																						1786	1786	1786
215		1541	1541	1541	1675	1651	1700	1863	1863	1863																			1863	1863	1863
216		1542	1542	1542	1750	1701	1800													1634	1634	1634	1906	1906	1906				1542	1542	1542
217		1545	1545	1545	1573	1573	1573	1774	1774	1774	1900	1900	1900																1900	1900	1900
218	*	1546	1546	1546	1682	1682	1682													1851	1851	1851							1682	1682	1682
219		1549	1549	1549	1695	1691	1700	1776	1776	1776	1842	1842	1842	1906	1906	1906													1842	1842	1842
223	*o	1550	1545	1555																											
224		1550	1545	1555	1751	1751	1751																								
225		1550	1545	1555	1695	1691	1700	1823	1823	1823										1898	1898	1898							1823	1823	1823
226	*	1550	1501	1600	1790	1790	1790													1841	1841	1841	1874	1874	1874						
227	o	1550	1501	1600																											
228		1550	1501	1600	1691	1691	1691	1747	1747	1747																			1747	1747	1747
229		1550	1501	1600	1788	1788	1788	1913	1913	1913																			1913	1913	1913
230	*o	1550	1501	1600																									1550	1501	1600
231	o	1550	1501	1600																									1550	1501	1600
232	*	1550	1501	1600																											
233		1550	1501	1600	1653	1653	1653													1874	1874	1874							1653	1653	1653
234	*o	1550	1501	1600																									1550	1501	1600
235	*o	1550	1545	1555																											
236	*	1542	1501	1583	1775	1751	1800																								
237	*o	1550	1501	1600																											
238		1550	1501	1600	1766	1766	1766	1811	1811	1811																			1766	1766	1766
239		1550	1501	1600																									1812	1812	1812
240	*	1550	1501	1600	1827	1827	1827																								

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l	
242	*	1550	1501	1600	1655	1655	1655	1911	1911	1911																			1655	1655	1655	
243	* ^o	1550	1501	1600																												
244	*	1550	1501	1600	1616	1616	1616	1789	1789	1789																			1789	1789	1789	
245		1550	1501	1600	1614	1614	1614	1747	1747	1747	1814	1814	1814	1897	1897	1897																
246		1550	1501	1600	1742	1742	1742	1878	1878	1878																						
247		1550	1501	1600	1609	1609	1609	1825	1825	1825																						
248		1550	1501	1600	1719	1719	1719													1881	1881	1881										
249		1550	1501	1600	1705	1705	1705																						1938	1938	1938	
250		1550	1501	1600	1634	1634	1634	1844	1844	1844										1680	1680	1680							1844	1844	1844	
251		1550	1501	1600	1705	1705	1705																									
253		1550	1501	1600																									1550	1501	1600	
254		1550	1501	1600	1655	1655	1655	1682	1682	1682	1854	1854	1854							1854	1854	1854										
255		1550	1501	1600	1626	1626	1626	1775	1751	1800	1911	1911	1911																			
256		1511	1511	1511	1695	1691	1700	1780	1780	1780																			1780	1780	1780	
257		1553	1553	1553	1787	1787	1787													1922	1922	1922										
258		1553	1553	1553																1798	1798	1798							1553	1553	1553	
259	*	1553	1553	1553	1682	1682	1682	1830	1830	1830																			1830	1830	1830	
260		1572	1554	1590	1659	1659	1659	1907	1907	1907																			1907	1907	1907	
261		1555	1555	1555	1585	1585	1585	1750	1701	1800										1688	1688	1688	1935	1935	1935				1585	1585	1585	
261a	*	1555	1555	1555	1750	1701	1800																									
262	* ^o	1555	1555	1555	1819	1819	1819													1684	1684	1684							1555	1555	1555	
263	*	1555	1555	1555	1738	1738	1738																						1738	1738	1738	
264	^o	1555	1555	1555	1686	1686	1686													1774	1774	1774										
265		1557	1557	1557	1655	1655	1655	1752	1752	1752	1801	1801	1801	1838	1838	1838	1926	1926	1926										1926	1926	1926	
266		1558	1558	1558	1695	1691	1700	1833	1833	1833																						
268		1560	1560	1560	1662	1662	1662	1770	1770	1770	1834	1834	1834							1896	1896	1896							1770	1770	1770	
270		1562	1562	1562	1695	1691	1700	1821	1821	1821	1911	1911	1911																1911	1911	1911	
271		1568	1563	1574	1750	1750	1750	1787	1787	1787	1884	1884	1884																1884	1884	1884	
272		1564	1564	1564	1777	1777	1777													1598	1598	1598	1654	1654	1654							
273	*	1564	1564	1564	1714	1714	1714	1821	1821	1821	1916	1914	1918																1821	1821	1821	
274		1566	1566	1566	1723	1723	1723	1829	1829	1829										1885	1885	1885							1829	1829	1829	
275	*	1567	1567	1567	1787	1787	1787	1838	1838	1838										1916	1914	1918							1838	1838	1838	
276		1569	1569	1569	1609	1609	1609	1750	1745	1755	1843	1843	1843	1916	1914	1918	1935	1935	1935										1935	1935	1935	
277		1569	1569	1569	1790	1790	1790													1849	1849	1849							1790	1790	1790	
278		1570	1570	1570	1773	1773	1773													1926	1926	1926										
279		1570	1570	1570	1705	1701	1710	1885	1885	1885																			1885	1885	1885	
280		1570	1570	1570	1678	1678	1678	1816	1816	1816										1887	1887	1887										
281		1570	1570	1570	1705	1701	1710	1825	1801	1850																						
282		1571	1571	1571	1705	1701	1710	1838	1838	1838																				1838	1838	1838
283		1571	1571	1571	1825	1825	1825																							1825	1825	1825

id th	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rm1_d	rm1_f	rm1_l	rm2_d	rm2_f	rm2_l	rm3_d	rm3_f	rm3_l	m_d	m_f	m_l
284		1572	1572	1572	1743	1743	1743	1815	1815	1815	1907	1907	1907																		
285		1572	1572	1572	1751	1751	1751													1698	1698	1698									
287		1576	1576	1576	1700	1700	1700	1852	1852	1852	1904	1904	1904																1904	1904	1904
288		1577	1577	1577	1600	1600	1600	1796	1796	1796	1816	1816	1816	1931	1931	1931													1931	1931	1931
289		1578	1578	1578	1691	1691	1691	1789	1789	1789	1868	1868	1868																1868	1868	1868
290		1580	1580	1580	1705	1701	1710	1908	1908	1908																			1908	1908	1908
291		1580	1580	1580	1674	1674	1674	1785	1785	1785	1806	1806	1806							1873	1873	1873							1806	1806	1806
292		1574	1568	1581	1705	1701	1710	1899	1899	1899																			1899	1899	1899
293		1582	1582	1582	1905	1905	1905																						1905	1905	1905
295		1584	1584	1584	1706	1706	1706	1855	1855	1855	1938	1938	1938																		
296		1584	1584	1584																1732	1732	1732							1584	1584	1584
297	*	1584	1584	1584	1664	1664	1664																								
299		1586	1586	1586	1724	1724	1724	1842	1842	1842	1928	1928	1928																1724	1724	1724
301	*	1589	1589	1589	1625	1625	1625	1705	1705	1705	1771	1771	1771	1850	1850	1850													1589	1589	1589
302		1589	1589	1589	1632	1632	1632	1699	1699	1699	1839	1839	1839	1934	1934	1934													1934	1934	1934
303		1590	1590	1590	1791	1791	1791																								
304		1590	1590	1590	1705	1701	1710	1896	1896	1896										1841	1841	1841							1896	1896	1896
305		1590	1590	1590	1686	1636	1736	1780	1780	1780	1826	1826	1826	1881	1881	1881															
306		1590	1590	1590	1665	1665	1665	1882	1882	1882										1925	1925	1925							1882	1882	1882
307	°	1592	1592	1592																											
307 a		1592	1592	1592	1795	1795	1795													1913	1913	1913							1592	1592	1592
308		1593	1593	1593	1760	1760	1760																						1760	1760	1760
309		1594	1594	1594	1748	1748	1748	1764	1764	1764																			1594	1594	1594
310		1594	1594	1594	1750	1745	1755													1661	1661	1661	1825	1825	1825	1906	1906	1906	1594	1594	1594
311		1598	1598	1598	1715	1715	1715	1881	1881	1881																			1881	1881	1881
312		1595	1595	1595																									1595	1595	1595
313	*	1598	1598	1598	1746	1746	1746	1882	1882	1882																					
314		1599	1599	1599	1655	1655	1655	1859	1859	1859																					
315		1595	1591	1600	1778	1750	1806													1910	1910	1910							1778	1750	1806
316		1600	1600	1600	1776	1776	1776	1881	1881	1881																			1881	1881	1881
317	*	1595	1591	1600	1643	1643	1643													1760	1760	1760							1595	1591	1600
318	*	1575	1551	1600																											
319		1595	1591	1600	1605	1601	1610	1939	1939	1939																			1939	1939	1939
320	°	1600	1600	1600	1765	1765	1765	1911	1911	1911																			1911	1911	1911
321		1600	1600	1600																									1600	1600	1600
322		1600	1600	1600	1774	1774	1774	1908	1908	1908																					
323		1600	1600	1600	1756	1756	1756	1890	1890	1890																					
324		1600	1600	1600	1759	1759	1759																								
325		1600	1600	1600																1788	1788	1788							1600	1600	1600

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
326		1601	1601	1601	1674	1674	1674																								
327		1601	1601	1601	1812	1812	1812																						1812	1812	1812
328		1602	1602	1602	1725	1701	1750	1850	1845	1855																					
329	°	1602	1602	1602																											
330		1602	1602	1602	1725	1701	1750													1911	1911	1911									
331		1602	1602	1602	1700	1700	1700	1837	1837	1837										1934	1934	1934									
332		1603	1603	1603	1908	1908	1908																						1603	1603	1603
333		1604	1604	1604	1750	1745	1755	1890	1890	1890																					
335		1604	1604	1604	1749	1749	1749	1867	1867	1867										1925	1925	1925							1604	1604	1604
336		1604	1604	1604	1679	1679	1679	1778	1778	1778	1939	1939	1939							1885	1885	1885									
337		1606	1606	1606	1861	1861	1861																						1606	1606	1606
338		1608	1608	1608	1651	1651	1651	1901	1901	1901																			1901	1901	1901
339		1608	1608	1608	1826	1826	1826	1911	1911	1911																			1911	1911	1911
340		1608	1608	1608	1712	1712	1712													1908	1908	1908									
341		1608	1608	1608	1655	1655	1655	1829	1829	1829	1913	1913	1913																1913	1913	1913
342		1608	1608	1608	1750	1745	1755	1861	1861	1861																			1861	1861	1861
343		1609	1609	1609	1643	1643	1643	1787	1787	1787	1909	1909	1909																1909	1909	1909
344		1585	1562	1609	1771	1771	1771													1771	1771	1771							1771	1771	1771
345		1609	1609	1609	1804	1804	1804																						1804	1804	1804
346		1609	1609	1609	1674	1674	1674	1850	1850	1850										1875	1875	1875									
347		1609	1609	1609	1750	1745	1755	1907	1907	1907																			1907	1907	1907
348		1609	1609	1609	1750	1745	1755	1919	1919	1919																					
349		1609	1609	1609	1766	1766	1766													1857	1857	1857									
350		1610	1610	1610																1760	1760	1760							1610	1610	1610
351	*°	1611	1611	1611																											
352	*°	1611	1611	1611																									1611	1611	1611
353	*°	1611	1611	1611	1620	1620	1620																								
354		1611	1611	1611	1776	1776	1776																						1776	1776	1776
355	*°	1611	1611	1611																											
356		1611	1611	1611	1739	1739	1739	1881	1881	1881																					
357		1612	1612	1612	1750	1745	1755	1939	1939	1939																			1939	1939	1939
358		1567	1567	1567	1612	1612	1612													1902	1902	1902							1612	1612	1612
359		1614	1614	1614	1725	1725	1725	1847	1847	1847																			1847	1847	1847
360		1614	1614	1614																1759	1759	1759									
361	*	1637	1615	1660	1767	1767	1767																						1638	1615	1660
362	°	1615	1615	1615																									1615	1615	1615
363		1616	1616	1616	1791	1791	1791	1900	1900	1900																					
364		1613	1610	1616	1910	1910	1910																						1613	1610	1616
365		1617	1617	1617	1804	1804	1804																						1804	1804	1804
366		1617	1617	1617	1745	1745	1745	1918	1918	1918																			1745	1745	1745

id ^{ab} note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
367	1617	1617	1617	1797	1797	1797													1850	1845	1855									
368	1617	1617	1617	1714	1714	1714	1734	1734	1734	1814	1814	1814							1880	1880	1880	1921	1921	1921						
369	1618	1618	1618	1763	1763	1763	1875	1875	1875																			1875	1875	1875
370	1618	1618	1618																1910	1910	1910	1910	1910	1910				1618	1618	1618
371	1619	1619	1619	1769	1769	1769	1868	1868	1868																					
372	1619	1619	1619																1789	1789	1789									
373	1619	1619	1619	1637	1637	1637	1750	1750	1750	1783	1783	1783	1896	1896	1896													1783	1783	1783
374	^{ao} 1620	1620	1620																											
375	1620	1620	1620	1843	1843	1843	1886	1886	1886										1936	1936	1936							1620	1620	1620
376	1620	1620	1620	1682	1682	1682	1760	1760	1760	1927	1927	1927							1896	1896	1896							1927	1927	1927
377	1620	1620	1620	1745	1745	1745	1809	1809	1809										1837	1837	1837							1809	1809	1809
378	1620	1620	1620	1750	1745	1755																								
379	1620	1620	1620	1750	1745	1755	1870	1870	1870																			1870	1870	1870
380	1620	1620	1620																1733	1733	1733							1620	1620	1620
381	^{ao} 1621	1621	1621																											
382	1621	1621	1621	1809	1809	1809													1899	1899	1899									
383	1621	1621	1621	1750	1745	1755	1853	1853	1853																					
383a	^o 1621	1621	1621																									1621	1621	1621
384	1621	1621	1621	1750	1745	1755	1861	1861	1861																					
385	1621	1621	1621																1924	1924	1924	1935	1935	1935				1621	1621	1621
386	1622	1622	1622	1700	1700	1700	1874	1874	1874																					
387	^{ao} 1622	1622	1622																											
388	1622	1622	1622	1750	1750	1750	1896	1896	1896	1921	1921	1921																		
389	1622	1622	1622																1926	1926	1926							1622	1622	1622
390	1622	1622	1622	1693	1693	1693	1741	1741	1741										1857	1857	1857							1693	1693	1693
391	1623	1623	1623																1884	1884	1884							1623	1623	1623
392	1623	1623	1623	1786	1786	1786	1878	1878	1878										1831	1831	1831									
393	1624	1624	1624	1852	1852	1852																						1852	1852	1852
394	1624	1624	1624	1725	1701	1750	1825	1801	1850																					
395	1624	1624	1624	1650	1650	1650	1720	1720	1720	1762	1762	1762																1762	1762	1762
396	1625	1625	1625	1871	1871	1871																						1871	1871	1871
398	1605	1601	1610	1740	1740	1740																								
399	1605	1601	1610	1653	1653	1653																						1653	1653	1653
400	[*] 1605	1601	1610	1782	1782	1782																						1605	1601	1610
401	1605	1601	1610	1675	1675	1675	1796	1796	1796										1914	1914	1914							1796	1796	1796
402	1650	1601	1700	1818	1818	1818																						1818	1818	1818
403	1605	1601	1610	1650	1650	1650	1836	1836	1836																			1836	1836	1836
404	1605	1601	1610	1773	1773	1773	1909	1909	1909																					
405	1626	1626	1626	1821	1821	1821																						1626	1626	1626
406	[*] 1626	1626	1626																1750	1745	1755							1626	1626	1626

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
407		1626	1626	1626	1655	1655	1655	1831	1831	1831	1904	1904	1904																1904	1904	1904
408		1626	1626	1626	1742	1742	1742	1876	1876	1876																					
409		1627	1627	1627	1635	1635	1635													1760	1760	1760	1857	1857	1857	1895	1895	1895	1635	1635	1635
410		1628	1628	1628																									1628	1628	1628
411		1629	1629	1629	1860	1860	1860	1899	1899	1899																			1899	1899	1899
412	*	1630	1630	1630																									1630	1630	1630
413		1630	1630	1630	1887	1887	1887													1934	1934	1934							1887	1887	1887
414		1616	1603	1630	1724	1724	1724	1911	1911	1911																			1911	1911	1911
415	°	1631	1631	1631																											
416		1632	1632	1632																									1632	1632	1632
417	*°	1643	1632	1654																									1643	1632	1654
418		1633	1633	1633	1767	1767	1767	1908	1908	1908																			1908	1908	1908
419		1634	1634	1634	1775	1751	1800	1902	1902	1902																			1902	1902	1902
420		1634	1634	1634																									1634	1634	1634
421		1631	1629	1634	1749	1749	1749	1873	1873	1873																					
422		1634	1634	1634																1899	1899	1899							1634	1634	1634
423		1635	1635	1635																1902	1902	1902									
424		1635	1635	1635																									1635	1635	1635
425		1635	1635	1635	1775	1751	1800	1905	1905	1905																			1905	1905	1905
426		1636	1636	1636	1775	1751	1800	1900	1900	1900																			1900	1900	1900
427		1636	1636	1636	1773	1773	1773	1898	1898	1898																			1898	1898	1898
428	*°	1636	1636	1636	1696	1696	1696																								
429		1636	1636	1636	1752	1752	1752																								
430		1636	1636	1636	1749	1749	1749	1909	1909	1909	1924	1924	1924																1924	1924	1924
431	°	1636	1636	1636																									1636	1636	1636
432		1636	1636	1636	1725	1701	1750	1819	1819	1819																			1819	1819	1819
433		1637	1637	1637	1645	1645	1645	1785	1785	1785																					
434		1637	1637	1637	1791	1791	1791	1892	1892	1892																					
435		1639	1639	1639	1648	1648	1648	1754	1754	1754	1850	1845	1855																		
436		1639	1639	1639	1720	1720	1720													1899	1899	1899							1639	1639	1639
437		1639	1639	1639	1853	1853	1853													1879	1879	1879									
438		1639	1639	1639	1835	1835	1835																								
439	°	1641	1641	1641	1751	1751	1751													1910	1910	1910							1751	1751	1751
440		1641	1641	1641	1788	1788	1788	1909	1909	1909										1860	1860	1860							1909	1909	1909
441	*°	1641	1641	1641																											
442		1641	1641	1641																1919	1919	1919							1641	1641	1641
443		1642	1642	1642	1680	1680	1680	1783	1783	1783										1870	1870	1870							1783	1783	1783
444		1642	1642	1642	1655	1655	1655	1775	1775	1775	1906	1906	1906																1906	1906	1906
445		1642	1642	1642	1744	1744	1744	1763	1763	1763	1847	1847	1847	1921	1921	1921				1895	1895	1895							1847	1847	1847
446		1642	1642	1642	1690	1690	1690													1797	1797	1797	1918	1918	1918				1690	1690	1690

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rm1_d	rm1_f	rm1_l	rm2_d	rm2_f	rm2_l	rm3_d	rm3_f	rm3_l	m_d	m_f	m_l
447		1643	1643	1643																1783	1783	1783	1914	1914	1914				1643	1643	1643
448		1644	1644	1644	1750	1750	1750	1900	1900																				1900	1900	1900
449		1644	1644	1644	1660	1660	1660	1766	1744	1788	1824	1824	1824							1881	1881	1881							1660	1660	1660
450	°	1645	1645	1645																											
451		1646	1646	1646	1937	1937	1937													1874	1874	1874									
452	*°	1646	1646	1646																											
453		1647	1647	1647	1772	1772	1772	1850	1850	1850										1918	1918	1918							1647	1647	1647
454		1648	1648	1648	1766	1766	1766	1825	1825	1825																					
455		1650	1650	1650	1676	1676	1676	1762	1762	1762	1910	1910	1910																1910	1910	1910
457		1650	1645	1655	1795	1791	1800	1933	1933	1933																					
458		1650	1601	1700																1792	1792	1792									
459		1650	1601	1700	1792	1792	1792	1810	1810	1810																			1810	1810	1810
460		1650	1601	1700	1795	1791	1800													1931	1931	1931									
461	*	1650	1645	1655	1686	1686	1686	1700	1700	1700	1897	1897	1897							1842	1842	1842							1897	1897	1897
462	°	1650	1601	1700																											
463		1650	1601	1700																1850	1845	1855							1650	1601	1700
464	*	1637	1601	1673																											
465	°	1650	1601	1700																											
466	°	1650	1601	1700																											
467	*°	1650	1601	1700																											
468		1650	1645	1655	1861	1861	1861	1924	1924	1924										1784	1784	1784							1924	1924	1924
469		1650	1601	1700	1784	1784	1784	1858	1858	1858																			1858	1858	1858
470		1650	1601	1700	1828	1828	1828																						1828	1828	1828
471		1656	1651	1661	1764	1764	1764													1873	1873	1873									
472		1652	1652	1652	1873	1873	1873	1918	1918	1918																					
473		1652	1652	1652	1769	1769	1769													1919	1919	1919							1769	1769	1769
474		1655	1655	1655	1840	1840	1840																						1840	1840	1840
475		1661	1656	1666	1732	1732	1732	1910	1910	1910																					
476		1661	1661	1661	1891	1891	1891																						1891	1891	1891
477		1662	1662	1662	1795	1791	1800													1926	1926	1926									
478		1664	1664	1664	1770	1770	1770	1917	1917	1917																					
479		1664	1664	1664	1755	1755	1755													1893	1893	1893							1664	1664	1664
480	*	1664	1664	1664																1845	1845	1845							1664	1664	1664
481		1664	1664	1664																									1664	1664	1664
482	*	1664	1664	1664																											
483		1659	1655	1664	1855	1855	1855																								
484	°	1664	1664	1664																											
485		1665	1665	1665	1870	1860	1880																								
486		1655	1655	1655	1801	1801	1801																						1801	1801	1801
487		1655	1655	1655	1767	1767	1767	1881	1881	1881																			1881	1881	1881

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l	
488		1666	1666	1666																1739	1739	1739	1918	1918	1918				1666	1666	1666	
489	°	1666	1666	1666	1686	1686	1686																						1686	1686	1686	
490		1668	1668	1668																												
491	*	1669	1669	1669																									1669	1669	1669	
492		1670	1670	1670	1759	1759	1759	1910	1910	1910																			1910	1910	1910	
493		1670	1670	1670																												
494		1670	1670	1670	1815	1815	1815																									
495		1670	1670	1670	1784	1784	1784	1868	1868	1868																						
496		1670	1670	1670	1771	1771	1771	1885	1885	1885																			1885	1885	1885	
497		1671	1671	1671	1746	1746	1746	1902	1902	1902																						
498		1674	1674	1674																												
499		1674	1674	1674	1755	1755	1755	1869	1869	1869																			1674	1674	1674	
500		1676	1676	1676	1768	1768	1768	1887	1887	1887																			1869	1869	1869	
501		1676	1676	1676																										1887	1887	1887
502		1676	1676	1676	1790	1790	1790	1924	1924	1924										1750	1701	1800							1676	1676	1676	
503		1677	1677	1677	1792	1792	1792	1897	1897	1897																				1924	1924	1924
504		1678	1678	1678	1704	1704	1704																							1897	1897	1897
505		1678	1678	1678	1823	1823	1823	1905	1905	1905										1881	1881	1881								1704	1704	1704
506		1680	1680	1680	1734	1734	1734	1848	1848	1848																						
507		1680	1680	1680	1789	1789	1789																							1848	1848	1848
508		1682	1682	1682	1935	1935	1935													1895	1895	1895							1789	1789	1789	
509		1682	1682	1682	1853	1853	1853													1771	1771	1771										
510		1684	1684	1684	1792	1792	1792																							1792	1792	1792
511		1684	1684	1684	1818	1818	1818																							1818	1818	1818
512		1688	1688	1688	1782	1782	1782	1898	1898	1898																				1898	1898	1898
513		1688	1688	1688	1860	1860	1860																									
514		1689	1689	1689	1748	1748	1748																									
515		1694	1694	1694	1729	1729	1729																									
516		1695	1695	1695	1805	1801	1810	1927																						1729	1729	1729
518		1696	1696	1696																										1927	1927	1927
519		1697	1697	1697	1802	1802	1802	1900	1900	1900										1750	1750	1750							1696	1696	1696	
520		1697	1697	1697	1767	1767	1767																									
521		1698	1698	1698	1788	1788	1788	1907	1907	1907																				1767	1767	1767
522		1698	1698	1698	1789	1789	1789																							1907	1907	1907
523		1699	1699	1699	1770	1770	1770	1920	1920	1920										1908	1908	1908							1789	1789	1789	
524	°	1695	1691	1700																												
525		1695	1691	1700	1750	1701	1800	1773	1773	1773										1911	1911	1911								1695	1691	1700
526		1675	1651	1700																										1773	1773	1773
527	*	1675	1651	1700	1847	1847	1847																							1675	1651	1700
528	°	1695	1691	1700																1738	1738	1738										

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
529		1695	1691	1700	1722	1722	1722	1840	1840	1840										1883	1883	1883							1840	1840	1840
530		1700	1700	1700																											
531		1700	1700	1700	1875	1875	1875																						1875	1875	1875
532		1700	1700	1700																1812	1812	1812	1929	1929	1929				1700	1700	1700
533		1701	1701	1701																									1701	1701	1701
534		1701	1701	1701	1785	1785	1785	1894	1894	1894																			1894	1894	1894
535		1702	1702	1702																1832	1832	1832							1702	1702	1702
537		1703	1703	1703	1750	1750	1750													1918	1918	1918							1750	1750	1750
538		1704	1704	1704	1766	1766	1766																								
539		1704	1704	1704																1821	1821	1821							1704	1704	1704
540		1705	1705	1705																									1796	1796	1796
541		1705	1705	1705	1838	1838	1838													1770	1770	1770							1838	1838	1838
542		1706	1706	1706	1933	1933	1933																						1933	1933	1933
543		1706	1706	1706	1835	1835	1835													1913	1913	1913									
544		1707	1707	1707	1904	1904	1904																						1904	1904	1904
545	°	1710	1710	1710																											
546		1710	1710	1710	1820	1820	1820													1881	1881	1881							1820	1820	1820
547		1712	1712	1712																1817	1817	1817	1875	1875	1875						
548		1712	1712	1712	1785	1785	1785													1812	1812	1812	1882	1882	1882						
549		1713	1713	1713																									1713	1713	1713
550		1714	1714	1714	1816	1816	1816	1902	1902	1902										1865	1865	1865							1902	1902	1902
551		1714	1714	1714	1928	1928	1928																						1928	1928	1928
552		1715	1715	1715	1837	1837	1837																						1837	1837	1837
553		1717	1717	1717																											
554		1717	1717	1717	1750	1750	1750	1817	1817	1817										1882	1882	1882							1817	1817	1817
555		1720	1720	1720	1770	1770	1770	1932	1932	1932																					
556		1720	1720	1720	1904	1904	1904																								
557		1720	1720	1720	1780	1780	1780	1832	1832	1832	1860	1860	1860							1923	1923	1923							1832	1832	1832
558		1724	1724	1724	1824	1824	1824																								
559		1725	1725	1725	1758	1758	1758	1800	1800	1800																					
560	*	1705	1701	1710																1919	1919	1919									
561		1705	1701	1710	1763	1763	1763																								
562		1705	1701	1710	1848	1848	1848																								
563		1705	1701	1710	1910	1910	1910	1925	1925	1925																			1925	1925	1925
564		1726	1726	1726	1883	1883	1883													1812	1812	1812									
565		1726	1726	1726	1930	1930	1930													1780	1780	1780							1930	1930	1930
566		1727	1727	1727	1803	1803	1803													1927	1927	1927							1803	1803	1803
567		1729	1729	1729	1815	1815	1815																						1815	1815	1815
568		1731	1731	1731	1782	1782	1782																								
569		1731	1731	1731	1833	1833	1833	1878	1878	1878																			1833	1833	1833

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l		
570		1732	1732	1732																1921	1921	1921							1732	1732	1732		
571		1732	1732	1732	1877	1877	1877																						1877	1877	1877		
572		1733	1733	1733	1744	1744	1744													1935	1935	1935							1733	1733	1733		
573		1746	1735	1757																													
574		1735	1735	1735	1863	1863	1863													1918	1918	1918							1863	1863	1863		
575	°	1738	1738	1738	1820	1820	1820																										
576		1740	1740	1740																1922	1922	1922							1740	1740	1740		
577		1741	1741	1741	1795	1795	1795																										
578		1742	1742	1742	1796	1796	1796																										
579		1742	1742	1742																1919	1919	1919							1742	1742	1742		
580	°	1743	1743	1743																													
581		1744	1744	1744	1864	1864	1864																							1864	1864	1864	
582		1744	1744	1744	1847	1847	1847	1893	1893	1893										1791	1791	1791							1893	1893	1893		
583		1744	1744	1744	1808	1808	1808	1916	1916	1916																							
584		1744	1744	1744	1923	1923	1923																										
585		1744	1744	1744	1764	1764	1764													1875	1875	1875											
586		1744	1744	1744	1919	1919	1919																										
587		1744	1744	1744	1795	1795	1795	1927	1927	1927										1856	1856	1856							1927	1927	1927		
588	°	1744	1744	1744																													
589		1744	1744	1744	1861	1861	1861																										
590		1745	1745	1745	1860	1860	1860	1908	1908	1908																				1908	1908	1908	
591		1746	1746	1746																													
592		1746	1746	1746																1919	1919	1919							1746	1746	1746		
593		1747	1747	1747																													
594		1747	1747	1747	1900	1900	1900																										
595		1749	1749	1749																1919	1919	1919											
596		1750	1701	1800	1935	1935	1935																							1750	1701	1800	
597		1750	1701	1800	1921	1921	1921																										
598		1750	1701	1800																													
599		1750	1745	1755	1805	1805	1805	1927	1927	1927																							
600		1750	1701	1800	1788	1780	1797																										
601		1750	1701	1800																													
602	*	1750	1701	1800																													
603	*	1750	1701	1800																													
604		1750	1701	1800	1854	1854	1854													1924	1924	1924							1854	1854	1854		
605		1750	1701	1800																													
606		1750	1701	1800	1803	1803	1803													1911	1911	1911							1803	1803	1803		
607		1750	1701	1800	1792	1792	1792	1911	1911	1911																				1911	1911	1911	
608	*	1750	1701	1800	1927	1927	1927																										
609	°	1750	1701	1800																											1750	1701	1800

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
610	*o	1750	1701	1800																											
611		1750	1701	1800																1902	1902	1902							1750	1701	1800
612		1750	1701	1800																1929	1929	1929									
613		1750	1701	1800	1863	1863	1863																								
614		1750	1701	1800	1929	1929	1929																								
615		1750	1701	1800	1826	1826	1826	1856	1856	1856																			1856	1856	1856
616	*	1750	1701	1800	1750	1701	1800	1825	1825	1825																			1825	1825	1825
617		1750	1750	1750	1791	1791	1791													1924	1924	1924							1791	1791	1791
618		1750	1750	1750																											
619		1750	1750	1750																											
620		1750	1750	1750	1875	1875	1875													1816	1816	1816									
621		1752	1752	1752	1776	1776	1776	1908	1908	1908																			1908	1908	1908
622		1752	1752	1752	1826	1826	1826																						1826	1826	1826
623		1754	1754	1754	1892	1892	1892													1939	1939	1939									
624		1754	1754	1754																											
625		1754	1754	1754																											
626		1754	1754	1754	1914	1914	1914													1859	1859	1859									
627		1754	1754	1754	1835	1835	1835																								
628		1755	1755	1755	1789	1789	1789	1842	1842	1842																					
629	o	1768	1756	1780	1818	1818	1818																								
630		1756	1756	1756	1819	1819	1819													1923	1923	1923							1819	1819	1819
631	o	1758	1758	1758	1854	1854	1854																								
632		1757	1757	1757	1862	1862	1862	1939	1939	1939										1916	1916	1916							1939	1939	1939
633		1758	1758	1758																											
634		1758	1758	1758																1924	1924	1924									
635		1759	1759	1759																											
636		1759	1759	1759	1802	1802	1802	1829	1829	1829	1895	1895	1895																1829	1829	1829
637	*	1759	1759	1759	1849	1849	1849													1886	1886	1886									
638		1760	1760	1760	1794	1794	1794													1926	1926	1926									
639		1762	1762	1762	1859	1859	1859																						1859	1859	1859
640		1762	1762	1762	1927	1927	1927																								
641		1762	1762	1762																1895	1891	1900									
642		1762	1762	1762	1906	1906	1906																								
643		1763	1763	1763	1903	1903	1903																								
644		1763	1763	1763																									1763	1763	1763
645		1764	1764	1764																											
646		1764	1764	1764	1854	1854	1854	1882	1882	1882																			1882	1882	1882
647		1765	1765	1765	1786	1786	1786																								
648		1765	1765	1765																									1765	1765	1765
649		1765	1765	1765	1771	1771	1771																								

	id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
	650		1766	1766	1766	1883	1883	1883																								
	651		1766	1766	1766	1814	1814	1814																								
	652		1766	1766	1766																											
	653		1766	1766	1766																1803	1803	1803									
	654		1767	1767	1767	1848	1848	1848	1906	1906	1906																		1906	1906	1906	
	655		1768	1768	1768																											
	656		1769	1769	1769	1906	1906	1906																					1906	1906	1906	
	659		1770	1770	1770	1870	1870	1870																								
	660		1770	1770	1770	1868	1868	1868																								
	661		1770	1770	1770																											
	662		1770	1770	1770	1776	1776	1776	1847	1847	1847																					
	663		1771	1771	1771	1878	1878	1878																								
	664		1771	1771	1771																											
	665		1772	1772	1772																1875	1875	1875									
	666		1772	1772	1772																1839	1839	1839						1772	1772	1772	
	667		1772	1772	1772	1803	1803	1803																					1772	1772	1772	
	668		1773	1773	1773																											
	669		1773	1773	1773																											
	670		1773	1773	1773	1880	1880	1880																								
	671		1773	1773	1773	1898	1898	1898																								
	672		1774	1774	1774	1847	1847	1847																								
	673		1774	1774	1774																											
	674		1774	1774	1774																											
	675		1774	1774	1774																1880	1880	1880									
	676		1775	1775	1775																											
	677		1755	1755	1755	1892	1892	1892																								
	678		1776	1776	1776																											
	679		1776	1776	1776																											
	680		1777	1777	1777																											
	681		1777	1777	1777	1883	1883	1883																								
	682		1777	1777	1777	1849	1849	1849																					1849	1849	1849	
	683		1778	1778	1778																											
	684		1778	1778	1778	1881	1881	1881																								
	685		1778	1778	1778	1864	1864	1864																					1864	1864	1864	
	686		1779	1779	1779	1927	1927	1927																								
	687		1779	1779	1779																											
	688		1779	1779	1779	1909	1909	1909																					1909	1909	1909	
	689		1780	1780	1780	1931	1931	1931																					1931	1931	1931	
	690		1780	1780	1780	1800	1800	1800																					1800	1800	1800	
	691		1780	1780	1780																								1780	1780	1780	

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
692	*	1781	1781	1781	1882	1882	1882	1918	1918	1918																			1882	1882	1882
693		1781	1781	1781	1845	1845	1845													1900	1900	1900									
694		1781	1781	1781	1862	1862	1862																						1862	1862	1862
695		1781	1781	1781	1897	1897	1897																								
696		1781	1781	1781	1910	1910	1910																								
697		1781	1781	1781	1847	1847	1847																						1847	1847	1847
698		1781	1781	1781																1933	1933	1933							1781	1781	1781
699		1781	1781	1781																1876	1876	1876	1934	1934	1934						
700		1782	1782	1782	1932	1932	1932																								
701		1782	1782	1782																									1928	1928	1928
702		1782	1782	1782	1916	1916	1916																						1916	1916	1916
703		1782	1782	1782	1888	1888	1888																								
704		1782	1782	1782																											
705		1782	1782	1782																											
706		1783	1783	1783	1893	1893	1893													1845	1845	1845									
707		1783	1783	1783	1901	1901	1901																						1901	1901	1901
708		1783	1783	1783	1863	1863	1863																						1863	1863	1863
709		1783	1783	1783	1861	1861	1861																								
710	*	1784	1784	1784	1885	1885	1885																								
711	*	1784	1784	1784	1885	1885	1885																								
712	*o	1784	1784	1784																											
713	*o	1784	1784	1784																											
714	*	1784	1784	1784																											
715	*	1784	1784	1784	1806	1806	1806																						1860	1860	1860
716	*	1784	1784	1784	1850	1850	1850																								
717		1784	1784	1784																											
718		1784	1784	1784																											
719		1785	1785	1785																											
720		1785	1785	1785	1805	1801	1810	1858	1858	1858																			1858	1858	1858
721		1786	1786	1786																1891	1891	1891									
722		1786	1786	1786	1875	1875	1875																								
723		1786	1786	1786	1889	1889	1889																						1889	1889	1889
724		1786	1786	1786																											
725		1786	1786	1786	1921	1921	1921																								
726		1787	1787	1787	1851	1851	1851																								
727		1787	1787	1787	1898	1898	1898																								
728		1787	1787	1787																1863	1863	1863									
729		1787	1787	1787	1939	1939	1939																						1939	1939	1939
730		1787	1787	1787	1900	1900	1900																						1900	1900	1900
731		1788	1788	1788	1906	1906	1906																								

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
732		1789	1789	1789	1933	1933	1933																						1933	1933	1933
733		1789	1789	1789	1870	1870	1870																								
734		1789	1789	1789																											
735		1789	1789	1789	1906	1906	1906																								
736		1789	1789	1789	1906	1906	1906																						1789	1789	1789
737		1789	1789	1789	1906	1906	1906																								
738		1790	1790	1790																											
739		1790	1790	1790																1916	1916	1916							1790	1790	1790
740		1790	1790	1790																											
741		1790	1790	1790	1840	1840	1840																						1840	1840	1840
742		1790	1790	1790	1790	1790	1790																								
743		1791	1791	1791	1839	1839	1839																								
744		1792	1792	1792	1805	1805	1805																								
745		1792	1792	1792	1862	1862	1862																								
746		1792	1792	1792																1914	1914	1914							1792	1792	1792
747		1792	1792	1792	1820	1820	1820													1896	1896	1896							1820	1820	1820
748		1792	1792	1792																											
749		1792	1792	1792																1910	1910	1910									
750		1792	1792	1792																											
751		1793	1793	1793																											
752		1793	1793	1793																											
753		1793	1793	1793																											
754		1794	1794	1794	1910	1910	1910																								
755		1794	1794	1794	1877	1877	1877																								
756		1794	1794	1794	1924	1924	1924																								
757		1794	1794	1794	1883	1883	1883																						1883	1883	1883
758		1794	1794	1794																											
759		1795	1795	1795	1830	1830	1830	1905	1905	1905																					
760		1795	1795	1795																											
761		1795	1795	1795	1916	1916	1916																								
762		1795	1795	1795	1865	1865	1865																						1795	1795	1795
763		1796	1796	1796																											
764		1796	1796	1796																											
765		1797	1797	1797	1901	1901	1901																						1901	1901	1901
766		1797	1797	1797	1883	1883	1883																						1883	1883	1883
767		1798	1798	1798																									1798	1798	1798
768		1799	1799	1799																1890	1890	1890	1927	1927	1927						
769		1799	1799	1799	1855	1855	1855																						1855	1855	1855
770		1795	1791	1800	1854	1854	1854																						1854	1854	1854
771		1795	1791	1800	1908	1908	1908																								

id ^{ab}	note ^c	b_d	b_f	b_l	rb1_d	rb1_f	rb1_l	rb2_d	rb2_f	rb2_l	rb3_d	rb3_f	rb3_l	rb4_d	rb4_f	rb4_l	rb5_d	rb5_f	rb5_l	rn1_d	rn1_f	rn1_l	rn2_d	rn2_f	rn2_l	rn3_d	rn3_f	rn3_l	m_d	m_f	m_l
772		1795	1791	1800	1840	1840	1840																								
773		1795	1791	1800	1860	1860	1860	1879	1879	1879																					
774	*	1795	1791	1800	1891	1891	1891																						1891	1891	1891
775		1775	1751	1800	1818	1818	1818	1853	1853	1853										1934	1934	1934							1853	1853	1853
776		1800	1800	1800																											
777		1800	1800	1800	1840	1840	1840																						1840	1840	1840
778	*°	1800	1800	1800																											

^a The churches' ids correspond with the original list. The churches, which are present in the original description, but were not within the GDL at the time of their founding are excluded. The original entries of the dates are not included for brevity, while the intervals of uncertainty in this dataset are significantly narrower than in the manors' dataset.

^b The full column names are as follows: b_d – built_default (the middle of the interval between the first and last dates when the church was likely built); b_f – built_first – the earliest possible building date according to the source; b_l – the latest possible building date according to the source; rb1_d – rebuilt1_default (refers to the first rebuilding date, other 'rb' columns refer to subsequent rebuildings); rb1_f – rebuilt1_first; rb1_l – rebuilt_last; rn1_d – renovated1_default (refers to the first renovation date, other 'rn' columns refer to subsequent renovations); rn1_f – renovated1_first; rn1_l – renovated1_last; m_d – masonry_default (refers to the date when the church was converted to masonry); m_f – masonry_first; masonry_last.

^c The notes are transferred from the original list: * denotes Evangelical and Reformist churches; ° denotes the churches that, at some point, have been destroyed and were not rebuilt, or were permanently converted to Orthodox churches from the 19th century. The latter dates are taken into account when calculating the total number of churches in Figure 3.4.

Source: author based on original list of churches and their various construction dates from Gimbutas (1970).

APPENDIX C. ROBUSTNESS CHECKS OF THE ANALYSIS OF MANORS IN CHAPTER 5

In addition to the simulations presented in the main text, Tables C1 and C2 provide another robustness check, suggesting that the structural breaks in the trend of new manors are likely not random. In particular, the table presents the results of simple OLS models testing the possible presence of alternative structural breaks:

$$m_t = \beta_0 + \beta_1 D_t^{1491} + \beta_2 D_t^{\text{alt}} + u_t, \quad (2)$$

where m_t is the estimated number of new manors in year t , D_t^{1491} is the dummy variable equal to 1 if year t falls into the time interval (growth regime) after the structural break in 1491 (as estimated in the main text), D_t^{alt} is the dummy variable equal to 1 if year t is larger than the tested alternative break, and u_t is the error term. β_0 is the intercept and in this case, it represents the average number of new manors in the period before all breaks. Then, $\beta_1 D_t^{1491}$ is the additional number of new manors after 1491, while $\beta_2 D_t^{\text{alt}}$ is the additional number of new manors after the alternative break, compared to the average number of manors before all breaks.

The dummy variable representing the structural break in 1491 is included in all OLS models, as this break is the most frequent occurring over 10,000 simulations reported in Table 5.3 of the main text. Its inclusion allows to check whether the alternative breaks have (more) explanatory power in comparison. Without this inclusion, almost any time-related dummy variable would have a statistically significant coefficient due to omitted variable bias, picking up the noticeable increase in the trend of new manors during the latter part of the analysed period.

The alternative breaks tested by the OLS models correspond with the deaths of the grand dukes (1430, 1440, 1506, 1548, 1572) and the last important battles within ethnic Lithuania (the geographical scope of the manor data; 1392, 1435), as they are likely exogenous to institutional change. Only the death of Casimir in 1492 is excluded, as it almost corresponds with the most frequent structural break in 1491. Table C1 also reports the average OLS coefficients and statistics, estimated over 10,000 iterations of each model, where datasets are simulated following the same principle of random assignment of specific founding dates of manors within known intervals, as described in the main text.

Table C1 confirms that the average number of new manors per year increased after 1491, as this break is the only one yielding a statistically

significant coefficient in all models. In the alternative years tested as potential breaks, the founding rate of manors does not appear to have changed significantly. Table C2 presents similar results regarding the number of new manors per 1 million people, where the alternative breaks generally produce non-significant and smaller coefficients. The only exception is year 1506, which produces a statistically significant negative coefficient in the two models where it is tested. Yet, in both cases, the cumulative average number of manors (2.54) after 1506 remains almost twice larger than before 1491 (1.29).

Table C1. The number of new manors per year before and after tested breaks, average results over 10,000 simulated datasets.

	OLS 1-1	OLS 1-2	OLS 1-3	OLS 1-4	OLS 1-5	OLS 1-6	OLS 1-7	OLS 1-8	OLS 1-9
Intercept	0.362*** ^a (0.086) ^b	0.381*** (0.079)	0.432*** (0.069)	0.432*** (0.069)	0.432*** (0.069)	0.171 (0.104)	0.372*** (0.082)	0.362*** (0.087)	0.171 (0.104)
alt=1430	0.122 (0.132)							0.108 (0.202)	
alt=1440		0.105 (0.139)						0.016 (0.218)	
1491	1.066*** (0.187)	1.064*** (0.195)	1.613*** (0.420)	0.891*** (0.208)	0.997*** (0.185)	1.094*** (0.174)	1.065*** (0.191)	1.559*** (0.435)	1.065*** (0.191)
alt=1506			-0.574 (0.449)					-0.980* (0.459)	
alt=1548				0.475 (0.308)				0.615 (0.374)	
alt=1572					0.471 (0.364)			0.219 (0.460)	
alt=1394						0.285* (0.128)			0.246 (0.141)
alt=1435							0.112 (0.135)		0.068 (0.142)
Adj. R ²	0.195	0.195	0.207	0.213	0.209	0.196	0.195	0.238	0.193
F	27.020	26.984	29.109	30.061	29.277	27.079	27.000	12.196	18.089
df	212	212	212	212	212	212	212	208	211

^a*** average p-value < 0.01, ** average p-value < 0.05, * average p-value < 0.1.

^b The standard errors are robust.

Source: author's calculations, data from Semaškaitė (2010).

Table C2. The number of new manors per 1 million people per year before and after tested breaks, average results over 10,000 simulated datasets.

	OLS 3-1	OLS 3-2	OLS 3-3	OLS 3-4	OLS 3-5	OLS 3-6	OLS 3-7	OLS 3-8	OLS 3-9
Intercept	1.286*** (0.304) ^b	1.334*** (0.276)	1.395*** (0.217)	1.395*** (0.217)	1.395*** (0.217)	0.635 (0.383)	1.313*** (0.288)	1.286*** (0.307)	0.635 (0.384)
alt=1430	0.190 (0.429)							0.267 (0.677)	
alt=1440		0.127 (0.439)						-0.091 (0.698)	
1491	2.155*** (0.472)	2.17*** (0.497)	4.235*** (1.166)	2.083*** (0.579)	2.226*** (0.494)	2.165*** (0.431)	2.162*** (0.483)	4.169*** (1.210)	2.162*** (0.484)
alt=1506			-2.319* (1.202)					-2.920** (1.252)	
alt=1548				0.319 (0.725)				1.249 (0.896)	
alt=1572					0.038 (0.730)			-0.300 (0.968)	
alt=1394						0.830 (0.450)			0.827 (0.511)
alt=1435							0.155 (0.430)		0.006 (0.460)
Adj. R ²	0.130	0.129	0.165	0.131	0.129	0.131	0.129	0.169	0.128
F	16.964	16.93	22.207	17.094	16.867	17.184	16.942	8.322	11.531
df	212	212	212	212	212	212	212	208	211

^a *** average p-value < 0.01, ** average p-value < 0.05, * average p-value < 0.1.

^b The standard errors are robust.

Source: author's calculations, data from Semaškaitė (2010).

APPENDIX D. ROBUSTNESS CHECKS OF THE ANALYSIS OF CHURCHES IN CHAPTER 5

Figure D1 relates to an additional robustness check and provides the construction activities of only Catholic and Orthodox churches, with Reformist churches excluded from the dataset. The increase in the construction trend is visible before the take-off of the Reformation in 1517, as further confirmed by the structural breaks estimated in Table 5.6 and simulations in Table D1. Figure D2 depicts the most frequent estimation of Model 3a.

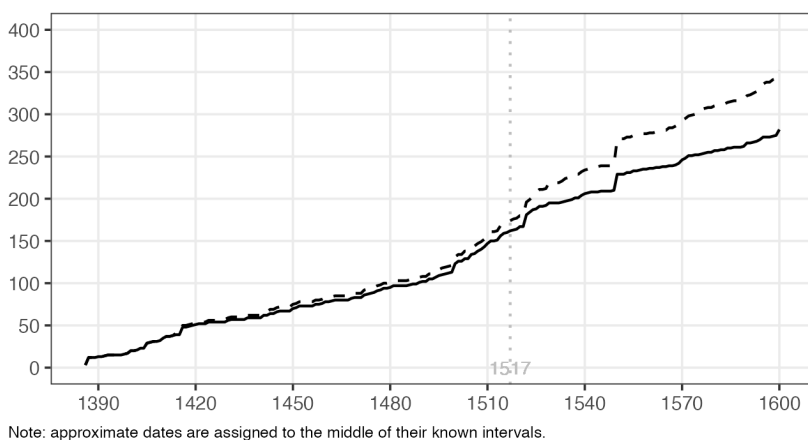


Figure D1. The total number of Catholic and Orthodox churches (solid line), and the total number of their recorded construction activities (dashed line) in ethnic Lithuania. Source: author, data from Gimbutas (1970).

Tables D1-D3 present the results of another robustness exercise, testing the potential presence of alternative structural breaks, identified exogenously from institutional development. The OLS models take the following form:

$$c_t = \beta_0 + \beta_1 D_t^{1493} + \beta_2 D_t^{\text{alt}} + u_t, \quad (3)$$

where c_t is the estimated number of newly-built, rebuilt, and renovated churches in year t , D_t^{1493} is the dummy variable equal to 1 if year t falls into the time interval after the structural break in 1493 (as estimated in the main text), D_t^{alt} is the dummy variable equal to 1 if year t is after the tested alternative break, and u_t is the error term. β_0 is the intercept and in this case, it represents the average number of new manors in the regime before all breaks. Appendix C, implementing the same robustness check regarding manors, provides more details on the interpretation of results and the selection

of alternative breaks. The only different independent variable in this case is the D_t^{1493} , selected as the most frequent structural break produced by the simulations summarised in Table 5.5 of the main text.

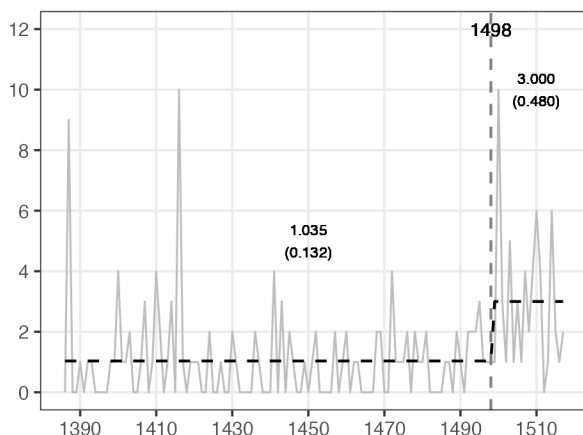


Figure D2. The most frequent result of Model 3a, estimating newly-built, rebuilt, and renovated Catholic and Orthodox churches in Lithuania per year, where the construction dates are randomly assigned within known intervals. Source: author's calculations, data from Gimbutas (1970).

The models presented in Table D1 generally confirm the existence of the most important structural break in 1493, reflecting a significantly larger number of built, rebuilt, and renovated churches per year after this date. An alternative break in 1430 also produces statistically significant negative coefficients in both models where it is tested. Yet, this break does not compete with the one in 1493 – a similar break in 1417 is also produced by the structural breaks' models following the KT algorithm (Model 3b in Tables 5.4 and 5.5), likely reflecting the slowdown of churchbuilding after the initial baptism of ethnic Lithuania. Very similar results are produced by models in Table D2, which consider just the newly-built churches, and by models in Table D3, estimating the yearly number of newly built, rebuilt, and renovated churches per 1 million people. OLS models 6-4 and 6-5 show a possible slowdown in churchbuilding after 1548 or 1572, but the cumulative coefficients after these dates still yield a larger number of construction activities per year than before 1493.

Table D1. The number of new manors per year before and after tested breaks, average results over 10,000 simulated datasets.

	OLS 3-1	OLS 3-2	OLS 3-3	OLS 3-4	OLS 3-5	OLS 3-6	OLS 3-7	OLS 3-8	OLS 3-9
Intercept	1.280*** ^a (0.245) ^b	1.099*** (0.217)	1.002*** (0.125)	1.002*** (0.125)	1.002*** (0.125)	1.394** (0.698)	1.165*** (0.232)	1.280*** (0.249)	1.394* (0.699)
alt=1430	-0.477* (0.269)							-0.998*** (0.314)	
alt=1440		-0.197 (0.252)						0.619** (0.230)	
1493	1.753*** (0.248)	1.655*** (0.253)	1.939*** (0.690)	1.784*** (0.371)	1.608*** (0.294)	1.59*** (0.253)	1.695*** (0.250)	2.04*** (0.694)	1.695*** (0.250)
alt=1506			-0.438 (0.720)					-0.203 (0.801)	
alt=1548				-0.474 (0.440)				-0.531 (0.524)	
alt=1572					-0.208 (0.515)			0.195 (0.550)	
alt=1394						-0.428 (0.706)			-0.279 (0.734)
alt=1435							-0.304 (0.259)		-0.253 (0.262)
Adj. R ²	0.126	0.121	0.123	0.126	0.121	0.122	0.123	0.121	0.119
F	16.434	15.749	15.952	16.488	15.776	15.816	15.946	5.906	10.639
df	212	212	212	212	212	212	212	208	211

^a*** average p-value < 0.01, ** average p-value < 0.05, * average p-value < 0.1.

^b The standard errors are robust.

Source: author's calculations, data from Gimbutas (1970).

Table D2. The number of newly-built churches per year before and after tested breaks, average results over 10,000 simulated datasets.

	OLS 4-1	OLS 4-2	OLS 4-3	OLS 4-4	OLS 4-5	OLS 4-6	OLS 4-7	OLS 4-8	OLS 4-9
Intercept	1.213*** ^a (0.251) ^b	1.044*** (0.220)	0.946*** (0.123)	0.946*** (0.124)	0.946*** (0.124)	1.394** (0.698)	1.104*** (0.235)	1.213*** (0.254)	1.394** (0.699)
alt=1430	-0.457* (0.270)							-0.928*** (0.318)	
alt=1440		-0.199 (0.246)						0.560** (0.221)	
1493	1.193*** (0.234)	1.104*** (0.237)	1.725** (0.748)	1.342*** (0.365)	1.133*** (0.290)	1.043*** (0.242)	1.139*** (0.235)	1.826** (0.752)	1.139*** (0.236)
alt=1506			-0.823 (0.769)					-0.502 (0.842)	
alt=1548				-0.699* (0.399)				-0.568 (0.480)	
alt=1572					-0.501 (0.394)			-0.024 (0.415)	
alt=1394						-0.489 (0.706)			-0.354 (0.736)
alt=1435							-0.295 (0.257)		-0.231 (0.261)
Adj. R ²	0.068	0.062	0.071	0.078	0.068	0.064	0.064	0.076	0.061
F	8.824	8.118	9.234	10.097	8.821	8.267	8.319	3.927	5.624
df	212	212	212	212	212	212	212	208	211

^a*** average p-value < 0.01, ** average p-value < 0.05, * average p-value < 0.1.

^b The standard errors are robust.

Source: author's calculations, data from Gimbutas (1970).

Table D3. The number of newly built, rebuilt, and renovated churches per 1 million people per year before and after tested breaks, average results over 10,000 simulated datasets.

	OLS 6-1	OLS 6-2	OLS 6-3	OLS 6-4	OLS 6-5	OLS 6-6	OLS 6-7	OLS 6-8	OLS 6-9
Intercept	4.597*** ^a (0.890) ^b	3.932*** (0.789)	3.338*** (0.446)	3.338*** (0.447)	3.338*** (0.447)	5.167** (2.590)	4.18*** (0.841)	4.597*** (0.899)	5.167* (2.599)
alt=1430	-2.158** (0.951)							-3.657*** (1.100)	
alt=1440		-1.210 (0.882)						1.782** (0.743)	
1493	3.673*** (0.666)	3.390*** (0.684)	4.722** (1.908)	3.952*** (1.034)	3.314*** (0.840)	2.940*** (0.710)	3.500*** (0.672)	5.338*** (1.906)	3.500*** (0.674)
alt=1506			-2.218 (1.952)					-1.008 (2.170)	
alt=1548				-2.425** (1.068)				-1.862 (1.325)	
alt=1572					-2.065* (1.008)			-0.603 (1.041)	
alt=1394						-1.995 (2.619)			-1.203 (2.720)
alt=1435							-1.568* (0.913)		-1.351 (0.912)
Adj. R ²	0.064	0.052	0.055	0.069	0.059	0.052	0.056	0.074	0.053
F	8.281	6.918	7.229	8.898	7.738	6.818	7.352	3.87	5.003
df	212	212	212	212	212	212	212	208	211

^a*** average p-value < 0.01, ** average p-value < 0.05, * average p-value < 0.1.

^b The standard errors are robust.

Source: author's calculations, data from Gimbutas (1970).

APPENDIX E. URBANISATION DATA

Table E1 provides the list of towns included in the urbanisation statistics of Lithuania, Poland, and Ukraine, where slight adjustments are made to the original town attribution in Buringh's (2021) dataset. Several Ukrainian towns present in the list were lost after 1569, but their data is only included in the GDL's totals before the PLC in sub-section 5.2.3. The attribution of towns to other countries are kept the same as in Buringh (2021).

Table E1. Towns included in the calculation of urban population of Lithuania, Poland, and Ukraine after adjusting original country attributions of Buringh (2021).

Country ^a	Towns
Lithuania	Eišiškės, Kaunas, Panevėžys, Šiauliai, Trakai, Vilnius
Poland	Białystok, Bielsko-Biała, Bochnia, Braniewo, Brody, Brzeg, Bydgoszcz, Chełmno, Częstochowa, Elbląg, Gdańsk, Gliwice, Głogów, Gniezno, Gorzów Wielkopolski, Grudziądz, Gubin, Jarosław, Jelenia Góra, Kalisz, Katowice, Kazimierz Dolny, Kielce, Kłodzko, Kołobrzeg, Kostrzyn, Koszalin, Kraków, Kwidzyn, Legnica, Leszno, Łódź, Lubañ, Lublin, Lviv, Malbork, Mohyliv-Podilskyi, Nowy Sącz, Nysa, Olkusz, Olsztyn, Opole, Płock, Poznań, Przemyśl, Radom, Ruda Śląska, Rybnik, Rzeszów, Sandomierz, Słupsk, Sosnowiec, Stargard Szczeciński, Sulechów, Świdnik, Szczecin, Tarnów, Ternopil, Toruń, Tychy, Wałbrzych, Warszawa, Wolin, Wrocław, Wschowa, Zabrze, Żagań, Zamość, Zielona Góra, Złotoryja, Zolochiv
Ukraine (before 1569)	Berdychiv, Borzna, Cherkasy, Chernihiv, Dnipro, Dubno, Hlukhiv, Izyaslav, Kamianets-Podilskyi, Kyiv, Kobeliaky, Konotop, Korop, Kremenchuk, Kremenets, Krolevets, Myrhorod, Nizhyn, Ostroh, Pereiaslav-Khmelnytskyi, Poltava, Pryluky, Rivne, Starokostiantyniv, Uman, Vasylykiv, Zinkiv, Zhytomyr, Zolotonosha

Source: author, see the text above.

Table E2 presents the data used to calculate urbanisation rates in sub-sections 5.2.3 and 6.3.3. Urban population totals are obtained by simply summing up the town population.

Table E2. Urban population, total population, and calculated urbanisation rates of European countries.

Country	1500			1600			1700			1800		
	Urban population ('000)	Total population ('000)	Urbanisation rate (%)	Urban population ('000)	Total population ('000)	Urbanisation rate (%)	Urban population ('000)	Total population ('000)	Urbanisation rate (%)	Urban population ('000)	Total population ('000)	Urbanisation rate (%)
Albania	26	200	13.0	39	200	19.5	76	300	25.3	101	437	23.1
Austria	77	2,000	3.9	118	2,500	4.7	203	2,500	8.1	379	3,369	11.2
Belgium	433	1,400	30.9	443	1,600	27.7	598	2,000	29.9	710	3,434	20.7
Bulgaria	82	800	10.3	110	1,250	8.8	163	1,250	13.0	269	2,187	12.3
Denmark	25	600	4.2	77	650	11.8	88	700	12.6	133	1,155	11.5
Finland	6	300	2.0	13	400	3.3	16	400	4.0	33	1,169	2.8
France	1,473	15,000	9.8	2,204	18,500	11.9	3031	21,471	14.1	3,995	31,250	12.8
Germany	1,046	12,000	8.7	1,297	16,000	8.1	1422	15,000	9.5	2,375	24,905	9.5
Greece	103	1,000	10.3	186	1,500	12.4	181	1,500	12.1	257	2,312	11.1
Hungary	97	1,250	7.8	112	1,250	9.0	130	1,500	8.7	488	4,146	11.8
Ireland	52	800	6.5	62	1,000	6.2	169	1,925	8.8	454	7,101	6.4
Italy	2,358	10,500	22.5	3,420	13,100	26.1	3631	13,300	27.3	4,904	20,176	24.3
Lithuania	28	365	7.7	50	579	8.6	46	616	7.5	42	1,126	3.7
Netherlands	305	950	32.1	540	1,500	36.0	758	1,900	39.9	796	2,333	34.1
Norway	12	300	4.0	17	400	4.3	31	500	6.2	59	970	6.1
Poland	244	4,000	6.1	394	5,000	7.9	377	6,000	6.3	522	10,426	5.0
Portugal	252	1,000	25.2	371	1,100	33.7	480	2,000	24.0	903	3,297	27.4
Spain	1,382	6,800	20.3	2,032	8,240	24.7	1753	8,770	20.0	2,772	12,203	22.7
Sweden	29	550	5.3	37	760	4.9	91	1,260	7.2	150	2,573	5.8
Switzerland	75	650	11.5	94	1,000	9.4	117	1,200	9.8	150	1,986	7.6
United Kingdom	407	3,942	10.3	695	6,170	11.3	1246	8,565	14.5	3,019	21,239	14.2

Source: author's calculations, urban population data from Buringh (2021), Lithuanian total population data interpolated from Šešelgis (1988), the rest of the total population data from Bolt and van Zanden (2024).

APPENDIX F. CONSTRUCTION OF THE POPULATION DATA

The population data of present-day Lithuania used in all calculations rely on the estimates by Šešelgis (1988). While generally accepted within the Lithuanian historiography, these figures are the only ones allowing to interpolate an annual time-series covering the whole analysed period from 1200 to 1800. Šešelgis (1988) provides point estimates for 1200, 1410, 1569, 1653, 1667, 1700, 1721, and 1790. Based on the first comprehensive hearth census, the latest estimate is the most accurate. The figures for 1569-1721 rely on a synthesis of existing historiography, knowledge of primary sources, and qualitative information. Finally, the figures in 1200 are back-casted based on qualitative information and assumptions on the population growth rate, taking into account the growth rates in Rus' and Western Europe.

Until 1600, chapters 4 and 5 of the dissertation use the same estimates and obtain annual data through linear interpolation. Yet, more recent historiography allows to somewhat refine the later time-series. Figure F1 depicts both the original and adjusted interpolations.

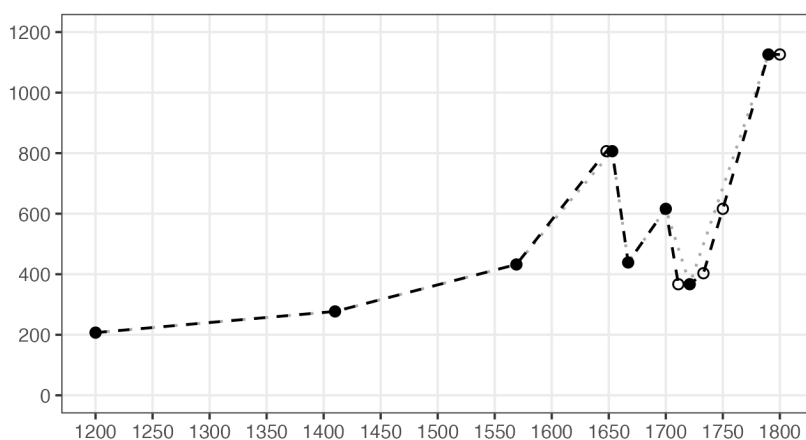


Figure F1. Population of present-day Lithuania (in thousands). Solid black dots represent the original estimates, empty circles – the adjusted estimates. The dashed line marks the final (adjusted) interpolation, the dotted line – interpolation solely between the original estimates. Source: author based on Šešelgis (1988), Sliesoriūnas (2015), and Kiaupa (2012).

First, the population is kept the same from 1648 to 1653 following Sliesoriūnas' (2015: 120) that 1648 recorded the pre-war peak. Šešelgis (1988) seems to account for the drop in the population following the Great

Deluge and its subsequent rebound. Then, Sliesoriūnas (2015: 123) clarifies that the main population decline from the wars/plague/famine took place until 1711, therefore, in the adjusted time-series, the population from 1712 to 1721 is assumed stable. Following another claim, it is interpolated to achieve half of the 1648 peak in 1733 (*Ibid.*: 126). Then, the population likely grew faster, reaching its 1700 figure in 1750 (Kiaupa, 2012: 269). Finally, the numbers are interpolated to the original 1790 value, which is kept the same until 1800, assuming the lack of growth due to the occupations.

It might be also be possible to obtain an estimate based on the 1775 hearth census, but it is generally deemed incomplete and inaccurate. In fact, summing up the regional records provided by Kiaupa (2012: 265) the same way as Šešelgis (1988), the resulting number is 753,410, which then yields an unrealistically large growth rate until 1790.

APPENDIX G. LAW BREACHES BY MONARCHS AND NOBLES PRESENTED IN CHAPTER 6

Table G1. List of explicit breaches of public law by the monarchs reported in the main syntheses of Lithuanian historiography.

Year	Monarch	Action
1574	Henri Valois	Unilaterally left the PLC to obtain the French throne
1592	Sigismund Vasa	Negotiated to transfer the throne to Ernest Habsburg
1635	Ladislaus Vasa	Attacked Livonia without parliamentary approval
1648	Ladislaus Vasa	Armed Cossacks to provoke war with the Ottomans despite parliamentary opposition
1656	John Casimir Vasa	Committed to elect a Romanov as his successor
1657	John Casimir Vasa	Committed to elect a Habsburg as his successor
1658	John Casimir Vasa	Negotiated to elect Henri-Jules de Bourbon-Condé as his successor
1668	John Casimir Vasa	Abdicated his throne following continuously failed attempts to designate successors
1675	Jan Sobieski	Secret alliance treaty with France
1677	Jan Sobieski	Secret alliance treaty with Sweden
1678	Jan Sobieski	Confiscated the former holdings of the Radvila Biržai branch
1697	Augustus II Wettin	Decided the electoral outcome with his troops; sought Moscow's help
1699-1700	Augustus II Wettin	Secretly plotted an invasion with the Livonian nobility; signed secret agreements, incl. with Brandenburg, precluding it
1700	Augustus II Wettin	Ordered troops against Sweden without parliamentary approval
1700	Augustus II Wettin	Allowed the Lithuanian 'republicans' to assume political power for support in an illegitimate war against Sweden
1699-1701	Augustus II Wettin	Granted citizenship and the office of the Lithuanian stableman to J. H. von Fleming despite his protestant religion
1703	Augustus II Wettin	Co-signed one of the 'republicans' separatist alliance agreements with Moscow
1706-1709	Lesczyński vs. Augustus II Wettin	Armed struggle for power during the Northern War
1709	Augustus II Wettin	Seeking Moscow's help to return to power, included a clause designating his son as successor
1713-1715	Augustus II Wettin	Stationed his troops within the PLC without parliamentary approval
1713-1715	Augustus II Wettin	Arrested members of the opposition; replaced the Lithuanian hetman
1716	Augustus II Wettin	Initiated an attack on the Tarnograd Confederation
1724	Augustus II Wettin	Granted G. D. von Flemming the office of general major despite his Protestant religion
1733	Augustus III Wettin	Overturned lost election following military intervention of Moscow

Year	Monarch	Action
1757	Augustus III Wettin	Allowed foreign armies to march through and station their troops in the PLC without parliamentary consent
1764	S. A. Poniatowski	Assumed the throne after his faction invited Russia to defeat the opposition
1768	S. A. Poniatowski	Initiated an attack on Bar Confederation alongside Russia
1772	S. A. Poniatowski	Rejoined Russia's defusal of confederate opposition
1790	S. A. Poniatowski	Co-signed the reformist faction's alliance with Prussia

Source: author based on Sliesoriūnas (2015), Kiaupa (2012), Kiaupa (2018), and Kiaupa, Kiaupienė, and Kuncevičius (2000).

Table G2. List of explicit breaches of public law by the nobility reported in the main syntheses of Lithuanian historiography.

Year	Monarch	Action
1622	K. Radvila	Signed truce with Sweden without the monarch's approval
1625	K. Radvila	Signed truce with Sweden without the monarch's approval
1627	LT senators	Signed truce with Sweden without the monarch's approval
1655	PL nobles	Accepted the protection of Sweden
1655	LT nobles	Accepted the protection of Sweden, abolishing the union with Poland, partitioning the GDL, and carving out a duchy for Jonušas Radvila
1656	B. Radvila	Signed the Commonwealth's partitioning agreement in return for a duchy
1656	LT nobles	Pledged allegiance to and accepted the rule of Moscow
1656	Senators	Committed to elect a Romanov as John Casimir Vasa's future successor
1657	Senators	Committed to elect a Habsburg as John Casimir Vasa's future successor
1658-1661	K. Z. Pacas	Led the efforts to designate duc de Condé as John Casimir Vasa's future successor
1667	Jan Sobieski	Signed an alliance with the Crimean Khanate without parliamentary approval
1668	LT senators	Negotiated a truce with Moscow without parliamentary approval
1670	Jan Sobieski	Appealed to Louis XIV for military support against Wiśniowiecki
1683	J. A. Morsztyn	The Polish grand treasurer, sentenced for treason due to relations with France
1697	Nobles	Raised troops in support of de Conti following unsuccessful election
1700-1702	LT nobles (‘republicans’)	Rebelled against the Sapieha clan, killed M. K. Sapieha, attacked the Sapiehas' estates, killed their supporter J. K. Pacas
1700	LT nobles (‘republicans’)	Assumed political and judicial powers at the height of the civil war in the GDL

Year	Monarch	Action
1702	Sapieha family	Joined Sweden's attacks on the Commonwealth
1702-1703	LT nobles (‘republicans’)	Signed three alliance agreements with Russia without parliamentary approval
1704	PL nobles	Rebelled against Augustus II and alternatively elected S. Leszczyński
1705-1706	Sapieha family, S. Leszczyński	Joined Sweden's attacks on the GDL
1733	Nobles, M. S. Wiśniowiecki	Arranged Russia's military intervention in support of Augustus III Wettin
1764	Nobles (reformist faction)	Arranged Russia's military intervention in support of S. A. Poniatowski
1766	Nobles (reformist faction)	Yielded to Russia's demands and reaffirmed <i>liberum veto</i>
1767	Nobles	Joined anti-reform confederations upon Russia's requests
1767	Parliament	Did not act against Russia's arrests of opponents to Cardinal Laws
1772-1773	Nobles (magnates)	Organised pro-Russian elections in district parliaments to confirm the first partition
1790	Pro-reform nobles	Signed an alliance with Prussia without parliamentary approval
1792-1793	Anti-reform nobles	Joined anti-constitution confederations organised by Russia and organised others; arranged Russia's military intervention
1793	Anti-reform nobles	Organised pro-Russian elections in district parliaments to confirm the second partition

Source: author based on Sliesoriūnas (2015), Kiaupa (2012), Kiaupa (2018), and Kiaupa, Kiaupienė, and Kuncevičius (2000).

APPENDIX H. CORRUPTION RELATED TO FOREIGN POWERS PRESENTED IN CHAPTER 6

Table H1. List of explicit foreign-related corruption activities by the PLC's monarchs and nobility reported in the main syntheses of Lithuanian historiography.

Year	Monarch	Action
1655	J. Radvila (GDL grand hetman)	Took Swedish protection for promised administration of royal Šiauliai economy and possibly a hereditary duchy
1656	B. Radvila (governor of Prussia)	Joined Radnot partition on promises of major territorial gains
1657	V. A. Gosievski (GDL field hetman)	Accepted financial support from the Elector of Brandenburg for brokering a peace treaty
1660s	PLC nobles	Received bribes from France to influence parliament decisions
1675	Jan Sobieski	Signed a secret treaty to receive military funding from France
1677	Jan Sobieski	Signed a secret treaty with Sweden to obtain Prussia as a fief
~1678	Opposition nobles	Received bribes from Austria and Brandenburg for anti-Ottoman stance
1683	J. A. Morsztyn (Polish treasurer)	Was revealed to have kept a secret correspondence with the French court
1690s	The Sapiehas	Implied instances of bribes from Brandenburg/Habsburgs; back-payments for not contesting the inheritance of Neuberg estates
1697	De Conti supporters	Promised to pay the salaries of the GDL's army to organise a rebellion
1697	De Conti / Sapieha camp	Relied on French financial support to organise a rebellion
1701-1703	The 'republicans' leaders	Received personal subsidies from Moscow in addition to military aid related to the war
1702	The Sapiehas	Received military aid from Sweden and safe haven/logistics in Prussia
1705	Stanisław Leszczyński	Signed a treaty giving up Courland to Sweden in exchange for support
1707	M. S. Wiśniowiecki (GDL field hetman)	Joined Leszczyński/Sapieha/Sweden camp, expecting future promotion
1707-1708	Lithuanian 'republicans' and Polish magnates (incl. grand hetman Sieniawski)	Received sponsorship from Moscow
1729-1732	Opposition magnates	Received support from Russia and France for obstructing parliament sessions
1733-1734	GDL magnates	Ensured Augustus III's support in district parliaments in exchange for rewards from Russia
1733-1735	PLC magnates	Switched allegiance from Leszczyński to Augustus III for support from Russia

1738-1750	H. Brohl (First Minister of Saxony, Augustus III's deputy)	Received bribes from Russia and Austria
1740	Potocki (conservative) faction	Received support from Prussia to terminate the parliament session on boosting the military
1744	Potocki (conservative) faction; the gentry	Received bribes from Prussia and France to obstruct boosting the military
1748	Members of the parliament	The parliament was terminated following the sponsorship from Prussia and Moscow
1750	Conservative faction	Received Prussian and Russian support to ensure an inconclusive parliament session
1752	Conservative faction	Received Prussian and Russian support to ensure an inconclusive parliament session
1763-1764	Progressive faction	Received Russian support to ensure the election of Poniatowski
1767	PLC nobles	Induced by Russia to create local confederations against Poniatowski
1773-1775	PLC lords (incl. M. Radvila, W. Gurowski)	Received bribes from Russia
1773-1775	97 PLC nobles, led by A. Poninski	Received support from Russia to operate the parliament
1775->	A. Sulkowski (marshall of the Permanent Council)	Received continuous rewards from Russia

Source: author based on Sliesoriūnas (2015), Kiaupa (2012), Kiaupa (2018), and Kiaupa, Kiaupienė, and Kuncevičius (2000).

APPENDIX I. POSSIBLE LINK BETWEEN GRAIN PRICES AND CHURCH-BUILDING ACTIVITIES

The goal of this appendix is to briefly explain the construction of Figures 7.11 and 7.12 using Allen's (2001) data and disaggregate the presented relationships, providing more information for future analyses.

Table I1 summarises the descriptive statistics for each crop and city used in the figures. First, they do not include the data for Madrid, Naples, 'Northern Italy', and Valencia, as the PLC barely traded with Southern Europe (Žiemelis, 2011a; Žiemelis, 2011b). The second important point is that there are varying gaps in the cities' annual data – the second column of Table I1 provides the number of existing non-interpolated values. This impacts the calculation of price gaps, as there is a large difference in data availability between the four Polish cities – Gdańsk, Kraków, Warsaw, and Lviv.

The interpolation of missing data is necessary to obtain the 10-year averages used in the figures, thus, the possible effect on results is unavoidable. The interpolation is performed before restricting the sample to the period of 1386-1800 – the earliest and latest available values for each city-crop pair in Table I1 indicate the possible start and end of each sample. Meanwhile, using the moving averages is the only way to obtain any sensible information, given the large annual fluctuations in the data (esp. re. new churches) and the time necessary for the (Polish-)Lithuanian landowners to actually react to changing Western European prices. Finally, in case of a few cities where Allen (2001) provides multiple time series for the same crop, the series are combined taking whichever price is available for a given year or a simple average of a few (usually very similar) points is calculated.

Figures I1, I2, and I3 disaggregate the correlation between the number of new churches and the prices of rye, barley, and wheat. It is worth pointing out that although the relationship is usually positive (except in the case of barley-Amsterdam), the fit is rather different across the city-crop pairs. As illustrated by Figures I4, I5, I6, this is also the case for the relationships between the number of new churches and price gaps by Polish city-crop pairs. Here, the different availability of non-interpolated data could potentially be important.

Table II. Summary of data availability for crop-city pairs in Allen's (2001) database.

Country	Rye				Barley				Wheat			
	N	N (%)	Min year	Max year	N	N (%)	Min year	Max year	N	N (%)	Min year	Max year
Amsterdam ^a	267	64.3	1503	1913	80	19.3	1500	1593	265	63.9	1500	1800
Antwerp	344	82.9	1366	1913	333	80.2	1386	1718	230	55.4	1427	1800
Augsburg	333	80.2	1427	1820	339	81.7	1417	1800	96	23.1	1668	1800
Gdańsk	256	61.7	1501	1815	231	55.7	1501	1800	98	23.6	1703	1800
Kraków	151	36.4	1371	1914	129	31.1	1392	1795	134	32.3	1389	1800
Leipzig	209	50.4	1564	1810	192	46.3	1564	1800	205	49.0	1564	1800
London	-	-	-	-	-	-	-	-	415	100	1386	1800
Lviv	76	18.3	1519	1914	50	12.1	1535	1800	47	11.3	1520	1800
Munich	347	83.6	1404	1913	213	51.3	1506	1779	232	55.9	1507	1800
Paris	47	11.3	1727	1774	-	-	-	-	358	86.3	1431	1788
Strasbourg	389	93.7	1313	1875	381	91.8	1386	1800	366	88.2	1386	1800
Warsaw	89	21.5	1526	1914	67	16.1	1555	1800	84	20.2	1526	1800
Wien	229	55.2	1439	1913	-	-	-	-	222	53.5	1439	1800

Source: author, based on Allen (2001).

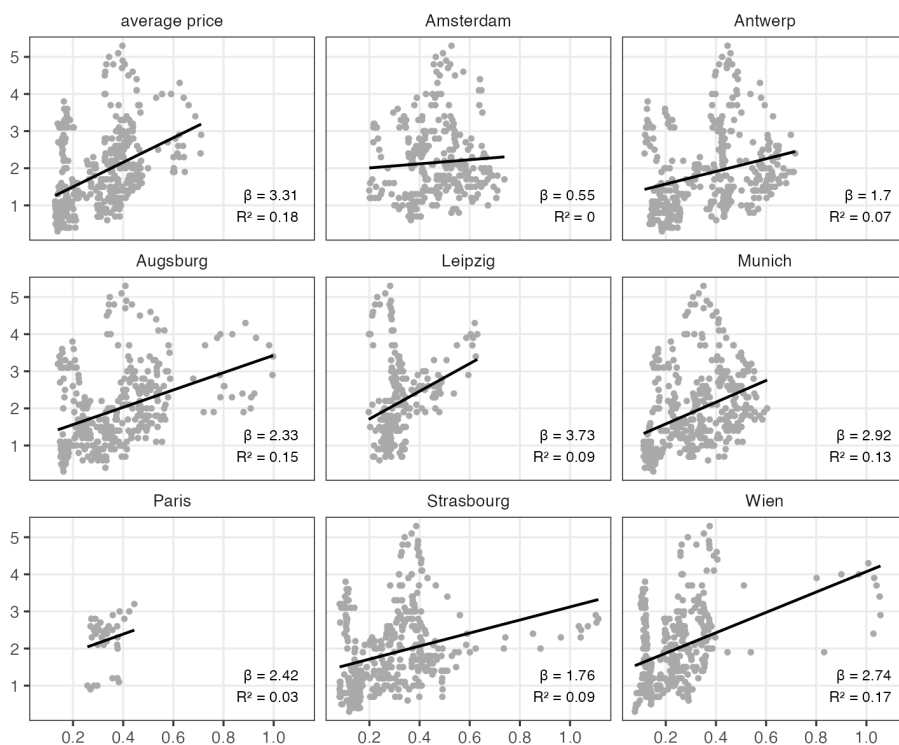


Figure I1. The relationship between the 10-year moving averages of rye prices (grams of silver; x-axis) in Western European cities and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

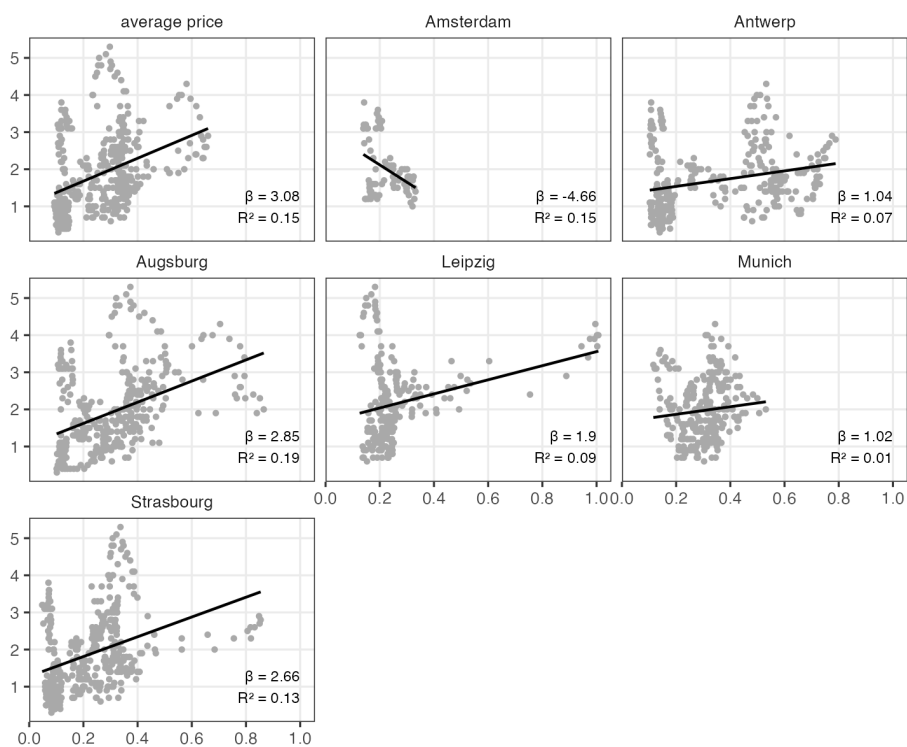


Figure I2. The relationship between the 10-year moving averages of barley prices (grams of silver; x-axis) in Western European cities and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

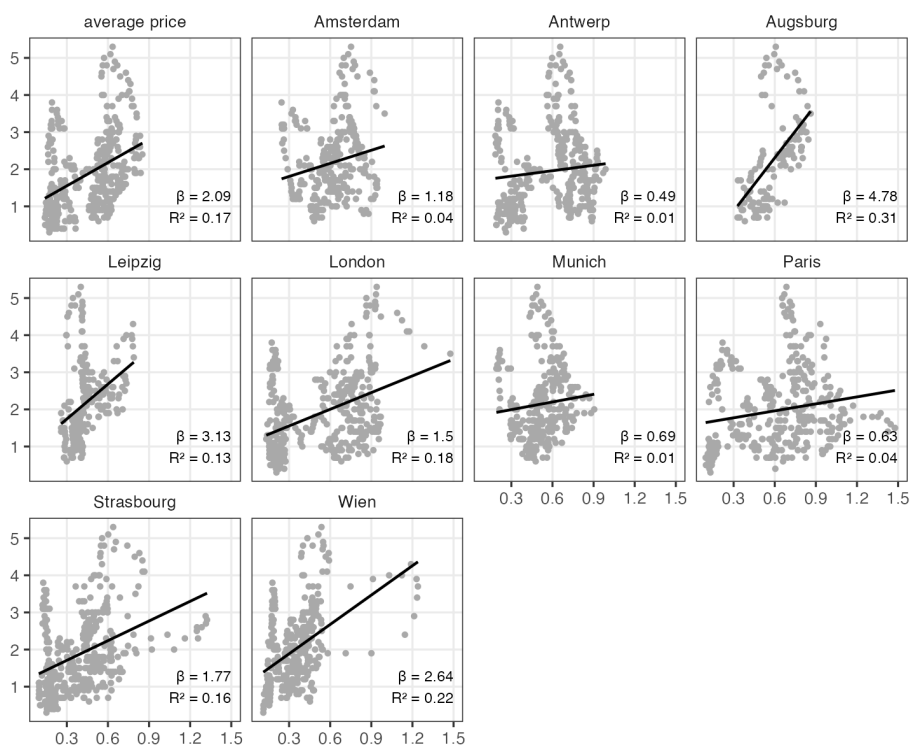


Figure I3. The relationship between the 10-year moving averages of wheat prices (grams of silver; x-axis) in Western European cities and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

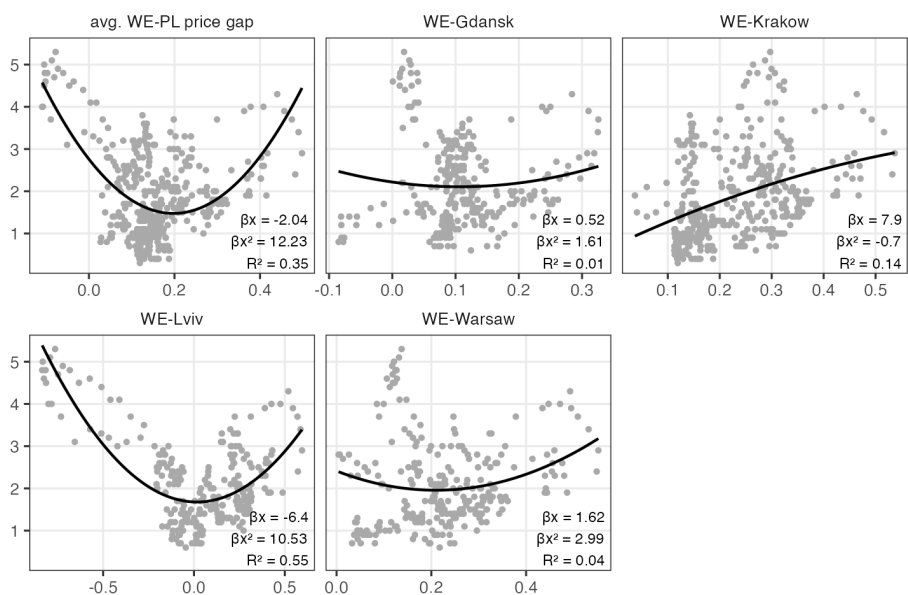


Figure I4. The relationship between the 10-year moving averages of rye price gaps between Western European and Polish cities (x-axis) and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

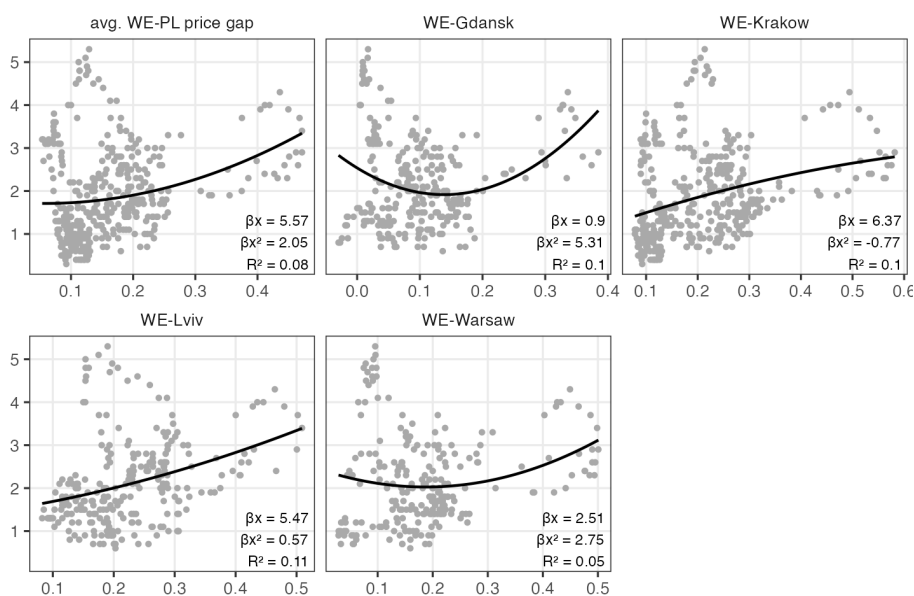


Figure I5. The relationship between the 10-year moving averages of barley price gaps between Western European and Polish cities (x-axis) and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

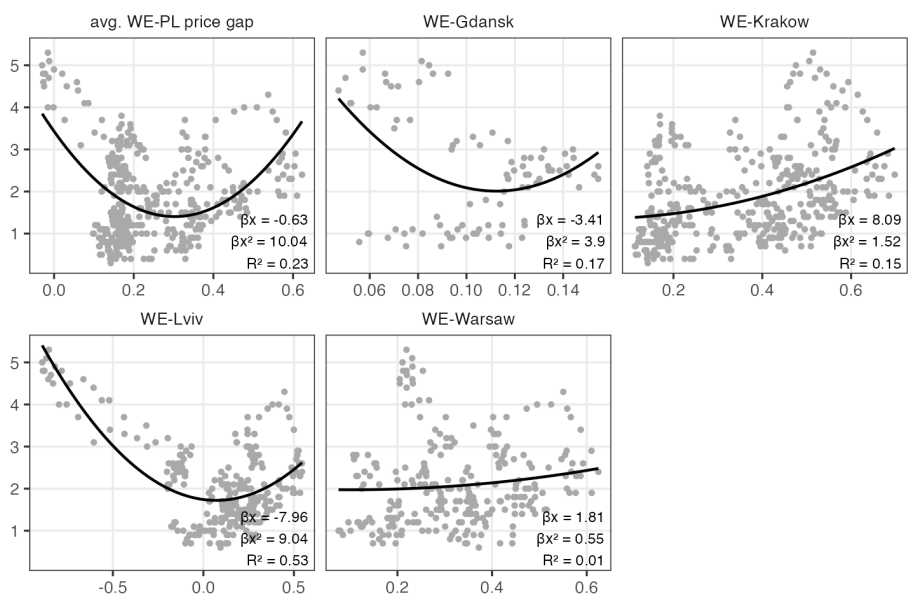


Figure I6. The relationship between the 10-year moving averages of wheat price gaps between Western European and Polish cities (x-axis) and the number of new churches built in Lithuania (y-axis) (1395-1800). Source: author's calculations, data from Gimbutas (1970) and Allen (2001).

LIST OF PUBLICATIONS

1. Bureika, M. (2024). Institutions and development in a fragile limited access order of late-medieval Lithuania. *Journal of Institutional Economics*, 20(e40). <https://doi.org/10.1017/S1744137424000304>.
2. Bureika, M. (2026). Institutional and economic development in a limited access order of Lithuania (1386–1569). *Scandinavian Economic History Review*, 1–24. <https://doi.org/10.1080/03585522.2026.2617585>.

LIST OF CONFERENCE PRESENTATIONS

1. Bureika, M. (2023, December 28). Institutions and Deveopment: A Case of Limited Access Order in Late-Medieval Lithuania. *12th Annual Lithuanian Conference on Economic Research*, ISM University of Management and Economics, Vilnius.
2. Bureika, M. (2024, May 2-3). Institutional Change and Development in a Limited Access Order of the Grand Duchy of Lithuania (1385-1569). *9th NoRSA Conference: Regional Outcomes of Global Challenges in the Nordic Countries*, Vilnius.
3. Bureika, M. (2024, June 12-14). Institutional Change and Development in a Limited Access Order of the Grand Duchy of Lithuania (1385-1569). *Baltic Connections 2024: A Conference in Social Science History*, University of Jyväskylä.
4. Bureika, M. (2024, June 27-29). Institutional Change and Development in a Limited Access Order of the Grand Duchy of Lithuania (1385-1569). *Economic and Business History Society and Association of Business Historians Annual Conference 'Connections'*, York St John University.
5. Bureika, M. (2024, November 15-16). Institucinės ir ekonominės raidos ryšys LDK (1245-1569 m.). *16th Conference of the Lithuanian Sociological Association*, Vilnius University.
6. Bureika, M. (2025, May 21-23). Limited Access Order and Economic Development in Lithuania under the Polish-Lithuanian Commonwealth (1569-1795). *Baltic Connections 2025: A Conference in Social Science History*, University of Helsinki.
7. Bureika, M. (2025, July 28-31). Institutional Change and Economic Development in Lithuania (1245-1795). *World Economic History Congress 2025*, Lund University, poster presentation.
8. Bureika, M. (2025, September 4-5). Lietuvos institucijų ir ekonomikos vystymasis po Liublino unijos (1569-1795 m.). *17th Conference of the Lithuanian Sociological Association*, Lithuanian Academy of Sciences.

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Scientific interests: institutional economics, economic development, political economy, economic history, public finance and its sustainability, sociology, etc.

SANTRAUKA

Temos aktualumas

Ekonomikos disciplina yra tyrusi ne vieną augimo ir vystymosi priežastį. Teigiama, kad, be kitų veiksnių, ekonomikos augimą skatina finansinis išsivystymas (pvz., Demetriades & Hussein, 1996; Calderón & Liu, 2003), žmogiškasis kapitalas (pvz., Hanushek, 2013; Pelinescu, 2015), infrastruktūra (pvz., Esfahani & Ramirez, 2003; Farhadi, 2015), tiesioginės užsienio investicijos (pvz., Borensztein, De Gregorio & Lee, 1998; Li & Liu, 2005) ir inovacijos (pvz., Ulku, 2007; Hasan & Tucci, 2010). Politinės ekonomijos tyrėjai atkreipia dėmesį į tokius augimo veiksnius kaip politinis stabilumas (pvz., Alesina *et al.*, 1996; Aisen & Veiga, 2013) bei socialinė darna (Whiteley, 2000; Chou, 2006). Pilnas galimai augimą lemiančių veiksnių sąrašas praktiškai negali būti baigtinis, tačiau neatrodo, kad jį atitinkantys politikos receptai būtų sėkmingai panaikinę gyvenimo kokybės skirtumus tarp skirtingų pasaulio šalių.

Tikėtina, taip yra todėl, jog daugelį tiesioginių augimo priežasčių, kaip išvardintos aukščiau, veikia esminis veiksnys – institucijos. Institucijas sudaro formalių taisyklių ir neformalių normų visuma, kuri daro įtaką vystymuisi veikdama ekonominius, politinius bei socialinius santykius (North, 1991). Institucijos taip pat gali būti apibrėžiamos kaip „kolektyvinis veikimas, kontroliuojantis, išlaisvinantis bei išplėčiantis individualų veikimą“ (*autorius vertimas*; Commons, 1931). Institucijos yra tuo „geresnės“, kuo labiau jos gali užtikrinti teisės viršenybę, apsaugoti nuosavybės teisės ir sumažinti dalyvavimo ekonomikoje kaštus.

Ši disertacija tiria institucijų kokybę ir ekonomikos vystymosi ryšį per visą Lietuvos Didžiosios Kunigaikštystės istoriją (1245-1795 m.). Nagrinėti šį ryšį iki šiol netirtose šalyse svarbu, nes jo egzistavimas įtvirtintas naujausių empirinių tyrimų (pvz., Acemoglu, Johnson & Robinson, 2002; Easterly & Levine, 2003; Rodrik, Subramanian & Trebbi, 2004; Tan, 2010; Michalopoulos & Papaioannou, 2013; 2014; Nawaz, 2015; Góes, 2016; Broadberry & Wallis, 2017; Acemoglu *et al.*, 2019; Shirley, 2025), įskaitant darbus, nagrinėjančius istorinius kontekstus (pvz., Cantoni & Yuchtman, 2014; Dittmar & Meisenzahl, 2020; Bisin *et al.*, 2024). Tuo pačiu, atvejo analizė gali pasiūlyti detalesnį įžvalgų tiriant šią sąsają ilguoju laikotarpiu. Kuomet Changas (2011) kritikuoja institucinę ekonomiką dėl jos (pernelyg didelio) rėmimosi daug skirtingų šalių apimančiais duomenų rinkiniais, Shirley (2025) konkrečiai ragina tyrėjus rinktis atvejo analizes kaip potencialų šios problemos sprendimą. Iki šiol jau atlikta ne viena atvejo analizė, tačiau

jos daugiausia orientuotos į dabartinius ar tik neseniai praėjusius laikus (žr. literatūros apžvalgą 2 skyriuje).

Lietuvos Didžiosios Kunigaikštystės (LDK) atvejis ypač įdomus, nes nuo XIII iki XVIII amžiaus ją apibūdino unikalūs skirtingų polit-ekonominių santvarkų rinkinys. Iškilusi iš pirmykščių girių ir pelkių tarp jau susiformavusių krikščioniškų valstybių, LDK tapo paskutine Europos pagoniška imperija. XIII-XIV amžių Lietuva lyginama ne su to meto kaimynais, bet ankstesniųjų viduramžių politiniais dariniais, įskaitant X-XII amžių Lenkiją, Vengriją ir Bohemiją ar Kyjivo Rusios kunigaikštystes (Babinskas, 2022; Petrauskas, 2009; Rowell, 1994). LDK institucijų raida XV ir XVI amžiais taip pat atsiliko nuo didžiosios Europos dalies. Vis dėlto, kadangi LDK greitai išvystė rašytinę teisę, nuosavybės teises ir parlamentinį atstovavimą, istorikai yra svarstę išskirti šiuos amžius kaip atskirą Lietuvos „europėjimo“ laikotarpį, kuris neatitinka tradicinio „Antikos-viduramžių-modernųjų laikų“ modelio (Bumblauskas, 2005: 140; Petrauskas, 2009). Galiausiai, XVII-XVIII amžiais LDK buvo didžiausios Europos bajorų demokratijos – Abiejų Tautų Respublikos (ATR) – dalimi, suteikusios balsavimo teisę iki 7-8% populiacijos (Sliesoriūnas, 2015: 361; Augustyniak, 2016/2008: 246).

Tyrimo klausimas, tikslas ir uždaviniai

Nagrinėdama centrinę institucinės ekonomikos problemą, ši disertacija siekia išsiaiškinti: ar egzistavo ryšys tarp institucijų kokybės ir ekonomikos vystymosi *ikiindustrinėje Lietuvos istorijoje*?

Darbo tikslas yra atsakyti į šį tyrimo klausimą įgyvendinant žemiau nurodytus uždavinius:

1. Pasirinkti ilgalaikio LDK vystymosi tyrimui tinkamą teorinį pagrindą ir pagrįsti jo pasirinkimą.
2. Išanalizuoti teorinio pagrindo poveikį empirinei literatūrai, kuris leistų patvirtinti jo tinkamumą ir susieti jį su kitais moksliniais darbais.
3. Operacionalizuoti teorinį pagrindą mišrioje metodologijoje, leidžiančioje įvertinti institucinių aplinkų kokybę bei istorinį išsivystymo lygį.
4. Pritaikant metodologiją išanalizuoti LDK institucijų kokybę, ekonomikos būklę bei jų ryšį XIII ir XIV amžiuose (nuo maždaug 1245 iki 1386 m.).
5. Pritaikant metodologiją išanalizuoti LDK institucijų kokybę, ekonomikos būklę bei jų ryšį dinastinės unijos su Lenkija metu (1386-1569 m.).
6. Pritaikant metodologiją išanalizuoti LDK institucijų kokybę, ekonomikos būklę bei jų ryšį ATR laikais (1569-1795 m.).

7. Įvertinti bendrą LDK institucijų raidą, ekonomikos būklę ir jų ryšį nuo XIII iki XVIII amžiaus.

Teorinis pagrindas

Disertacijos metodologija remiasi holistiniu socialinių tvarkų (*social orders*) konceptu, kuris, priešingai nei tikslūs kiekybiniai rodikliai, atsižvelgia tiek į formalius, tiek į neformalius bendros institucinės aplinkos bruožus. Plačiąja prasme, socialinės tvarkos apibrėžia visumas skirtingų būdų, kuriais visuomenės riboja bei kontroliuoja jėgos naudojimą (*violence*) (North, Wallis & Weingast, 2009: 1-3). Tai, kaip visuomenės sprendžia saugumo problemą, lemia, kaip jos kuria institucijas ir buriasi į organizacijas siekti bendrų tikslų. Laikui bėgant, socialinės tvarkos sukuria konkrečius elgesio modelius bei formuoja įsitikinimus, lūkesčius ir paskatas politinei bei ekonominei veiklai. Darydami įtaką kasdieniams sprendimams, šie įsitikinimai, lūkesčiai ir paskatos galiausiai lemia ilgalaikį išsivystymą.

Northas, Wallisas ir Weingastas (2009) išskiria du pagrindinius socialinių tvarkų tipus – uždaras visuomenės (*limited access orders*) ir atviros visuomenės (*open access orders*). Ši disertacija pagrinde nagrinėja pirmąjį tipą, nes iki XIX amžiaus uždaros visuomenės konceptas apibūdino ne tik LDK, bet ir likusį pasaulį. Net šiandien uždarose visuomenėse gyvena apie 85% viso pasaulio populiacijos (*Ibid.*: 13). Tuo pačiu, svarbu suprasti abiejų tipų veikimą, nes uždaros visuomenės apibrėžiamos kontrastuojant jas su atviromis visuomenėmis.

Panašiai kaip modernios liberalios demokratijos, atviros visuomenės garantuoja saugumą pasitelkdamos valstybės galios monopolį, paremtą stipriomis institucijomis, užtikrinančiomis policijos ir kariuomenės atskaitomybę piliečiams. Atviros institucijos palaiko lygybę skatindamos teisės viršenybę, kuri taip pat prisideda prie neasmeninių santykių, nepriklausomų bei kompleksiskų organizacijų veikimo ir inovatyvios konkurencijos. Tuo tarpu saugumą uždarose visuomenėse suteikia elitas, sudarytas iš žmonių, gebančių organizuotai naudoti jėgą, mobilizuoti politinę paramą ir/ar išgauti ekonomines rentas. Tokio elito nariai įsipareigoja riboti jėgos naudojimą tam, kad išlaikytų savo išskirtines rentas, atsirandančias dėl tokių privilegijų kaip nuosavybės teisės, prieiga prie produktyvių išteklių ar ypatinga teisinė apsauga. Tai, jog saugumas priklauso nuo rentų išsaugojimo, reiškia, kad ilgalaikį uždarų visuomenių stabilumą lemia „dvigubas balansas“ tarp ribotų galimybių užsiimti politine veikla ir ribotų galimybių užsiimti ekonomine veikla.

Nors perėjimai iš uždarų į atviras visuomenes įprastai vyksta kaip aiškūs kokybiniai lūžiai, pačios uždaros visuomenės sudaro spektrą. Judėjimas tarp trijų teorinių uždarų visuomenių kategorijų – trapių, įprastų ir brandžių, – kurios apibrėžia šį spektrą, yra labiau laipsniškas ir nepastovus, nors ir atspindintis kokybinius institucinės aplinkos pokyčius. Trapioms uždaroms visuomenėms trūksta stabilios prievartos ribojimo sistemos ir tokios visuomenės vos gali išlaikyti pačią valstybę, nes jėgos naudojimo tikimybė išauga su kiekvienu elito sudėties pokyčiu. Tokioje aplinkoje gimstančios institucijos negali sukurti stabilios aplinkos organizacijoms. Įprastose uždarose visuomenėse valstybė, jos valdymas ir administracinės procedūros yra ilgaamžiškesnės už konkrečias elito konfigūracijas. Įprastos uždaros visuomenės bent šiek tiek pasikliauja viešąja teise, elito nuosavybės teisėmis ir užtikrina elito narių organizacijų veikimą. Elitas dalinai remiasi neasmeniniais santykiais susiformuodamas bendrus įsitikinimus (pvz. priklausymą tai pačiai socialinei klasei), kurie įgalina labiau ilgalaikius bei daugiau žmonių apimančius ryšius nei vien tik asmeniniai santykiai. Brandžiose uždarose visuomenėse visi šie bruožai išvystyti labiau, papildomai įskaitant privačią teisę ir bent šiek tiek suteikiamo saugumo privačioms organizacijoms, tiesiogiai nesusijusioms su elitu.

Bendrai, uždaros visuomenės turėtų būti mažiau išsivysčiusios nei atviros visuomenės, nes ribotos veiklos galimybės lemia ribotą politinę ir ekonominę konkurenciją, o privačių organizacijų trūkumas riboja darbo pasidalijimą, žinių sklaidą, inovacijas bei kitas bendradarbiavimo naudas. Dėl tokio dinamiškumo trūkumo uždaros visuomenės yra neatsparios išorės sukrėtimams.

Tiesa, elitas vis tiek gali sukurti sąlygas augimui stiprindamas savo institucijas ir/ar didindamas jų įtaką. „Dvigubas balansas“ reiškia, kad augantis elito stabilumas ir atvirumas turėtų skatinti plėsti rentas, kuriomis nariams atlyginama už bendradarbiavimą. Stiprėjantis politinis bendradarbiavimas ir viešojo administracija gerina asmeninį saugumą, nuosavybės teises ir bendrų paslaugų, tokių kaip gynyba nuo išorės grėsmių ar infrastruktūra, teikimą. Viešojo bei privati teisė užtikrina elito susitarimų laikymąsi ir įgalina taikų bei standartizuotą konfliktų sprendimą. Didesnis saugumas, geresnė administracija, taisyklių laikymąsi užtikrinančios trečiosios šalys ir bendros paslaugos skatina produktyvia veikla, o ne rentų išgavimu, užsiimančias organizacijas, kurios prisideda prie vystymosi. Tuo pačiu, didesnė tokių organizacijų galia kelia grėsmę esamoms elito schemoms ir gali papildomai skatinti labiau institucionalizuotai atsižvelgti į platesnius politinius interesus.

Northo, Walliso ir Weingasto (2009) teorija yra ideali LDK tyrimui ne tik todėl, kad uždaro visuomenės apibūdina praktiškai visus ikiindustrinius politinius darinius, bet ir dėl to, jog ji ilgalaikio vystymosi priežastis paaiškina plačiau nei kitos panašios idėjos. Institucinė ekonomika iš esmės suderinama su teorijomis, pabrėžiančiomis geografinės, klimato ar reliatyvios vietos tarptautinėje ekonominėje tvarkoje svarbą, nes institucijos vis tiek veikia kaip tarpinis veiksnys pasireiškiant jų galutiniam poveikiui. Tuo tarpu socialinių tvarkų konceptas savaime atsižvelgia į kultūros vaidmenį, įskaitant kelio priklausomybę, įsitikinimus ir bendrą tarpusavio pasitikėjimą. Kertiniai „senosios institucinės ekonomikos“ konceptai kaip orientacija į augimą, realiai įgyvendinamos taisyklės ir instrumentinės institucijos taip pat integruotos į socialinių tvarkų teoriją. Kalbėdama apie valstybės struktūrą, teisę ir politinį bei ekonominį atvirumą, ši teorija panašiai atsižvelgia į valstybės pajėgumą ir institucijų įtrauktį, kuriuos akcentuoja naujesnės institucinės ekonomikos teorijos.

Metodologija ir duomenys

Lietuvos atvejo analizė įgyvendina mišrią metodologiją. Pirmoji kiekvieno empirinio skyriaus dalis analizuoja LDK institucijų išsivystymą pagal kokybinę metodologiją, pritaikytą nagrinėti uždaro visuomenės. Ši metodologija operacionalizuoja minėtą teoriją tokiu būdu, kuris išskiria tarpusavyje susijusias bendros institucinės aplinkos dimensijas (1 lentelė). Remiantis istoriografijos bei kitų susijusių disciplinų žiniomis, kokybinė analizė priskiria šias dimensijas ir visą uždarą visuomenę pagal jų vietą uždaro visuomenių spektre. Šios prieskyros ir jų pokyčiai laike leidžia įvertinti kuriamas ekonomines paskatas bei suformuluoti hipotezes apie tikėtinas ekonomikos vystymosi tendencijas.

Antroji kiekvieno empirinio skyriaus dalis vertina istorinę ekonomikos būklę pasitelkiant skirtingų kiekvienam laikotarpiui prieinamų rodiklių kombinaciją. Susiduriant su didžiausiu ekonominių duomenų trūkumu XIII ir XIV amžiais, 4 skyrius rekonstruoja metinio medinių pilių skaičiaus tendenciją etninėje Lietuvoje. Ši tendencija maždaug atspindėjo ekstensyvų augimą, nes medinės pilys funkcionavo kaip proto-miestai, o jų skaičius nebuvo susijęs vien tik su karine veikla. 4 skyrius taip pat aptaria archeologinius ir kitus susijusius darbus, tiriančius žmonių sveikatą, miestų populiaciją, žemdirbystės plėtrą, gyventojų tankumą, amatų vystymąsi ir pirmųjų vietinių monetų atsiradimą.

1 lentelė. Uždarų visuomenių operacionalizavimas.

Uždara visuomenė	Institucijų kompleksiskumas	Teisinė sistema	Nuosavybės teisės	Organizacinė aplinka	(Ne)asmeniniai santykiai
Trapi	institucijos paprastos ir <i>ad hoc</i>	teisė aiškiai neišreikšta, privatumas nuo viešumo neatskiriamas	nuosavybės teisės aiškiai neišreikštos	veikia tik valstybė	tik asmeniniai klientelistiniai santykiai
Įprasta	daugiausia paremtos viešąja teise, šiek tiek išliekančios	organizacijoms taikoma viešoji teisė	elito nuosavybės teisės	valstybė + su ja susijusios organizacijos	šiek tiek bendrų įsitikinimų elito tarpe
Brandi	organizacijos – juridiniai asmenys, veikia trečiosios šalies užtikrinimas	aiškiai išreikšta viešoji ir privačioji teisė	teisinė viešos ir privačios nuosavybės apsauga	su valstybe susijusios + tiesiogiai nesusijusios organizacijos	elitas kaip organizacijų organizacija

Šaltinis: autorius, pagal Northą, Wallisą ir Weingastą (2009).

5 ir 6 skyriai kiekybiškai analizuoja naujus metinius žinomų dvarų ir bažnyčių statybos veiklų duomenų rinkinius. Šie skyriai atlieka struktūrinių lūžių testus, ganėtinai dažnai taikomus ilgalaikio augimo tyrimuose. Laiko eilučių duomenyse struktūriniai lūžiai įprastai atskiria skirtingus augimo režimus. Taigi, remiantis disertacijos teoriniu pagrindu, lūžiai turėtų atsirasti panašiu metu, kaip LDK kategorizacijos pokyčiai uždarų visuomenių spektre, nustatyti kokybinės analizės. Teigiamas institucijų vystymasis turėtų sutapti su spartesnėmis naujų dvarų atsiradimo ir bažnyčių statybos tendencijomis, o neigiamas vystymasis – su lėtesnėmis tendencijomis. Bai ir Perrono (2003) bei Kurozumi ir Tuvaandorjo (2011) sukurtos procedūros leidžia nustatyti labiausiai tikėtinius struktūrinius lūžius algoritmiškai, išvengiant diskrecinio pasirinkimo, kuriuos konkrečius galimus lūžius tikrinti.

Be struktūrinių lūžių analizės, 5 ir 6 skyriai aptaria kelių kitų rodiklių aprašomąją statistiką. 5 skyrius nagrinėja sveikatos indekso raidą, nors duomenų XVII ir XVIII amžiams nepakanka. Abu skyriai pateikia keleriems skirtingiems metams apskaičiuotą urbanizacijos lygį, dažnai tiesiogiai naudojamą įvertinti ekonomikos išsivystymui, kas leidžia nubrėžti tendenciją nuo 1200 iki 1800 metų. Galiausiai, abu šie skyriai analizuoja pirmuosius prieinamus Lietuvos bei LDK BVP duomenis, Kocho, Stojkosio ir Hidalgo (2024) apskaičiuotus remiantis mašininio mokymosi algoritmu, o 6 skyrius papildomai nustato struktūrinius lūžius Lenkijos/Krokvos BVP vienam gyventojui duomenyse, sukonstruotus Malinowskio ir van Zandeno (2017).

Mokslinis naujumas ir pagrindinis indėlis

Disertacijos naujumas remiasi indėliu į kelias literatūros sritis. Jį galima išskirti į dvi dalis: indėlį į institucinę ekonomiką ir ekonomikos istoriją apskritai bei indėlį į LDK (ir Centrinės Rytų Europos) ekonomikos istoriją konkrečiai.

Plačiausiai ši disertacija prisideda prie institucinės ekonomikos bei ekonomikos istorijos tirdama institucijų kokybės ir ekonomikos vystymosi ryšį naujame kontekste. Tyrimo rezultatai didžiąja dalimi sutampa su kiekybiniais tyrimais, minėtais pradžioje. Taip pat, disertacija padidina labai mažą kiekį iki šiol atliktų atvejo analizių, taikančių Northo, Walliso ir Weigasto (2009) teoriją ikiindustriniams politiniams dariniams. Literatūros apžvalga, pateikiama 2 skyriuje, rodo, kad tokių pritaikymų skaičius veikiausiai išlieka vienženklis, nes panašūs tyrimai daugiausia nagrinėja naujesnę istoriją. Galiausiai, kuomet kitos kokybinės atvejo analizės įprastai teikia prioritetą politinei sferai, ši disertacija siekia uždarų visuomenių konceptą pritaikyti sistemiškai, kartu atsižvelgiant ir į ekonomines institucijas bei organizacijas, įskaitant jų poveikį politikai.

Kalbant apie konkretų atvejį, ši disertacija taip pat yra pirmoji, sistemiškai pritaikanti institucinės ekonomikos teoriją LDK ir Lietuvos istorijai. Be to, remdamiesi dviem naujai sukurtais dvarų ir bažnyčių statybos veiklų duomenų rinkiniais, 5 ir 6 skyriai pirmą kartą vertina Lietuvos ikiindustrinės ekonomikos būklę kiekybiškai. Nors ir suteikdami daug svarbios aprašomojo pobūdžio bei faktinės informacijos, ankstesni LDK politinės ir ekonominės istorijos tyrimai daugiausia taiko istoriografinius (ar marksistinės istoriografijos) metodus (pvz., Baronas, Dubonis & Petrauskas, 2011; Jurginis, 1962; 1978; Łowmiański, 1931-2; Šalčius, 1998/1943-1957; Пащуты, 1959; Довнар-Запольскі, 1901; Ochmański, 1986; 1990; Kiaupa, 2018; Glemža, 2010; Šapoka, 1941a; 1941b). Keli autoriai specifiškai nagrinėja LDK institucijas, tačiau jie įprastai remiasi kitokiomis, politinėmis *arba* ekonominėmis, teorijomis, nesusiejant institucijų su ekonomikos būkle (pvz., Norkus, 2007; 2018/2009; French, 1970; Millward, 1984; Petrauskas, 2003; Mączak, 2000/1994; Kowalski, 2013). Žiemelis (2006; 2011a; 2011b; 2011c) yra arčiausiai šio tikslo, bet jo straipsniai, skirti XVII-XVIII amžiams, nesiremia institucine ekonomika sistemiškai ir pagrinde koncentruojasi į tarptautinę prekybą. Visi šie darbai arba jau yra integruoti į šiuolaikinę istoriografiją, arba tiesiogiai cituojami disertacijoje (žr. 3.1 poskyrį).

Galiausiai, tirdama LDK, ši disertacija taip pat prisideda prie (Centrinės) Rytų Europos tyrimų. Iki šiol atlikta keletas darbų apie Lenkijos istorinį vystymąsi (Malinowski & Van Zanden, 2017; Malinowski, 2016; 2019; 2025)

ir šis regionas yra ypač populiarus ieškant šiuolaikinių uždarų visuomenių pavyzdžių (pvz., Toshkov, Dimitrova & Börzel, 2021; Keudel & Carbou, 2021; Flikke, 2021). LDK analizė prideda dar vieną iki šiol nenagrinėtą atvejį, suteikdama daugiau žinių apie regiono institucijų bei ekonomikos vystymąsi ikiindustriniu laikotarpiu.

Rezultatai ir išvados

Bendrai, disertacija remia pagrindinį institucinės ekonomikos teiginį, kad egzistuoja teigiamas institucijų kokybės ir ilgalaikio ekonomikos vystymosi ryšys, atskleisdama šį ryšį ir LDK. Per daugiau nei šešis amžius jos istorijos, tais laikotarpiais, kuriais LDK institucinė aplinka buvo geresnė ir skatino taisyklėmis grįstą bendradarbiavimą, kompleksiškesnes organizacijas bei neasmeninius santykius, jos ekonomikos būklė taip pat didžiąja dalimi buvo geresnė. 2 lentelė pateikia LDK institucijų ir ekonomikos vystymosi santrauką.

2 lentelė. LDK institucijų ir ekonomikos vystymosi santrauka per jos istoriją (~1245-1795 m.).

Metai	Institucijų kokybė (uždaro visuomenės tipas)	Lūkesčiai ekonomikos būklei	Nustatyta ekonomikos būklė	Parama teorijai	Disertacijos skyrius
~1245~1320s	labai trapi	prasta	prasta	pilna	4 skyrius
~1320s-1390s	trapi	nedidelis	nedidelis	pilna	4 skyrius
1390s-1490s	pažengusi trapi	pagerėjimas	pagerėjimas		5 skyrius
1490s-1660s	įprasta	reikšmingas pagerėjimas tarp elito	reikšmingas pagerėjimas tarp elito	pilna	5 (ir 6) skyriai
1660s-1760s	pažengusi trapi	reikšmingas nuosmukis	reikšmingas nuosmukis	dalinė	6 skyrius
1760s-1795	~įprasta				

Šaltinis: autoriaus analizė.

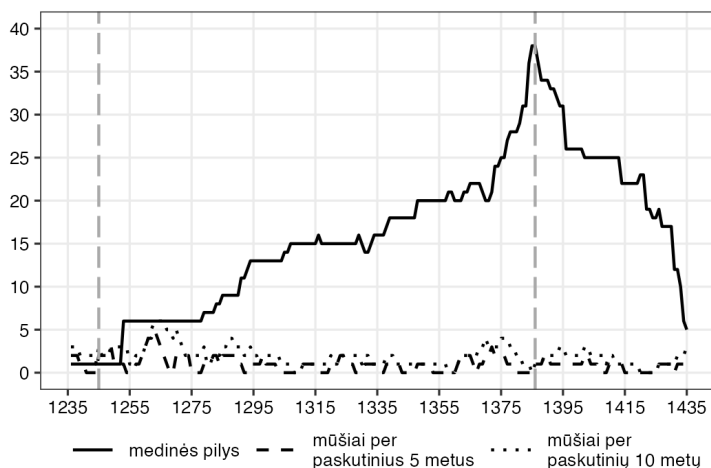
4 skyrius teigia, kad nuo savo iškilimo apie 1245 metais iki 1386-ųjų LDK išliko trapia uždara visuomenė, tačiau sugebėjo laipsniškai pagerinti institucijas. LDK buvo trapi uždara visuomenė, nes jos santykiai buvo vien tik asmeniniai ir dažnai lėmė nesutarimus, o galios monopolis išliko sunkiai pasiekiamas. Politinės institucijos buvo neformalios bei nesukūrė palankios aplinkos kompleksinėms politinėms, religinėms ar ekonominėms struktūroms. Pagonybė buvo esminė valdovų legitimumo sąlyga, bet nesuteikė reikšmingos pagalbos konsoliduojant jų autoritetą. Lietuvos žemdirbystę apibūdino maži ūkiai, skirti asmeniniam vartojimui, kuomet elitas daugiausiai turtėjo dėl jėgos naudojimo pajėgumais grįstų privilegijų.

Visi šie bruožai, dėl kurių LDK buvo trapi uždara visuomenė, turėjo kliudyti ekonomikos vystymuisi.

Tuo pačiu, LDK institucinė aplinka šiuo laikotarpiu kiek priartėjo prie įprastos uždaros visuomenės. Lietuvos elitas tapo stabilesnis po to, kai sutelkė valdymo privilegijas didžiojo kunigaikščio šeimoje ir integravo į elitą iki tol konkuravusius sritinius kunigaikščius, kurių statusas tapo priklausomas nuo paramos valdančiajai dinastijai. Administracinė ir karinė tarnyba tapo dažniau atlyginamos paveldimais žemės plotais, kas sukūrė prielaidas žemės kaupimui ir padarė ją patrauklesniu rentų šaltiniu nei karinių žygių organizavimas. Bajorija pradėjo formuoti aiškesnę paklausą teisiškai įtvirtintoms nuosavybės teisėms, kuri, kartu su didėjančiu poreikiu finansuoti karą prieš Kryžiuočių ordiną, atvėrė galimybes įsileisti krikščionybę bei imti atsisakyti pagonybės.

Šie pokyčiai gerino ekonomines paskatas. Administracinės privilegijos ir rentos, susietos su karine tarnyba, sukūrė naujas elito klases ir suteikė joms produktyvesnius pajamų šaltinius nei tuomet, kai elitą sudarė tik sritiniai kunigaikščiai. Tvirtesnės nuosavybės teisės išplėtė prieigą prie žemės tiems, kurie turėjo galimybių investuoti ir imtis didesnio masto žemdirbystės. Galiausiai, ekonominių rentų perskirstymas pagal pasikeitusią politinę hierarchiją prisidėjo prie politinio stabilumo bei sustiprino „dvigubą balansą“. Pagerėjus saugumui ir dažnėjant kontaktui su krikščionimis, vietiniai pirkliai turėjo daugiau laisvės dalyvauti rinkoje vietoje to, kad priklausytų tik nuo elito. Amatininkai buvo reikalingi pilyse ir galėjo mokytis iš imigrantų bei bendradarbiauti su pirkliais.

Taigi, pagrindinė 4 skyriaus hipotezė ta, jog Lietuvos ekonomikos būklė turėjo gerėti kartu su institucine aplinka. Ekstensyvų augimą išties atspindi duomenys apie dirbamų žemės plotų plėtrą, didėjančią Lietuvos gyventojų tankumą, urbanizaciją ir medinių pilių skaičių (1 paveikslas) bei tyrimai apie pirmųjų lietuviškų monetų atsiradimą. Kita vertus, sveikatos duomenys rodo stagnuojančią gyvenimo kokybę bei jo vidutinę trukmę. Labiausiai tikėtina, kad ši skirtingų rodiklių priešprieša atspindi „Malthuso spąstus“, kuriuose, nesant sparčios technologinės pažangos, ekonomikos augimą atsveria augantis žmonių skaičius. LDK atveju prisidėjo ir uždaroms visuomenėms būdinga nelygybė, dėl kurios ekonomikos augimo vaisiai taip pat daugiausia kaupėsi geresnes galimybes joje dalyvauti turinčio elito tarpe.



Pastabos:

1. Grafikas vaizduoja daugiau nei 1245-1386 metus siekiant parodyti unikalų medinių pilių vaidmenį šiuo laikotarpiu.
2. Pearsono koreliacijos koeficientas tarp medinių pilių ir mūšių per praėjusius 1-20 metų skaičiaus yra nuo -0,1 iki -0,34. Tarp 1245 ir 1386 metų šis koeficientas yra nuo -0,13 iki -0,43.

1 paveikslas. Medinių pilių etninėje Lietuvoje ir mūšių, kuriuose per paskutinius 5 ar 10 metų kovėsi didžiųjų kunigaikščių kariuomenės, skaičius. Šaltinis: autorius, duomenys iš Baranausko (2003; 2020)

1386-1569 metų laikotarpio analizė 5 skyriuje atskleidžia, kaip LDK palaipsniui tapo įprasta uždara visuomene. Ankstesnė elito schema sugriuvo, kai Jogaila išvyko į Lenkiją, o Lietuvą valdyti paskirtas jo brolis Skirgaila nesugebėjo konsoliduoti savo autoriteto ir buvo nuverstas Vytauto. Vytautas tuomet paklojo pamatus tolesnei institucijų raidai elitą performuluodamas. Siekdamas įtvirtinti savo paties valdžią, jis paspartino Gediminaičių dinastijos traukimąsi pašalindamas savo pusbrolius iš rusėniškų kunigaikštysčių bei pakeisdamas juos lojaliais tolimesniais giminaičiais ir aristokratais (bajorais tapusiais ankstesnių laikų sritiniais kunigaikščiais). Kadangi aristokratai neturėjo legitimų pretenzijų į valdovo sostą, pagrindinis elitas automatiškai nebeturėjo valdymo privilegijų ir politiniai paskyrimai tapo svarbesni už kunigaikštišką kilmę. Vytautas aristokratams atsidėkojo administracinėmis pareigybėmis, įprastai suteikiančiomis ir žemės.

Aristokratų įtaka toliau augo po Vytauto mirties ir LDK tapo įprasta uždara visuomene maždaug paskutiniuoju XV amžiaus dešimtmečiu (3 lentelė). Kuomet LDK elitas iš kariaujančių kunigaikščių klanų pavirto žemvaldžių bajorų korporacija, LDK institucinė pažanga, įgalinusi platesnio elito bendradarbiavimą, buvo akivaizdi visose penkiose socialines tvarkas apibūdinančiose dimensijose. LDK išvystė centrinę administraciją ir rašytinę

viešąją teisę. Politinių sprendimų priėmimas vis labiau rėmėsi procedūromis ir kolektyviniu, o ne asmeniniu, Ponų tarybos autoritetu. Besimezgantys bendri bajorijos įsitikinimai bei didėjantis socialinių personų vaidmuo atspindi neasmeninių santykių atsiradimą, o nuosavybės teisės taip pat įtvirtintos nuosekliau nei atskirose valdovų privilegijose ir atskirtos nuo šeimos. Prisidedant santykiniai taikai bei pasibaigus ekonominei izoliacijai nuo Vakarų Europos, dvarai tapo pagrindinėmis ekonominėmis organizacijomis, skatindami žemdirbystę ir žemės valdų kaupimą, o ne rentų išgavimą.

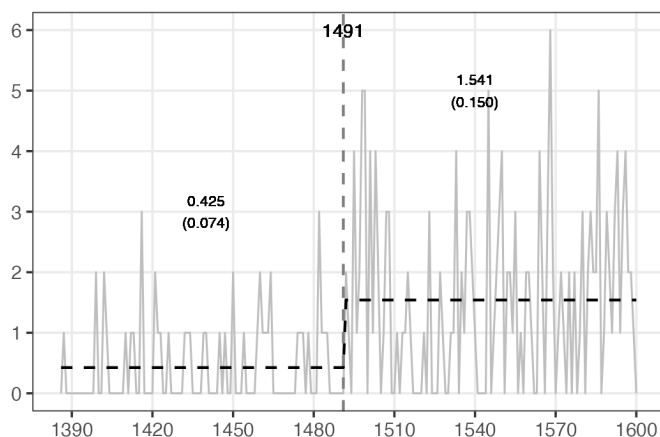
3 lentelė. LDK kaip uždaros visuomenės raida (1316-1569 m.).

Laikotarpis: didieji kunigaikščiai ^a	Institucijų kompleksumas	Teisinė sistema	Nuosavybės teisės	Organizacinė aplinka	(Ne)asmeniniai santykiai
1316-1392: Gediminaičių dinastija	trapi	trapi	trapi	trapi	trapi
1392-1430: Vytautas	trapi	trapi	trapi/įprasta	trapi/įprasta	trapi/įprasta
1430-1440: keli	trapi	trapi	trapi/įprasta	trapi/įprasta	trapi/įprasta
1440-1492: Kazimieras	trapi/įprasta	trapi/įprasta	įprasta	įprasta	įprasta
1492-1506: Aleksandras	įprasta	įprasta	įprasta	įprasta	įprasta
1506-1548: Ž. Senasis	įprasta	įprasta	įprasta	įprasta	įprasta
1548-1569: Ž. Augustas	įprasta	įprasta/brandi	įprasta	įprasta	įprasta/brandi

^a Laikotarpiai reprezentuoja įvardintų kunigaikščių valdymą.

Šaltinis: autoriaus analizė.

Ekonomikos būklę atspindintys duomenys patvirtina spartesnį augimą nuo maždaug to paties laiko, kuriuo iš esmės pasikeitė LDK institucinė aplinka. Tai rodo naujų dvarų ir bažnyčių statybos veiklų tendencijose algoritmiškai nustatyti struktūriniai lūžiai (vienas iš modelių pavaizduotas 2 paveiksle). Po šių lūžių kasmet vidutiniškai atsirasdavo maždaug triskart daugiau naujų dvarų ir vykdavo apie 2,5 karto daugiau statybos veiklų. Vis dėlto, nepaisant sparčiai didėjančio urbanizacijos lygio, LDK netapo labiau urbanizuota lyginant su likusia Europa. Miestietiški verslai susidūrė su veiklos kliūtimis, o valstiečiai tapo vis labiau pririšti prie savo žemės bei statuso. Sveikatos rodikliai ir Lietuvos BVP vienam gyventojui įverčiai taip pat toliau stagnavo. Šie dvejoji rezultatai visgi yra logiški, nes LDK toliau išliko uždara visuomene, kur „dvigubas balansas“ lemia, kad augimo vaisiai pirmiausia prieinami turintiesiems galią bei privilegijas.



2 paveikslas. Struktūrinio lūžio naujų dvarų tendencijoje pavyzdys: dažniausi Modelio 1a koeficientai, nurodantys vidutinį kasmet atsirandančių naujų dvarų skaičių šiandieninėje Lietuvoje, kuomet tikslūs dvarų įkūrimo metai nustatomi atsitiktinai žinomuose intervaluose. Šaltinis: autoriaus skaičiavimai, duomenys iš Semaškaitės (2010).

Išlaikydamas lietuvišką kryptį, 6 skyrius išplečia analizę iki ATR. Šio tyrimo rezultatai rodo, kad priartėjusi prie brandžios uždarnos visuomenės, ATR institucinė aplinka ėmė prastėti nuo XVI amžiaus pabaigos, o iki septinto XVII amžiaus dešimtmečio ji prarado ir įprastos uždarnos visuomenės klasifikaciją (4 lentelė). Pirmiausia prie to prisidėjo politinio bendradarbiavimo ir taisyklėmis grįsto sprendimų priėmimo griūtis, kurią iliustruoja vis dažniau nepripažįstami ir jėga bandomi pakeisti valdovo rinkimų rezultatai, dažnėjančios konfederacijos bei negebėjimas susitarti parlamente. ATR teisinė sistema vis labiau negalėjo užkirsti kelio elito nesutarimams ar juos išspręsti – tikėtina, jog dažnėjo atvejai, kai įstatymų nesilaikė tiek bajorai, tiek valdovai, kuomet teismai išliko neefektyvūs. Negebant susitarti, netobulėjo ir ATR centrinė administracija, o renkamų valdovų galiai esant ribotai, valdysena vis labiau rėmėsi vietinių bajorų pajėgumais.

Su pastaruoju pokyčiu susijęs nuosavybės teisių režimo pasikeitimas. Jas ATR suteikė ir užtikrino nebe didysis kunigaikštis, o horizontalūs Liublino unijos bei Henriko artikulų susitarimai, pagal kuriuos valdovas įsipareigojo jau egzistuojančias bajorų teises tik saugoti. Tokių horizontaliai apibrėžtų nuosavybės teisių saugumas turėtų būti užtikrinamas fiskalinės valstybės ir jos apmokamos kariuomenės bei veikiančių teismų, tačiau ATR neišvystė valstybės pajėgumų rinkti mokesčius ir negalėjo dėl jų kiekvieną kartą naujai susitarti parlamente. Piliečių apsaugoti nebuvo pajėgūs ir ribotos galios bei atskirų interesų turintys monarchai. Tai skatino turtingus bajorus (magnatus)

stiprinti savo pačių politinius, administracinius bei karinius pajėgumus ir mažino paskatas bendradarbiauti su kitais bajorais valstybės lygmeniu. Mažiau turtingiems bajorams, ypač po XVII amžiaus vidurio karų, bado ir maro, analogiškai tapo saugiau kliautis magnatų protekcija nei valstybe, kas prisidėjo prie klientelizmo bei korupcijos. ATR institucinę aplinką pavyko trumpam atkurti paskutiniųjų trijų jos egzistavimo dešimtmečių reformų laikotarpiu, bet šias pastangas nutraukė užsienio jėgų įsiveržimai.

4 lentelė. LDK kaip uždaros visuomenės raida (1569-1795 m.).

Laikotarpis: ATR monarchai ^a	Institucijų kompleksas	Teisinė sistema	Nuosavybės teisės	Organizacinė aplinka	(Ne)asmeniniai santykiai
1569-1587: S. Augustas, H. Valua, S. Batoras	įprasta	įprasta/brandi	įprasta/brandi	įprasta	įprasta/brandi
1588-1648: Žygimantas ir Vladislovas Vazos	įprasta	įprasta	įprasta	įprasta	įprasta
1648-1668: Jonas Kazimieras Vaza	įprasta/trapi	įprasta/trapi	įprasta/trapi	įprasta/trapi	įprasta/trapi
1669-1696: M. K. Višnioveckis ir J. Sobieskis	įprasta/trapi	įprasta/trapi	trapi	įprasta/trapi	trapi
1697-1764: Augustas II ir Augustas III Vetinai	įprasta/trapi	įprasta/trapi	įprasta/trapi	įprasta/trapi	trapi
1764-1795: Stanislovas Augustas Poniatovskis	įprasta/brandi	įprasta	įprasta	brandi	įprasta/brandi

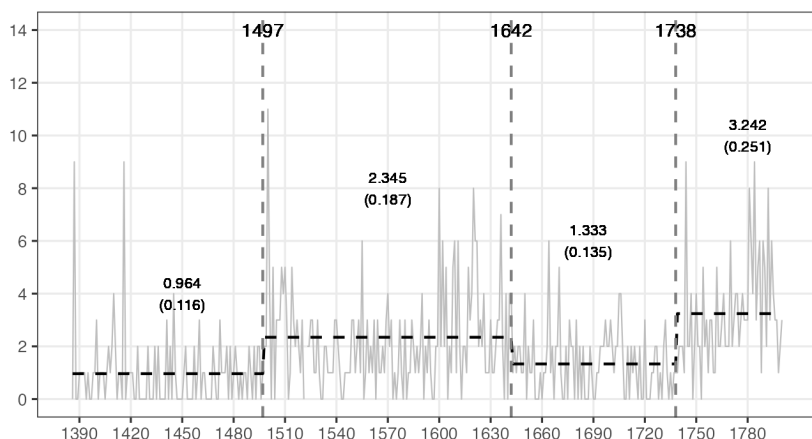
^a Laikotarpiai reprezentuoja įvardintų kunigaikščių valdymą.

Šaltinis: autoriaus analizė.

Remiantis teoriniu pagrindu, visi išvardinti pokyčiai turėjo prisidėti ir prie prastesnės ekonomikos būklės, nes teisinė sistema vis mažiau galėjo užtikrinti bajorų lygybę bei konkurenciją, kuomet nuosavybės teisių režimas tapo fragmentuotas turtingų magnatų ir jų stambių organizacijų naudai. Dvarai išliko pagrindinėmis LDK/ATR ekonominėmis organizacijomis, tačiau žemės valdos buvo sutelktos siaurame turtingiausiųjų rate, o tai labiau skatino ne modernizaciją, bet tolesnį žaliavų eksportą remiantis nemokamu valstiečių darbu bei nesudėtingus verslus.

Išsivystymo rodikliai dalinai remia hipotezę, jog ATR augimo tendencija sulėtėjo maždaug XVII amžiaus septintajame dešimtmetyje. Kai kurie modeliai panašiu laiku identifikuoja struktūrinius lūžius bažnyčių statybos veiklų tendencijoje (3 paveikslas), o urbanizacijos lygis taip pat didžiąja dalimi kito panašiai, kaip būtų galima tikėtis. Tačiau ne visi rezultatai vienareikšmiški. Kiti bažnyčių statybos veiklų modeliai rodo lūžius skirtingais laikotarpiais, naujų dvarų tendencija sulėtėjo anksčiau nei reikšmingai pasikeitė institucinė aplinka, o išanalizuoti Lenkijos ir Lietuvos BVP

duomenys apskritai rodo kiek prieštarinę vaizdą. Tiesa, vidutinis naujų dvarų skaičius per metus galėjo sumažėti anksčiau ir dėl aptartų politinių priežasčių, kuomet kiti rezultatai neišvengiamai susiduria su istorinių duomenų atkūrimo iššūkiais.



3 paveikslas. Struktūrinio lūžio bažnyčių statybos tendencijoje pavyzdys: dažniausi Modelio 4a koeficientai, nurodantys, kiek vidutiniškai bažnyčių buvo kasmet naujai pastatoma Lietuvoje, kai tikslūs statybos metai nustatomi atsitiktinai žinomuose intervaluose. Šaltinis: autoriaus skaičiavimai, duomenys iš Gimbuto (1970).

Nepaisant to, net ir nevienareikšmiški rezultatai nebūtinai prieštarauja Northo, Walliso ir Weingasto (2009) teorijai. Bendri disertacijos tyrimo rezultatai pagrindžia šią teoriją iliustruodami, kad uždaros visuomenės gali vystytis stiprindamos ir/arba plėsdamos savo elito institucijas, bet šis vystymasis daugiausia juntamas elito tarpe. Kuomet XIII-XVI amžių analizė tiesiogiai lemia tokią išvadą, prieštaringesni rezultatai XVII-XVIII amžiais galimai atspindi uždarų visuomenių mažą gebėjimą prisitaikyti ir jautrumą išorės sukrėtimams – ypač grūdų kainų, kurių pilną poveikį nustatyti su turimais duomenimis sudėtinga.

Negalutinis atsakymas, ar ryšys tarp institucijų kokybės ir ekonomikos būklės egzistavo per visą LDK istoriją, yra vienas šios disertacijos apribojimų. Kitas apribojimas tas, jog net ir XIII-XVI amžių, kuriais ši sąsaja, tikėtina, tikrai egzistavo, tyrimo rezultatai nėra priežastiniai. 4 skyrius pagrįdė analizuoją fizinių tyrimų duomenis ir aprašomąją statistiką. Tuo tarpu nors ir derinama su kokybine institucijų analize, struktūrinių lūžių metodologija pati iš savęs nėra priežastinė. Galiausiai, naujai sistemizuoti dvarų ir bažnyčių statybos veiklų duomenys potencialiai gali atspindėti ir rašytinių šaltinių tobulėjimą ar išgyvenusiujų šališkumą (geresnes žinias apie vėlesnius/išlikusius statinius).

Nepaisant šių apribojimų, disertacija vis tiek prisideda prie literatūros. Be minėtų pagrindinių įnašų ir su jais susijusių galimų ateities tyrimų kryptių, ši disertacija siūlo holistinį požiūrį į institucijų raidą tiek lyginant skirtingus uždarų visuomenių tipus, tiek jų viduje, pabrėžiant dažną institucijų raidos laipsniškumą bei neformalumą, kurį sunku išmatuoti standartizuotais rodikliais. Šis požiūris atspindi mėginime operacionalizuoti uždarų visuomenių konceptą išskleidžiant jį penkiose dimensijose, padedančiose tiksliau klasifikuoti institucines aplinkas. Disertacijos metodologija potencialiai gali būti taikoma kituose darbuose, ypač tiriančiuose ikiindustrinę istoriją bei ilgus istorinius laikotarpius, neskaitant teorijos bendro populiarumo, pristatomo literatūros apžvalgoje.

Galiausiai, LDK atvejo analizė ne tik pabrėžia tai, kad svarbu nagrinėti jėgos panaudojimo kontrolę elito viduje, bet ir bendrai iliustruoja heterogenišką išorinio saugumo vaidmenį. Kuomet institucijų tobulėjimas prisidėjo tiek prie vidinio, tiek prie išorinio saugumo XIII-XIV amžiuose, ekonominių paskatų pasikeitimas įprastoje uždaroje visuomenėje pavertė saugumą dalimi kompromiso tarp rentų maksimizavimo ir kolektyvinio kariuomenės finansavimo. Bajorijos pasirinkimas koncentruotis į dvarų ekonomiką galėjo nulemti kelio priklausomybę, apsunkinusią valstybės pajėgumų plėtrą ir fiskalinės valstybės sukūrimą, dėl ko atskiriems magnatams galiausiai tapo labiau optimalu siekti saugumo privačiai. Kertinės reformos įgyvendintos tik tuomet, kai vidinė parama esamai situacijai ir išorinis spaudimas jau buvo susikaupę iki tuometinei valstybei ir institucinei aplinkai nepakeliamo lygio.

Ginamieji teiginiai

Ginamieji teiginiai išplaukia iš disertacijos tikslų bei su jais susijusių tyrimo rezultatų:

1. LDK ilgalaikis vystymasis gali būti analizuojamas remiantis socialinių tvarkų teorija dėl dviejų priežasčių. Pirma, institucijos bendrai veikia kaip tarpinis veiksnys pasireiškiant kitų veiksnių, įskaitant geografinę, klimato ir šalių tarptautinės padėties, poveikiui, o Northas, Wallisas ir Weingastas (2009) jau atsižvelgia į kultūros įtaką per neformalias institucijas. Antra, socialinių tvarkų teorija ilgalaikio vystymosi priežastis paaiškina plačiau nei kitos institucinės teorijos, nes ji jau panašiai atsižvelgia į pagrindines „senosios institucinės ekonomikos“ idėjas bei naujesnius institucinius požiūrius, kurie koncentruojasi į valstybės pajėgumą, įtrauktį ir valstybės-visuomenės galios balansą.

2. Egzistuojanti literatūra sustiprina socialinių tvarkų teorijos pasirinkimą ir pabrėžia disertacijos naujumą. Nepaisant to, kad Northo, Walliso ir Weingasto (2009) teorija plačiai taikoma daugelyje atvejo analizių ir keletame kiekybinių tyrimų, tik nedidelė dalis šių darbų tiria istorinius laikotarpius iki XIX amžiaus, o Lietuvai jokia institucinės ekonomikos teorija dar nebuvo sistemiškai taikyta apskritai.
3. Uždarų visuomenių konceptą galima operacionalizuoti nuosekliam taikymui įvairiose atvejo analizėse išskleidžiant jį institucijų kompleksiskumo, teisinės sistemos, nuosavybės teisių, organizacinės aplinkos ir neasmeninių santykių paplitimo dimensijose. Remiantis šiomis dimensijomis galima tiksliau lokalizuoti konkrečius atvejus trapių, įprastų bei brandžių uždarų visuomenių spektre. Tuo tarpu istorinių ekonominių duomenų trūkumą galima išspręsti pasitelkiant skirtingų rodiklių kombinaciją. Besikeičiančios pilių, dvarų ir bažnyčių statybos tendencijos atskleidžia ekstensyvų vystymąsi, o struktūrinių lūžių testai, taikomi pastariesiems dviems rodikliams, yra dažnai naudojami tiriant ilgalaikį augimą. Urbanizacijos ir sveikatos duomenys yra kiti Lietuvai prieinami rodikliai, kartu su neseniai pasirodžiusiais BVP vienam gyventojui įverčiais ir archeologinių, antropologinių bei kitų susijusių tyrimų rezultatais.
- 4a. XIII-XIV amžiuje (~1245-1385 m.) LDK išliko trapia uždara visuomene, tačiau vis tiek sugebėjo patobulinti savo institucijas. LDK politinis stabilumas išaugo sutelkus valdžios privilegijas Gediminaičių dinastijos rankose ir integravus konkuruojančius sritinius kunigaikščius į elitą jiems suteikiant administracines pareigas bei šeimos nuosavybės teises. Šie pokyčiai didino paskatas kaupti žemės valdas ir užsiimti produktyvia veikla, o ne rentų išgavimu, kuris apibrėžė buvusią karinę ekonomiką.
- 4b. Tankėjančio medinių pilių tinklo, žemdirbystės plėtros, didėjančios urbanizacijos ir pirmųjų vietinių monetų atsiradimo įrodymai leidžia manyti, jog institucijų vystymasis sutapo su ekstensyviu augimu. Tuo pačiu, galimai dėl populiacijos augimo ir uždaroms visuomenėms būdingos nelygybės, sveikatos duomenys nerodo jokios vidutinės gyvenimo kokybės pagerėjimo.
- 5a. Dinastinės unijos su Lenkija metu (1386-1569 m.), LDK tapo įprasta uždara visuomene. Iki paskutinio XV amžiaus dešimtmečio LDK elitas iš kariaujančių kunigaikščių klanų pilnai pavirto į žemvaldžių bajorų korporaciją, bendrai valdančia kartu su didžiuoju kunigaikščiu. LDK palaipsniui išvystė centrinę administraciją, viešąją teisę, kolektyvinį sprendimų priėmimą Ponų taryboje ir pirmaujančių bajorų klasinę

- savivoką, tuo pačiu įtvirtindama jų nuosavybės teises, kurios leido dvarams tapti pagrindinėmis ekonominėmis organizacijomis.
- 5b. Augančios naujų dvarų, bažnyčių ir urbanizacijos tendencijos nuo maždaug to paties laiko, kai įvyko institucinis perėjimas, rodo, kad įprastos uždaros visuomenės institucinė aplinka toliau skatino produktyvią žemdirbystę. Kita vertus, augimas daugiausia išliko ekstensyvus, nes buvo koncentruotas tarp bajorų – LDK netapo labiau urbanizuota lyginant su kitomis Europos šalimis, o žmonių sveikata vis dar negerėjo.
- 6a. ATR, įskaitant LDK (1569-1795 m.), iš pradžių pagerino savo institucinę aplinką ir priartėjo prie brandžios uždaros visuomenės. Vis dėlto, nuo XVI amžiaus pabaigos institucinė aplinka ėmė prastėti. Septintajame XVII amžiaus dešimtmetyje ATR nustojo būti įprasta uždara visuomenė, nes kolektyvinis sprendimų priėmimas tapo vis labiau neefektyvus, teisinė sistema negalėjo užkirsti kelio elito nesutarimams ar jų išspręsti, nuosavybės teisės tapo fragmentuotos turtingų magnatų ir jų stambių organizacijų naudai, o klientelizmas bei korupcija pakeitė iki tol besivysčiusius neasmeninius santykius. ATR atkūrė savo institucinę aplinką priėmusi nuodugrias reformas, bet tai įvyko tik pačioje jos egzistavimo pabaigoje.
- 6b. Šiuo laikotarpiu analizuotų išsivystymo rodiklių tendencijos toliau kito kartu su institucijų kokybe, bet tik iki tam tikro lygio. Kai kurie bažnyčių statybos veiklų modeliai rodo lūkesčius patvirtinančius struktūrinius lūžius apie septintąjį XVII amžiaus dešimtmetį, o urbanizacijos lygis taip pat, tikėtina, pradėjo mažėti apie šį laiką. Tačiau ne visų bažnyčių statybos modelių rezultatai yra tokie patys, kuomet kiti rodikliai kuria kiek prieštaringą paveikslą.
7. Atsižvelgiant į visus rezultatus, ši atvejo analizė didžiąja dalimi remia pagrindinį institucinės ekonomikos teiginį, kad egzistuoja teigiamas institucijų kokybės ir ilgalaikio ekonomikos vystymosi ryšys. Disertacija taip pat atliepia Northo, Walliso ir Weingasto (2009) teoriją, kuri tikina, jog nors uždaros visuomenės gali vystytis gerindamos elito institucijas, uždaro logika ir „dvigubas balansas“ lemia šį vystymąsi esant pirmiausia ekstensyvų ir koncentruotą elito tarpe.

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Po magistro studijų Mantas kelerius metus buvo „Euromonitor International“ verslo konsultacijų departamento duomenų analitiku, o nuo 2022 m. vasaros dirba Finansų ministerijos fiskalinės valdysenos skyriuje, kartu atstovaudamas Lietuvai ES Tarybos skolos tvarumo analizės (DSA WG) bei visuomenės senėjimo ir tvarumo darbo grupėse (AWG).

Moksliniai interesai: institucinė ekonomika, ekonomikos vystymasis, politinė ekonomija, ekonomikos istorija, viešieji finansai ir jų tvarumas, sociologija, kt.

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