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INTRODUCTION

This dissertation investigates the interaction between labour market institutions (LMIs) and exchange rate regimes (ERRs), focusing on their combined effects on economic growth, external balances, and the formation of national growth models. Drawing on four published articles (Spurga 2025; Kuokštis and Spurga 2025; Kuokštis, Asali, and Spurga 2025; 2022), this work develops a unified account of how LMIs operate as a key moderating variable that shapes the macroeconomic outcomes of currency regime choices.

LMIs are the laws, practices, policies, and conventions that structure employment contracts, collective representation and collective bargaining, working conditions, and wage setting (Betcherman 2012, 2). The dissertation focuses on the degree of *flexibility* of LMIs. Rigid LMIs are those that impose high adjustment costs and constraints on firms and workers. By contrast, labour market flexibility (LMF) allows pay, hours, and employment to adjust relatively quickly. Indices of LMIs employed in this work cover the key institutional levers across labour markets, such as employment protection, unemployment benefits, collective bargaining coverage, and minimum wage regimes (Gwartney et al. 2023; Adams et al. 2017; OECD 2024).

The analysis of the effects of rigid vs. flexible LMIs is based on two foundational frameworks. First, the optimum currency area (OCA) theory, which provides the criteria for assessing exchange rate choices and elaborates on the role of LMIs (Mundell 1961; De Grauwe 2018; Grittersová 2014). According to the OCA theory, economies with more flexible labour markets are better suited to operate under the constraints of a fixed exchange rate, because flexible LMIs constitute an alternative external adjustment channel to the exchange rate flexibility (see Figure 1).

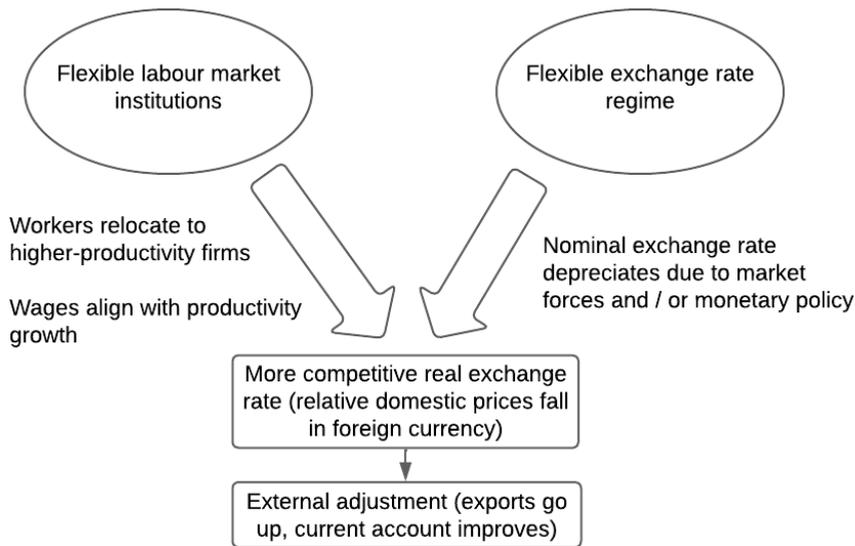


Figure 1. Two paths to external adjustment (OCA functional substitution)

Notes: See more in Literature Review.

Source: Compiled by the author.

Second, the dissertation draws on the Growth Models (GM) scholarship that examines how Post-Fordist economies mobilise sources of aggregate demand to secure economic growth (Baccaro and Pontusson 2016; 2020; Hall 2018; Johnston and Regan 2016). Within this framework, LMIs, especially collective bargaining and the degree of wage coordination, are seen as key determinants that condition the wage share and the resulting GM.

At the heart of this dissertation is the argument that LMIs constitute a crucial, yet underexplored, factor in the relationship between ERRs and growth. Researchers in international and comparative political economy have frequently examined the link between ERRs and macroeconomic performance, including inflation (Ghosh et al. 1997; Bleaney and Francisco 2007), growth (Dubas et al. 2005; Frankel 2012; Cruz-Rodriguez 2022), external balances (Ghosh et al. 2008; Chinn and Wei 2013; Martin 2016), and other macroeconomic variables. However, the debate over the effects of different ERR choices continues, as the scholarship has, for the most part, not yet yielded definitive answers. For instance, regarding long-term economic growth, the overall results may be summarised as a “null finding”: in

aggregate, ERRs do not seem to have a significant effect (Harms and Kretschmann 2009).

Despite compelling theoretical arguments for their significance, the role of LMIs in conditioning the macroeconomic outcomes of ERR choices remains largely underappreciated, particularly beyond the euro area. Similarly, the literature on comparative GMs, while focusing on wage coordination, often overlooks how other configurations of LMIs can underpin distinctive growth trajectories. More specifically, the GM scholarship has mainly focused on two institutional complementarities. First, wage coordination under fixed exchange rates, whereby exchange rate fixity incentivises wage restraint to sustain an export-led GM (Wansleben 2024; Baccaro and Höpner 2022). Second, flexible LMIs under floating currencies with discretionary monetary policy that supports domestic demand-led economies (Hope and Soskice 2016). Consequently, other viable combinations remain underexplored.

Nevertheless, the functional necessity of LMF under fixed exchange rates is widely accepted in policy circles. The management by the International Monetary Fund (IMF) and the European Union (EU) institutions of the euro area's sovereign debt crisis illustrates this consensus, as the Southern European economies were advised to deregulate their labour markets in the absence of an external adjustment mechanism (IMF 2011, 9; Council of the European Union 2016). It is therefore surprising that the literature lacks comprehensive attempts to carry out an in-depth analysis of the LMF and ERR nexus. One region where such investigation may provide important insights is the Baltic States, which are characterised by both very flexible and decentralised labour markets (Masso et al. 2015; Staehr 2017) and the hardest form of fixity – membership in a currency union.

This dissertation therefore addresses two core research questions:

- *How do labour market institutions condition the macroeconomic outcomes (growth and external balances) of exchange rate regime choices?*
- *What is the role of labour market institutions in shaping national growth models, particularly in interaction with a fixed exchange rate regime, as illustrated by the case of the Baltic States?*

The findings, drawn from the four articles, converge on several key points. First, economies with more flexible LMIs are more likely to have a higher degree of exchange rate fixity (Kuokštis, Asali, and Spurga 2022). This constitutes the first empirical validation of the OCA theory's implications regarding LMF, paving the way for the analysis directly linked to the research

questions at hand. Second, under fixed ERRs, flexible labour markets positively affect long-term economic growth, although the results are not equally reliable depending on the LMF indicator used (Kuokštis, Asali, and Spurga 2025). Third, the interaction between LMF and exchange rate rigidity tends to be associated with more positive external balances (Kuokštis and Spurga 2025). This is consistent with results in Article 2, as increasing external balances could be considered a mechanism for economic performance: institutional flexibility increases competitiveness and helps avoid accumulation of external deficits that may result in “sudden stops”.

Fourth, LMF can also contribute to the development of a balanced GM under fixed regimes, as seen in the Baltic States (Spurga 2025). While Article 3 finds that the interaction of LMF and exchange rate rigidity tends to produce more positive external balances (or even persistent external surpluses if labour markets are highly flexible), the Baltic case points to a different outcome. Despite operating under hard fixity and flexible labour markets, a balanced GM formed in Lithuania, Latvia, and Estonia over 2010-2022, where domestic consumption and export performance jointly contributed to growth without sustained current account surpluses. This apparent tension is not a contradiction but a theoretical opening, suggesting that the outcomes of flexibility depend on the broader institutional and distributive configuration.

The supply-side institutionalism of the OCA theory can explain the immediate post-Global Financial Crisis (GFC) internal devaluation and the decrease in the unit labour costs in the Baltic States, facilitated by the highly flexible LMIs. Real effective exchange rates adjusted downward in part due to wage compression, leading to significant improvements in trade and current account balances (Walter 2016). This transitory adjustment phase well aligns with the results in Article 3 and, more generally, with the focus of the OCA theory on crisis adjustment rather than long-term outcomes.

However, the GM lens allows a more comprehensive analysis of the expansion phase of the business cycle. Its application shows how the long-term effects of the LMF-exchange rate fixity interaction were conditioned by other factors, such as the rise in non-price competitiveness that prevented the emergence of a purely export-based GM. This is despite the Baltics adhering to the Economic and Monetary Union’s (EMU) macroeconomic governance regime, which is generally associated in the GM literature with an export-led model (Bramucci 2023; Hein and Martschin 2021; Johnston and Matthijs 2022; Regan 2017). Therefore, flexible LMIs and a fixed exchange rate can facilitate a wider variety of GM outcomes than implied by the literature. The

role of LMIs is critical in this respect, as they play a key role in shaping the distribution of income and the structure of aggregate demand.

These insights allow the dissertation to integrate supply-side institutionalism, derived from the OCA theory (where LMIs substitute for nominal exchange rate flexibility), with the demand-side post-Keynesian framework of growth models (which emphasizes income distribution and demand composition). In this regard, LMF serves as a bridging variable between the OCA theory's emphasis on shock adjustment capacity and GM theory's concern with the structural composition of aggregate demand. While the OCA theory posits LMF as a condition for successful adjustment under exchange rate rigidity, GM theory can contribute to explaining the long-term trajectory that flexible LMIs under fixed regimes may imply – i.e., whether they facilitate an export-led, consumption-led, or balanced growth. By bridging theoretical approaches and leveraging diverse empirical evidence, the dissertation aims to advance the understanding of the institutional foundations of economic performance in the global political economy.

1. LITERATURE REVIEW

The central proposition of this dissertation is that flexible LMIs operate as a key moderating variable shaping the macroeconomic outcomes of ERR choices and the long-term configuration of national growth models. This section reviews the relevant literature, starting with the conceptual foundations of flexible LMIs, followed by their macroeconomic implications, and finally moving to the underexplored interaction between ERRs and LMIs, which frames the research questions of this dissertation.

1.1. Labour Market Institutions and Labour Market Flexibility

LMF can be broadly defined as the speed and efficiency with which the labour markets adjust to evolving macroeconomic conditions (Dorel and Daniela 2010, 159). It is commonly analysed through two primary dimensions: wage flexibility and labour mobility. The first dimension, wage flexibility, refers to the responsiveness of nominal or real wages to labour market shocks, often measured by how wages react to changes in unemployment (Arpaia and Pichelmann 2007; Clar et al. 2007). The second dimension, labour mobility, includes both spatial mobility (e.g., cross-country migration), originally emphasized by the OCA theory, and non-spatial forms such as sectoral or occupational reallocation across jobs, thus impacting the employment structure (Paas et al. 2003).

Empirical research has consistently shown that LMIs underpin both dimensions that constitute LMF. For example, strict employment protection legislation (EPL), high union density, and centralized bargaining systems have been linked to increased downward stickiness of real wages to a change in unemployment (Clar et al. 2007; Guriev et al. 2019). Similarly, regulatory constraints on workforce adjustment were shown to hinder job reallocation and discourage job creation (Haltiwanger et al. 2014; Martin and Scarpetta 2012). Results in OECD (2010) suggest that a one-point increase in the OECD employment protection legislation (EPL) index reduces, on average, total worker reallocation by between 5.2 and 6.7 percentage points.

Due to the established effects of LMIs on labour market outcomes, this dissertation focuses on the former when defining the extent to which labour markets are flexible. However, two important caveats should be mentioned. First, in comparative political economy literature, coordinated or centralised wage bargaining systems have been shown as capable of delivering sustained wage moderation to boost competitiveness (Soskice and Iversen 2000;

Johnston et al. 2014; Papapetrou and Tsalaporta 2018). This is in line with the seminal model by Calmfors and Driffill (1988), which posits a non-linear relationship between bargaining levels and economic outcomes. The model suggests that intermediate levels of wage bargaining coordination create collective action problems in wage negotiations, whereas both highly decentralised and highly centralised systems achieve superior macroeconomic performance. This perspective challenges the standard economic literature regarding the assumption of a linear trade-off between institutional rigidity and wage flexibility.

The second caveat is that formal (*de jure*) labour market institutions may not align with *de facto* labour market outcomes not only due to the non-linear effects of the former, but also due to enforcement issues. This discrepancy is particularly relevant for developing economies, where labour market rigidity may often be overestimated due to the lack of effective enforcement (Kanbur and Ronconi 2018). In fact, this has also been the case in the Baltic States, where the standard indicators do not suggest the level of LMF implied by the literature (Masso et al. 2015; Staehr 2017).

Although these caveats present challenges, the dissertation attempts to address them through the triangulation of indices and a mixed-methods research design (see Section 3 on Research Design and Methodology). Combining multiple indicators and data sources helps mitigate the potential measurement bias associated with relying on any single metric. Crucially, the Fraser index (Gwartney et al. 2023), utilised across the three quantitative studies testing the OCA theory, incorporates opinion surveys, which helps capture *de facto* practices rather than strictly *de jure* regulations. Furthermore, beyond the standard model used in the OCA-based Articles 1-3, the case study of the Baltic States (Article 4) highlights aspects of the functional equivalence between the decentralised Baltic labour markets and the highly coordinated bargaining structures found in Sweden.

1.2. Macroeconomic Outcomes of Labour Market Institutions

Both wage flexibility and labour mobility can significantly affect macroeconomic outcomes. First, wage flexibility acts as the primary lever for unit labour costs (ULCs), a driver of cost-competitiveness. Rigid LMIs create downward nominal wage rigidity, which exacerbates competitiveness losses during booms by driving wage inflation and making subsequent corrections slower and more painful (Abbritti and Fahr 2013; Boltho and Carlin 2013). Conversely, responsive wage-setting mechanisms allow for a rapid correction

of ULCs, which leads to terms of trade depreciation and supports external adjustment while mitigating the recessionary spike in unemployment (Arpaia and Pichelmann 2007).

Second, beyond cost adjustments, more flexible LMIs facilitate the structural efficiency of the economy by governing the reallocation of labour. Rigid LMIs, such as high severance costs or strict employment protection, may lock resources into lower productivity firms, preventing the movement of labour from declining sectors to more productive ones (Brixiova and Égert 2012; Griffith and Macartney 2014; Messina and Vallanti 2007). Empirical evidence supports this transmission channel. Bassanini et al. (2009) find that higher EPL has a statistically significant negative effect on total factor productivity growth, especially in sectors that require high labour reallocation. In contrast, LMF fosters creative destruction, enabling high-productivity sectors to expand at the expense of lagging ones, particularly during crises (Caballero and Hammour 1994; Melitz 2003). In open economies, higher productivity growth allows nominal wages to rise without increasing ULCs, thereby preventing upward pressure on domestic prices.

Overall, LMF is generally linked to a greater adjustment capacity in standard economic literature. This is reflected empirically in its association with lower real exchange rate levels (Du and Liu 2015). Both Bernal-Verdugo et al. (2012) and Gnocchi et al. (2015) provide robust evidence that increases in LMF reduce the persistence of unemployment shocks and reduce unemployment variability. By allowing the labour market to clear more rapidly, LMF can therefore constitute an alternative adjustment pathway to a flexible ERR, as elaborated by the OCA theory (see Section 2.1).

1.3. Exchange Rate Regimes and Labour Market Institutions: Addressing the Gap

1.3.1. The Effects of Exchange Rate Regimes

The exchange rate is arguably the most important price in an economy (Frieden 2016), governing the cost of exports, imports, and production. However, despite the profound implications of ERR choices, there is no consensus on their macroeconomic effects. As noted by Frankel (1999, 1), “No single currency regime is right for all countries or at all times.”

All ERRs have both important advantages and disadvantages. Fixed regimes offer stability: by eliminating nominal exchange rate uncertainty, they reduce transaction costs, encourage trade and investment, and serve as a nominal anchor against inflation. This commitment effectively ties domestic

interest rates to foreign interest rates (Obstfeld and Rogoff 1995). However, this stability comes at the cost of monetary autonomy, a trade-off formalized in the “Impossible Trinity” (Aizenman 2017). Under a currency peg, policymakers cannot nominally devalue an overvalued real exchange rate to restore competitiveness or adjust interest rates to manage domestic demand. In contrast, flexible regimes retain these policy levers, allowing the exchange rate to act as a shock absorber and permitting monetary independence to address domestic economic conditions.

Given these trade-offs, empirical evidence regarding the ERR-growth nexus remains inconclusive. Some scholars argue that flexible regimes outperform fixed ones by better absorbing terms-of-trade shocks (Edwards and Levy Yeyati 2005). Others identify a non-linear relationship where intermediate regimes yield the highest growth, as they balance monetary independence with exchange rate stability, outperforming both pure floats and hard pegs (Frankel et al. 2019; Sosvilla-Rivero and Ramos-Herrera 2014). Finally, a significant body of scholarship reports no robust relationship between ERRs and long-term economic growth. Ghosh et al. (1997) and Terrones (2020) found no systematic differences in large samples, a null finding echoed separately in transition economies (Domac et al. 2001) and industrial nations (Levy-Yeyati and Sturzenegger 2003). This collective ambivalence supports the hypothesis of monetary neutrality, namely that nominal variables like exchange rates do not shape real long-run outcomes (Harms and Kretschmann 2009).

Another important macroeconomic variable is the external balance. To some extent, it could be considered a mechanism for economic growth as external balance is often a proxy for the competitiveness of the real exchange rate (Rodrik 2008), while large, persistent current account deficits often lead to “sudden stops”, forcing painful adjustments (Edwards 2004).

ERRs are a strong candidate in explaining the formation of external balances. In *The Case for Flexible Exchange Rates* (1953), Friedman argued that flexible ERRs facilitate faster current account mean reversion. Ghosh, Terrones, and Zettelmeyer (2008) support this view, linking flexible regimes to smaller external imbalances and fewer abrupt reversals. However, Chinn and Wei (2013) challenged this consensus, identifying no strong relationship between ERR flexibility and the speed of current account reversion once economic development and openness are accounted for. In response, scholarship has refined the investigation with different ERR classification choices, generally confirming the original proposition by Friedman in favour of flexible regimes (Ghosh et al. 2015; Martin 2016). The topic has gained

prominence recently given the relevance of global imbalances for the global economy and geoeconomic fragmentation (IMF 2023a).

1.3.2. The Interaction Between Exchange Rate Regimes and Labour Market Institutions

While the macroeconomic effects of ERRs have been widely investigated, far less attention has been devoted to how these effects are conditioned by domestic institutional environments. In particular, large-N studies are lacking that would quantify the extent to which LMIs moderate the impact of exchange rate regimes on growth and external balances.

Scholarship within the European context, however, does suggest that the effectiveness and sustainability of fixed exchange rate arrangements depend on the flexibility of labour markets. For instance, De Grauwe (2018), Berger and Nitsch (2014), and Hancké (2013) highlight that under a common currency, countries with more rigid labour markets – such as those in Southern Europe – face greater difficulty adjusting to asymmetric shocks, which in turn contributes to internal euro area imbalances. In contrast, countries with coordinated LMIs (e.g., Germany or the Netherlands) have been better able to adjust, thus accumulating external surpluses. Accordingly, countries with stronger wage bargaining coordination have been seen as better equipped to organize around the export sector, adhere to EMU’s rulebook, and achieve superior macroeconomic outcomes, often at the expense of countries lacking strong wage coordination (Johnston 2020; Johnston and Matthijs 2022).

Beyond Europe, the empirical analysis of the interaction between ERRs and LMIs remains limited. One exception is the study by Manger and Sattler (2020), who focus on the impact of wage bargaining coordination on external imbalances and explore the potential moderating effect of ERR in a broader developed countries’ sample. However, they do not find a significant moderating influence of ERR and argue that wage bargaining coordination has strong effects under both flexible and rigid ERR.

It is important to emphasize that many contributions in comparative political economy recognize the interdependence of institutions – including LMIs and macroeconomic regimes – but the gaps in the analysis remain. This applies to the GM scholarship, which privileges two specific institutional complementarities, leaving other viable combinations underexplored. The first complementarity is between wage coordination and fixed exchange rates, whereby a conservative monetary policy facilitates incentives for wage restraint to sustain an export-led GM (Wansleben 2024; Baccaro and Höpner 2022). Under such interaction, the impossibility of currency devaluation

forces competitiveness to be generated internally. Unions realise that excessive wage claims cannot be inflated away and will result in increasing unemployment, and instead commit to wage moderation. Therefore, as discussed by Baccaro and Höpner (2022, 238), “an inflexible exchange rate regime translates domestic price containment into real exchange rate devaluation”, which supports export-led growth.

The second complementarity consists of flexible LMIs under floating currencies with discretionary monetary policy that supports domestic demand-led economies (Hope and Soskice 2016). In demand-led models like the UK, the monetary regime does not affect wage setters to the same degree as in coordinated regimes given the decentralised and fragmented labour market. Instead, the flexible ERR accommodates the capital inflows that sustain asset prices and finance the debt-led consumption (Reisenbichler and Wiedemann 2022). Credit markets can therefore complement or substitute for real wage growth where the unions lack bargaining power. More generally, LMF in GM scholarship is often either implicitly or explicitly associated with liberal market domestic demand-led economies (Lavery 2019), without examining how institutional flexibility may serve as an enabling condition for a wider range of growth model configurations.

Against this background, the Baltic States seem like a fitting case to study the ERR-LMI interaction. First, the literature characterizes them as having a very high degree of LMF (Masso et al. 2015; Staehr 2017). Second, the Baltic States had made a highly politically salient decision to enter the euro area – the hardest form of a peg. After the GFC, they committed to macroeconomic rebalancing in their efforts to meet the euro adoption criteria (Dandashly and Verdun 2020). This constituted active policy-making which shaped their long-term growth model, with LMF and membership in a common currency area being its major pillars. However, this interaction between macroeconomic regime choices and LMF has not been analysed through the lens of the GM framework, which provides unique tools for understanding how institutional complementarities translate into specific patterns of demand, distribution, and growth.

Given the gaps in the literature discussed above, this dissertation is guided by two core research questions:

1. *How do labour market institutions condition the macroeconomic outcomes (growth and external balances) of exchange rate regime choices?*
2. *What is the role of labour market institutions in shaping national growth models, particularly in interaction with fixed exchange rate regimes, as illustrated by the case of the Baltic States?*

2. THEORY

The dissertation aims to contribute to the theoretical integration of supply-side institutionalist perspectives (the OCA theory) with demand-side frameworks (growth models). This dual perspective allows for a more comprehensive understanding of the institutional foundations of macroeconomic performance and the diverse growth trajectories observed across countries.

2.1. Optimum Currency Area

The OCA theory, pioneered by Mundell (1961), has long served as the dominant framework for assessing the trade-offs of joining a currency union or adopting a fixed exchange rate (Grittersová 2014, 205; Klein and Shambaugh 2012, 76). The core insight of the theory is that the economic cost of giving up monetary sovereignty – that is, the ability to adjust the nominal exchange rate or set independent monetary policy – depends on a set of structural characteristics that determine how easily an economy can adjust to asymmetric shocks.

The OCA theory identifies the following factors that determine the costs of adopting a fixed exchange rate: the synchronicity of business cycles (and the probability of suffering asymmetric shocks), degree of fiscal and trade integration, mobility of capital and financial integration, the convergence of inflation rates, diversification of production, as well as labour mobility and wage flexibility (Grubel 1970; Horvath 2003; Mundell 1961; Kenen 1969). Countries that meet these criteria are more likely to benefit from the credibility, stability, and integration gains of a fixed exchange rate or currency union, while avoiding the costs of economic misalignment and persistent underperformance (De Grauwe and Ji 2016).

Within this framework, LMF occupies a central role (see, for instance, Goodhart 1998, 419–20). As nominal exchange rate adjustment becomes unavailable under a peg or in a currency union, internal adjustment mechanisms must compensate – including through flexible wages and mobile labour (De Grauwe 2006). LMF's importance is due to its effects on productivity, wages, and prices, elaborated in the Literature Review (De Grauwe and Ji 2016; Baas and Belke 2014). Wage flexibility allows the real exchange rate to adjust through nominal wage adjustments, improving competitiveness and correcting external imbalances without the need for currency devaluation. Labour mobility, on the other hand, enables surplus

labour to relocate from contracting to expanding sectors or regions. When these mechanisms are strong, countries can absorb shocks and restore equilibrium more smoothly under fixed regimes. Conversely, in the absence of flexible institutions, rigid exchange rates can lead to long and painful adjustments marked by unemployment, stagnant demand, and political backlash – as seen in parts of Southern Europe during the euro crisis (Hancké 2013).

First, this dissertation articulates a hypothesis that countries which exhibit greater LMF are not only better suited to operate under fixed ERR but may also be more likely to adopt a peg in the first place. This institutional precondition helps mitigate the expected costs of rigidity, making hard pegs or euro adoption more politically and economically sustainable.

Second, it is estimated that fixed exchange rate regimes foster growth when LMF is high. Greater LMF should let a fixing country adjust faster and with less pain, reducing the cost of giving up monetary and nominal exchange rate policy. Such economies can thus keep the certainty and integration benefits of a fixed exchange rate while bearing lower adjustment costs, making the net effect on growth more likely to be positive.

Finally, as the OCA logic implies that LMF influences the adjustment capacity, the dissertation also focuses on the effects of ERR-LMF interaction on external balances. When wages can adjust downwards in response to adverse shocks, real exchange rate misalignments are less likely to persist, and export competitiveness can be preserved or restored. Similarly, an economy gains a price advantage as productivity increases, leading to an increase in exports and a decline in imports, which improves the external balance (Kennedy and Sløk 2005; Zemanek et al. 2010). As a result, trade balances and current account positions should improve more quickly and remain more stable in fixed regimes with highly flexible LMIs.

Based on these theoretical considerations, this dissertation puts forward the following hypotheses:

1. *Economies with more flexible labour markets will be more likely to have fixed exchange rate systems. (Article 1)*
2. *The effect of a fixed exchange rate regime on growth will positively increase with increasing labour market flexibility. (Article 2)*
3. *The higher the labour market flexibility, the more positive effect exchange rate rigidity will have on trade and current account balance. (Article 3)*

2.2. The Growth Models Framework

The post-Keynesian GM framework examines the sources of aggregate demand growth that are mobilised to sustain economic expansion over time. While the OCA framework's core concern is transitory adjustment to asymmetric shocks and maintaining external competitiveness through supply-side mechanisms (such as LMF), the GM framework is better suited to analyse the expansion phase of the business cycle. The GM scholarship treats growth as primarily demand-led, differentiating growth models by the relative contribution of exports, household consumption, investment and government spending to GDP growth and by the institutional and distributive configurations that support these demand drivers (Baccaro and Pontusson 2016; Streeck 2016). It can therefore be used to trace how different combinations of demand components generate distinct growth trajectories over longer periods, in a way that a supply-side, shock-adjustment-centred OCA approach, by construction, is not designed to do.

In the Baccaro-Pontusson framework applied in this dissertation, three key factors help determine a growth model: (a) the relative importance of consumption and exports; (b) different ways of financing consumption, and (c) the presence or absence of trade-offs between consumptions and exports (Baccaro and Pontusson 2016, 199; Hassel and Palier 2020, 12; Baccaro et al. 2022, 12).

Scholarship generally discusses the dichotomy of two foundational post-Fordist GMs. In the domestic demand-led models (e.g., UK, US), growth is (a) driven by mainly household consumption, which is (b) debt-financed, where credit and property wealth effects can substitute for wage growth (Reisenbichler and Wiedemann 2022). Therefore, consumption-led economies generally run persistent current account deficits. Finally, (c) exports are not price-sensitive, which eliminates the need for wage moderation that would undermine domestic demand (Baccaro and Pontusson 2016, 190).

A prototypical export-led economy (e.g. Germany) relies (a) on foreign demand evidenced by net exports driving the majority of growth (Baccaro and Pontusson 2016, 187–89). In terms of (b) sources of domestic consumption, the model depends on corporatist institutions to enforce wage moderation, ensuring real undervaluation. However, the suppression of ULC (c) comes at the expense of depressed domestic demand. Wage moderation is often supported by the suppression of the sheltered sector wage growth relative to wage growth in the manufacturing sector (Johnston et al. 2014).

Theoretically, these GMs are viewed not as functionally optimal, but as transient political compromises underpinned by specific cross-class coalitions and macroeconomic regimes (Streeck 2016; Amable 2022; Blyth and Matthijs 2017). Crucially, the interaction between export-led and demand-led models in a currency union can generate systemic imbalances, as the competitive advantage gained through wage restraint cannot be neutralized via nominal devaluation by the trading partners (Iversen et al. 2016; Hall 2018). By focusing on the distribution of income, the GM literature also argues that export-led and consumption-led growth have different implications for income inequality (Behringer and van Treeck 2022).

Scholarship also identifies a balanced GM, exemplified by Sweden (Baccaro and Pontusson 2016; 2020). In terms of (a) the relative importance of aggregate demand components, balanced growth is driven by a dual engine of net exports and private consumption. While exports remain a primary vehicle for growth, they function differently than in the “German” model: rather than requiring wage suppression, export competitiveness serves to finance simultaneous increases in domestic consumption. As described by Erixon and Pontusson (2022, 268):

“Both economies were export-led but export growth generated more consumption growth in Sweden than in Germany, and thus boosted growth of import- competing goods and sheltered services. It is in this specific sense that the Swedish growth model of 1994 to 2007 can be characterized as ‘balanced’.”

In terms of (b) financing of consumption, the balanced GM rests on an equitable distribution of wage gains. Unlike the export-based model, Swedish coordinated bargaining prevents dualization by maintaining stable wage ratios between the sheltered and exposed sectors (Høgedahl et al. 2024; Thelen 2020, 214), thus sustaining consumption.

Finally, the balanced GM relies on non-price competitiveness to mitigate the (c) trade-off between consumption and exports. As Thelen (2020) argues, strong unions in sheltered sectors in Sweden have driven a shift toward knowledge-intensive industries. This structural upgrading allows maintaining strong domestic consumption while safeguarding export performance (Baccaro 2022, 19).

The GM framework is applied in this dissertation to complement the OCA perspective and provide a richer understanding of long-term macroeconomic outcomes. It can provide a wider lens to analyse the interactive relationship between LMF and ERRs, a subject of the first three hypotheses. In this regard, LMF serves as a bridging variable between the OCA theory’s emphasis on

short-term shock adjustment capacity and GM theory's concern with the structural composition of aggregate demand over the expansion phase of the business cycle.

Moreover, the GM framework enables a focus on a specific case where the interaction between LMF and exchange rate rigidity is playing out – the Baltic States in the context of this dissertation. As described in the Literature Review, the Baltic States offer a particularly suitable context for examining the interaction between LMF and the macroeconomic framework shaped by exchange rate rigidity. The three economies have actively adhered to EMU's macroeconomic governance framework, with the "EU leash" on macroeconomic policy remaining largely uncontested (Medve-Bálint and Szabó 2024). This allows further testing of a proposition in the GM literature that the post-crisis EMU macroeconomic regime promotes export-led growth (Bramucci 2023; Hein and Martschin 2021; Johnston and Matthijs 2022; Regan 2017).

Finally, the use of the GM framework allows applying a more qualitative approach to investigating the research topic, complementing the more formalised empirical tests associated with OCA theory.

Against this background, the following thesis is put forward regarding the Baltic States:

4. *A high degree of labour market flexibility and membership in the euro area (underpinned by the EMU macroeconomic regime) has led to the emergence of a balanced growth model in the Baltic States. (Article 4)*

3. RESEARCH DESIGN AND METHODOLOGY

This dissertation employs a multi-method, mixed-methods design. This triangulation shows how the LMF×ERR interaction operates in large-N samples and how its effects are mediated by country-specific institutional settings.

Articles 1-3 (Kuokštis, Asali, and Spurga 2022; 2025; Kuokštis and Spurga 2025) form a quantitative core that formally tests propositions derived from the OCA theory in three large-N cross-country panels (TWFE/ordered probit/probit; dynamic panel GMM; hierarchical models; LP-DiD). All three studies draw on global or regionally diverse datasets, covering developing, emerging, and advanced economies over periods ranging from the 1970s to the late 2010s.

Article 4 (Spurga 2025) undertakes a comparative case study of the Baltic States guided by the GM framework, combining qualitative interpretation with within-case quantitative tests, interpreting and probing mechanisms in a theoretically informed Baltic context. The Baltics are chosen as a case because they combine high LMF with the hardest form of fixity (membership in the euro area) – the constellation under which OCA predicts strong internal adjustment.

The key variables are operationalised consistently across Articles 1-3. ERRs are coded using the widely accepted *de facto* classification scheme by Ilzetzi, Reinhart, and Rogoff (IRR) (Ilzetzi et al. 2019), which allows for clear distinctions between hard pegs, soft pegs, crawling pegs, and floating regimes. The construct validity of LMF is addressed by triangulating widely recognized indices – the Fraser Institute’s Labour Market Regulation Index (Gwartney et al. 2023), the OECD’s Employment Protection Legislation (EPL) indicator (OECD 2024), and the CBR worker protection indicators by Adams et al. (2017). This allows better capturing of variation in both legal and *de facto* dimensions of flexibility. The decision to use composite indices is based on the complexity of labour market regulation and “the evidence that improvements in labour market efficiency are likely to require reforms in more than one area of the labour market” (Bernal-Verdugo et al. 2012, 252).

The Fraser index is the broadest in scope, as it encompasses seven different sub-components: labour regulations and minimum wage, hiring and firing regulations, wage determination flexibility, hours regulations, cost of worker dismissal, conscription, and foreign labour. It has been widely used in various avenues of research to estimate the effects of LMF (Agnello et al. 2014; Artha

and de Haan 2011; Bernal-Verdugo et al. 2012). Unlike the EPL and CBR indices, the Fraser index is based on various sources, including surveys, as opposed to coding information from legal provisions. The OECD's EPL indicator measures the strictness of regulation of individual dismissal of employees on regular contracts, while the CBR indicators are based on coding of labour laws on worker protection in 117 countries.

The choice of empirical methods is tailored to the dependent variable in each article (see Table 1 below). To estimate the choice of ERR (Article 1), a standard two-way fixed effects (TWFE) linear regression is used, as well as a TWFE ordered probit or probit for the coarse and binary scale of ERR respectively. For some specifications, a lagged dependent variable is included to capture dynamics and compute the long-term effects.

For growth outcomes (Article 2), static fixed-effects panel models are estimated and, to capture persistence and mitigate endogeneity, dynamic panel GMM estimators are employed to then obtain implied long-term effects. The analysis of external balances (Article 3) applies hierarchical linear models that allow for the intercept and the ERR coefficients to vary by country, thus estimating both within-country and between-country effects. This allows focusing on long-run differences in persistent macroeconomic (im)balances *across* countries.

Table 1. Overview of methods used in articles testing the OCA theory

Article	Dependent Variable(s)	Methods Used	LMF Operationalisation
<i>Labor Market Flexibility and Exchange Rate Regimes</i> (Article 1)	ERR operationalised on a fine scale (1-13), a coarse scale (1-4), and a binary scale (fixed vs floating)	<ul style="list-style-type: none"> - TWFE linear regression for the fine scale and dynamic specifications with a lagged dependent variable; - TWFE ordered probit for the coarse scale; - TWFE probit for the binary scale and - IV estimation as a robustness check. 	Fraser Institute's Labour Market Regulation Index. Composite index (0-10, 10 = most flexible). Individual subcomponents also tested.
<i>How Labour Market Institutions Influence the Relationship Between Exchange Rate Regimes and Economic Growth</i> (Article 2)	Growth rate of real GDP per capita	<ul style="list-style-type: none"> - Fixed-effects regression models (in a panel setting) with a linear time-trend; - Includes interaction terms between ERR rigidity (binary and fine scale) and LMF; - Dynamic panel models with a lagged dependent variable, estimated via Arellano-Bond GMM. 	<ul style="list-style-type: none"> - CBR data by Adams et al. (2017) covering labour laws (worker protection). The benchmark index derived using Principal Component Analysis (PCA) on the 5 categories of the underlying 40 indicators. Index normalized with 10 representing the most flexible labour market; - Fraser Institute's Labor Market Regulation Index used as an alternative measure in robustness checks.
<i>The Political Economy of Exchange Rate Regimes and External (Im)Balances: The Role of Labor Market Institutions</i> (Article 3)	Trade balance (% of GDP) and current account balance (% of GDP)	<ul style="list-style-type: none"> - Hierarchical (multi-level) linear models with time fixed effects as the primary method; - Includes interaction terms between ERR rigidity (1-4 scale) and LMF index; - Local projections difference-in-differences (LP-DiD) for analysing the effect of changes in ERR (switches to hard fixed regimes). 	<ul style="list-style-type: none"> - OECD's Employment Protection Legislation (EPL) indicator as the primary measure. Measures strictness of dismissal regulation; inverted so higher scores (0-5) indicate more flexibility; - Fraser Institute's Labor Market Regulation Index used as an alternative measure in robustness checks.

Sources: Compiled by author based on Kuokštis, Asali, and Spurga (2022; 2025); Kuokštis and Spurga (2025).

Two of the three articles incorporate interaction terms between ERR rigidity and LMF. This allows for a direct test of the core OCA prediction: that institutional flexibility is a functional substitute for nominal exchange rate adjustment. The interaction terms test whether the macroeconomic effects of fixed exchange rates – on growth, current account balances, and trade balances – depend on the degree of LMF present in a given country.

The studies employ econometric techniques to address potential issues of endogeneity and confounding, where the relationship between variables might be two-way or influenced by unobserved factors, increasing the *causal* credibility of the methods used. This includes the use of lagged variables, spatial instrumental variables (IV) in Article 1, as well as local projections difference-in-differences (LP-DiD) estimation in Article 3 to estimate the effects of *changes* in the ERR on the external balance. These designs are supplemented with robust controls for common macroeconomic confounders such as GDP per capita, financial openness, trade exposure, inflation, and political regime type, helping reduce the likelihood that results are driven by omitted variable bias.

Taken together, this consistent methodological approach enables each article to contribute individually to the overarching research topic, while their collective logic provides strong cumulative evidence in support of the dissertation’s theoretical claims. By integrating LMIs into the analysis of ERRs, the studies provide a novel empirical basis for understanding how institutional complementarities condition the ERR choices and their outcomes.

Article 4 complements the preceding studies by shifting from a global panel data design to a focused comparative case study to understand how LMF and ERR rigidity interact in shaping the long-term growth model of the Baltic States. Unlike the first three articles, which emphasize hypothesis testing using large-N cross-country datasets, this article employs a small-N, theory-informed within-case analytical framework rooted in the GM literature.

The methodological strategy triangulates qualitative interpretations of institutional dynamics (e.g., wage-setting systems, political decisions related to euro adoption), grounded in a coherent theoretical framework, with quantitative empirical analysis. The empirical analysis relies on assembling a time-series cross-sectional dataset for the three Baltic countries, drawing on various macroeconomic data sources such as the IMF WEO, AMECO, Eurostat, OECD databases. It examines three key dimensions of the growth model: the relative importance of consumption and exports in driving growth, the sources used to finance domestic consumption, and the presence or

absence of trade-offs between consumption and exports, assessed by the price sensitivity of exports.

To specifically investigate the price sensitivity of exports, the study employs Ordinary Least Squares (OLS) linear regression. This is used to estimate the relationship between the yearly log change in real export volumes (for goods and services separately) and the yearly log change in the Real Effective Exchange Rate (REER, ULC-based), while controlling for the growth rate of the European Union as a key trading partner.

The article also leverages a comparative logic by contrasting the Baltic States both among themselves and against benchmark cases (e.g., Germany, Sweden) to draw inferences about the interaction between LMF and the macroeconomic regime. This allows the article to investigate how high LMF, in conjunction with membership in the euro area, contributed to the emergence of a balanced growth trajectory in the Baltics. By doing so, the article provides the micro-foundational narrative that illustrates and enriches the broader quantitative findings of the dissertation.

4. RESULTS

The following sections present the results of the four articles forming the basis of this dissertation.

4.1. The Choice of Exchange Rate Regimes and Labour Market Institutions (Article 1)

Article 1 examines the choice of an ERR, serving as the first test empirically validating the implications of the OCA theory regarding the role of LMF (Kuokštis, Asali, and Spurga 2022). The article finds that increases in LMF tend to, on average, be associated with more rigid ERRs.

Table 2 below reports the TWFE estimation results when the dependent variable (ERR flexibility) is measured on a fine-scale of 1 to 13 (with 1 being the hardest form of fixity).

Table 2. Labour market flexibility and the choice of a fixed exchange rate

	(1)	(2)	(3)	(4)	(5)
				Developing	Developed
Labor market flexibility (lagged)	-.400*** (.135)	-.308** (.155)	-.114** (.045)	-.108** (.048)	-.148 (.127)
Lagged dependent variable			.838*** (.026)	.810*** (.017)	.860*** (.106)
Remittances/GDP (lagged)	-.033 (.036)	-.037 (.037)	-.003 (.013)	-.005 (.012)	.156 (.195)
Log GDP	2.419 (1.557)	3.956* (2.155)	1.17** (.53)	1.13* (.626)	.221 (1.791)
Log GDP per capita	-2.954 (2.095)	-3.506 (2.314)	-1.302** (.541)	-1.158** (.581)	.749 (2.111)
Export/GDP (lagged)	-.032* (.018)	-.026 (.018)	-.005 (.004)	-.007* (.004)	-.009 (.017)
Capital account openness (Chinn-Ito)	-.877 (.65)	-.703 (.697)	-.362** (.166)	-.418** (.195)	-.679 (.679)
Total reserves (months of imports)	.034 (.054)	.034 (.058)	-.002 (.013)	-.004 (.017)	.008 (.029)
Democracy (polity score)	.038 (.03)	.037 (.03)	-.003 (.007)	-.004 (.007)	.027 (.06)
Inflation (lagged)	.016 (.017)	.014 (.017)	-.001 (.004)	.002 (.004)	.004 (.041)
Current account balance/GDP	.002 (.011)	.011 (.011)	0.0004 (.005)	-.001 (.005)	.017 (.021)
Manufacturing/GDP	.043 (.048)	-.012 (.05)	-.002 (.015)	.001 (.017)	-.059 (.036)
Observations	1647	1647	1638	1282	356
R-squared	.109	.142	.743	.707	.838
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	Yes	Yes	Yes	Yes

Notes: Dependent variable is the exchange rate regime defined on a fine scale, from 1 to 13. Estimates are based on fixed effects and two-way fixed effects linear estimation. Robust standard errors, clustered at the country level, are in parentheses.

*** p<.01, ** p<.05, * p<.1

Source: Kuokštis, Asali, and Spurga (2022)

The relationship of interest is negative and significant. The TWFE estimation is presented in Column 2: it shows that for a 1 unit increase in the LMF index (on a 10 point scale), exchange rate rigidity goes up by 0.3 units. The article further provides robustness tests to address potential threats to causal identification, including an Instrumental Variables (IV) estimation.

The results highlight an important influence of LMIs in currency regime choice. In this sense, the results are suggestive that policymakers take into account aggregate efficiency reasons when setting the ERR policy, based on the assumption that LMF is an important prerequisite for the successful operation of a fixed currency regime.

4.2. Exchange Rate Regimes, Labour Market Institutions, and Long-Term Economic Growth (Article 2)

Article 2 examines the hypothesis that fixed ERRs are associated with faster growth under flexible LMIs (Kuokštis, Asali, and Spurga 2025). The results suggest that LMF does play a moderating role in the relationship between ERRs and growth, although the results vary depending on which LMF indicator is used.

Table 3 reports the fixed effects estimation results for the effect of fixed ERRs on growth in the static model, using three variants of the CBR measure of LMF. CBR1 represents the predicted level from Principal Component Analysis (PCA) on all forty individual subcomponents of the Index; CBR2 represents the simple mean of the forty subcomponents; and CBR3, the benchmark specification, is constructed from PCA on the five dimensions of the Index's individual subcomponents.

Table 3. The effect of exchange rate regimes on economic growth conditional on LMF

	(1) Full	(2) Restricted	(3) CBR1	(4) CBR2	(5) CBR3
Fixed exchange rate (FER_{t-1})	0.829*** (0.260)	0.547** (0.276)	-1.321** (0.606)	-1.683** (0.746)	-1.606** (0.699)
Labor market flexibility (LMF_{t-1})			-0.054 (0.158)	-0.118 (0.175)	-0.125 (0.169)
$FER_{t-1}\#LMF_{t-1}$			0.393*** (0.133)	0.462*** (0.156)	0.457*** (0.151)
Log population	-1.582* (0.843)	-1.681 (1.016)	-2.023** (1.000)	-1.942* (0.994)	-1.910* (0.988)
Population growth	-0.483*** (0.135)	-0.729*** (0.144)	-0.734*** (0.146)	-0.734*** (0.145)	-0.735*** (0.146)
Log GDP per capita (lag)	-3.081*** (0.588)	-3.065*** (0.625)	-3.186*** (0.586)	-3.165*** (0.591)	-3.160*** (0.591)
Time trend	Yes	Yes	Yes	Yes	Yes
Observations	7962	4066	4066	4066	4066
R^2 within	0.036	0.054	0.059	0.060	0.060

Notes: The dependent variable is the annual growth rate of real GDP per capita. Fixed exchange rate (FER) is a dichotomous variable that takes the value 1 if the exchange rate is fixed, and zero otherwise. Regressions include fixed effects (FE) and a linear time trend. Robust standard errors, clustered at the country level, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Kuokštis, Asali, and Spurga (2025)

Large and highly statistically significant interaction effect between LMF and exchange rate fixity on economic growth is found for all three CBR measures (Columns 3, 4, and 5). The estimation results across all variations of the CBR Index hover around a partial effect of 0.39-0.46. Using the benchmark indicator CBR3, an increase in LMF amplifies the effect of exchange rate fixity on economic growth by statistically significant 0.457 percentage points.

Article 2 also examines the robustness of the findings using the Fraser index. However, since the Fraser data have many missing values in earlier years before 2000s, these have been imputed using extrapolated values from a linear regression of the Fraser indicator on the five building sub-indices of the CBR Index. Table 4 below displays fixed effects estimation results for two samples: the “restricted sample,” which includes only observations with non-missing values for both indices; and the “full sample,” which includes all observations with a defined CBR Index and imputed data for the missing Fraser values.

Table 4. The effect of fixed exchange rate regime on economic growth conditional on CBR and Fraser measures

	Restricted sample		Full sample	
	Fraser	CBR	Fraser	CBR
Fixed exchange rate (FER_{t-1})	0.811 (0.927)	-0.091 (0.933)	-1.867* (1.036)	-1.606** (0.699)
Labor market flexibility (LMF_{t-1})	0.536*** (0.180)	-0.073 (0.187)	-0.162 (0.157)	-0.125 (0.169)
$FER_{t-1}\#LMF_{t-1}$	-0.185 (0.145)	-0.055 (0.165)	0.391** (0.176)	0.457*** (0.151)
Log population	-0.667 (1.385)	-1.131 (1.376)	-1.581 (1.020)	-1.910* (0.988)
Population growth	-0.692*** (0.212)	-0.687*** (0.213)	-0.740*** (0.147)	-0.735*** (0.146)
Log GDP per capita (lag)	-3.527*** (0.928)	-3.803*** (0.952)	-3.069*** (0.621)	-3.160*** (0.591)
Time trend	Yes	Yes	Yes	Yes
Observations	2143	2143	4066	4066
R^2 within	0.098	0.092	0.056	0.060

Notes: The dependent variable is the annual growth rate of real GDP per capita. Fixed exchange rate (FER) is a dichotomous variable that takes the value 1 if the exchange rate is fixed, and zero otherwise. Columns 1 and 2 were estimated for the “restricted sample,” where observations were available for both Fraser and CBR Indices. Columns 3 and 4 were estimated for all available data (including the imputed Fraser values). Regressions include fixed effects (FE) and a linear time trend. Robust standard errors, clustered at the country level, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Kuokštis, Asali, and Spurga (2025b)

No significant results are found using the Fraser indicator for the subsample of country-years for which Fraser data are available. Using the “augmented” Fraser indicator as a measure of LMF, the effect of exchange rate fixity on economic growth appears to be an increasing function of LMF, as shown in Column 3. The difference in these results likely stems from the differing coverage of the two indices, as the CBR Index encompasses a larger sample both temporally and geographically. Moreover, the divergent results could be driven by the differences between *de facto* and *de jure* LMF, with the Fraser index better accounting for the former than the CBR.

Overall, fixed ERRs are found to have a negative effect on economic growth in economies with highly rigid labour markets, and a large positive effect in economies with highly flexible labour markets, although this can be confirmed with confidence only using the CBR data.

4.3. Exchange Rate Regimes, Labour Market Institutions, and External Balances (Article 3)

Article 3 analyses how LMIs moderate the influence of ERRs on trade and current account balance (Kuokštis and Spurga 2025). Using OECD's EPL indicator, hierarchical models in Table 5 show that the interaction term between ERR and LMI is positive and highly significant regardless of specification for both trade and current account balance: fixed ERRs tend to be associated with higher trade and current account balances at higher levels of LMF.

Table 5. LMI and exchange rate regime interaction effects on external balances using EPL

	Model 1 (trade)	Model 2 (trade)	Model 3 (CAB)	Model 4 (CAB)
<i>ERR_{t-1}</i>	-5.471*** (0.934)	-4.995*** (0.814)	-4.532*** (0.833)	-4.254*** (0.753)
<i>EPL_{t-1}</i>	-2.529*** (0.925)	-3.655*** (0.842)	-3.293*** (0.853)	-3.748*** (0.768)
<i>ERR_{t-1}#EPL_{t-1}</i>	1.873*** (0.290)	1.825*** (0.263)	1.548*** (0.268)	1.664*** (0.242)
<i>LogPopulation_{t-1}</i>		0.668 (0.423)		0.382 (0.316)
<i>LogGDPpc_{t-1}</i>		3.624*** (0.622)		2.610*** (0.546)
<i>FiscalBalance_{t-1}</i>		0.0713** (0.0306)		0.107*** (0.0356)
<i>Openness_{t-1}</i>		0.698*** (0.159)		-0.0133 (0.174)
<i>GDPgrowth_{t-1}</i>		-0.130*** (0.0409)		-0.145*** (0.0468)
<i>FuelExports_{t-1}</i>		0.0743*** (0.0219)		0.0434** (0.0202)
<i>AgeDepRatio_{t-1}</i>		-0.0972** (0.0389)		-0.0856* (0.0465)
<i>IIPtoGDP_{t-1}</i>		-1.684*** (0.201)		1.096*** (0.230)
<i>_cons</i>	5.351* (2.877)	-35.87*** (10.01)	7.200*** (2.668)	-22.38*** (8.087)
<i>P</i>	0.000	0.000	0.000	0.000
<i>N</i>	1095	996	1018	946

Notes: Standard errors in parentheses. Time FE included but not shown.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Kuokštis and Spurga (2025)

The results are also checked with a broader sample using the Fraser Index. The results are very similar to the ones using the EPL index, as the positive

effect of ERR rigidity increases with higher LMF, while it is negative at low LMF.

Table 6. LMI and exchange rate regime interaction effects on external balances using Fraser

	Model 1 (trade)	Model 2 (trade)	Model 3 (CAB)	Model 4 (CAB)
<i>ERR_{t-1}</i>	-4.343*** (1.074)	-3.599*** (1.089)	-3.073*** (0.927)	-4.040*** (0.930)
<i>Fraser_{t-1}</i>	-1.687*** (0.554)	-1.516*** (0.558)	-0.874* (0.476)	-1.566*** (0.469)
<i>ERR_{t-1}#Fraser_{t-1}</i>	0.729*** (0.160)	0.657*** (0.162)	0.508*** (0.141)	0.672*** (0.139)
<i>LogPopulation_{t-1}</i>		1.055*** (0.394)		0.628*** (0.239)
<i>LogGDPpc_{t-1}</i>		4.498*** (0.476)		1.856*** (0.333)
<i>FiscalBalance_{t-1}</i>		0.271*** (0.0309)		0.374*** (0.0292)
<i>Openness_{t-1}</i>		-0.216 (0.195)		-0.558*** (0.170)
<i>GDPgrowth_{t-1}</i>		-0.0592* (0.0354)		-0.114*** (0.0350)
<i>FuelExports_{t-1}</i>		0.120*** (0.0139)		0.0843*** (0.0112)
<i>AgeDepRatio_{t-1}</i>		0.0437 (0.0602)		0.0551 (0.0490)
<i>IIPtoGDP_{t-1}</i>		-1.154*** (0.188)		-0.0732 (0.173)
<i>_cons</i>	1.843 (3.884)	-51.07*** (8.823)	2.838 (3.862)	-20.73*** (6.033)
<i>P</i>	0.000	0.000	0.000	0.000
<i>N</i>	3083	2547	3050	2567

Notes: Dependent variable is the exchange rate regime defined on a fine scale, from 1 to 13. Estimates are based on fixed effects and two-way fixed effects linear estimation. Robust standard errors, clustered at the country level, are in parentheses.

*** p<.01, ** p<.05, * p<.1

Source: Kuokštis and Spurga (2025)

In addition to hierarchical models, the article also employs Local Projections Difference-in-Differences (LP-DiD) analysis to estimate the effects of changes in ERR from flexible or intermediate regimes to the highest level of fixity. Switches to a fixed ERR under very rigid LMIs lead to a decreasing external balance; conversely, under highly flexible LMIs, switching to a fixed ERR leads to an expansion of trade and current account balances.

Overall, the study provides strong empirical evidence that ERR rigidity significantly influences external balances. However, this relationship depends on domestic institutions, particularly LMF. The findings are important in at least two ways with regard to the topic of the dissertation. First, the results contribute to the literature on the politics of ERR choice by presenting a mechanism of why countries with more LMF tend to have more rigid ERR (Kuokštis, Asali, and Spurga 2022), as this choice may reflect political and public preferences for achieving stronger external balances (McKibben and Taylor 2020). Second, the results can be suggestive of a mechanism behind stronger growth in fixed regimes that have flexible LMIs (Kuokštis, Asali, and Spurga 2025): with more responsive wages and prices, as well as a positive effect on productivity, flexible LMIs facilitate competitiveness and thus stronger export performance, contributing to faster economic growth.

4.4. The Baltic Growth Model and Labour Market Institutions (Article 4)

Article 4 analyses the GM of the Baltic States, employing the Baccaro-Pontusson framework (Baccaro and Pontusson 2016; 2020). The empirical analysis is based on three dimensions: (a) the relative importance of consumption and exports; (b) different ways of financing consumption, and (c) the presence or absence of trade-offs between consumption and exports. Based on the available data, as well as the estimates of price sensitivities of the Baltic exports, the paper contends that over the period 2010-22 the Baltic States represented a case of a balanced GM. After a strong adjustment to the crisis, the Baltic States were able to maintain robust export performance and increase exports-to-GDP ratios despite the appreciating real effective exchange rates. The exports rose together with consumption growth (with no apparent trade-off), as well as an increasing wage share on the back of strong wage gains. This, however, did not result in persistent current account deficits and increasing household debt pertinent to consumption-led economies.

Non-price competitiveness was crucial in this convergence story. Substantial labour productivity gains in tradable sectors were led by Lithuania's high-tech manufacturing and Estonia's ICT services. This enabled real wage growth across the Baltics necessary for consumption to drive GDP, although Latvia lagged behind.

Crucially, the Baltics saw a broad distribution of wage increases across both sheltered and exposed sectors – a feature of a prototypical balanced model like Sweden (see Figure 2). Contrary to the prevailing consensus in the

GM literature, the paper shows that such dynamic may emerge without strong wage coordination.

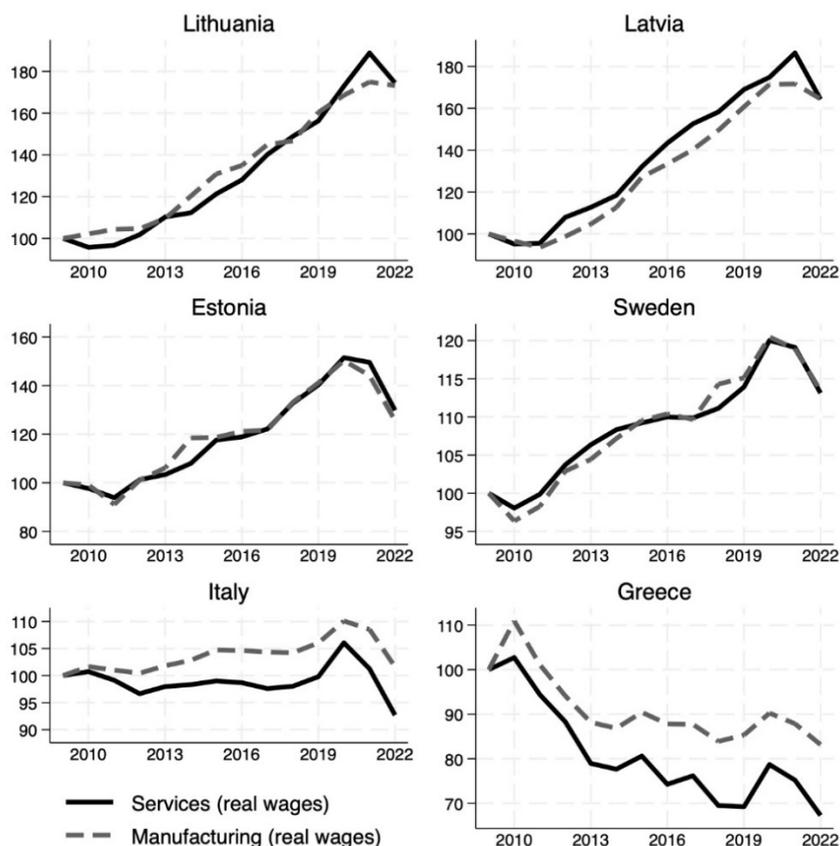


Figure 2. Real hourly labour compensation in the Baltics and selected comparators (manufacturing and services), 2010-2022

Note: “Manufacturing” includes sectors under ISIC Rev. 4 Section C. “Services” includes sectors under ISIC Rev. 4 Sections G-I: Wholesale and retail trade, Transportation and storage, Accommodation and food service activities.

Source: Spurga (2025).

The article puts forward that LMF was the key institutional domain that allowed a broad allocation of wage gains. The Baltics represent a case of high LMF due to lax enforcement of existing regulations (Eamets 2013), an extremely decentralized bargaining structure, and the labour market outcomes, such as real wage flexibility and a strong correlation between wage and productivity growth (Rusinova et al. 2015; IMF 2023b, 49).

Flexible LMIs in the Baltics allowed for wages in the non-tradable sector to follow wage growth in the more productive tradable sector, in line with the Balassa-Samuelson hypothesis (IMF 2014; Meshulam and Sanfey 2019; Wolf 2016). In the Baltic context, LMF and an education system oriented towards developing generalist skills created a uniform market for labour with a high degree of fungibility of workers (Feldmann 2013; Kuokštis 2011; 2015; Norkus 2008). Decentralized bargaining prevented the emergence of dual labour markets, where outsiders experience worse employment and wage outcomes than insiders, often protected by unions (Seo 2021). At the same time, the Baltic manufacturing sector lacks the coordinating power to prevent strong wage growth in the sheltered sectors (Kalanta 2020). Therefore, the distribution of wage gains in the Baltic context resembled outcomes in the Swedish labour market, highlighting the functional equivalence of a market-based and a coordinated system in this domain.

Within the GM literature, the post-crisis EMU macroeconomic regime is seen as promoting export-led growth (Bramucci 2023; Hein and Martschin 2021; Johnston and Matthijs 2022; Regan 2017). The Baltic case shows that its implementation may also facilitate a balanced GM. Crucially, EMU's recommendations, especially before the Covid pandemic, were aimed not only towards fiscal consolidation, but also towards increased domestic institutional flexibility. For instance, the Council recommendation on the establishment of National Productivity Boards calls for reducing rigidities in the labour markets in the absence of a flexible nominal exchange rate (Council of the European Union, 2016). The Baltics can therefore be regarded as stronger adherents to the EMU's macroeconomic regime than the Mediterranean economies, which are described in the GM literature as underperforming export-led models precisely due to aggregate demand policies supported by the EMU (Stockhammer and Novas Otero 2023).

The emergence of a balanced model in the Baltics is at odds with the findings of Article 3, which predicts external surpluses for fixed ERR with flexible LMIs. It is also at odds with the prevailing consensus in the GM literature that EMU governance framework should lead to an export-based model. The GM perspective allows evaluating these generalised findings against a country or region-specific institutional background. A crucial factor for the formation of a balanced growth path in the Baltics was an increase in non-price competitiveness, which supported wage growth that does not undermine external performance. Therefore, flexible LMIs and a fixed exchange rate can facilitate a wider variety of GM outcomes than implied by the literature.

CONCLUSIONS AND DISCUSSION

This dissertation has investigated the interaction between labour market institutions (LMIs) and exchange rate regimes (ERRs), focusing on their combined effects on economic growth, external balances, and the formation of national growth models. By integrating insights from the Optimum Currency Area (OCA) theory and the Growth Models (GM) framework, it offers both a theoretical synthesis and a set of empirical findings that advance our understanding of how institutional complementarities shape macroeconomic outcomes. Drawing on four published articles, the central argument developed is that LMIs are a crucial moderating variable in the relationship between ERRs and macroeconomic performance. While the necessity of flexible LMIs under fixed exchange rates has become a conventional policy wisdom, its in-depth quantitative investigation, as well as its integration into the GM literature have been largely absent. The findings from the four articles provide strong evidence supporting the dissertation's central hypotheses and thesis.

The first three articles collectively reaffirm the argument put forward by the OCA theory that labour market flexibility (LMF) acts as a functional substitute for exchange rate flexibility. This is the first attempt in the literature to directly test this theoretical proposition in a large-N setting. The findings indicate that fixed ERRs are not universally “good” or “bad” – their outcomes are *conditional* on LMIs.

Article 1 finds that economies with more flexible labour markets are more likely to have a higher degree of exchange rate fixity. This suggests that LMF facilitates not only economic, but also the political sustainability of hard pegs, as policy makers account for aggregate efficiency considerations in currency regime choice. The relationship holds across different ERR classifications (fine, coarse, binary) and is robust to various specifications, including instrumental variables estimation addressing potential endogeneity.

Article 2 finds novel empirical evidence that the effects of ERRs on economic growth are contingent on the flexibility of LMIs, supporting the OCA theory's view that economies with more flexible labour markets are better equipped to handle the constraints of fixed exchange rates. Using the CBR index to measure LMF, ERRs are found to have a negative effect on economic growth in economies with highly rigid labour markets, and a large positive effect in economies with highly flexible labour markets. However, no significant results are reported using the Fraser indicator for the subsample of countries-years for which Fraser data is available. The difference likely stems

from the differing geographic and time coverage of the two indices, as the CBR Index encompasses a larger sample both temporally and geographically. Moreover, the divergent results could also be driven by the differences between *de facto* and *de jure* LMF, with the Fraser index better accounting for the former than the CBR. Imputing values for the missing Fraser data using extrapolation from a linear conditional expectation model renders the results based on the Fraser data statistically and economically significant.

Article 3 investigates the interaction between ERR rigidity and LMF in shaping external balances. It finds strong empirical evidence that this relationship is contingent on the institutional environment: specifically, rigid ERRs are associated with positive trade and current account balances if LMF is high, and with external deficits if LMF is low. This supports the theoretical argument based on the competitiveness channel, where LMF facilitates the necessary internal adjustment (through wages, prices, and productivity) to maintain external competitiveness under a fixed exchange rate. The results are robust across diverse modelling approaches (hierarchical models and LP-DiD).

Finally, Article 4 shifts focus to a comparative case study of the Baltic States (Lithuania, Latvia, Estonia) to understand how high LMF interacts with membership in the euro area to shape a national growth model. The Baltic economies combine high LMF with the most rigid form of currency arrangement – membership in the single currency area. Contrary to expectations derived from comparative political economy and GM literature that might associate LMF with domestic demand-led models or the Economic and Monetary Union (EMU) regime with export-led growth, the study concludes that the Baltic States, post-Global Financial Crisis (GFC), have exhibited a balanced growth model. This model is characterized by both robust export performance (despite the appreciating real effective exchange rate) and strong consumption growth (supported by broad-based wage increases), without generating persistent current account deficits. The study argues that the highly flexible and decentralized labour markets in the Baltics played a key role by allowing wage gains to be broadly distributed across sectors, supporting domestic consumption. Therefore, LMIs are key for the evolution of growth models as they significantly affect income distribution and the structure of aggregate demand.

Article 3 demonstrates that the combination of high LMF and fixed ERRs can lead to external surpluses through the adjustment and competitiveness channels. Similarly, the GM literature views membership in the euro area (and the associated macroeconomic governance framework of the EMU) as

facilitating – or even imposing – export-led growth based on external surpluses. Article 4 is at odds with these implications. It shows that the specific way LMF operates within a country or region-specific institutional and political economy context determines the ultimate GM outcome. In the short term after the GFC, the supply-side OCA institutionalism could explain the immediate internal devaluation and the decrease in unit labour costs (ULCs) in the Baltics, facilitated by the highly flexible labour markets. Real effective exchange rates adjusted downward in part due to wage compression, leading to significant improvements in trade balances. However, the application of the GM framework shows that the interaction between the membership in the euro area and a high degree of LMF can yield a different outcome over the business cycle than implied by the OCA focus on adjustment.

Collectively, these findings underscore the crucial role of LMF as an interacting variable in analysing the macroeconomic effects of ERR rigidity. They show that macroeconomic regimes such as exchange rate systems should not be studied in isolation from LMIs. By integrating the insights from supply-side institutionalism (OCA theory) with a demand-side framework (GM theory), the dissertation conveys how the macroeconomic outcomes observed under fixed ERRs depend not solely on the presence of flexibility, but on the broader institutional configuration that channels how this flexibility interacts with wage-setting, sectoral dynamics, and ultimately, the composition of aggregate demand.

Table 7. Overview of findings in Articles 1-4

Choice	Growth	External Balances	Growth Models
LMF → ERR fixity	Fixed ERR + LMF → Growth	Fixed ERR + LMF → External surpluses	Fixed ERR + LMF + Non-price competitiveness → Balanced GM

Source: Compiled by the author.

This research makes several key contributions to the fields of international political economy and comparative political economy. First, it bridges a theoretical and empirical gap by providing the first rigorous quantitative investigation of the moderating role of LMIs in the outcomes of ERR choices. As a result, it offers an empirical validation of the OCA theory regarding the suitability of countries for fixed exchange rates, highlighting the conditioning

role of LMF. It also extends some of the euro area-specific findings on the ERR-LMI nexus to broader samples.

The dissertation therefore contributes to the ongoing debates regarding the effects of ERRs on growth (Frankel et al. 2019; Sosvilla-Rivero and Ramos-Herrera 2014; Edwards and Levy Yeyati 2005) and external balances (Friedman 1953; Ghosh et al. 2008; Chinn and Wei 2013). By extension, the results can provide additional explanations regarding the politics of ERR choices (Frieden 1991). If exchange rate fixity can deliver stronger growth and external surpluses under appropriate conditions (flexible domestic labour markets), policymakers may choose to fix the exchange rate to accommodate public support for these macroeconomic outcomes.

The findings also provide an alternative perspective on GMs: the Baltic case challenges the prevalent association of LMF with consumption-led models, or membership in the euro area with export-led growth. It shows that a balanced GM can emerge under high LMF and a fixed ERR, relying on market-driven wage diffusion and non-price competitiveness. Finally, the dissertation integrates supply-side (OCA) and demand-side (GM) perspectives, using LMIs as a key institutional variable connecting the theories of short-term external adjustment and long-term demand composition. Methodologically, it presents an innovative research design, combining a multi-method quantitative program and large-N panels with a comparative case study of the Baltic States that employs within-case quantitative testing, supplying mechanisms and scope conditions.

The dissertation also highlights important limitations in investigating the LMI-ERR nexus. LMF is a contested concept theoretically and poses measurement challenges. The *de facto* LMF can differ from *de jure* institutional flexibility, which is difficult to account for in quantitative indices. This is also relevant from the political economy perspective, as rigid LMIs (for instance, high collective bargaining centralisation) can yield flexible outcomes, particularly with regard to wage flexibility. This factor may explain why the moderating role of LMF in the ERR-growth relationship remains empirically ambiguous. Researchers should remain mindful of the context-dependency associated with operationalising LMF.

Nevertheless, the results carry important implications for both domestic and international policy. The ERR choice remains an important policy lever both for developed countries (e.g. those that have the option, or even an obligation to join the euro area) and for the emerging economies that are reforming their exchange rate frameworks (for instance, as part of the IMF adjustment programmes; IMF 2025). This dissertation shows that the choice

of the ERR should consider the degree of flexibility in the labour market. While higher labour market regulation might bring important benefits, such as higher labour income share and employment (Adams et al. 2017), the findings also highlight the importance of reforms that increase LMF and enhance the ability to adjust in countries with established pegs. In fact, retaining a fixed exchange rate may not necessarily be disadvantageous compared to a floating regime, particularly when labour markets are sufficiently flexible. As shown by the Baltic case, increases in non-price competitiveness can help currency pegs with flexible LMIs combine both strong export performance and robust domestic consumption. This introduces an important dimension to the policy debate on the macroeconomic benefits of ERR choice, highlighting the potential role of LMIs in evaluating the trade-offs involved.

In light of these contributions, the dissertation also opens several avenues for future research. Scholars may further explore conditional interest-based explanations, examining if the preferences of specific interest groups regarding ERRs are shaped by the level of LMF. Moreover, assessments of countries' readiness to join currency areas should be revisited by explicitly including measures of domestic LMF alongside other OCA criteria. Integrating LMF indicators into quantitative models predicting currency crises could potentially improve forecasting accuracy, as higher flexibility might reduce the likelihood of speculative attacks or peg abandonment.

Another important area for future research is an exploration of the specific mechanisms driving the effects of the LMF-ERR interaction. These could include ULCs and real effective exchange rates. Similarly, further research on the mechanisms behind wage growth distribution in flexible, decentralized labour markets is essential for a fuller understanding of balanced growth paths like the Baltics. Finally, research could focus on other institutional complements to ERRs, such as financial regulation or fiscal rules.

In conclusion, this dissertation provides a comprehensive and empirically grounded argument for the critical role of LMIs in the political economy of ERRs and macroeconomic outcomes. By demonstrating that *flexibility* conditions the outcomes of *rigidity*, it offers a novel perspective on how domestic institutions interact with international macroeconomic frameworks to shape national economic performance.

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SANTRAUKA (SUMMARY)

Ši disertacija parengta straipsnių pagrindu. Ją sudaro keturi straipsniai, paskelbti recenzuojamuose tarptautiniuose žurnaluose, turinčiuose poveikio faktorių Clarivate Analytics Web of Science duomenų bazėje. Pirmoje dalyje pateikiama literatūros apžvalga: apibrėžiamos darbo rinkos institucijų, darbo rinkos lankstumo sąvokos, apžvelgiami tyrimai, nagrinėjantys valiutos kursų režimų ir darbo rinkos institucijų sąveikos poveikį makroekonominiams rezultatams, įvardinamos esamos literatūros spragos ir suformuluojami tyrimo klausimai. Antra dalis – tyrimo teorinis pagrindas, kurį sudaro optimalios valiutų erdvės ir augimo modelių teorijos. Trečioje dalyje apžvelgiamas tyrimo dizainas (mišrių metodų strategija) ir taikomi metodai. Ketvirtoje dalyje apibendrinami straipsniuose paskelbti rezultatai ir pateikiamos išvados, apibrėžiamas tyrimo indėlis į teorines diskusijas bei politinės ekonomijos literatūrą, nurodomi tyrimo ribotumai ir tolesnių tyrimų kryptys. Paskutinėje dalyje pateikiamos straipsnių, sudarančių šią disertaciją, kopijos. Santraukoje į kiekvieną šių straipsnių referuojama pagal jam priskirtą numerį (žr. dalį „List of Publications“).

1. Kontekstas ir problema

Disertacija grindžiama keturiais moksliniais straipsniais, kuriuose nagrinėjama darbo rinkos institucijų (DRI) ir valiutų kursų režimų (VKR) sąveika ir jos poveikis ekonomikos augimui, išorės balansui ir nacionalinių augimo modelių formavimuisi. Darbas grindžiamas keturiais moksliniais straipsniais (Spurga 2025; Kuokštis ir Spurga 2025; Kuokštis, Asali ir Spurga 2025; 2022), kuriuose plėtojamas argumentas, jog DRI yra esminis kintamasis, formuojantis makroekonominius VKR pasirinkimų rezultatus.

Valiutos kurso režimai (VKR)

Valiutos kursas laikomas „svarbiausia kaina ekonomikoje“ (Frieden 2016) – jis svarbus išorės konkurencingumui, importo kainoms ir gamybos sąnaudoms. Mokslinėje literatūroje nėra sutariama dėl VKR poveikio daugeliui svarbių ekonominių rodiklių. Nors VKR poveikis infliacijai (Ghosh et al. 1997; Bleaney ir Francisco 2007), augimui (Dubas et al. 2005; Frankel 2012; Cruz-Rodriguez 2022) ir išorės balansams (Chinn ir Wei 2013; Martin 2016) tyrinėtas plačiai, rezultatai išlieka nevienareikšmiai. Dalis tyrimų rodo, kad lankstūs režimai padeda geriau prisitaikyti prie išorės sukrėtimų (Edwards ir Levy Yeyati 2005), kiti argumentuoja tarpinių režimų naudai (Frankel et al.

2019), o dalyje tyrimų neranda jokie sisteminio ryšio tarp VKR ir ekonomikos augimo (Ghosh et al. 1997; Terrones 2020).

Išorės (einamosios sąskaitos) balansas gali būti laikomas svarbiu ekonomikos augimo mechanizmu, nes jis atspindi realaus valiutos kurso konkurencingumą (Rodrik 2008) ir padeda išvengti krizių, kurias sukelia dideli einamosios sąskaitos deficitai (Edwards 2004). VKR dažnai laikomas esminiu veiksniumi, paaiškinančiu išorės balansus, bet ir čia esama nesutarimų: pavyzdžiui, Chinn ir Wei (2013) prieštaravo klasikinei Friedmano (1953) tezei, kad lankstūs režimai efektyviau koreguoja perteklinius einamosios sąskaitos balansus.

Darbo rinkos institucijos (DRI)

Disertacijoje daroma prielaida, kad dalį neapibrėžtumo dėl VKR poveikio gali paaiškinti literatūroje dažnai ignoruojamas DRI vaidmuo formuojant VKR pasirinkimų rezultatus.

DRI apibrėžiamos kaip įstatymai, praktikos, politikos priemonės ir normos, struktūruojančios darbo sutartis, kolektyvinį atstovavimą, darbo sąlygas bei darbo užmokesčio nustatymą (Betcherman 2012, 2). Pagrindinis dėmesys disertacijoje skiriamas šių institucijų *lankstumo* lygiui. Nelanksčios darbo rinkos pasižymi aukštomis prisitaikymo prie išorės sukrėtimų sąnaudomis, tuo tarpu darbo rinkos lankstumas leidžia atlyginimams ir užimtumui greičiau reaguoti į makroekonominis pokyčius.

DRI lankstumas apibrėžiamas per dvi esmines dimensijas – darbo užmokesčio lankstumą ir darbo jėgos mobilumą (Dorel and Daniela 2010). Darbo užmokesčio lankstumas nusako, kaip jautriai nominalus ar realus darbo užmokestis reaguoja į nedarbo lygio pokyčius (Arpaia and Pichelmann 2007; Clar et al. 2007). Darbo jėgos mobilumas apima tiek geografinę migraciją, tiek darbuotojų mobilumą skirtingų ekonomikos sektorių ar įmonių lygmenyje (Paas et al. 2003). Empiriniai tyrimai patvirtina stiprų ryšį tarp *de jure* institucijų ir jų *de facto* rezultatų darbo rinkoje: pavyzdžiui, griežta darbo vietos apsauga yra siejama su žemesniu darbo užmokesčio lankstumu ir darbo jėgos mobilumu (Clar et al. 2007; Guriev et al. 2019; Haltiwanger et al. 2014; Martin and Scarpetta 2012).

DRI lankstumas yra svarbus vienetinių darbo sąnaudų, taigi – kaininio konkurencingumo reguliavimo kanalas (Abbritti and Fahr 2013; Boltho and Carlin 2013). Lanksčios atlyginimų nustatymo sistemos leidžia efektyviau koreguoti vienetines darbo sąnaudas, mažinti realų valiutos kursą ir koreguoti išorės disbalansus (Arpaia and Pichelmann 2007; Du and Liu 2015). Be to, DRI lankstumas didina ekonomikos struktūrinį efektyvumą: lankstesnės

reguliacinės nuostatos skatina darbo jėgos perėjimą iš žemo į aukštesnio produktyvumo sektorius (Bassanini et al. 2009; Brixiova and Égert 2012; Griffith and Macartney 2014; Messina and Vallanti 2007).

Šie DRI poveikio kanalai leidžia daryti prielaidą, kad DRI yra svarbus veiksnys, sąlygojantis VKR rezultatus. Vis dėlto literatūroje trūksta sisteminio dėmesio tam, kaip VKR poveikį makroekonominiams rezultatams sąlygoja vidaus institucinė aplinka, ypač DRI. Tyrimai dažniausiai apsiriboja euro zonos kontekstu: pabrėžiama, kad makroekonominiam euro zonos tvarumui reikalingos lanksčios DRI, o jų griežtumas dalyje šalių narių lemia skausmingą prisitaikymą prie asimetrinių šokų ir vidines įtampas pinigų sąjungoje (De Grauwe 2006; 2018; De Grauwe and Ji 2016; Berger and Nitsch 2014; Hancké 2013). Didelių imčių tyrimų, kurie kiekybiškai modeliuotų DRI ir VKR sąveikos poveikį augimui ir išorės balansui, trūksta.

Nagrinėjamai problemai svarbi ir lyginamosios politinės ekonomijos literatūra, didelį dėmesį skirianti institucijų komplementarumui. Svarbi jos šaka – augimo modelių (AM) prieiga, nagrinėjanti, kaip ekonomikose mobilizuojama paklausa siekiant užtikrinti ilgalaikį ekonomikos augimą (Baccaro and Pontusson 2016; 2020; Hall 2018; Streeck 2016). Lanksčios DRI dažnai siejamos su liberaliais, vidaus paklausa grįstais augimo modeliais (Hope and Soskice 2016; Lavery 2019), o fiksuoti kursai – su koordinuotomis, eksportu grįstomis sistemomis (Baccaro and Höpner 2022; Wansleben 2024; Johnston and Regan 2016). Kiti galimi DRI ir VKR deriniai, pavyzdžiui, lanksčios darbo rinkos ir fiksuotas kursas, lieka mažai ištirti.

Šiame kontekste Baltijos šalys yra aktualus tyrimo objektas, pasižymintis tiek itin lanksčiomis darbo rinkomis (Masso et al. 2015; Staehr 2017), tiek griežčiausia fiksuoto kurso forma – naryste valiutų sąjungoje.

Atsižvelgiant į aptartas spragas mokslinėje literatūroje, disertacijoje formuluojami du pagrindiniai tyrimo klausimai:

1. *Kaip darbo rinkos institucijos sąlygoja valiutos kursų režimų pasirinkimo makroekonominis rezultatus – ekonomikos augimą ir išorės balansus?*
2. *Koks DRI vaidmuo formuojant nacionalinius augimo modelius, ypač sąveikoje su fiksuotu valiutos kursu?*

Disertacija remiasi keturiais straipsniais, kurie sistemingai atsako į šiuos klausimus, pirmiausia didelių šalių imčių panelių analizės, o vėliau – Baltijos valstybių lyginamojo atvejo studijos pagrindu.

2. Teorinis pagrindas

Disertacija grindžiama dviejų teorinių prieigų integracija: Optimalios valiutų erdvės (OVE) teorija ir augimo modelių (AM) literatūra. Šios dvi perspektyvos leidžia kartu vertinti tiek trumpalaikį prisitaikymą prie išorės sukrėtimų ir išorinį konkurencingumą, tiek ilgalaikę paklausos struktūrą ir atitinkamas ekonominio augimo trajektorijas.

Optimalios valiutų erdvės (OVE) teorija

R. Mundell (1961) suformuluota OVE teorija numato kriterijus, kuriais remiantis vertinamos fiksuoto valiutos kurso sąnaudos. OVE parodo, kad piniginio suvereniteto atsisakymo kaina priklauso nuo ekonomikos gebėjimo prisitaikyti prie asimetrinių šokų. Šiuose teoriniuose rėmuose darbo rinkos lankstumas yra kertinis veiksnys. Kadangi esant fiksuotam kursui nominalaus valiutos kurso koregavimas negalimas, vidiniai mechanizmai – lankstus darbo užmokestis ir darbo jėgos mobilumas – gali veikti kaip funkcinis laisvai svyruojančio valiutos kurso ekvivalentas (De Grauwe 2006). Lankstus darbo užmokestis leidžia koreguoti realųjį valiutos kursą per nominalaus užmokesčio pokyčius (vidinė devalvacija), taip atstatant konkurencingumą be nominalaus valiutos kurso devalvavimo (De Grauwe ir Ji 2016; Baas ir Belke 2014). Tuo tarpu darbo jėgos mobilumas leidžia darbui pereiti į efektyviau veikiančius ekonomikos sektorius. Dėl to lanksčios darbo rinkos leidžia fiksuoto kurso sąlygomis prie asimetrinių sukrėtimų prisitaikyti be ilgalaikių nedarbo ir kitų neigiamų pasekmių; priešingu atveju, kaip rodo Pietų Europos patirtis euro zonos valstybių skolų krizės metu, prisitaikymas trunka ilgai ir yra politiškai skausmingas (Hancké 2013; Walter 2016).

Remiantis šia logika, disertacijoje keliamos trys OVE hipotezės:

1. Šalys, turinčios lankstesnes darbo rinkas, dažniau pasirinks fiksuotus VKR;
2. Fiksuoti VKR teigiamai veiks ekonomikos augimą lanksčių DRI sąlygomis;
3. Kuo lankstesnė darbo rinka, tuo labiau teigiamas fiksuoto VKR poveikis išorės balansui.

Šios hipotezės atitinkamai testuojamos 1–3 straipsniuose.

Augimo modelių (AM) prieiga

AM literatūra analizuoja, kokie paklausos komponentai – grynasis eksportas, namų ūkių vartojimas, investicijos ir valdžios sektoriaus išlaidos – yra pagrindiniai ilgalaikio augimo ekonominio varikliai ir kokios institucinės

bei pajamų pasiskirstymo konfigūracijos palaiko atskirų paklausos komponentų įtaką (Baccaro and Pontusson 2016; 2020; Streeck 2016). Skirtingai nei OVE teorija, orientuota į trumpalaikį prisitaikymą prie šokų, AM prieiga leidžia tirti ilgalaikes augimo trajektorijas ir verslo ciklo plėtros fazę.

Klasikinė dichotomija skiria:

- Vidaus paklausa grindžiamus modelius (pvz., JAV, JK), kuriuose augimą lemia namų ūkių vartojimas (Reisenbichler and Wiedemann 2022);
- eksportu grįstus modelius (pvz., Vokietija), kurie remiasi užsienio paklausa. Kaininis konkurencingumas eksportu grįstuose modeliuose grindžiamas koordinuotomis DRI, lemiančiomis darbo užmokesčio augimo ribojimą (Baccaro and Höpner 2022; Johnston et al. 2014).

Literatūroje taip pat identifikuojamas subalansuotas modelis (pvz., Švedija). Subalansuotose ekonomikose augimą palaiko palaiko eksportas, tiek vartojimas: išorės sektoriaus nekaininis konkurencingumas prisideda prie vartojimo augimo, o darbo užmokesčio augimas paskirstomas tolygiai tarp eksportuojančių ir vidaus sektorių (Erixon ir Pontusson 2022; Thelen 2020).

Disertacijoje AM rėmai pasitelkiami siekiant:

- pratęsti OVE analizę nuo trumpalaikio „vidinės devalvacijos“ etapo iki viso verslo ciklo plėtros etapo;
- nustatyti, kokio pobūdžio augimo modelis susiformavo Baltijos šalyse po pasaulinės finansų krizės (PFK), atsižvelgiant į jų didelį DRI lankstumą ir narystę euro zonoje;
- ištirti, ar OVE numatoma sąveika tarp DRI ir fiksuoto kurso ilgainiui veda prie prekybos balanso pertekliaus ir eksportu grįsto modelio, ar prie kitokių galimų rezultatų.

Remiantis AM teorija, disertacijoje keliama tezė, kad DRI lankstumas ir narystė euro zonoje Baltijos šalyse leido susiformuoti subalansuotam augimo modeliui, kuriam būdinga tiek didelė eksporto sektoriaus įtaka, tiek sparčiai augantis vartojimas.

3. Tyrimo dizainas ir metodologija

Disertacijoje taikomas mišrių metodų (angl. *mixed-methods*) tyrimo dizainas, apjungiantis kiekybinę didelės imties analizę (1-3 straipsniai) su lyginamąja atvejo studija (4 straipsnis). Tokia trianguliacija leidžia, viena vertus, statistiškai patikrinti OVE hipotezes globaliose ir regioninėse imtyse,

kita vertus – giliau suprasti šios sąveikos mechanizmus, rezultatus kontekstualizuojant nagrinėjant Baltijos šalių atvejį.

1–3 straipsniai: didelių panelinių duomenų analizė

Trys pirmieji straipsniai remiasi pasauliniais arba didelius geografinius regionus dengiančiais paneliniais šalių duomenimis, apimančiais tiek išsivysčiusias, tiek besivystančias ir žemų pajamų ekonomikas. Pagrindinių duomenų operacionalizavimas:

- Valiutų kursų režimai (VKR) operacionalizuojami naudojant Ilzetzki, Reinhart ir Rogoff (2019) klasifikaciją, atskiriančią fiksuotus režimus (įskaitant pinigų sąjungas) nuo tarpinių ar laisvai svyruojančių režimų.
- Darbo rinkos institucijų (DRI) lankstumas operacionalizuojamas trianguliuojant tris skirtingus ir literatūroje dažnai naudojamus duomenų šaltinius:
 1. *Fraser Institute* Darbo rinkos reguliavimo indeksas (Gwartney et al. 2023), apimantis ir ekspertinių apklausų duomenis, todėl geriau atspindintis *de facto* situaciją. Jis naudojamas visose trijose studijose.
 2. EBPO Užimtumo apsaugos įstatymų (EPL) rodiklis (OECD 2024), matuojantis darbo vietos apsaugos griežtumą.
 3. Kembridžio verslo tyrimų centro (CBR) darbuotojų apsaugos rodikliai (Adams et al. 2017), pagrįsti darbo teisės kodavimu 117-koje šalių.

1 straipsnyje (priklausomas kintamasis – VKR pasirinkimas) naudojama fiksuotų efektų (TWFE) tiesinė regresija, taip pat ranginis probit ir probit modeliai, kai naudojamas atitinkamai 1-4 reikšmių skalės ir dichotominis priklausomas kintamasis. Papildomai taikomas instrumentinio kintamojo (IV) metodas endogeniškumo problemoms spręsti. Nepriklausomas kintamasis – DRI lankstumas.

2 straipsnyje (priklausimas kintamasis – realiojo BVP vienam gyventojui augimas) taikomi statiniai fiksuotų efektų modeliai ir dinaminiai GMM (Arellano-Bond) įverčiai, leidžiantys apskaičiuoti ilgalaikį poveikį. Nepriklausomas kintamasis – DRI lankstumo ir VKR griežtumo sąveikos kintamasis.

3 straipsnyje (priklausomi kintamieji – einamosios sąskaitos ir prekybos balansas) naudojami hierarchiniai tiesiniai modeliai (vertinantys skirtumus tarp šalių). Nepriklausomas kintamasis – DRI lankstumo ir VKR griežtumo sąveikos kintamasis. Taip pat naudojama vietinių projekcijų skirtumų

skirtumuose (LP-DiD) analizė, skirta patikrinti priežastinį VKR pakeitimo (perėjimo prie griežto režimo) poveikį išorės balansui lanksčių ir nelanksčių DRI šalyse.

Visuose modeliuose plačiai kontroliuojami standartiniai literatūroje naudojami kintamieji, tokie kaip BVP vienam gyventojui lygis, demografiniai rodikliai ir kt.

4 straipsnis: Baltijos šalių atvejo studija

Ketvirtasis straipsnis pereina nuo didelės imties panelinių duomenų prie lyginamojo Baltijos šalių (Lietuvos, Latvijos, Estijos) atvejo, taikant AM prieigą. Metodologija remiasi teoriniu lyginamuoju požiūriu, interpretuojant Baltijos šalių DRI ir VKR sąveiką AM literatūros kontekste (Baccaro and Pontusson 2016; Hall 2018; Regan 2017; Medve-Bálint and Szabó 2024). Empirinei analizei pasitelkiamas panelinių duomenų rinkinys trims Baltijos šalims, remiantis IMF WEO, AMECO, Eurostat, EBPO ir kitais šaltiniais. Atliekama trijų augimo modelio dimensijų empirinė analizė: (a) eksporto ir vartojimo indėlio į BVP augimą; (b) vartojimo finansavimo šaltinių (darbo užmokestis, kreditavimas); ir (c) eksporto jautrumo kainoms. Pastarajai dimensijai įvertinti panaudojamas tiesinės regresijos modelis, nustatant realaus eksporto apimčių augimo ryšį su realiojo efektyviojo valiutos kurso pokyčiais bei pagrindinių eksporto rinkų (ES) augimu, atskirai prekėms ir paslaugoms. Duomenys lyginami su literatūroje dažniausiai nagrinėtais augimo modeliais, visų pirma Švedija kaip tipiniu subalansuoto augimo atveju.

4. Straipsniuose publikuoti rezultatai ir išvados

Pirmasis straipsnis (Kuokštis, Asali ir Spurga 2022) patvirtina OVE teorijos implikacijas didelės imties tyrime. Rezultatai rodo, kad šalyse, kuriose darbo rinka lankstesnė, labiau tikėtinas griežtesnis (labiau fiksuotas) VKR. Pavyzdžiui, modeliuojant VKR 13 balų skalėje, DRI lankstumo indekso padidėjimas vienu balu (10 balų skalėje, kur 10 – didžiausias lankstumas) siejasi su 0,3 balo griežtesniu VKR. Šis ryšys išlieka naudojant alternatyvias VKR skales ir instrumentinio kintamojo specifikacijas. Šie rezultatai suteikia papildomų argumentų teiginiui, kad DRI lankstumas yra funkcinis laisvai svyruojančio valiutos kurso funkcinis ekvivalentas. Galima daryti prielaidą, kad politikos formuotojai atsižvelgia į DRI pobūdį nustatant VKR; ir kad fiksuotas kursas, esant lanksčioms DRI, yra ekonomiškai ir politiškai tvaresnis.

Antrasis straipsnis (Kuokštis, Asali ir Spurga 2025) iš dalies patvirtina, kad fiksuoto VKR poveikis ekonominiam augimui priklauso nuo darbo rinkų lankstumo. Naudojant CBR duomenis, nustatytas stiprus teigiamas ryšys: fiksuoti režimai neigiamai veikia augimą šalyse su nelanksčiomis darbo rinkomis, tačiau teigiamai veikia augimą ten, kur DRI yra lanksčios. Sąveikos kintamojo koeficientas rodo, kad DRI lankstumo padidėjimas sustiprina teigiamą fiksuoto kurso poveikį maždaug 0,46 procentinio punkto. Naudojant *Fraser* indeksą rezultatai priklauso nuo duomenų aprėpties: vien „švarioje“ imtyje (be papildomo trūkstamų reikšmių užpildymo panaudojant CBR indeksą) sąveika statistiškai nereikšminga, tačiau išplėtus indeksą papildomomis reikšmėmis, randamas sąveikos efektas tampa statistiškai ir ekonomiškai reikšmingas. Tokie nevienareikšmiai rezultatai potencialiai atspindi skirtingas indeksų aprėptis (CBR apima daugiau šalių ir laikotarpių) bei *de jure* ir *de facto* DRI skirtumus (*Fraser* indeksas geriau atspindi *de facto* darbo rinkos lankstumą).

Trečiajame straipsnyje (Kuokštis ir Spurga 2025) hierarchiniai modeliai (naudojant tiek EPL, tiek *Fraser* indeksus) patvirtina, kad fiksuoti kursai yra susiję su išorės pertekliumi esant dideliam DRI lankstumui, bet su deficitu esant žemam DRI lankstumui. LP-DiD analizė leidžia patikimiau konstatuoti priežastinį ryšį: perėjimas prie valiutos fiksuoto kurso esant lanksčioms DRI institucijoms didina išorės balansą, o esant nelanksčioms – mažina. Šios išvados svarbios dviem aspektais. Pirma, jos paaiškina 1 straipsnyje identifikuotą tendenciją, kad lanksčias darbo rinkas turinčios šalys renkasi fiksuotus kursus: tokia politika leidžia joms generuoti išorinius perteklius – tikslą, kuris dažnai svarbus tiek ekonominiu, tiek politiniu požiūriu (McKibben and Taylor 2020; Lane and Milesi-Ferretti 2012). Antra, jos apibūdina galimą mechanizmą, kaip fiksuotas kursas ir lanksčios darbo rinkos skatina augimą (2 straipsnis) – tokios ekonomikos yra konkurencingesnės ir turi stipresnius išorės balansus.

Ketvirtasis straipsnis (Spurga 2025) parodo, kad Baltijos šalyse po 2010 m. susiformavo subalansuotas augimo modelis. Jam būdingas reikšmingas grynojo eksporto indėlis į BVP augimą ir didėjantis eksporto ir BVP santykis; spartus realių atlyginimų augimas tiek prekių gamybos (tradicinis eksportuojantis sektorius), tiek paslaugų sektoriuose; didėjanti darbo pajamų dalis bendroje ekonomikos pajamos; stiprus vartojimo augimas. Empirinė analizė rodo, kad Baltijos šalių eksporto augimas (ypač Lietuvoje ir Estijoje) nėra jautrus kainų pokyčiams – tai rodo nekaininio konkurencingumo svarbą ir struktūrinį perėjimą į didesnės pridėtinės vertės veiklas.

Baltijos šalys neatitinka eksportu grįsto modelio, kurį prognozuotų AM literatūra dėl griežtos Ekonominės ir pinigų sąjungos (EPS) makroekonominės valdysenos, kriterijų (Stockhammer ir Novas Otero 2023). Tyrimas rodo, kad Baltijos šalyse eksportas augo kartu su namų ūkių vartojimu, o nuolatiniai einamosios sąskaitos deficitai po PFK jose nesusiformavo. Esminis veiksnys buvo tai, kad darbo užmokesčio augimas Baltijos šalyse tiriamuoju laikotarpiu buvo plačiai pasiskirstęs tarp eksportuojančio ir vidaus (paslaugų) sektorių – panašią dinamiką AM literatūra akcentuoja Švedijos augimo modeliui. Vis dėlto skirtingai nei Švedijoje, kurioje tokį darbo užmokesčio pasiskirstymą užtikrina koordinuotų kolektyvinių derybų modelis (Høgedahl et al. 2024; Thelen 2020), Baltijos šalyse panašų rezultatą lėmė itin lanksti ir decentralizuota darbo rinka. Straipsnyje argumentuojama, kad labai decentralizuota kolektyvinių derybų struktūra ir silpnas darbo santykių reguliavimo įgyvendinimas sudarė sąlygas darbo užmokesčio augimo konvergencijai tarp skirtingų sektorių. Taigi Baltijos šalių patirtis rodo, kad EPS rekomendacijų dėl makroekonominės drausmės įgyvendinimas institucinio lankstumo sąlygomis gali padėti suformuoti subalansuotą augimo modelį, jei kartu auga nekaininis konkurencingumas.

Išvados

Disertacija pateikia svarių įrodymų, kad VKR poveikis neturi būti vertinamas izoliuotai nuo DRI. Fiksuoti VKR nėra universaliai „blogi“ ar „geri“ – jų rezultatai priklauso nuo to, ar DRI gali padidinti fiksuotą kursą turinčių ekonomikų lankstumą per atlyginimus, kainas ir produktyvumą. Tokios išvados patvirtinamos didelės imties testais: randama, kad VKR poveikis yra *sąlyginis*. Esant lanksčioms DRI, fiksuotas kursas gali paskatinti augimą ir išorės balanso perteklių susiformavimą; esant griežtoms DRI, fiksuotas kursas gali neigiamai paveikti augimą ir lemti einamosios sąskaitos ir prekybos deficitą. Struktūrinės reformos, didinančios DRI lankstumą, gali būti kritiškai svarbios šalyse, turinčiose fiksuotą kursą.

Disertacija prisideda prie augimo modelių literatūros, pateikdama kontekstualizuotų išvadų apie institucijų komplementarumą. Baltijos šalių atvejis atskleidžia, kad fiksuotas kursas ir aukštas DRI lankstumas nebūtinai „užprogramuoja“ eksportu grįstą augimo modelį. Lemiamu papildomu veiksnium tampa nekaininis konkurencingumas, sudarantis sąlygas didėti darbo užmokesčiui nepakenkiant išorės (eksporto) sektoriui. Atradus nekaininio konkurencingumo šaltinių, lanksčios DRI ir fiksuotas VKR gali palaikyti

subalansuotą augimo modelį, kuriame eksportas ir namų ūkių vartojimas kartu reikšmingai prisideda prie ekonomikos augimo.

Disertacija integruoja dvi tarptautinės politinės ekonomijos ir lyginamosios politinės ekonomijos perspektyvas. Tyrimas parodė, kad DRI yra aktualus kintamasis, nagrinėjant fiksuoto valiutos kurso rezultatus tiek iš Optimalios valiutų erdvės (OVE), tiek iš augimo modelių (AM) perspektyvos: DRI lankstumas ne tik veikia kaip funkcinis valiutos kurso režimo lankstumo ekvivalentas prisitaikant prie asimetrinių šokų, bet ir formuoja ilgalaikį augimo modelį, veikdamas pajamų pasiskirstymą ir paklausos struktūrą.

Disertacija įvardija svarbius tyrimo ribotumus: DRI lankstumas yra konceptualiai ginčytinas ir empiriškai sunkiai išmatuojamas, o *de facto* lankstumas gali skirtis nuo *de jure* institucijų. Dėl to DRI tyrimai reikalauja dėmesingo operacionalizavimo ir duomenų trianguliacijos.

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His doctoral work investigates the interplay between labour market institutions and exchange rate regimes, analysing how they jointly condition economic growth, external balances, and the formation of national growth models. He has also published policy papers and other contributions on Lithuania's membership in the euro area, as well as the Economic and Monetary Union's joint debt proposals.

Alongside his academic background, Simonas possesses extensive practical experience in global economic policy and governance. He currently works at the Bank of Lithuania's International Relations Division, where he leads a team overseeing Lithuania's participation in the International Monetary Fund (IMF). Previously, he served at the IMF's Executive Board in Washington, D.C., as Advisor and later Senior Advisor to the Executive Director for the Nordic-Baltic Constituency.

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LIST OF PUBLICATIONS

This dissertation is based on the following papers published in peer-reviewed international journals that have an impact factor in Clarivate Analytics Web of Science database. Each article is referred to in the dissertation by the assigned number:

1. **Article 1.** Kuokštis, Vytautas, Muhammad Asali, Simonas Algirdas Spurga (2022). Labor market flexibility and exchange rate regimes. *European Journal of Political Economy*, Vol 75, 102205. <https://doi.org/10.1016/j.ejpoleco.2022.102205>
2. **Article 2.** Kuokštis, Vytautas, Muhammad Asali, Simonas Algirdas Spurga (2025). How labor market institutions influence the relationship between exchange rate regimes and economic growth. *PLoS One*, 20(9): e0332492. <https://doi.org/10.1371/journal.pone.0332492>
3. **Article 3.** Kuokštis, Vytautas, and Simonas Algirdas Spurga (2025). The Political Economy of Exchange Rate Regimes and External (Im)Balances: The Role of Labor Market Institutions. *Comparative Economic Studies*. Vol 67, pp. 682–722. <https://doi.org/10.1057/s41294-025-00255-3>
4. **Article 4.** Spurga, Simonas Algirdas (2025). The Baltic growth model: Balanced growth under the EMU playbook. *Competition & Change*. <https://doi.org/10.1177/10245294251333203>

COPIES OF PUBLICATIONS

Please find attached the copies of the publications constituting this dissertation.

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

Labor market flexibility and exchange rate regimes

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ABSTRACT

Based on the optimum currency area (OCA) theory, labor market flexibility can be viewed as a key condition determining whether a geographical entity is a good candidate to become part of a currency union — or adopt any type of a fixed exchange rate regime, for that matter. It is therefore surprising that there have been no attempts so far in the literature to quantitatively investigate the relationship between labor market flexibility and currency regime choices in an in-depth manner. In this context, we investigate whether economies with more flexible labor markets are more likely to have a higher degree of exchange rate fixity. We find empirical support for our hypothesis with a global time-series cross-sectional sample. The findings are robust to different classifications of the dependent variable and instrumental variable estimation.

1. Introduction

As was put by Frieden, “the exchange rate is the most important price in any economy, for it affects all other prices” (Frieden 2016, 1). It is thus unsurprising that researchers and practitioners have devoted a lot of attention to both the consequences of and reasons behind choosing different currency regimes. However, despite ample research, we still know “surprisingly little about either the causes or consequences of national choices of exchange rate regimes” (Rose 2011, 652).

The most prominent theoretical framework for analyzing exchange rate choices has been based on the optimum currency area (OCA) theory. OCA theory analyzes the costs and benefits of joining a single currency area such as the euro area, but its conclusions carry over to the discussion over fixed versus flexible currency regimes in general (Grittersová 2014, 205; Klein and Shambaugh 2012, 76). The seminal OCA authors identified wage flexibility as a critical criterion determining whether a country should join a geographic domain of a single currency or several currencies whose exchange rates are pegged. As a result, the importance of flexible labor markets has become one of the guiding principles in monetary integration (see, for instance, Goodhart 1998, 419–20). According to De Grauwe (2006), countries should have sufficient flexibility in the labor markets to adjust to asymmetric shocks once they are in a currency union because such flexibility constitutes a viable substitute for nominal currency devaluation. Therefore, one should expect that countries with more flexible labor markets should be more willing to have fixed exchange rate regimes, as labor market flexibility reduces the drawbacks of fixing.

The necessity of labor market flexibility under fixed exchange rate regimes has become part of conventional wisdom in academic and policy circles. A prominent case in point is the advice by the International Monetary Fund to the Southern euro area countries,

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especially during the sovereign debt crisis, to increase labor market flexibility. For instance, the International Monetary Fund's Program Strategy for Portugal's adjustment to the euro area crisis stated: "In the absence of exchange rate policy, the program seeks an internal devaluation through front-loaded reforms to increase labor market flexibility" (IMF 2011). Given this theoretical and policy consensus, it is surprising that there have not been any attempts in the literature so far to quantitatively investigate the relationship between labor market flexibility and exchange rate regimes. We aim to fill this niche by testing – and finding support – for the hypothesis that countries with more flexible markets will be more likely to have more rigid (fixed) currency regimes.

The next section outlines the previous literature on currency regime choices. We then turn to the theoretical considerations on why the flexibility of labor markets can be an important parameter in a currency regime choice. The exposition of our data and empirical strategy follows. Subsequently, we present the results, followed by robustness checks, including instrumental variable estimations. Finally, we discuss the implications of our findings in the conclusions.

2. Previous research on the determinants of currency regime choice

There is a relatively large amount of literature in both economics and political economy analyzing the choices of exchange rate regimes (for overviews, see Broz and Frieden 2001; Klein and Shambaugh 2012; Mauro and Juhn 2002; Steinberg and Walter 2012). Researchers have focused on structural-economic (Lin and Ye 2011; Singer 2010), interest-based (Frieden 1994, 2002; Frieden and Stein 2000; Steinberg 2015; Walter 2008, 2014; Grittersová 2019), institutional (Bernhard and Leblang 1999; M. Hall 2008; Steinberg and Malhotra 2014), and even ideational/constructivist (Helleiner 2005; McNamara 1998; Straumann 2010) explanations.

Starting with structural-economic factors, scholars have found that smaller, open economies are more likely to fix (Yeyati et al. 2010). This is because open economies can benefit more from international integration; smaller countries also tend to be more open and have less need for domestic monetary autonomy (Yeyati et al. 2010, 661). Regarding inflation, the findings have been mixed. One reason is that a higher level of inflation can theoretically have an ambiguous effect on the policy-makers' willingness to adopt rigid exchange rate regimes (Frieden et al. 2000, 22). On the one hand, higher inflation might increase the need to fix the exchange rate to stabilize prices (fixing the exchange rate leads to inflation converging to the level of the target currency). On the other hand, a higher level of inflation means that a country has a lower capacity to maintain a fixed exchange rate regime as the real exchange rate becomes overvalued. Moreover, several other important structural-economic factors determine countries' ability to stick to a fixed exchange rate regime. Most importantly, larger foreign exchange reserves (Frieden et al. 2000) and a lower current account deficit/higher surplus are more conducive to maintaining (and hence also adopting) a fixed exchange rate regime. Therefore, these factors are expected to predict a higher probability of fixing. Furthermore, financial openness has been advanced as a potential explanatory factor (Yeyati et al. 2010). Finally, Singer (2010) has argued that remittances can lead to a higher probability of fixing because remittance flows can enhance the ability to maintain fixed exchange rate regimes, especially due to their counter-cyclical nature.

Interest-based explanations start with the observation that, while it is often hard to determine the aggregate efficiency impact of a currency regime, its distributional effects might be more discernible. Frieden's (Frieden 1991) contribution is considered the foundational work for this school of thought. Building on the specific factors model applied in the political economy of international trade, Frieden contends that different sectors have divergent interests regarding two aspects of currency policy — its *regime* (the degree of flexibility) and its *level* (value of the real exchange rate). More specifically, internationally-oriented sectors, such as multinational corporations, international banks and investors, as well as exporters and importers prefer fixed exchange rate regimes as they facilitate international transactions. In contrast, inwardly-oriented sectors (such as import-competing and service industries) prefer flexible exchange rates, which allow the room to use monetary policy to tackle domestic macroeconomic problems. Regarding the level of the exchange rate regime, non-tradables' representatives (such as the services sector) who prefer stronger exchange rates due to higher purchasing power are pitted against tradables' representatives who lobby for weaker exchange rates (i.e., higher competitiveness). Subsequently, extensions of the original Frieden's model have included factors such as the degree of product standardization, balance sheet effects, and the reliance on imported inputs (Steinberg and Walter 2012, 30–33).

Other researchers have drawn attention to political institutions. Most prominently, researchers have identified the political regime type as a potentially important factor. The general finding has been that democracies are more likely to fix, although scholars have put forward different mechanisms behind this association (Cohen 2017, 664). According to Bernhard and Leblang (1999, 613), "policy-makers in democratic countries are under more pressure to implement distributive and (potentially) inflationary policies than those in authoritarian regimes" and thus "are less willing to have their hands tied when it comes to domestic monetary policy". Broz (2002) argues that autocracies are more likely to peg because dictatorships are more opaque and thus have a higher need to demonstrate policy credibility. Bearce and Hallerberg (2011, 172) connect the interest-based approach with institutional insights and argue that "democratic regimes should be associated with less de facto fixity because the median voter is likely to be a domestically oriented producer with a monetary preference for domestic policy autonomy, requiring a more flexible exchange rate regime". Researchers have also looked into the potential influence of partisanship, although theoretically, the sign of this variable is ambiguous. The usual argument goes that left-wing governments are more likely to adopt flexible exchange rates because they care less about inflation and more about employment (Steinberg and Walter 2012, 32). During the interwar years, left-wing governments were more likely to abandon the Gold Standard (Simmons 1997). At the same time, left-wing political parties might lack credibility and thus be more willing to adopt fixed exchange rates to signal their commitment to macroeconomic stability (Bodea 2010; Broz and Frieden 2001).

In general, however, empirical results based on large-N time-series cross-sectional studies have been somewhat disappointing, as there are few universally accepted factors influencing exchange rate choices (Cohen 2017; Rose 2011). According to Rose (2011, 655), "perhaps the greatest disappointment is in the empirical modeling of the *causes* of exchange rate regimes". Echoing similar sentiments, Steinberg and Walter (2012, 36) conclude: "There is not one major political variable that always has a consistently strong effect upon

exchange-rate policy, and many variables have opposite effects in different circumstances". To provide one example, "the influence of the manufacturing sector, a tradable industry that is export-oriented in some countries and import-competing in others, on exchange-rate regime choice varies across [...] studies to a shocking degree" (Steinberg and Walter 2012, 29). Furthermore, there is disagreement regarding the mechanisms driving some established correlations — as noted above, authors have put forward different explanations behind the finding that democracies are less likely to fix. In response to the dearth of established conclusions stemming from rationalist accounts in the tradition of Open Economy Politics (Lake 2009), some authors have preferred ideational/constructivist arguments over structural-economic and rational interest-based ones (McNamara 1998; Straumann 2010); instead, others have opted for conditional explanations whereby "hard" factors are influential only under specific circumstances (Steinberg 2015). It is noteworthy that one such contextual factor that has been found to be potentially significant is the level of economic development. Numerous studies find the explanatory variables pertaining to exchange rate policies to be different in the developed and developing countries' samples (see, e.g., Berdiev et al. 2012; Bernhard and Leblang 1999; Bordo 2003; Levy-Yeyati and Sturzenegger 2003; Steinberg and Walter 2012; Yeyati et al. 2010).

Given the relatively large interest in the topic as well as the lack of established results, it is surprising that, to the authors' knowledge, to date, there are no in-depth quantitative studies exploring the influence of labor market flexibility on currency regime choices. As laid out below in the theoretical part, labor market flexibility may be considered one of the most important "structural" prerequisites for the successful operation of a pegged regime. It is further worth mentioning that much attention has been paid to another potential outcome of labor market flexibility — its effect on unemployment (see, e.g., Bernal-Verdugo et al. 2012; Freeman 2005; Nickell 1997).

3. Theory

Economics has not formulated an unequivocal answer as to which exchange rate regime is better for economic performance in general. As was aptly put by Frankel, "No single currency regime is right for all countries or at all times" (Frankel 1999, 1). Instead, one should consider the costs and benefits of different exchange rate systems. The main advantage of fixed exchange regimes is their higher predictability. Eliminating the uncertainty of nominal exchange rates stabilizes the expectations of transnational economic actors, lowers transaction costs, reduces demands for import protection, and can thus increase trade, investment, and financial integration. Moreover, fixing to a low-inflation currency can help curtail domestic inflationary pressures. The peg can serve as a commitment device not to pursue excessively expansionary macroeconomic policies — in the presence of capital mobility, a fixed exchange rate requires that the domestic national interest rate equals the foreign nominal interest rate (Obstfeld and Rogoff 1995).

On the flip side, the main disadvantage of fixing is losing an important tool for managing the economy — the nominal exchange rate. Thus, a country with an overvalued real exchange rate and/or facing a high level of unemployment cannot devalue its currency (i. e., change the nominal exchange rate). Furthermore, as revealed by the "impossible trinity" or "the Trilemma" (Aizenman 2017), under conditions of perfect capital mobility, fixing the exchange rate leads to the loss of the independent monetary policy. In turn, both exchange rate and monetary policy might be beneficial when regulating the economy — either by tightening monetary conditions when the economy is "overheating" or, even more importantly, pursuing monetary easing during downturns to stimulate aggregate demand via lower interest rates and a weaker exchange rate. In the absence of such a policy lever, a country may find it challenging to address the overvaluation of the real exchange rate or provide macroeconomic accommodation.

The exact cost of fixing the exchange rate depends on a number of factors, as elaborated by the OCA theory (Grubel 1970; Horvath 2003; Mundell 1961; Kenen 1969). These factors encompass synchronicity of business cycles (and the probability of suffering asymmetric shocks), degree of fiscal and trade integration, mobility of capital and financial integration, the convergence of inflation rates, diversification of production, as well as labor mobility and wage flexibility. Adherence to these criteria helps ensure that the benefits of monetary integration¹ or fixing the exchange rate exceed the costs (De Grauwe and Ji 2016). One should note that this proposition has not been widely tested empirically. Nannestad (2020) shows that adherence to OCA conditions may not be the best predictor of economic performance in the currency area compared to governance indicators. On the other hand, Kuokstis (2015) explains the differential ability to adjust under fixed exchange rates in the Baltic countries versus the Southern euro area members by the differences in their underlying institutional structures, including labor market flexibility. We show below strong theoretical considerations in favor of labor market flexibility being an important adjustment mechanism for a country in a currency area or under a currency peg.

3.1. The importance of labor market flexibility for fixed currency regimes

De Grauwe (2006, 712) summarized the OCA conditions by three concepts: symmetry (of shocks); flexibility; and integration. According to De Grauwe, countries should have sufficient flexibility in their labor markets to adjust to asymmetric shocks once they are in a currency union. An increase in flexibility raises the sustainability of a monetary union; it thus follows that a monetary union can be made more sustainable by introducing structural reforms.

Labor market flexibility can be defined as the speed of adjustment with which the labor market responds to adverse shocks or changing macroeconomic conditions (Dorel and Daniela 2010, 159). A common interpretation of labor market flexibility relates to

¹ In this article, we treat membership in a currency union as the most credible form of a fixed exchange rate (De Grauwe 2018, 104–10).

labor market regulations and institutions. These affect the two main dimensions of flexibility: wage flexibility (nominal or real) and labor mobility. Spatial mobility (e.g., cross-country migration) is one of the original OCA criteria. Labor mobility can also be non-spatial, for instance, sectoral or occupational mobility, characterized as reallocation in the labor market across jobs and sectors.

The first of the two dimensions discussed above, wage flexibility, can be described as the speed with which real or nominal wages adjust to shocks, often measured as unemployment variations (Arpaia and Pichelmann 2007; Clar et al. 2007). The literature has identified a strong relationship between wage flexibility and labor market regulations. Clar, Dreger, and Ramos (2007) applied meta-analytical techniques to provide a quantitative summary of the available evidence regarding the influence of labor market institutions on real wage flexibility. The database of the study comprised 27 studies with 608 estimates of real wage elasticity. The study found that the higher presence of trade unions (union density), employment protection legislation, centralization of collective bargaining, and the tax wedge all negatively impacted the response of real wages to a change in unemployment. In more deregulated labor markets which also had a lower presence of trade unions, the response of real wages to unemployment was found to be particularly large. Guriev, Speciale, and Tuccio (2019) constructed a counterfactual for a regulated labor market by examining wage adjustment in Italy's regulated and unregulated labor markets during the Great Recession using data on immigrant workers. During the crisis, formal nominal wages did not adjust down in Italy while wages in the unregulated informal labor market fell so that by 2013 the gap had grown to 32%. This was consistent with the view of a substantial downward stickiness of wages in the regulated labor market.

Wage flexibility is an important adjustment mechanism for a country under a currency peg. It constitutes an alternative way to reduce relative prices, which are in turn permitted by lower wages. In particular, a reduction in domestic wages leads to terms of trade depreciation: by bringing about the required adjustment in the real effective exchange rate, it allows for the current account to arrive at an equilibrium more in line with the fundamentals (Arpaia and Pichelmann 2007). This, in turn, increases aggregate demand, output, and employment. In a currency union or under a hard peg, a country-specific adverse shock that calls for a real exchange rate depreciation, an "internal devaluation" based on wages is thus warranted (Gali and Monacelli 2016). Conversely, the presence of rigid wages hinders the adjustment and amplifies the adverse effects of crises, as a more considerable adjustment burden comes to rest on economic activity rather than wages. Persistent wage rigidity can also transform short-term shocks into unfavorable long-term outcomes, as inflationary wage pressures can result in a protracted structural loss of competitiveness.

However, the problem with "internal devaluation" is that due to the presence of nominal wage and price rigidities, it is usually considered to be longer and less efficient than currency devaluation, resulting in prolonged spells of unemployment as well as heightened political and social tensions. This can help explain the demise of the Gold Standard Regime in the interwar period — as labor markets had become more rigid in the wake of the First World War, it was no longer economically (and more importantly politically) feasible to implement "internal devaluation" to restore the equilibrium (Eichengreen 2019). The experience of Southern euro area countries during the sovereign debt crisis also showed that wage restraint may not always work as expected. Villanueva et al. (2020) carried out an ex-post evaluation of the internal devaluation policy in correcting the external deficit in Spain. The analysis concluded that wage devaluation measures over 2010–2018 led to increased profit margins and a decreased wage share rather than decreases in export prices. Therefore, much of the improvement in the Spanish current account came from the depressed output and lower imports, not from more robust exports due to increases in price-competitiveness.

Due to this, productivity-enhancing reallocation in the labor market, the second dimension of labor market flexibility, can also be very important in adjusting under a fixed exchange rate. Reallocation refers to changes in employment structure, regarding how labor is allocated between jobs and sectors (Paas et al., 2003). Like wages, the amount and speed of reallocation is also a function of the flexibility of labor market institutions and regulations. Imposing implicit or explicit costs on a company's ability to adjust its workforce to optimal levels, inflexible labor market institutions may hinder efficient workforce adjustment, reducing job separations but also discouraging job creation (Martin and Scarpetta 2012). Employing industry-level data and analyzing within-country variations, results in OECD (2010) suggest that a one-point increase in the OECD index of employment protection stringency for regular workers reduces, on average, total worker reallocation by between 5.2 and 6.7 percentage points. Building on a sample of 16 industrial and emerging economies, Haltiwanger et al. (2014) find a statistically significant role for distortionary labor market regulations in hindering the pace of job reallocation.

As shown by the Varieties of Capitalism literature, employment protection can be desirable where firms need their workers to invest in firm-specific skills (P. A. Hall and Soskice 2001). However, job reallocation can lead to a more efficient labor force allocation, driving productivity growth. In their seminal paper, Hsieh and Klenow (2009) showed that if resources (capital and labor) were allocated as efficiently in China and India as in the US (equalizing marginal products), this would boost Total Factor Productivity by 30–50% in China and 40–60% in India. McMillan and Hartgen (2014) showed that a substantive decline in the share of the labor force engaged in agriculture in Africa had been accompanied by a systematic increase in the productivity of the labor force, as it had moved from low productivity agriculture to higher productivity manufacturing and services.

Productivity-enhancing effects of non-spatial labor mobility can bring substantial benefits during downturns in particular. When a shock hits, the desired allocation of jobs among firms and sectors changes. Low-productivity and low-wage firms shed proportionally more jobs in recessions (Bertheau et al. 2020). This relates to the "cleansing hypothesis", namely that recessions are periods in which productivity-enhancing reallocation intensifies, shifting resources away from less efficient to more efficient firms at a greater pace. Marques and Dias (2018) showed that during the Global Financial Crisis, aggregate productivity gains in Portugal came from the entry and exit of firms as well as from the reallocation of resources between surviving firms. Labor market flexibility can facilitate this "creative destruction", whereby high-productivity firms can enter and grow at the expense of low-productivity ones (Caballero and Hammour 1994). As shown by Messina and Vallanti (2007), stricter employment protection makes job destruction less responsive to economic fluctuations and slows both the creation and destruction of jobs in declining sectors relative to expanding ones.

Wage flexibility is also important for reallocation. Wage flexibility can bring real wages in line with productivity developments at

the regional, sectoral and occupational levels. Therefore, flexible real wages will allow for a smoother reallocation of labor across economic activities from less to more productive jobs in the event of a shock (Arpaia and Pichelmann 2007). As discussed previously, wage flexibility is also a function of flexible labor market institutions.

The flexibility of the labor market and its effects on reallocation and productivity bears particular importance under the fixed exchange rate because it has implications for unit labor costs and can help contain real exchange rate appreciation pressures. By definition, “fixers” lack the exchange rate channel for restoring unit labor cost competitiveness and have to resort to other policy measures. The dynamics of unit labor costs depend on wages as well as factors that contribute to productivity, including reallocation in the labor market. If wage developments lead to the deterioration in cost competitiveness, they can be offset by higher productivity growth, as adjustment via the nominal exchange rate is unavailable under the currency peg. For instance, in the initial years after the formation of the euro area, the competitiveness gains of Germany were driven by a significant downward adjustment in relative wages, while those of Austria were determined by a positive differential in productivity growth (Arpaia and Pichelmann 2007).

Therefore, the greater the labor market rigidities, the greater the unemployment and output costs, assuming that monetary policy cannot be deployed as a countercyclical instrument. Conversely, the higher the flexibility of the labor market, the quicker and more effective the adjustment to the shock through wage flexibility and productivity-enhancing labor reallocation. On the back of this theoretical narrative, the costs of entering the fixed exchange rate regime should be lower in countries with flexible labor markets. We, therefore, hypothesize that economies with more flexible labor markets would be more likely to have fixed exchange rate systems.

4. Data and operationalization

We assembled a time-series cross-sectional dataset to assess the effect of labor market regulations on the flexibility of the adopted exchange rate regime. Data on the de facto exchange rate regime, and its various classifications, were obtained from Ilzetzi et al. (2017).² For each country-year cell, for the 123 included countries and the years from 1970 to 2016, the flexibility of the exchange rate regime has been defined on a fine scale from 1 to 13 and on a respective coarse scale from 1 to 4, from a pegged exchange rate to a freely floating exchange rate regime. Higher levels on these scales represent more flexible exchange rate regimes.³

The labor market flexibility data were obtained from the Fraser Institute (Gwartney et al., 2019).⁴ The labor market regulations index is part of an overall rating of economic freedom and “is designed to measure the extent to which “restraints upon economic freedom are present.”⁵ More specifically, “in order to earn high marks in the component rating regulation of the labor market, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription.”⁶ These data have been used in other avenues of research, most prominently to estimate the effect of labor market flexibility on unemployment (Agnello et al., 2014; Artha and de Haan 2011; Bernal-Verdugo et al. 2012, 2013; Feldmann 2009) but also to investigate other research questions (Edmans et al. 2014; Potrafke 2013). One advantage of this dataset is that it allows us to build a large sample, including many developing economies. Using a composite indicator has an additional advantage “given the inherently complex nature of labor market regulation and the evidence that improvements in labor market efficiency are likely to require reforms in more than one area of the labor market” (Bernal-Verdugo et al. 2012, 252).

The flexibility of labor market regulations is measured with an index that lies in the interval [0,10], 10 being the most flexible. The index is an (arithmetic) average of 6 subcomponent measures, each of them lying in the [0,10] interval. These categories are: A- Hiring regulation and minimum wage (countries where fixed-term contracts are prohibited less and where minimum wages are higher receive lower scores); B- Hiring and firing regulations (countries where regulations hinder the free hiring and firing of workers receive lower scores); C- Collective bargaining (lower score is given to countries with more centralized bargaining process); D- Mandated cost of hiring (lower scores are given to countries where employers face higher mandated costs such as maternity leave, sickness leave, healthcare, retirement, family allowances, and social security and payroll taxes); E- Mandated cost of worker dismissal (lower scores are given to countries in which employers face higher costs of dismissing workers, such as severance payments, fines, and advance notices); and F- Conscription (lowest scores are given to countries with mandatory military service, and scores are higher the more flexible is military service or the shorter its duration). The original sources come from World Bank’s Doing Business Report for “Hiring regulations and minimum wage,” “Hours regulations,” and “Mandated cost of worker dismissal”⁷; World Economic Forum’s Global Competitiveness Report surveys for “Hiring and firing regulations” and “Mandated cost of hiring,” while conscription is based on

² Actual data can be obtained from: <https://carmenreinhardt.com/exchange-rate/>. (Last accessed 21-Jan-2022.)

³ Levels 1–4 in the fine scale (no separate legal tender, preannounced peg or band narrower than 2%, and de facto peg) are mapped into 1 in the coarse scale. Levels 5–8 (preannounced crawling peg, de facto moving band narrower than 1%, preannounced crawling band narrower than 2%, de facto crawling peg, and de facto crawling band narrower than 2%) are mapped into 2. Levels 9–12 (preannounced crawling band wider than 2%, de facto crawling band narrower than 5%, moving band narrower than 2%, and de facto moving band, or managed floating) are mapped into 3; and 13 (freely floating) is mapped into 4. Categories 14 and 15, respectively 5 and 6 in the coarse scale, refer to freely falling currencies or missing dual market data, and are thus usually omitted from the analysis.

⁴ Economic Freedom of the World database, found here <https://www.fraserinstitute.org/economic-freedom/dataset>. (Last accessed 21-Jan-2022.)

⁵ <https://www.fraserinstitute.org/economic-freedom/approach> (Last accessed 21-Jan-2022.).

⁶ <https://www.fraserinstitute.org/economic-freedom/approach> (Last accessed 21-Jan-2022.).

⁷ We recognize the potential causes for concern regarding the data reliability of the Doing Business reports. This is one of the reasons why we do not rely on a sole dimension, and instead opt for a composite index. Moreover, the recent investigations regarding Doing Business data reliability were conducted over irregularities identified in the Doing Business 2018 and Doing Business 2020 reports. Our sample, however, ranges from 1970 to 2016.

multiple sources. See Annex (Table A1) for a more detailed description of the subcomponents of the index. The data on the flexibility index is available from 1970; from 1970 to 2000, it is available only once every five years (that is, for 1970, 1975, 1980, 1985, 1990, 1995, and 2000); from the year 2000 onwards, it is available annually. Furthermore, many countries have missing labor market flexibility data for earlier years. All of this means that the bulk of our data comes from the post-2000 period (the mean year in our working sample is 2008).

The review of literature provided in an earlier section suggests several control variables. Data on economic-structural factors — real GDP, real GDP per capita, current account balance, exports of goods and services, inflation, foreign reserves, and personal remittances — are taken from the World Development Indicators of the World Bank Group. Financial openness — precisely capital account openness — is measured by the Chinn-Ito index: a normalized index between 0 (full capital controls) and 1 (full liberalization).⁸ A measure of democracy is based on the Polity database of the Center for Systemic Peace.⁹ The polity index lies in the interval [−10, 10], where −10 stands for the most autocratic regime, and 10 stands for the most democratic regime. Table A2 in the Annex reports summary statistics of the main variables used in this study.

4.1. Empirical strategy and results

To single out the effect of the flexibility of labor market regulations on the exchange rate regime of the country, we estimate the following relationship:

$$ERR_{it} = \alpha \times ERR_{i,t-1} + \beta \times \text{Labor Market Regulations}_{i,t-1} + X_{it}\gamma + u_{it}$$

where the exchange rate regime (*ERR*) can be measured on a more continuous fine scale, from 1 to 13, on a discrete coarse scale of 1–4, or, as a robustness check, categorically (floating versus fixed exchange rate regime). The parameter of interest is β : a positive beta indicates a positive relationship between labor market flexibility and exchange rate flexibility since higher levels of both the dependent variable and the regulations variable indicate higher levels of flexibility. Our hypothesis implies a *negative* value of β , as we expect more flexible labor markets to be associated with less flexible exchange rate regimes. However, the inclusion of the lagged dependent variable (exchange rate regime in the previous period) renders β the direct or short-run effect of labor market flexibility on the exchange rate regime. The long-run effect would take into account the dynamics of the exchange rate regimes and can be calculated as $\beta/(1 - \alpha)$ (see Asali et al. 2017). Nevertheless, we will focus our attention on the first order, direct effect of labor market flexibility on exchange rate regimes captured by β , the coefficient of the labor market flexibility index.

The vector *X* includes a variety of key macro, political, and institutional variables mentioned in the previous section. Since a heterogeneity in the response of different countries cannot be fully captured by these general macro variables, we control for country fixed effects — this is the fixed-effects estimator — and further control for time fixed effects, which leads to the two-way fixed effects (TWFE) estimation. The panel nature of the data warrants using the fixed effects method in order not to pool incomparable countries together and thus avoid the biased results of pooling. Whereas control variables help address potential confounding, there are still potentially important unobservable time-invariant confounding factors related to individual countries' history, culture, geography (e. g., presence of a sizeable neighboring economy might increase the probability of fixing), ideational environment, etc. Country fixed effects can address such confounding. Moreover, time fixed effects help to address unit-invariant confounders. The error term is u_{it} , assumed to be white noise conditional on the included control variables.

In Table 1, we report the estimation results when the dependent variable (exchange rate regime flexibility) is measured on a fine-scale of 1–13: although discrete, the wide range of outcomes allows us to treat it as a continuous variable, and thus employ linear regression methods to estimate the relationship in question.

The relationship of interest is negative and significant, as seen in the fixed-effects results reported in column 1: an increase in the labor market flexibility is associated with a decrease in the flexibility of the exchange rate regime in the country. Substantially, for a 1 unit increase in labor market flexibility index (on a 10 point scale), exchange rate rigidity goes up by 0.4 units (on a 13 point scale). The effect is statistically significant at the 1% level. Including time fixed effects, resulting in the two-way fixed effects estimates in column 2, maintains this result: more flexible labor markets render more likely the presence of less flexible (more pegged) exchange rate regimes. In column 3, as per the estimation model, we add the lagged dependent variable (the exchange rate regime in the previous period). The effect of labor market flexibility is still negative and statistically significant at the 5%, albeit slightly reduced in magnitude. That is explained by the fact that the inclusion of the lagged dependent variable, which captures some of the dynamics of the effect over time, leaves the main coefficient representing only the direct (short-run) effect.

Estimating the effect for the subsamples of developing and developed countries, as reported in columns 4 and 5 of Table 1, gives similar substantive results. The effect is more precisely estimated for developing countries; among developed countries, the effect is statistically insignificant, but that might result from the small subsample of developed countries in our data. This also explains why, in subsequent non-linear models, estimation for developed countries turns out infeasible or highly imprecise.

⁸ Actual data can be obtained from the index web site: web.pdx.edu/~ito/Chinn-Ito_website.htm. (Last accessed 16-Feb-2021.)

⁹ Data can be obtained here: <https://www.systemicpeace.org/inscrdata.html>. (Last accessed 16-Feb-2021.)

Table 1
Exchange rate regimes and labor regulations: Fine exchange-rate regime scale (1–13).

	(1)	(2)	(3)	(4)	(5)
				Developing	Developed
Labor market flexibility (lagged)	-.400*** (.135)	-.308** (.155)	-.114** (.045)	-.108** (.048)	-.148 (.127)
Lagged dependent variable			.838*** (.026)	.810*** (.017)	.860*** (.106)
Remittances/GDP (lagged)	-.033 (.036)	-.037 (.037)	-.003 (.013)	-.005 (.012)	.156 (.195)
Log GDP	2.419 (1.557)	3.956* (2.155)	1.17** (.53)	1.13* (.626)	.221 (1.791)
Log GDP per capita	-2.954 (2.095)	-3.506 (2.314)	-1.302** (.541)	-1.158** (.581)	.749 (2.111)
Export/GDP (lagged)	-.032* (.018)	-.026 (.018)	-.005 (.004)	-.007* (.004)	-.009 (.017)
Capital account openness (Chinn-Ito)	-.877 (.65)	-.703 (.697)	-.362** (.166)	-.418** (.195)	-.679 (.679)
Total reserves (months of imports)	.034 (.054)	.034 (.058)	-.002 (.013)	-.004 (.017)	.008 (.029)
Democracy (polity score)	.038 (.03)	.037 (.03)	-.003 (.007)	-.004 (.007)	.027 (.06)
Inflation (lagged)	.016 (.017)	.014 (.017)	-.001 (.004)	.002 (.004)	.004 (.041)
Current account balance/GDP	.002 (.011)	.011 (.011)	0.0004 (.005)	-.001 (.005)	.017 (.021)
Manufacturing/GDP	.043 (.048)	-.012 (.05)	-.002 (.015)	.001 (.017)	-.059 (.036)
Observations	1647	1647	1638	1282	356
R-squared	.109	.142	.743	.707	.838
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	Yes	Yes	Yes	Yes

Notes: Dependent variable is the exchange rate regime defined on a fine scale, from 1 to 13. Estimates are based on fixed effects and two-way fixed effects linear estimation. Robust standard errors, clustered at the country level, are in parentheses.

***p < .01, **p < .05, *p < .1.

The effects of other variables are mostly in line with findings from the previous literature. Of the statistically significant coefficients, the share of exports, GDP per capita, and capital account openness¹⁰ have a negative effect, while economic size has a positive effect.

Ilzetzki et al. (2017) provide a more discrete measure of the exchange rate flexibility, to which they refer as the coarse scale, which consists of 4 categories. This scheme cannot be consistently estimated with linear regression. Hence, we employ two-way fixed effects ordered probit regression. The results of this estimation are presented in Table 2.

Estimation results using this coarse scale of the exchange rate regime support our previous finding from the fine-scale linear estimation. The effect of labor market flexibility on the flexibility of the exchange rate regime is negative and highly statistically significant at all conventional levels. More flexible labor markets' regulations are associated with higher fixity of the exchange rate regime. Consistent and efficient TWFE estimates, with lagged values of the dependent variable, are reported in column 3 for the whole sample, and in column 4 for the subsample of developing countries. Given the difficulty of interpreting ordered probit coefficients, Table 2 also provides average marginal effect calculations. For instance, looking at column 1, one can see that a 1 unit increase in labor market flexibility lowers the probability of adopting more flexible exchange rate categories (3 and 4) by 4.3 percentage points (the sum of marginal effects for categories 3 and 4). Alternatively, one could say that the probability of adopting more rigid exchange rate categories increases by 4.3 percentage points. Estimation for the subsample of developed countries was practically infeasible.

5. Robustness checks

5.1. Dichotomous exchange rate regime: pegged versus floating

We define a dichotomous variable that takes on the value 1 for floating exchange rate regimes, which are classified as 3 or 4 on the coarse scale; and 0 for fixed exchange rate regimes, which are otherwise classified as 1 and 2 on the coarse scale. Using this binary dependent variable, we estimate our relationship using probit models: fixed-effects probit and TWFE probit — for the whole sample

¹⁰ Capital account openness is a consistently significant control variable throughout the results of this study. This is consistent with the earlier research that connects OCA criteria and exchange rate regime choice. For instance, Poirson (2001) shows that capital mobility is the variable that is the most strongly and significantly correlated with exchange rate regime decisions compared to other traditional OCA criteria (e.g. inflation or production diversification).

Table 2
Exchange rate regimes and labor regulations: Coarse exchange-rate regime scale (1–4).

	(1)	(2)	(3)	(4)
				Developing
Labor market flexibility (lagged)	-.385*** (.145)	-.368* (.191)	-.414*** (.151)	-.505*** (.188)
Average Marginal Effects				
Category 3	-.039*** (.015)	-.036*** (.018)	-.017** (.007)	-.024*** (.009)
Category 4	-.004* (.003)	-.004* (.002)	-.002** (.0008)	
Lagged dependent variable			3.158*** (.313)	3.066*** (.237)
Remittances/GDP (lagged)	-.027 (.032)	-.029 (.035)	-.028 (.031)	-.031 (.032)
Log GDP	1.912 (1.649)	3.171 (2.41)	3.406** (1.603)	2.962* (1.733)
Log GDP per capita	-1.995 (2.132)	-2.254 (2.327)	-3.285** (1.614)	-2.301 (1.698)
Export/GDP (lagged)	-.022 (.017)	-.021 (.016)	-.011 (.009)	-.015 (.011)
Capital account openness (Chinn-Ito)	-.895 (.623)	-.921 (.734)	-1.009** (.497)	-1.593** (.646)
Total reserves (months of imports)	-.011 (.047)	-.008 (.05)	.005 (.034)	.003 (.047)
Democracy (polity score)	.025 (.024)	.024 (.025)	.002 (.021)	.004 (.027)
Inflation (lagged)	.018 (.015)	.019 (.017)	0 (.012)	.009 (.012)
Current account balance/GDP	.004 (.015)	.007 (.015)	-.008 (.016)	-.013 (.018)
Manufacturing/GDP	-.009 (.058)	-.056 (.06)	-.029 (.042)	-.041 (.051)
Observations	1647	1647	1638	1282
Pseudo R ²	.697	.706	.879	.866
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	No	Yes	Yes	Yes

Notes: Dependent variable is the exchange rate regime defined on a coarse scale, from 1 to 4. Estimates are based on fixed effects and two-way fixed effects ordered probit estimation. Robust standard errors, clustered at the country level, are in parentheses.

**p < .01, *p < .05, *p < .1.

and for developing countries only. Results of this estimation are reported in Table 3 (columns 3 and 4, respectively). All estimated effects are large, negative, and statistically significant at all conventional levels. Average marginal effect calculations reveal that the effects are also substantively important. Columns 1 and 2 show that, for a 1 unit increase in labor market flexibility, the probability of adopting a flexible exchange rate regime goes down by 8.5 percentage points (alternatively, the probability of adopting a fixed exchange rate increases by 8.5 percentage points).

5.2. Restricted sample: excluding eurozone countries

We test whether our results are intact when we restrict our sample to exclude countries that might be limited in their choices of exchange rate regimes. In particular, we exclude from the analysis the countries that became members of the euro area, starting from the second year of their membership (i.e., we include in the sample the initial decision to enter the euro area). The reason is that, once a country joins the euro area, one could reasonably argue that the costs of exiting become so large that such a country no longer has a real choice in terms of exchange rate policy — as revealed poignantly by Greece's woes during the euro area debt crisis. Table 4 reports the results of this exercise for the most general model (two-way-fixed-effects with lagged dependent variables) for all measures of exchange rate regimes (fine, coarse, and binary).

As apparent from Table 4, the main result stays intact: flexibility in the labor market lowers the flexibility of the exchange rate regime. This negative relationship is highly statistically significant at all conventional levels, and it holds under all measures of the exchange rate regime.

Comparing these outcomes for the sample that excludes eurozone countries with their respective counterparts (from Tables 1–3), we see that the magnitude of the effect is slightly larger in the restricted sample.

5.3. Instrumental variables estimation

Although in the TWFE estimation framework, there is less concern about the endogeneity of our main variable of interest compared to a pooled model, an instrumental variables estimation approach might lead to a more consistent estimate of the effect in question should there remain any omitted variables that are not accounted for by including the time and individual fixed effects. Moreover, it

Table 3
Exchange rate regimes and labor regulations: Pegged versus free float exchange rate.

	(1)	(2)	(3)	(4)
				Developing
Labor market flexibility (lagged)	-.341*** (.132)	-.354** (.161)	-.622** (.251)	-.673** (.276)
Average Marginal effects	-.085*** (.033)	-.085** (.038)	-.061*** (.024)	-.067*** (.026)
Lagged dependent variable			3.632*** (.357)	3.538*** (.375)
Remittances/GDP (lagged)	-.014 (.037)	-.006 (.037)	-.03 (.043)	-.03 (.041)
Log GDP	1.519 (1.214)	.847 (1.595)	2.454 (1.898)	2.936 (2.1)
Log GDP per capita	-.303 (1.674)	.135 (1.75)	-2.443 (2.164)	-1.969 (2.281)
Export/GDP (lagged)	-.011 (.011)	-.021* (.012)	.004 (.016)	.002 (.017)
Capital account openness (Chinn-It0)	-.932 (.615)	-1.346** (.648)	-2.544*** (.815)	-2.74*** (.83)
Total reserves (months of imports)	-.036 (.034)	-.033 (.037)	.001 (.051)	.008 (.056)
Democracy (polity score)	.064 (.048)	.053 (.05)	.066 (.053)	.071 (.053)
Inflation (lagged)	.016 (.018)	.027 (.018)	.003 (.019)	.005 (.02)
Current account balance/GDP	.012 (.015)	-.001 (.015)	-.012 (.018)	-.013 (.019)
Manufacturing/GDP	-.021 (.049)	-.015 (.053)	-.105* (.058)	-.081 (.061)
Observations	517	515	496	443
Pseudo R ²	.339	.369	.735	.734
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	No	Yes	Yes	Yes

Notes: Dependent variable is the exchange rate regime defined on a binary scale: pegged (fixed) or freely floating. Estimates are based on fixed effects and two-way fixed effects probit estimation. Robust standard errors, clustered at the country level, are in parentheses.

***p < .01, **p < .05, *p < .1.

might be the case that countries which adopt pegged regimes are more likely to reform their labor markets. When the euro area was created, “it was hoped that the European Monetary Union would encourage flexible markets and accelerate the pace of structural reform in the member countries by raising the costs of excessive rigidity” (Lane 2006, 60). Admittedly, empirical research generally suggests that this is not the case in reality — as argued by Eichengreen on dollarization (which can be conceptualized as a very hard form of fixing), “neither theory nor evidence suggests that removing all scope for an independent monetary policy will necessarily accelerate the pace of reform” (Eichengreen 2002, 1; Willett et al. 2010). Commenting on the European monetary integration in 2006, Lane observed that “while greater wage flexibility has been observed in some European industries in recent years, this change seems to be largely a response to increased capital mobility and the outsourcing threat rather than having much to do with the euro.” (Lane 2006, 61). Besides, it was found that “the EMU has had no effect on reform that enhances the economy’s capacity to adjust to shocks” (Alesina et al. 2008; Bednarek-Sekunda, Jong-A-Pin, and de Haan 2010, 3; Duval and Elmeskov 2006). Still, it remains a possibility. The whole idea of endogenous OCA theory is based on the fact that, once countries become members of a single currency area, they gradually start better fitting the OCA criteria — one reason being the impetus to implement labor market reforms to increase their flexibility (Frankel and Rose 1998; Willett et al. 2010).

We follow the spatial IV strategy that has become increasingly popular in the literature (Caselli and Reynaud 2020). The spatial instrument is based on the idea that countries do not choose labor market policies independently, but instead, there might be substantial competition, learning, and emulation effects (literature arguing that there are spatial effects of labor market institutions includes Kahn-Nisser 2015; Gerven and Yang, 2017; Wang 2018). We, therefore, construct an instrument for the labor flexibility variable by calculating, for each country-year cell, the average of labor market flexibility in the rest of the world in that particular year and excluding the country in question. This variable is plausibly exogenous to the individual country’s exchange rate regime equation, yet it is likely correlated with the variable of interest. Indeed, the Pearson correlation coefficient between an individual country’s labor flexibility and the instrument (average labor flexibility in the rest of the world) is found to be 0.27. Moreover, the first-stage F-statistic is 85.7, pointing to a very strong instrument. We use this variable in instrumental variables TWFE probit estimation to estimate the effect in question. Results are reported in Table 5.

The first column reiterates the previously found results (without the use of IV) from Table 3, as the benchmark. Column 2 reports the results from the IV estimation method. The coefficient of the labor market flexibility is negative (slightly larger in absolute value than the base case) and statistically significant at the 8% significance level. The results are consistent with previous findings regarding the negative effect of labor market flexibility on the flexibility of the exchange rate regime.

One concern about our IV strategy is the potential violation of the exclusion restriction. In particular, it is possible that other

Table 4
Exchange rate regime and labor regulations (excluding eurozone countries).

	(1)	(2)	(3)
	Fine scale	Coarse scale	Binary
Labor market flexibility (lagged)	-0.133** (0.059)	-0.529*** (0.171)	-0.688*** (0.256)
Lagged dependent variable	0.801*** (0.027)	2.897*** (0.261)	3.547*** (0.356)
Remittances/GDP (lagged)	-0.007 (0.013)	-0.035 (0.030)	-0.031 (0.044)
Log GDP	0.809 (0.613)	1.599 (1.615)	1.408 (1.989)
Log GDP per capita	-0.956 (0.610)	-1.813 (1.633)	-1.722 (2.212)
Export/GDP (lagged)	-0.007 (0.004)	-0.014 (0.010)	0.004 (0.016)
Capital account openness (Chinn-Ito)	-0.414** (0.182)	-1.303** (0.553)	-2.761*** (0.844)
Total reserves (months of imports)	-0.008 (0.015)	-0.013 (0.038)	-0.013 (0.052)
Democracy (polity score)	-0.004 (0.007)	-0.005 (0.024)	0.055 (0.058)
Inflation (lagged)	0.002 (0.004)	0.011 (0.010)	0.010 (0.019)
Current account balance/GDP	-0.001 (0.005)	-0.009 (0.016)	-0.012 (0.018)
Manufacturing/GDP	-0.006 (0.018)	-0.055 (0.047)	-0.122* (0.063)
Observations	1439	1439	476
Pseudo R ²	0.651	0.872	0.730
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

Notes: Dependent variable is the exchange rate regime defined on a fine scale (column 1), or a coarse scale (column 2), or dichotomous (column 3). Reported are two-way fixed effect estimation results (using linear, ordered probit, and probit methods, respectively). Robust standard errors, clustered at the country level, are in parentheses.

***p < .01, **p < .05, *p < .1.

countries' labor market flexibility (the instrument) affects a given country's exchange rate regime via a channel separate from the one running through the given country's labor market. This alternative channel can be due to spatial effects of exchange rate regimes themselves, as it has been found that countries' exchange rate choices depend on what currency regimes other countries have adopted (Simmons and Hainmueller, 2005; Song, 2018). To address this concern, we built a "contiguity control" variable, defined as the share of floating exchange rate regimes in the bordering countries. In particular, letting CX be the contiguity control, we define it as $CX_{it} = \sum_{j \neq i} \frac{Y_{jt}}{J}$, where Y_{jt} is the exchange rate regime (0 or 1) in country j , that is sharing a land border with country i . We then include this variable as a control variable in our IV estimation, so it blocks a potential alternative channel that might invalidate our instrument. This exercise is reported in column 3 of Table 5, where we see that the effect remains negative and statistically significant.

Finally, in column 4, we enhance the estimation from column 3 by using a second instrument along with the original instrument — the "contiguity IV, (CIV)" to borrow terminology from Caselli and Reynaud (2020), defined as above for the labor market flexibility measures in bordering countries: $CIV_{it} = \sum_{j \neq i} \frac{L_{jt}}{J}$. Using the two instruments, and controlling for CX , results in column 4 confirm our finding that the effect is negative and statistically significant, and lend further support to our argument that we have potentially identified a causal effect.

5.4. Individual subcomponents of the labor market regulations index

We checked whether our conclusions are not overly influenced by individual subcomponents of the labor market flexibility index. Table 6 reports the results. Taking the coarse scale measure of the exchange rate regime, we estimated our main equation, replacing the overall composite index with its subcomponents: first by including all its six subcomponents simultaneously (column 2 of Table 6), and then by including only one subcomponent at a time (columns 3–8 of Table 6).

Taken separately, the only statistically significant subcomponent was conscription, as seen in columns 2 and 8.¹¹ In particular, conscription had a negative and statistically significant effect. Thus, we further investigated whether the results were robust to the exclusion of the conscription subcomponent, and for that matter for the exclusion of any one subcomponent, and found that they are —

¹¹ In some specifications for developing countries, the "hiring-firing" subcomponent was also significant.

Table 5
Instrumental variables estimation of the exchange rate regime-labor market regulation relationship.

	(1)	(2)	(3)	(4)
	Probit	IV	IV	IV
Labor market flexibility (lagged)	-0.622** (0.295)	-0.880* (0.505)	-0.700* (0.423)	-0.866** (0.399)
Lagged dependent variable	3.632*** (0.410)	3.599*** (0.411)	3.585*** (0.434)	3.568*** (0.444)
Remittances/GDP (lagged)	-0.030 (0.053)	-0.048 (0.057)	-0.046 (0.044)	-0.047 (0.044)
Log GDP	2.454 (2.506)	1.334 (2.936)	0.673 (2.673)	-0.951 (2.596)
Log GDP per capita	-2.443 (2.842)	-1.179 (3.315)	-0.716 (3.371)	0.978 (3.177)
Export/GDP (lagged)	0.004 (0.020)	0.005 (0.020)	-0.001 (0.020)	-0.005 (0.017)
Capital account openness (Chinn-Ito)	-2.544** (1.011)	-2.676*** (0.981)	-2.827*** (1.024)	-2.970*** (1.018)
Total reserves (months of imports)	0.001 (0.058)	-0.005 (0.057)	-0.025 (0.063)	-0.014 (0.063)
Democracy (polity score)	0.066 (0.077)	0.068 (0.079)	0.071 (0.055)	0.063 (0.055)
Inflation (lagged)	0.003 (0.024)	0.007 (0.023)	-0.011 (0.026)	-0.003 (0.025)
Current account balance/GDP	-0.012 (0.022)	-0.010 (0.022)	-0.011 (0.021)	-0.036 (0.032)
Manufacturing/GDP	-0.105 (0.082)	-0.101 (0.084)	-0.120 (0.079)	-0.102 (0.080)
Observations	496	496	460	454
Pseudo R ²	0.735	0.277	0.318	0.341

Notes: Column (1) reports the baseline probit estimation (similar to Table 4, column 3). Column (2) uses the average index of labor market flexibility in other countries as an instrumental variable. Column (3) uses the same IV as column (2), but controls for the share of the floating regime in bordering countries (contiguity control). Column (4) extends the specification in column (3) by using the additional IV (average index of labor market flexibility in bordering countries, contiguity instrument).

Standard errors, clustered at the country level, are in parentheses.

***p < .01, **p < .05, *p < .1.

Table 6
Decomposing the effect of the labor market flexibility index: individual subcomponents.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Composite index	-.414*** (.151)							
<i>Included Component:</i>								
Minimum wage		.053 (.052)	-.023 (.042)					
Hiring-firing		-.116 (.104)		-.086 (.099)				
Centralized collective bargaining		.080 (.130)			.008 (.122)			
Cost of hiring		-.161 (.100)				-.106 (.096)		
Cost of worker dismissal		.08 (.094)					.008 (.09)	
Conscription		-.093* (.053)						-.092*** (.036)
Observations	1638	1477	1602	1552	1564	1624	1554	1630
Pseudo R ²	.879	.898	.881	.876	.876	.880	.896	.877

Notes: Dependent variable is the coarse scale of exchange rate regimes (1–4), hence reported estimates come from ordered probit two-way fixed effects estimations. Other included control variables are the same as in all previous tables.

Standard errors, clustered at the country level, are in parentheses. The first column reports the benchmark case for comparison (these are the results from Table 2, column 3). Column 2 uses the individual subcomponents of the labor market flexibility index, all simultaneously. Columns 3–8 uses one subcomponent of the index (listed on the left) separately.

***p < .01, **p < .05, *p < .1.

the aggregate index (excluding conscription, or excluding any one subcomponent at a time) still produced a substantively large, negative, and statistically significant effect, as shown in Table 7 below. This lends support to our earlier argument that a composite index is a more useful measure than its individual subcomponents.

Table 7
Decomposing the labor market flexibility index: joint subcomponents (excluding one subcomponent at a time).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Composite index	-0.414*** (0.151)						
<i>Excluded Component:</i>							
Minimum wage		-0.442*** (0.162)					
Hiring-firing			-0.337*** (0.127)				
Centralized collective Bargaining				-0.362*** (0.116)			
Cost of hiring					-0.329** (0.154)		
Cost of worker dismissal						-0.277*** (0.107)	
Conscription							-0.339** (0.154)
Observations	1638	1638	1638	1638	1638	1638	1638
Pseudo R ²	0.879	0.879	0.879	0.879	0.878	0.878	0.878

Notes: Dependent variable is the coarse scale of exchange rate regimes (1–4), hence reported estimates come from ordered probit two-way fixed effects estimations. Other included control variables are the same as in all previous tables. Standard errors, clustered at the country level, are in parentheses. First column reports the benchmark case for comparison (these are the results from Table 2, column 3). In columns 2–7, each time we use a sub-component index of labor market flexibility: the index calculated from 5 components only, excluding the sixth component that is listed on the left side of the table.

***p < .01, **p < .05, *p < .1.

6. Conclusions

In this article, we have conducted the first (to our knowledge) quantitative in-depth investigation on how labor market flexibility influences currency regime choices. We believe this fills a niche in the literature for several reasons. First, the question on the determinants of exchange rate policy is important, yet there is little consensus on what factors drive it. Second, there is a firm theoretical foundation on why labor market flexibility should be consequential. We, therefore, found such an investigation wanting. We have provided evidence that there is a relationship — increases in labor market flexibility tend to, on average, be associated with more rigid exchange rate regimes. Moreover, while one can never be certain about causality with observational data, we have provided several ways of addressing potential threats to causal identification.

Some important implications stem from our findings. We highlighted an important influence of one “structural-economic” factor — labor market institutions, and specifically the degree of their flexibility. Therefore, we contribute to the broader theoretical debate in the political economy literature over the role of “hard” structural and interest-based explanations (reflecting the Open Economy Politics paradigm) as opposed to the role of “soft” factors such as ideas and norms. At the same time, we should not forget that currency choices are ultimately political affairs — even if a given regime is beneficial for the country in terms of aggregate efficiency, it does not necessarily follow that policy-makers will adopt it. In this sense, our results are suggestive that policy-makers do take into account aggregate efficiency reasons — based on the assumption that labor market flexibility is an important prerequisite for the successful operation of a fixed currency regime.

There are several potential avenues for future research. First, one could turn to “conditional” interest-based explanations and explore whether the preferences of certain interest groups depend on the level of labor market flexibility. To reify this, one might expect tradables’ representatives to support fixed exchange rate regimes in countries with more flexible labor market institutions. This would contribute to the “conditional preference theory” of exchange rates (Steinberg 2015). For instance, Steinberg argues that manufacturers only support undervalued exchange rates when the state heavily controls labor and the financial system. Another example is Fernandez-Albertos’ analysis (Fernández-Albertos 2012, 26), where he contends “that fixed exchange rate regimes are preferred by the international sector only if they are adopted in economies endowed with anti-inflationary policy-making institutions (i.e., independent central banks)”. Such an approach can potentially contribute to the resolution of the lack of consistent findings in the large-N literature about the influence of interest groups on currency politics (Steinberg and Walter 2012).

Second, one could extend the insights of this article by updating currency crises models. Specifically, one could hypothesize that a higher level of labor market flexibility will be associated with a lower likelihood of a speculative attack or an actual abandonment of the currency peg. Currency crises can have significant economic and political consequences. Thus a better explanation of which countries are more likely to suffer them is not only of academic interest but also holds substantial practical value. The existing quantitative models of predicting currency crises (e.g., Burkart and Coudert 2002; Kaminsky et al. 1998) do not include indicators of

labor market flexibility; and yet there is solid case-based evidence that labor market rigidity was behind certain currency crises, such as the infamous collapse of the Argentinean currency board regime in 1994 (Gurtner, 2004).

Third, one could revisit the assessments on countries' readiness to join a single currency area (Bayoumi and Eichengreen 1997; Buigut and Valev 2005) — or adopt any type of fixed exchange rate system — by including measures of labor market flexibility alongside other variables such as the degree of trade integration, business cycle synchronicity, and country size.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: One of the authors of the paper is currently working as a Senior Advisor in the Executive Board of the IMF.

Data availability

Data will be made available on request.

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Annex 1.

Table A1 below describes the subcomponents that make up the labor market flexibility index from the Fraser Institute. The overall labor market flexibility index is the average of the sub-component indices' values. For each sub-component, the higher the sub-index value, the higher the labor market flexibility. In case of the first subcomponent on the Hiring regulations and minimum wage, a 0–100 “difficulty of hiring index” is constructed which has higher values for more regulation. However, the Economic Freedom of the World index formula inverts it so that more regulations yield lower overall index scores. Table A2 reports summary statistics of the main variables used in this study. Source and quotations in Table A1 are from Gwartney et al., (2019), 234–235.

Table A1 Detailed description of the labor market flexibility data from the Fraser Institute

Subcomponent	Description and original source
Hiring regulations and minimum wage	“This sub-component is based on the “Employing Workers” section of the World Bank’s Doing Business and uses the following components: (1) whether fixed-term contracts are prohibited for permanent tasks; (2) the maximum cumulative duration of fixed-term contracts; and (3) the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker. An economy is assigned a score of 1 if fixed-term contracts are prohibited for permanent tasks and a score of 0 if they can be used for any task. A score of 1 is assigned if the maximum cumulative duration of fixed-term contracts is less than 3 years; 0.5 if it is 3 years or more but less than 5 years; and 0 if fixed-term contracts can last 5 years or more. Finally, a score of 1 is assigned if the ratio of the minimum wage to the average value added per worker is 0.75 or more; 0.67 for a ratio of 0.50 or more but less than 0.75; 0.33 for a ratio of 0.25 or more but less than 0.50; and 0 for a ratio of less than 0.25.” Original source: World Bank, <i>Doing Business</i> .
Hiring and firing regulations	“This sub-component is based on the Global Competitiveness Report question: “The hiring and firing of workers is impeded by regulations (= 1) or flexibly determined by employers (= 7)”. The question’s wording has varied over the years.” Original source: World Economic Forum, Global Competitiveness Report.
Centralized collective bargaining	“This sub-component is based on the Global Competitiveness Report question: “Wages in your country are set by a centralized bargaining process (= 1) or up to each individual company (= 7)”. The wording of the question has varied over the years.” Original source: World Economic Forum, Global Competitiveness Report.
Hours regulations	“This sub-component is based on the “Employing Labor” section in the World Bank’s Doing Business, uses the following five components: (1) whether there are restrictions on night work; (2) whether there are restrictions on holiday work; (3) whether the length of the work week can be 5.5 days or longer; (4) whether there are restrictions on overtime work; and (5) whether the average paid annual leave is 21 working days or more. For each question, when the regulations apply, a score of 1 is given. If there are no restrictions, the economy receives a score of 0. The zero-to-10 rating is based on how many of these regulations are in place: 0 regulations results in a rating of 10; 1 regulation results in a rating of 8; and so on.” Original source: World Bank, <i>Doing Business</i> .

(continued on next page)

(continued)

Subcomponent	Description and original source
Mandated cost of worker dismissal	“This sub-component is based on the World Bank’s Doing Business data on the cost of the advance notice requirements, severance payments, and penalties due when dismissing a redundant worker with 10-years tenure. The formula used to calculate the zero-to-10 ratings was: $(V_{max} - V_i)/(V_{max} - V_{min})$ multiplied by 10. V_i represents the dismissal cost (measured in weeks of wages). The values for V_{max} and V_{min} were set at 58 weeks (1.5 standard deviations above average in 2005) and 0 weeks, respectively. Countries with values outside the V_{max} and V_{min} range received ratings of either zero or 10, accordingly.” Original source: World Bank, Doing Business.
Conscription	“Data on the use and duration of military conscription were used to construct rating intervals. Countries with longer conscription periods received lower ratings. A rating of 10 was assigned to countries without military conscription. When length of conscription was six months or less, countries were given a rating of 5. When length of conscription was more than six months but not more than 12 months, countries were rated at 3. When length of conscription was more than 12 months but not more than 18 months, countries were assigned a rating of 1. When conscription periods exceeded 18 months, countries were rated zero. If conscription was present but apparently not strictly enforced or the length of service could not be determined, the country was given a rating of 3. In cases where it is clear conscription is never used, even though it may be possible, a rating of 10 is given. If a country’s mandated national service includes clear non-military options, the country was given a rating of 5.” Original sources: “International Institute for Strategic Studies, The Military Balance; War Resisters International, World Survey of Conscription and Conscientious Objection to Military Service; additional online sources used as necessary.”

Table A2
Summary statistics of main variables

Variable		Obs	Mean	Std. Dev.	Min	Max
RR Exchange rate regime 1 (fixed) to 13 (free)	Overall	1638	6.57	3.90	1	13
	Between	123		3.57	1	13
	Within	13.32		1.44	-.83	17.24
RR Coarse EXR regime 1 (fixed) to 4 (free)	Overall	1638	1.96	.87	1	4
	Between	123		.78	1	4
	Within	13.32		.34	.19	4.63
Labor market flexibility index (lagged)	Overall	1638	6.22	1.39	2.45	9.73
	Between	123		1.31	3.11	9.13
	Within	13.32		.59	3.06	8.84
A-Minimum Wage	Overall	1602	6.39	2.66	0	10
	Between	123		2.37	.48	10
	Within	13.02		1.26	-.84	10.24
B-Hiring and firing regulations	Overall	1552	4.62	1.34	1.33	8.51
	Between	120		1.16	2.01	7.49
	Within	12.93		.66	1.90	7.78
C-Centralized collective bargaining	Overall	1564	6.39	1.43	1.83	8.85
	Between	120		1.27	2.50	8.55
	Within	13.03		.60	3.77	10.49
D-Mandated cost of hiring	Overall	1624	7.47	2.07	1.9	10
	Between	123		1.74	3.79	10
	Within	13.20		1.16	2.02	11.83
E-Mandated cost of worker dismissal	Overall	1554	6.03	3.15	0	10
	Between	123		3.04	0	10
	Within	12.63		.79	1.42	11.25
F-Conscription	Overall	1630	6.45	4.08	0	10
	Between	123		3.98	0	10
	Within	13.25		1.50	-2.96	13.01
Remittances/GDP (lagged)	Overall	1638	3.96	6.26	0	43.47
	Between	123		6.83	.01	38.11
	Within	13.32		1.69	-12.21	17.20
Log GDP	Overall	1638	25.26	1.97	20.63	30.46
	Between	123		2.02	20.72	30.33
	Within	13.32		.20	24.25	25.91
Log GDP per capita	Overall	1638	8.77	1.41	5.73	11.43
	Between	123		1.44	5.80	11.28
	Within	13.32		.15	8.03	9.29
Export/GDP (lagged)	Overall	1638	39.2	19.61	7.13	124.64
	Between	123		18.31	11.44	96.17
	Within	13.32		6.72	5.93	72.72
Capital account openness (Chinn-Ito)	Overall	1638	.64	.36	0	1
	Between	123		.35	0	1
	Within	13.32		.12	-.12	1.22

(continued on next page)

Table A2 (continued)

Variable		Obs	Mean	Std. Dev.	Min	Max
Total reserves (months of imports)	Overall	1638	4.82	4.50	.03	36.78
	Between	123		4.70	.06	33.10
	Within	13.32		1.63	-4.47	16.27
Democracy (polity score)	Overall	1638	6	5.23	-10	10
	Between	123		5.61	-10	10
	Within	13.32		1.46	-7.95	13.18
Inflation (lagged)	Overall	1638	5.43	5.93	-4.48	96.09
	Between	123		4.06	.01	27.12
	Within	13.23		4.76	-7.27	88.90
Current account balance/GDP	Overall	1638	-1.92	8.17	-65.03	45.45
	Between	123		7.62	-26.57	28.26
	Within	13.32		5.30	-54.32	23.02
Manufacturing/GDP	Overall	1638	14.45	6.61	1.53	56.65
	Between	123		6.98	1.98	46.59
	Within	13.32		1.77	.75	27.00
Developed country	Overall	1638	.22	.41	0	1
	Between	123		.38	0	1
	Within	13.32		0	.22	.22

Developed economies are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

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RESEARCH ARTICLE

How labor market institutions influence the relationship between exchange rate regimes and economic growth

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Abstract

How do exchange rate regimes affect economic growth? Although this topic has attracted considerable empirical attention, a definitive answer remains elusive. This study aims to advance our understanding by examining how labor market flexibility affects the link between exchange rate regimes and growth. Using a panel of 194 countries from 1970 to 2019, we find that in developing economies, fixed exchange rate regimes hinder growth when labor markets are highly rigid but boost growth when labor markets are highly flexible. We also demonstrate that this relationship varies depending on which labor market flexibility indicator is used, reflecting the differences in each measure's geographic and temporal coverage.

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Introduction

How do exchange rate regimes affect macroeconomic performance, and in particular long-run economic growth? This question is highly relevant in international economics, development, and international political economy. Interestingly, there seems to be a divide between policymakers and economists regarding the impact of foreign exchange policies on economic growth. While policy discourse often holds that a lower exchange rate will encourage economic growth, economists tend to be skeptical that relative currency prices are a fundamental long-run growth driver. For many economists, the exchange rate is an endogenous variable, whose contribution to growth may be difficult to disentangle [1]. Addressing the impact of exchange rate regimes on long-run growth could have profound implications for both exchange rate policy design and the international monetary system. Yet despite a vast empirical literature on this nexus, no definitive consensus has emerged. Notably, labor market institutions remain underexplored within empirical research.

The optimum currency area (OCA) theory provides a foundational lens for assessing a country's exchange rate choices and clarifying the role of labor market

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institutions, even though the theory was first designed to assess the benefits and costs of joining a currency union [2–4]. Based on OCA theory, one can predict that economies with more flexible labor markets will be better equipped to handle the constraints of a fixed exchange rate because labor market flexibility constitutes an alternative channel for adjustment. Flexible labor markets enable the real exchange rate (RER) to adjust when changes in the nominal rate are ruled out.

The standard model thus predicts that a fixed exchange rate is better for growth in countries with more flexible labor markets. Yet, despite these well-established theoretical expectations, to our knowledge, no large-N study has empirically tested them.

We address this gap by analyzing whether fixed exchange rate regimes hinder growth when labor market flexibility is low but foster it when flexibility is high. Kuokštis, Asali, and Spurga previously examined how labor market flexibility shapes exchange rate regime choices [4] and how it helps countries with fixed exchange rates recover from global recessions [5]. In this article, we focus on the dependent variable of long-run economic growth using static fixed-effects panel models and dynamic panel estimators based on the generalized method of moments (GMM).

Our results suggest that labor market flexibility plays a moderating role in the relationship between exchange rate regimes and growth, though with important caveats. The findings are statistically significant only for developing countries and depend on the flexibility measure and sample used. Using the CBR Labour Regulation Index [6], we find that fixed exchange rates hinder growth in rigid (more regulated) labor markets but increase it in economies with flexible (less regulated) labor markets. These effects are especially pronounced in the long run according to the dynamic panel analysis. In contrast, results using the Fraser Institute's Labor Market Regulation indicator [7] are not significant, likely due to its more limited coverage. However, imputing the missing Fraser data yields results consistent with those based on the CBR Index.

The next section surveys the literature on how exchange rate regimes affect economic growth. Drawing on OCA theory, we then explain why labor market flexibility can shape this relationship. We next outline our data sources and methodological choices, present the empirical results, and conclude with their academic and policy implications.

Previous literature

Which exchange rate regime is most conducive to sustained economic growth?

The prevailing view in economics is that there is no one-size-fits-all prescription [8]. Both fixed and floating exchange rates entail distinct costs and benefits [4,9]. Fixed exchange rate regimes can provide important advantages by offering greater predictability and stability, thereby fostering international economic integration. Because foreign trade and investment tend to enhance efficiency and support long-run growth, such stability can translate into higher growth under a rigid currency regime. In macroeconomically unstable settings, fixed rates can also help build credibility, anchor expectations, and reduce inflationary pressures. Maintaining a credible peg requires macroeconomic policies consistent with the fixed rate, which constrains inflationary tendencies. By binding themselves to these constraints, policymakers signal a

commitment to stability, boosting confidence in the economy, lowering inflation expectations, and improving the investment climate, all of which can promote growth.

Fixed exchange rate regimes, though praised for stability and policy discipline, can also impose substantial costs [4]. Chief among them is the loss of the nominal exchange rate as an adjustment tool: when economies face RER overvaluation or high unemployment, they cannot devalue to regain competitiveness. Under full capital mobility, the monetary policy trilemma [10] means that fixing the exchange rate also sacrifices independent monetary policy. Conventional levers—lowering interest rates in downturns or raising them to cool an overheating economy—become unavailable, curbing a country's capacity to counter cyclical fluctuations [4]. In short, the fix restricts adjustment to domestic macroeconomic needs, which is the flip side of its stability benefits.

The empirical literature remains inconclusive about the effects of exchange rate regimes on economic growth, especially over the long run. Some studies, such as Edwards and Levy Yeyati [11], find that countries with more flexible regimes grow faster, because trade shocks are amplified under rigid ones. Others [12,13] argue that intermediate exchange rate regimes are most conducive to growth, as they preserve some monetary independence without sacrificing too much exchange rate flexibility. Meanwhile, Dubas, Lee, and Mark [14] report that the highest growth rates occur under *de facto* fixers.

Many studies distinguish the effects of exchange rate regimes by a country's level of development. In developing economies, shallow financial markets, limited monetary credibility, and reliance on trade and capital inflows may favor exchange rate fixity. Evidence, however, is mixed. Husain, Mody, and Rogoff [15] find that flexibility boosts growth in advanced economies but yields no gains for developing ones, whereas Cruz-Rodríguez [16] reports higher growth in developing countries with fixed regimes. Bohl, Michaelis, and Siklos [17] conclude that fixed regimes work best for emerging markets, while crawling pegs deliver the greatest growth in the G20. By contrast, Bleaney and Francisco [18] show that hard pegs suppress growth relative to soft pegs and floats, and several studies [19–21] link greater flexibility in developing economies to faster growth and lower output volatility.

Finally, some authors report no robust relationship between exchange rate regimes and growth. Ghosh, Gulde, Ostry, and Wolf [22] find no systematic differences in growth rates or output volatility across regimes in a sample of 136 countries during 1960–1990. Terrones [23] likewise finds no stable long-run link, though he notes advantages of flexible rates during recoveries from global crises. Domac, Peters, and Yuzefovich [24] reach similar conclusions for transition economies. In Baycan [25], the average treatment effect of floating regimes on growth is statistically insignificant. Bailliu, Lafrance, and Perrault [26] add that the presence of a monetary-policy anchor, rather than the regime type itself, matters for growth.

Overall, if any consensus exists, it could be described as a "null finding": in aggregate, exchange rate regimes appear to have little effect on economic growth. A broad survey by Harms and Kretschmann [27] reinforces this ambivalence, consistent with monetary neutrality: the view that nominal variables do not shape real outcomes in the long run.

Given these considerations, it is evident that conflicting theoretical and empirical considerations of exchange rate regimes and growth nexus persist. We aim to contribute to this body of literature by empirically analyzing the moderating role of labor market flexibility in this relationship.

Theory

OCA theory remains a central tool for judging whether a country should adopt a fixed or flexible exchange rate regime. Depending on a given country's conditions, one policy may be more efficient than the other. Key factors [28–31] include the symmetry of business cycles among countries that fix their currencies, the depth of economic and fiscal integration, the degree of capital and labor mobility, and labor market flexibility. The more symmetric the cycles, the deeper the integration, and the higher the mobility and flexibility of factors of production, the stronger the case for pegging the exchange rate. A country also benefits more from a fixed regime if it faces relatively few real shocks, such as terms-of-trade shocks. Within this framework, labor market flexibility is critical [4,31,32].

Defining labor market flexibility

According to OCA theory, labor market flexibility is pivotal in determining whether a country gains or loses from adopting a fixed versus a flexible exchange rate. We define labor market flexibility broadly, as encompassing both wage flexibility and labor mobility [4]. It is the capacity of the labor market to reallocate labor and adjust wages efficiently when shocks occur. A more flexible market can therefore return to equilibrium more quickly after a disturbance [33].

Empirical research shows that labor market regulations support both wage flexibility and labor mobility, helping markets absorb shocks. Measures that proxy wage rigidity—such as employment protection legislation (EPL)—are linked to a muted wage response to unemployment changes [34]. Furthermore, research demonstrates that wage stickiness is substantially higher in formal than in informal labor markets [35].

Like wages, labor reallocation can depend on the flexibility of labor market institutions. Rigid regulations can limit firms' ability to adjust their workforces, reducing both job creation and separations [36]. Haltiwanger, Scarpetta, and Schweiger [37] find that distortionary labor rules significantly slow job reallocation across a sample of developed and emerging economies.

Because labor market institutions are known to shape labor market outcomes, we use them to define labor market flexibility.

Labor market flexibility, exchange rate regimes, and economic growth

To see why labor market flexibility matters, recall the key weakness of a peg. Fixing the nominal exchange rate eliminates both the exchange-rate tool and, under full capital mobility, independent monetary policy. If a fixing country faces loss of competitiveness or high unemployment, unless it is willing to abandon the peg, it must turn to "internal devaluation" [38,39]. Internal devaluation means the reduction of domestic real wages and salaries, which in turn can allow a lower price level and thus the depreciation of the RER. Internal devaluation can therefore substitute for nominal exchange rate (external) devaluation. The RER depreciates via lower domestic prices instead of a lower nominal exchange rate, since the RER is a function of the domestic price level, the foreign price level, and the nominal exchange rate.

Although internal devaluation can theoretically match the adjustment achieved by external devaluation, it is generally considered slower and less efficient because of nominal rigidities and price stickiness [4]. Whereas the exchange rate can depreciate (or be devalued) overnight, wages and prices may take much longer to fall to comparable levels of competitiveness. As a result, the process is often politically fraught and painful.

Nevertheless, the capacity to implement internal devaluation is not necessarily the same across countries. Specifically, it can depend on the degree of labor market flexibility. When wages adjust quickly to productivity changes, firms can cut prices sooner and remain competitive internationally. Evidence shows that higher hiring costs deepen output losses in recessions [40] and that flexible labor markets accelerate economic recoveries [41]. Wage declines also depreciate the RER, improving competitiveness and helping the current account move toward equilibrium [42]. Rigid labor market institutions may slow this process, and studies link greater flexibility to lower RER levels [43].

Furthermore, labor mobility enhances its reallocation towards more productive sectors and companies [44]. In open economies, higher productivity growth allows nominal wages to rise without increasing unit labor costs, thereby preventing upward pressure on prices. This supports a more competitive RER without requiring nominal depreciation, strengthening export performance and improving the external balance [45,46].

Overall, greater labor market flexibility should let a fixing country adjust faster and with less pain, reducing the cost of giving up monetary and nominal exchange rate policy. Such economies can thus keep the certainty and integration benefits of a fixed exchange rate while bearing lower adjustment costs, making the net effect on growth more likely to be positive.

By contrast, countries with rigid labor markets lack alternative adjustment mechanisms and are therefore likely to suffer under fixed exchange rate regimes. This logic underlies the International Monetary Fund's (IMF) and European Central Bank's (ECB) advice to countries that maintain pegs or belong to currency areas such as the euro area [47,48]. It can also explain why countries with higher labor market flexibility are more likely to *choose* more rigid exchange rate regimes [4].

The nexus between exchange rate regimes and labor market institutions in relation to macroeconomic performance remains insufficiently explored in the scholarly literature. Several studies have focused on the euro area, emphasizing how the institutional design of the Economic and Monetary Union (EMU)—a form of a hard peg—interacts with persistent national differences in labor market structures. By stripping away nominal flexibility while leaving divergent wage-setting systems intact, the euro fostered sizable North–South imbalances that built up before the Global Financial Crisis [49–51]. Extending this line of thought beyond euro area, Kuokštis and Spurga [9] show that exchange rate rigidity produces trade and current-account surpluses when labor markets are flexible but deficits when they are rigid, implying that only fixers with flexible labor markets gain competitiveness. Yet no large-N study has tested how this interaction shapes long-run economic growth; only one study examines how labor market flexibility aids post-crisis recoveries under fixed rates [5]. We therefore put forward the following hypothesis:

H1 *The effect of fixed exchange rate regimes on economic growth will be negative at low levels of labor market flexibility and positive at high levels of labor market flexibility.*

Data

We compile an annual panel dataset covering 194 countries, for the years 1970–2019, comprising of exchange rate regimes, demographic data, labor market regulations, and global economic variables, although the actual working samples are smaller due to missing values for some variables from the different sources of the assembled data. *De facto* exchange rate regime data is sourced from Ilzetzki, Reinhart, and Rogoff [52]. The flexibility of the exchange rate regime is defined on a fine scale (1–13, 1 being a currency union or no separate legal tender, and 13 denoting a freely floating regime), a coarse scale (1–4), and a dichotomous scale: fixed and floating (0–1). Growth rates were calculated from World Bank Group real GDP per capita data (World Development Indicators).

Measuring labor market flexibility

Our primary measure of labor market flexibility is based on the Center for Business Research (CBR) Labour Regulation Index data introduced by Adams et al. [6]. Our assumption is that the degree of employment regulations protecting workers—the key concept captured by CBR Labour Regulation Index—serves as a good proxy for labor market rigidity (or inversely, flexibility). For a robustness test, we use the Fraser Institute's Labor Market Regulation indicator [7]. Both Indices have been previously used in literature to measure the influence of labor market regulations on economic outcomes: see [5,53–56] for CBR, and [4,9,40,57,58] for Fraser.

While the CBR Index relies on leximetric coding to track cross-national and intertemporal variation in legal rules, the Fraser indicator draws on a broader range of sources, including surveys. We employ both Indices to better address labor market flexibility's multidimensional nature, encompassing both *de jure* regulation and *de facto* institutional diversity.

The CBR provides data on labor laws in 117 countries, for the period of 1970–2019, captured by 40 different variables reflecting a specific dimension of labor market regulation. It codes 40 legal indicators, each normalised on a 0–1 scale, where 0 denotes no or the lowest level of statutory protection and 1 denotes the highest. The indicators are averaged into five sub-indices: (A) regulation of different forms of employment; (B) working-time regulation; (C) dismissal protection; (D) employee representation; and (E) industrial action. Some indicators originate from cardinal legal quantities (e.g., maximum hours) while most begin as ordinal categories; after normalisation all appear as bounded numerical variables between 0 and 1.

To capture labor market flexibility, we invert the original CBR protection scores so that higher values correspond to lower regulatory intensity. Next, we aggregate these transformed scores within each regulatory category by summing the relevant indicators, generating five intermediate flexibility scores: $F_A = \sum_{i=1}^8 F_i$, $F_B = \sum_{i=9}^{15} F_i$, $F_C = \sum_{i=16}^{24} F_i$, $F_D = \sum_{i=25}^{31} F_i$, $F_E = \sum_{i=32}^{40} F_i$. We then use principal component analysis (PCA) on these five sub-indices to construct a composite measure of overall labor market flexibility. The resulting Index is rescaled to range from 0 to 10, where 10 denotes the most flexible (least regulated) labor market.

The composite Index is subsequently used in conjunction with exchange rate regime data to assess the effect of their interaction on economic growth. For robustness checks, we also show results based on alternative CBR-based definitions of labor market flexibility, namely CBR1, which is the predicted level from PCA on all forty individual subcomponents; and CBR2, which is the simple average of all (non-missing) forty subcomponents. We refer to our chosen composite Index explained earlier as CBR3.

The estimated correlation coefficients (and p-values) between the different definitions of CBR measures are as follows: $r_{cbr1,cbr2} = 0.956$ (< 0.001), $r_{cbr1,cbr3} = 0.962$ (< 0.001), $r_{cbr2,cbr3} = 0.997$ (< 0.001).

Fig 1 shows the level of labor market flexibility, measured with the CBR Index defined as above (CBR3), across countries and over years of the working data.

Fig 1 illustrates that both exchange rate regimes and labor market flexibility exhibit a temporal variation across a number of countries. Overall, it suggests a general trend of decreasing labor market flexibility, with some countries imposing more regulations over time.

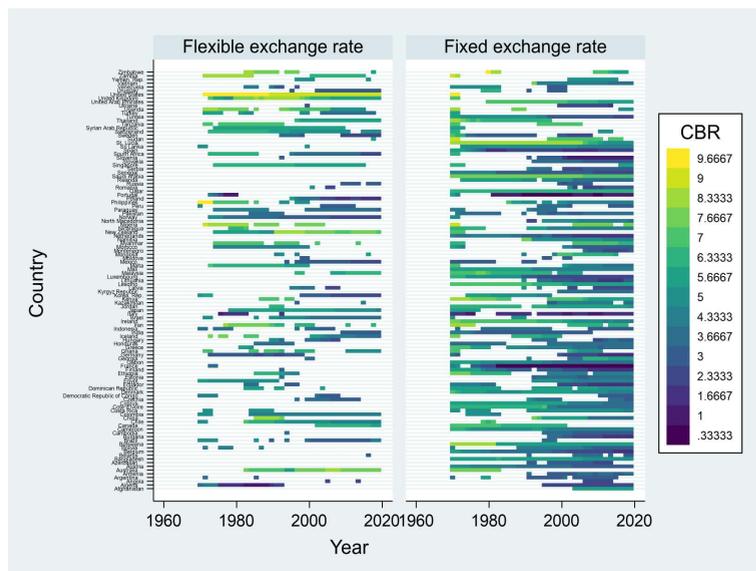


Fig 1. Labor market flexibility (CBR) by country, year, and exchange rate regime. Notes: Data for de facto exchange rate regimes from Ilizetcki, Reinhart, and Rogoff [52]. Data for labor market flexibility from Adams et al. [6].

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Table 1 shows summary statistics of the main variables for some years spanning the study period (1971, 2000, and 2019), as well as for the entire sample, by the exchange rate regime in the countries. Both the global economic growth rate and labor market flexibility have fallen, especially over the past two decades. Shifts in the demographic and economic profiles of countries with fixed versus floating rate regimes suggest that many have switched regimes during this period.

Methodology

We study the effect of the exchange rate regime on economic growth, and how it is moderated by the flexibility of the labor market. The benchmark relationship therefore is:

$$g_{it} = \alpha_i + \beta_1 FER_{it-1} + \beta_2 LMF_{i,t-1} + \beta_3 FER_{it-1} \times LMF_{i,t-1} + \gamma \ln(GDPPC_{i,t-1}) + X_{it}\delta + \phi t + \varepsilon_{it} \tag{1}$$

In the equation, g_{it} represents the growth rate of the real per-capita GDP of country i in year t . We use the exact definition of the growth rate ($g_t = \Delta GDPPC / GDPPC_{t-1}$) rather than the approximation usually used (which is $\Delta \ln GDPPC$). This choice, however, has virtually no effect on the results of this study. Fixed effects estimation allows capturing the country individual fixed effects α_i . The variable FER stands for the fixity of the exchange rate regime. Our main analysis and results pertain to using the dichotomous measure of exchange rate regimes: $FER = 0$ if the exchange rate regime is flexible, and $FER = 1$ if it is fixed. In our robustness checks, we use the fine scale [from 1 to 13] of exchange rate regimes as provided by Ilzetzki, Reinhart, and Rogoff [52].

For the purpose of this study, we reverse the definition of the exchange rate regime categories, so that level 1 stands for freely floating exchange rate, and level 13 for very hard fix (currency union or no separate legal tender). It is important

Table 1. Summary statistics of the main variables, by exchange rate regime (1971, 2000, 2019, and the entire sample).

		Flexible exchange rate				Fixed exchange rate			
		Mean	SD	Min	Max	Mean	SD	Min	Max
1971	Growth (%)	2.58	6.03	-13.31	8.64	3.99	5.01	-6.63	23.34
	Labor market flexibility	5.3	1.58	3.96	9.71	6.04	1.66	1.59	9.79
	GDP per capita (1000s)	2.82	2.53	0.78	9.63	8.93	9.78	0.14	36.11
	Population (millions)	28.49	25.69	4.69	98.77	34.39	83.65	0.3	570
	Population growth (%)	2.2	0.36	1.58	2.75	2.01	1.2	-0.42	4.65
2000	Growth (%)	3.84	3.66	-4.18	18.91	3.24	3.05	-4.36	10.19
	Labor market flexibility	5.01	1.61	2.92	9.3	4.26	1.7	0.04	8.12
	GDP per capita (1000s)	16.74	19.97	0.51	73.75	13.78	18.55	0.26	92.53
	Population (millions)	51.3	67.09	0.39	282.16	58.09	202.82	0.16	1262.65
	Population growth (%)	1.03	1.14	-1.94	3.14	1.31	1.2	-1.18	5.58
2019	Growth (%)	1.06	1.6	-1.72	4.48	2.2	2.44	-4.23	8.21
	Labor market flexibility	4.28	1.88	1.75	9.3	3.68	1.45	0.52	7.81
	GDP per capita (1000s)	30.02	25.31	1.94	87.12	16.2	20.75	0.49	107.35
	Population (millions)	114.01	275.2	0.36	1383.11	52.25	169.35	0.18	1407.74
	Population growth (%)	0.99	0.7	-0.14	2.2	1.12	1.11	-1.15	3.93
Sample	Growth (%)	2.21	4.02	-28.44	24.52	2.7	4.51	-29.92	36.56
	Labor market flexibility	5.09	1.93	0.83	10	4.38	1.76	0	9.79
	GDP per capita (1000s)	17.96	19.95	0.14	87.12	13.05	17.49	0.14	113.97
	Population (millions)	62.47	150.12	0.28	1383.11	49.39	164.75	0.12	1407.74
	Population growth (%)	1.5	1.12	-1.94	6.34	1.57	1.62	-2.26	19.36

Notes: GDP per capita is in thousands of constant 2015 US dollars.

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to emphasize that, except for population size and population growth, the independent variables of interest are included in the analysis in their lagged (t-1) form. Population size serves as a contemporaneous control variable for country size. This is standard in literature as the effects of explanatory variables on the outcome variable typically take time to materialize and are not observed immediately. We therefore assume that a change in policy in year (t-1) might affect GDP by the following year, which is captured by growth in year (t).

In a panel data setting with both cross-sectional units (countries) and time periods (years), pooled OLS model can produce biased results due to unobserved heterogeneity. Even when OLS is unbiased, it is typically inefficient, making fixed-effects or random-effects estimation appropriate depending on the correlation structure. To assess this, we conducted a Hausman specification test, which strongly rejected the random-effects model. The test yielded a Chi-squared statistic of 84.91 with a p-value approaching zero, providing robust evidence against the null hypothesis that the random-effects estimator is both consistent and more efficient than the fixed-effects alternative. Therefore, we chose the fixed-effects model.

LMF is the used measure of the labor market flexibility, as defined in the Data section of this study. The vector X includes time-variant control variables like the population size and population growth (in earlier working versions of this study, we included additional regressors like polity and the Chinn-Ito Index of capital account openness; their inclusion had virtually no effect on the study results.) Index φt captures a linear time trend, and ε_{it} is the error term, a mean-zero growth innovation.

The total effect of the exchange rate regime on the growth rate of the country is given by:

$$\frac{\partial g_t}{\partial FER_{t-1}} = \beta_1 + \beta_3 LMF_{t-1},$$

hence, it depends on the level of labor market flexibility. Of particular interest is the coefficient of the interaction term β_3 : A positive coefficient means that more flexible labor markets render the effect of fixed exchange rate regimes on economic growth more positive (or less negative).

We investigate this relationship with different specifications, and for different groups of countries (developing versus developed). We then augment the model to a dynamic panel, that allows us to study the long-run effects. In particular, we estimate the following dynamic panel model:

$$g_{it} = \alpha_i + \pi g_{it-1} + \beta_1 FER_{it-1} + \beta_2 LMF_{i,t-1} + \beta_3 FER_{it-1} \times LMF_{i,t-1} + \gamma \ln(GDPPC_{i,t-1}) + X_{it} \delta + \phi t + \varepsilon_{it} \quad (2)$$

We first estimate this model by fixed-effects regression, as a benchmark, and then use a GMM estimation method, proposed by Arellano and Bond [59], to address the potential inconsistency in the estimates due to the inclusion of the lagged dependent variable that is correlated with the unobserved individual (panel-level) effects. In this dynamic framework, while the short-run effect of the exchange rate regime is captured by $\beta_1 + \beta_3 LMF$, as before, the long-run effect is captured by:

$$\text{long-run effect of Fixed ER on growth} = \frac{\beta_1 + \beta_3 LMF}{1 - \pi}$$

This captures the steady-state effect of exchange rate fixity on economic growth at different levels of labor market flexibility. Importantly, this measure does not imply a fixed level of economic growth in the steady state—rather, it measures the effect of exchange rate fixity on any growth level in the long run.

Results

We first analyze the effect of fixed exchange rate regimes on economic growth (measured as real per-capita GDP growth), as moderated by labor market flexibility, using static panel regression analysis. We then investigate these effects in the long run using a dynamic panel regression framework.

Growth regressions: static panel analysis

Table 2 reports the estimation results for the effect of fixed exchange rate regimes on growth in the static model, using three variants of the CBR measure of labor market flexibility. CBR1 represents the CBR Index constructed from PCA of the forty individual subcomponents of the Index; CBR2 represents the simple mean of the forty subcomponents; and CBR3, the benchmark specification, is constructed from PCA of the five dimensions of the Index's subcomponents.

Column 1 of Table 2 reports the estimation results for the simplest unconstrained sample with an unconditional specification, where we use fixed-effects regression to estimate the effect of lagged fixed exchange rate regimes on economic growth, without taking into account labor market flexibility. The results indicate a positive coefficient of 0.83 and statistically significant effect of fixed exchange rate regimes on economic growth. The magnitude of this effect diminishes when we restrict the sample to observations with non-missing values for labor market flexibility (Column 2).

When incorporating labor market flexibility, as measured by CBR1, CBR2, and CBR3 in Columns 3, 4, and 5, respectively, we find a large and highly statistically significant interaction effect between labor market flexibility and exchange rate fixity on economic growth. The estimation results across all variations of the CBR Index hover around a partial effect of 0.39–0.46.

The main finding of this study, as evidenced by Table 2, is that the effect of fixed exchange rate on economic growth is conditional on labor market flexibility. Specifically, an increase in labor market flexibility amplifies the effect of exchange rate fixity on economic growth by a statistically significant 0.457 percentage points (Column 5). Notably, even the direction of the effect of exchange rate fixity depends on labor market flexibility: the effect is –1.606 percentage points in economies with very rigid labor markets (LMF = 0), compared to a substantial positive effect of 2.97 (= –1.606 + 0.457 × 10) percentage points in economies with highly flexible labor markets (LMF = 10). The corresponding total effects for highly flexible labor markets under CBR1 and CBR2 specifications are 2.61 and 2.94, respectively.

Table 2. The effect of exchange rate regimes on economic growth taking into account labor market flexibility.

	(1)	(2)	(3)	(4)	(5)
	Full	Restricted	CBR1	CBR2	CBR3
Fixed exchange rate (FER_{t-1})	0.829*** (0.260)	0.547** (0.276)	-1.321** (0.606)	-1.683** (0.746)	-1.606** (0.699)
Labor market flexibility (LMF_{t-1})			-0.054 (0.158)	-0.118 (0.175)	-0.125 (0.169)
$FER_{t-1} \times LMF_{t-1}$			0.393*** (0.133)	0.462*** (0.156)	0.457*** (0.151)
Log population	-1.582* (0.843)	-1.681 (1.016)	-2.023** (1.000)	-1.942* (0.994)	-1.910* (0.988)
Population growth	-0.483*** (0.135)	-0.729*** (0.144)	-0.734*** (0.146)	-0.734*** (0.145)	-0.735*** (0.146)
Log GDP per capita (lag)	-3.081*** (0.588)	-3.065*** (0.625)	-3.186*** (0.586)	-3.165*** (0.591)	-3.160*** (0.591)
Time trend	Yes	Yes	Yes	Yes	Yes
Observations	7962	4066	4066	4066	4066
R ² within	0.036	0.054	0.059	0.060	0.060

Notes: The dependent variable is the annual growth rate of real GDP per capita. CBR1 refers to the CBR Index of labor market flexibility (normalized to a 0–10 scale, with 10 denoting the most flexible labor market) constructed using PCA of the 40 subcomponents of the CBR Index; CBR2 is based on the simple average of these 40 subcomponents, while CBR3 is derived from PCA of the five main sub-indices of the CBR Index. Robust standard errors, clustered at the country level, are reported in parentheses.

*** p < .01, ** p < .05, * p < .1

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Table 3 reports the total effect of fixed exchange rates on growth, based on the Table 2 results, estimated at three labor market flexibility levels: 0 (rigid), 5 (medium), and 10 (highly flexible). Without accounting for labor market flexibility, fixed exchange rates are expected to have a positive effect on economic growth, as shown in Column 1 of Table 3. Columns 2–4, which employ different variants of the CBR Index, demonstrate that the effect of fixed exchange rate regimes on economic growth is conditional on the degree of labor market flexibility: fixed exchange rates have a negative effect on economic growth in economies with very rigid labor markets, and a large, positive effect on growth in economies with highly flexible labor markets.

Fig 2 shows these findings across all labor market flexibility levels, from 0 to 10, using the CBR3 Index, with 95% confidence intervals. The upward-sloping line demonstrates that the effect of fixed exchange rate regimes on economic growth increases with labor market flexibility.

Long-run effects of fixed exchange rate regimes: dynamic panel analysis

Table 4 reports the results analogous to those of the static model but employs a dynamic panel setting. This is achieved by incorporating the lagged dependent variable.

Column 1 reports the effect of fixed exchange rate regimes on growth without accounting for labor market flexibility. This effect is positive but statistically insignificant, although the endogeneity of the lagged dependent variable renders these estimates inconsistent. Column 2 accounts for labor market flexibility, and the results indicate a positive interaction effect between labor market flexibility and fixed exchange rate regimes on economic growth. Given the endogeneity of the lagged dependent variable, we employ a more consistent GMM estimator following Arellano and Bond [59] in Column 3. The estimation results from the dynamic panel models in Table 4 confirm our earlier findings, as the effect of exchange rate fixity on growth depends on labor market flexibility. This effect is positive, statistically significant, and persistent. In the long-run, exchange rate fixity promotes growth in economies with flexible labor markets but hinders growth in economies with highly regulated labor markets.

Table 5 reports total short-run and the total long-run effects of exchange rate fixity on growth across different labor market flexibility levels, based on the Table 4 estimation results.

At the lowest labor market flexibility levels, the effects of exchange rate fixity on growth are negative both in the short-run and in the long-run. At the highest labor market flexibility levels, the effect of fixed exchange rate on growth is positive and highly statistically significant; this effect is larger in the long run than in the short run.

Developing and developed countries

We split our sample by development status (developing versus developed countries) and re-examine our findings using both the static and the dynamic model specifications. The results are summarized in Table 6.

Table 3. Total effect of fixed exchange rate regimes on economic growth at different levels of labor market flexibility.

	Restricted 0.547** (0.276)	CBR1	CBR2	CBR3
At Labor market flexibility = 0		-1.321** (0.606)	-1.683** (0.746)	-1.606** (0.699)
At Labor market flexibility = 5		0.646** (0.262)	0.627** (0.256)	0.681*** (0.262)
At Labor market flexibility = 10		2.614*** (0.812)	2.937*** (0.893)	2.968*** (0.891)

Notes: Column heads refer to the respective specifications in Table 2. Robust standard errors, clustered at the country level and calculated using the delta method, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

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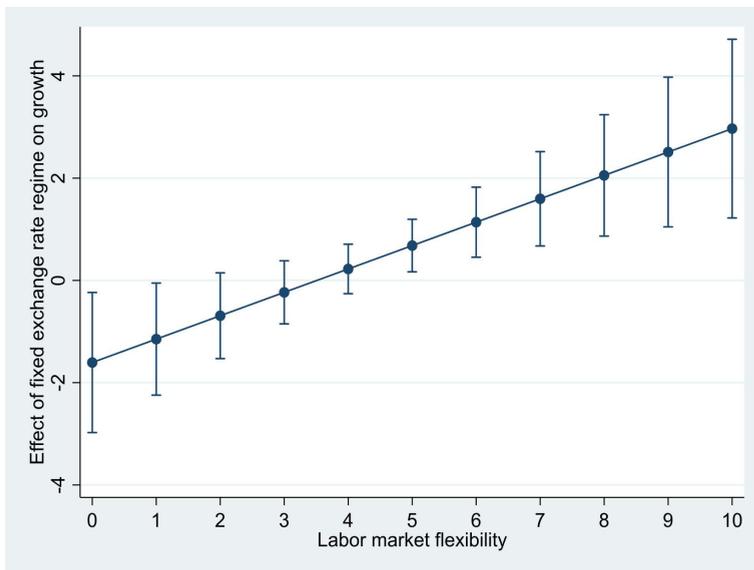


Fig 2. Average marginal effects of fixed exchange rate regimes on growth (with 95% CIs). Notes: Based on Column 5 of Table 2.

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Fixed exchange rate regimes have a highly statistically and economically significant effect on economic growth in developing countries only. This effect is negative under very rigid labor markets and positive under highly flexible labor markets. For developed countries, neither the short-run nor the long-run effects are significant.

The long-run effects, whether negative or positive, are more pronounced than the short-run effects. In developing economies with rigid labor markets, the short-run effect of fixed exchange rate regimes on economic growth is -2.314 (-3.982 from the dynamic estimation), compared to -4.624 in the long-run. At the highest labor market flexibility levels (LMF = 10), however, the effect in the short-run is a highly statistically significant $+3.906$ (SE 1.100), compared to $+6.617$ in the long-run.

Robustness checks

We now examine the robustness of the results to different measures of exchange rate fixity, conducting this analysis using both static and dynamic models. We also compare the findings with results using a different measure of labor market flexibility: the Fraser Institute's Labor Market Regulation indicator.

Continuous measure of exchange rate fixity

First, we analyze the effects of exchange rate regimes on growth using a continuous scale rather than a dichotomous fixed-float measure. Specifically, we employ the variable "fixity of exchange rate," which takes on values from 1 (free floating exchange rate) to 13 (no separate legal tender or currency union), replacing the dichotomous variable employed previously. Table 7 reports the results for both the static and the dynamic model specifications.

Table 4. Dynamic panel analysis of fixed exchange rates and economic growth taking into account labor market flexibility.

	(1)	(2)	(3)
	Unconditional	FE	IV-FE
Fixed exchange rate (FER_{t-1})	0.292 (0.226)	-1.291** (0.549)	-2.853** (1.301)
Labor market flexibility (LMF_{t-1})		-0.107 (0.131)	-1.031*** (0.357)
$FER_{t-1} \times LMF_{t-1}$		0.337*** (0.114)	0.729*** (0.255)
Lagged growth rate	0.273*** (0.032)	0.269*** (0.032)	0.139*** (0.030)
Log population	-1.744** (0.769)	-1.911** (0.751)	-6.484*** (1.998)
Population growth	-0.699*** (0.127)	-0.704*** (0.128)	-0.933*** (0.159)
Log GDP per capita (lag)	-3.165*** (0.504)	-3.240*** (0.484)	-10.290*** (1.802)
Time trend	Yes	Yes	Yes
Observations	4045	4045	3868
R-squared	0.137	0.140	0.050

Notes: The dependent variable is the annual growth rate of real GDP per capita. Labor market flexibility is measured by the CBR Index (CBR3). Four lags of the dependent variable are used as instruments in the Arellano-Bond procedure for estimating instrumental variables fixed-effects models (IV-FE). Robust standard errors, clustered at the country level, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

<https://doi.org/10.1371/journal.pone.0332492.t004>

Table 5. Dynamic panel analysis of the total effect of fixed exchange rate regime on economic growth at different labor market flexibility levels: short-run and long-run effects.

	Unconditional		FE		IV-FE	
	SR	LR	SR	LR	SR	LR
	0.292 (0.226)	0.401 (0.310)				
At Labor market flexibility = 0			-1.291** (0.549)	-1.766** (0.758)	-2.853** (1.301)	-3.312** (1.524)
At Labor market flexibility = 5			0.395* (0.219)	0.542* (0.297)	0.790* (0.491)	0.918* (0.565)
At Labor market flexibility = 10			2.081*** (0.670)	2.847*** (0.917)	4.433*** (1.426)	5.147*** (1.656)

Notes: Column heads refer to the respective specifications in Table 4. Robust standard errors, clustered at the country level and calculated using the delta method, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

<https://doi.org/10.1371/journal.pone.0332492.t005>

Table 7 demonstrates that the effect of exchange rate fixity on growth, and its interaction with labor market flexibility, does not depend on a dichotomous definition of exchange rate regimes. When measured on a continuous scale, exchange rate fixity exhibits a similar effect on economic growth, contingent upon labor market flexibility levels. The negative effect of exchange rate fixity on economic growth observed in economies with rigid labor markets becomes positive under more flexible labor markets. Moreover, the long-run effects are larger in magnitude than the short-run effects.

Table 6. The effect of fixed exchange rate regimes on economic growth in developing and developed countries.

	Developing		Developed	
	Static	Dynamic	Static	Dynamic
Fixed exchange rate (FER_{t-1})	-2.314** (1.064)	-3.982*** (1.529)	0.504 (0.564)	0.472 (0.622)
Labor market flexibility (LMF_{t-1})	-0.367 (0.266)	-1.399*** (0.461)	0.298*** (0.109)	0.139 (0.107)
$FER_{t-1} \times LMF_{t-1}$	0.622*** (0.207)	0.968*** (0.313)	-0.090 (0.119)	-0.068 (0.114)
Log population	-5.218*** (1.752)	-12.373*** (2.794)	0.437 (1.430)	1.799* (1.050)
Population growth	-0.729*** (0.168)	-0.811*** (0.143)	-0.383* (0.201)	-0.525*** (0.172)
Log GDP per capita (lag)	-3.844*** (0.724)	-11.373*** (1.753)	-3.103*** (0.777)	-3.576*** (0.749)
Time trend	Yes	Yes	Yes	Yes
Lagged growth rate		0.139*** (0.036)		0.321*** (0.029)
Observations	2628	2478	1438	1390
R-squared	0.063	0.075	0.113	0.204

Notes: The dependent variable is the growth rate of real GDP per capita. Dynamic models are IV-FE models. Robust standard errors, clustered at the country level, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

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Table 7. Effect of exchange rate fixity on growth with a continuous exchange rate regime measure.

	Static	Static	Dynamic FE	Dynamic IV-FE
Fixed exchange rate (FER_{t-1})	0.035 (0.034)	-0.265*** (0.085)	-0.208*** (0.066)	-0.544** (0.216)
Labor market flexibility (LMF_{t-1})		-0.321 (0.202)	-0.249 (0.156)	-1.341*** (0.458)
$FER_{t-1} \times LMF_{t-1}$		0.065*** (0.018)	0.048*** (0.013)	0.116*** (0.041)
Log population	-1.510 (1.020)	-1.999** (1.000)	-2.046*** (0.774)	-6.983*** (2.144)
Population growth	-0.735*** (0.146)	-0.728*** (0.146)	-0.696*** (0.127)	-0.929*** (0.156)
Log GDP per capita (lag)	-3.045*** (0.625)	-3.217*** (0.591)	-3.295*** (0.490)	-10.501*** (1.804)
Time trend	Yes	Yes	Yes	Yes
Lagged growth rate			0.268*** (0.032)	0.138*** (0.029)
Observations	4066	4066	4045	3868
R-squared	0.053	0.061	0.141	0.052

Notes: Fixity of the exchange rate regime is a continuous scale of exchange rate regimes that lies between 1 (free floating) to 13 (currency union or no separate legal tender). All other variables, specifications, and estimation methods are the same as in Table 2 and Table 4. Robust standard errors, clustered at the country level, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

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Using an alternative measure of labor market flexibility

To test our hypothesis we also employ an alternative measure: the Fraser Institute's Labor Market Regulation indicator [7]. This indicator is based on seven subcomponents: (i) hiring regulations and minimum wage, (ii) hiring and firing regulations, (iii) centralized collective bargaining, (iv) hours regulations, (v) mandated cost of worker dismissal, (vi) conscription, and (vii) regulations on the employment of foreign labor. The Fraser-based Labor Market Flexibility Index is constructed as the arithmetic average of all seven subcomponents, normalized to a 0–10 scale, where 10 represents the most flexible labor market (as in Kuokštis, Asali, and Spurga [4]).

The Fraser-based indicator, however, has more limited temporal coverage, as data are unavailable for many years between 1970 and 2000; during this period, Fraser data are available only once every five years. For some countries, Fraser data are first available beginning in 2000. Fig 3 illustrates the temporal and cross-country coverage of the Fraser indicator relative to the CBR Index: outlined squares represent Fraser indicator availability, and filled squares represent CBR Index availability.

Despite the limited availability of the Fraser indicator for many country-year observations, we examine the robustness of our findings using this independent measure of labor market flexibility. We impute missing values for the Fraser indicator by extrapolating predicted values from a linear regression of available Fraser observations against the five overarching categories of the CBR Index (F_A laws on employment, F_B laws on working time, F_C laws on dismissal, F_D laws on employee representation, and F_E laws on industrial action):

$$Fraser_{it} = \alpha + \beta_a F_A + \beta_b F_B + \beta_c F_C + \beta_d F_D + \beta_e F_E + \nu_{it}$$

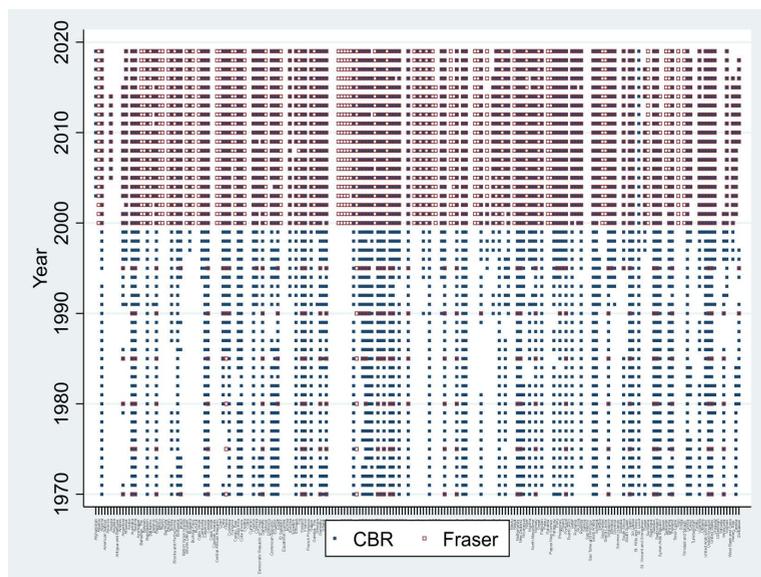


Fig 3. CBR and Fraser Index data availability. Notes: Data for CBR from Adams et al.[6]; data for Fraser from Gwartney, Lawson, Hall, and Murphy [7].

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Although the Fraser and CBR indices capture labor market flexibility through distinct methodologies, they exhibit a positive correlation. For the restricted sample (where both CBR and Fraser values are available), the correlation coefficient between the Fraser indicator and the CBR Index is 0.206 (positive and statistically significant, p -value < 0.001). For the full CBR sample, where missing Fraser values were imputed as described above, the correlation coefficient between CBR and the Fraser is higher and highly statistically significant (0.355, p -value < 0.001).

Table 8 presents the estimation results using both the CBR and Fraser indices. We report results for two samples: the “restricted sample,” which includes only observations with non-missing values for both indices; and the “full sample,” which includes all observations with a defined CBR Index, supplementing missing Fraser values with imputed data.

The first panel of Table 8 reports the estimation results from the restricted sample, and the second panel reports the estimation results from the full sample. Column 1 uses only the non-missing values of Fraser data. In this restricted sample the coefficient of the fixity-flexibility interaction term is slightly negative but not statistically significant. Using the CBR Index, as in Column 2, yields similar results, suggesting that labor market flexibility does not have a significant effect on the relationship between exchange rate fixity and economic growth.

Using the whole available sample on CBR, however, overturns this result. Column 4, which uses all available data on CBR, replicates our findings from Column 5 of Table 2, confirming that the effect of fixed exchange rates on growth is a function of the flexibility of the labor market. Using both actual and imputed Fraser values for the full sample, as in Column 3, provides corroborating evidence. Therefore, when using the “augmented” Fraser indicator as a measure of labor market

Table 8. The effect of fixed exchange rate regime on economic growth taking into account labor market flexibility with CBR and Fraser measures.

	Restricted sample		Full sample	
	Fraser	CBR	Fraser	CBR
Fixed exchange rate (FER_{t-1})	0.811 (0.927)	-0.091 (0.933)	-1.867* (1.036)	-1.606** (0.699)
Labor market flexibility (LMF_{t-1})	0.536*** (0.180)	-0.073 (0.187)	-0.162 (0.157)	-0.125 (0.169)
$FER_{t-1} \times LMF_{t-1}$	-0.185 (0.145)	-0.055 (0.165)	0.391** (0.176)	0.457*** (0.151)
Log population	-0.667 (1.385)	-1.131 (1.376)	-1.581 (1.020)	-1.910* (0.988)
Population growth	-0.692*** (0.212)	-0.687*** (0.213)	-0.740*** (0.147)	-0.735*** (0.146)
Log GDP per capita (lag)	-3.527*** (0.928)	-3.803*** (0.952)	-3.069*** (0.621)	-3.160*** (0.591)
Time trend	Yes	Yes	Yes	Yes
Observations	2143	2143	4066	4066
R^2 within	0.098	0.092	0.056	0.060

Notes: The dependent variable is the annual growth rate of real GDP per capita. Fixed exchange rate is a dichotomous variable that takes the value 1 if the exchange rate is fixed, and zero otherwise. Labor market flexibility is a [0–10] scale Index for labor market regulation, with higher values corresponding to more flexible labor markets. Columns 1 and 2 were estimated for the “restricted sample,” where observations were available for both Fraser and CBR Indices. Columns 3 and 4 were estimated for all available data. However, since Fraser data have many missing values in earlier years, these have been imputed using extrapolated values from a linear regression of the Fraser indicator on the five building sub-indices of the CBR Index. Columns 1 and 3 use the Fraser (or imputed Fraser) Index as a measure of labor market flexibility. Columns 2 and 4 use the CBR (CBR3) Index as a measure of labor market flexibility. Regressions include fixed effects (FE) and a linear time trend. Robust standard errors, clustered at the country level, are reported in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$

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flexibility, we find that the effect of exchange rate fixity on economic growth is an increasing function of labor market flexibility; the total effect is negative (-1.9) in rigid labor markets but positive and economically and statistically significant (2.0) in flexible labor markets.

Conclusions

In this article, we analyze the moderating role that labor market flexibility plays in the relationship between currency regimes and economic growth. There are strong theoretical reasons to expect this moderating effect to be important. Based on OCA theory, we hypothesize that fixed exchange rates promote growth under flexible labor markets but hinder it under rigid ones.

Our empirical results suggest that such a moderating relationship is important, although there are significant caveats. First, the results are statistically significant for developing countries only. Second, the significance of the findings depends on the measure of labor market flexibility and the sample used. In this study, we focus on two alternative measures of labor market flexibility: the CBR Labour Regulation Index by Adams et al. [6] and, for robustness tests, the Fraser Institute's Labor Market Regulation indicator [7].

We find a significant and economically substantial effect using the CBR Index. Fixed exchange rate regimes are found to have a negative effect on economic growth in economies with highly rigid labor markets, and a large positive effect in economies with highly flexible labor markets. Employing a dynamic panel analysis, we report long-run effects that are even more pronounced than the short-run effects.

However, we do not find significant results using the Fraser indicator for the subsample of countries-years for which Fraser data are available. The difference likely stems from the differing geographic and time coverage of the two indices, as the CBR Index encompasses a larger sample both temporally and geographically. Imputing values for the missing Fraser data using extrapolation from a linear conditional expectation model renders the results based on the Fraser data statistically and economically significant, similar to the main findings using the CBR Index.

More broadly, labor market flexibility is a contested concept theoretically and poses significant measurement challenges. Both measures of labor market flexibility employed in our study are legitimate, and both have been used in the previous literature. One takeaway is that researchers should be mindful of the different conclusions that can be reached using different operationalizations of labor market flexibility, which also applies to other important macroeconomic outcomes. Furthermore, our findings underscore that the labor market-exchange rate nexus may be context-dependent; we showed that the different conclusions reached using the CBR measure stem from its different sample coverage compared to the Fraser data. Moreover, the results hold for developing, but not developed, countries.

Our results have implications for policy. Exchange rate regime choice constitutes an important policy lever for developing and emerging economies reforming their monetary frameworks. Countries are often advised to transition gradually towards floating exchange rate regimes, as exemplified by the latest IMF program in Argentina [60]. We show that retaining a fixed exchange rate may not necessarily be disadvantageous compared to a floating regime, particularly when labor markets are sufficiently flexible. This introduces an important dimension to the policy debate on the macroeconomic benefits of exchange rate regime choice, highlighting the potential role of labor market institutions in evaluating the trade-offs involved.

Furthermore, our findings underscore the importance of institutional complementarities in macroeconomic policy design. When formulating policy prescriptions, policymakers and advisors should consider exchange rate arrangements and labor market reforms as interdependent levers in shaping a coherent growth strategy. The effects of a specific exchange rate regime on growth may be contingent upon a country's labor market institutions. Enhancing labor market flexibility may allow countries to better leverage the benefits of exchange rate fixity.

Finally, future research should explore the specific *mechanisms* driving the effects of the labor market flexibility-exchange rate interaction. The effect is likely mediated by changes in the RER and external competitiveness. Furthermore, associated effects on export growth are expected, especially for price-sensitive goods and services.

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The Political Economy of Exchange Rate Regimes and External (Im)Balances: The Role of Labor Market Institutions

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Abstract

External (im)balances are key to the evolution of financial crises and international disputes, yet the role of exchange rate regimes in shaping trade and current account balance remains contested. We contend that this relationship depends on the institutional environment: exchange rate rigidity fosters trade and current account surpluses under flexible labor market institutions but leads to deficits under rigid labor markets. The argument is supported by empirical analysis of a global time-series cross-sectional sample that includes both advanced economies and developing countries. The findings are robust across diverse modeling approaches and alternative measures of labor market flexibility.

Keywords Exchange rate regimes · Labor market institutions · Labor market flexibility · External imbalances · Trade balance · Current account balance

JEL codes F32 · E24 · F16 · P16

Introduction

External imbalances —manifesting as large current account and trade deficits and surpluses —are a persistent feature of the international monetary system and a focal point in both academic and policy debates (Frieden 2015; Manger and Sattler 2020; Simmons 1997). Global imbalances stand at the core of the debates on China’s external surplus and gained prominence in the wake of the Global Financial Crisis (GFC) and the Eurozone debt problem, both of which had been preceded by

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substantial current imbalances (Brancaccio 2012; Obstfeld 2012; Yang 2012). While global imbalances saw a sharp contraction in the aftermath of the GFC, significant current account deficits and surpluses persist (Chinn 2017; IMF 2019). They bear significant risks to the global economy, such as disruptive currency and capital flow movements, increasing geoeconomic fragmentation, and raising trade barriers (IMF 2023).

Considering the importance of external imbalances, scholarship has paid significant attention to their causes. Exchange rate regimes (ERR) are a strong candidate in explaining external imbalances. Friedman (1953) was the first to propose that flexible ERRs enable a faster mean reversion of the current account. Yet, the empirical literature offers conflicting evidence on the impact of ERR on external balance. Surprisingly, the role of labor market institutions (LMI)—a core tenet of Optimum Currency Area (OCA) theory (Grauwe 2006; Mundell 1961)—remains underexplored outside the Eurozone context. While political economy studies have linked rigid ERRs and heterogeneous LMIs to intra-Eurozone imbalances (Berger and Nitsch 2014; Brancaccio 2012; De Ville and Vermeiren 2016; Hancké, 2013; Johnston and Regan 2016), these insights are yet to be generalized.

This article addresses this gap by analyzing how LMIs moderate the influence of ERRs on trade and current account balance (CAB). Using OECD's employment protection legislation (EPL) index in a global time-series cross-section dataset, we find that more rigid ERRs are associated with a *positive* external balance if labor market flexibility (LMF) is high but a *negative* balance if LMF is low. These results align with the OCA theory, underscoring the role of LMIs in shaping the operation of ERRs. We primarily use hierarchical models that allow us to explain external (im)balances leveraging both cross-time and cross-country variation. The results support our main hypothesis and are robust to numerous sensitivity tests, such as excluding individual countries and Eurozone members, adding different controls, and specifying dynamic models. Moreover, the findings generalize using an alternative measure of LMF (Fraser Institute's Labor Market Regulation Index), which increases the sample's geographic and temporal scope. Furthermore, we supplement our analysis by running panel Difference-in-Differences (DiD) models to estimate the effect of a *change* in the ER, further supporting our hypothesis.

This research makes three contributions. First, it demonstrates that ERRs effect on external balances is contingent on LMIs, offering new insights into the ERR-LMI nexus. Second, it empirically validates a key observable implication of the OCA theory, bridging a gap in the literature. Finally, it extends Eurozone-specific findings to a broader range of countries, highlighting the global relevance of these dynamics. Policy implications emphasize the need to align ERR adjustments with labor market reforms to effectively address external imbalances, advocating for integrated macroeconomic strategies.



Literature Review

The nature of external imbalances remains a topic of ongoing debate. The persistence of large global current account imbalances has been a source of concern, particularly regarding their implications for financial stability. Large global current account imbalances have raised concerns about their implications for financial stability, particularly during periods of crisis. The GFC was preceded by large imbalances: the global current account balance (in absolute value) peaked above 5% of GDP in 2005–06 (IMF 2023, p. 2). While global imbalances saw a sharp contraction in the aftermath of the GFC, significant current account deficits and surpluses persist (Chinn 2017; IMF 2019). External imbalances do have positive implications: developing countries enjoy safe and liquid savings, while developed countries benefit from easier borrowing terms (Mendoza et al. 2009). However, global imbalances are generally seen as increasing risks to the world economy, with scholarship identifying important links between current account imbalances and financial crises (Brancaccio 2012; Copelovitch and Singer 2017; Obstfeld and Rogoff 2009). The *adjustment* of external imbalances can also bear important macroeconomic effects, e.g. on GDP and employment, in both deficit and surplus cases (Mihaljek 2013).

Various explanations for the emergence of global imbalances have been proposed. No single theory describes the entire range of empirical relationships studied in the literature. Since the current account is the sum of the trade balance and net foreign income, or equivalently the difference between savings and investment, the central account in economics emphasizes the key role of forward-looking saving and investment decisions (Obstfeld and Rogoff 1995). In this regard, the life-cycle hypothesis proposes that household saving behavior changes with age (Curtis et al. 2017). A higher share of the economically dependent population increases national consumption and reduces national savings, resulting in lower current accounts. Accordingly, dependency ratios are often used in empirical studies to assess the impact of aggregate household demographics (Cheung et al. 2013; Chinn and Prasad 2003). Nevertheless, scholarship has not established a clear-cut relationship between household financial balances and the current account (Allen 2019), with a separate avenue of research focusing on the shift in the supply of saving from households to the corporate sector (Chen et al. 2017).

In addition, scholarship has studied the influence of government balances. The “twin deficits” theory postulates that fiscal deficits fuel current account deficits, especially in an open economy setting (Corsetti and Müller 2006). From an intertemporal perspective, government budget deficits induce current account deficits by redistributing income from future to present generations (Rogoff and Obstfeld 1996). While many studies identified a positive relationship between fiscal balances and current account balances (Allen 2019; Chinn and Ito 2008; Chinn and Prasad 2003; IMF 2024), Bird et al. (2019) report no universal correlation across wider samples. This may explain the persistence of current account imbalances against a significant within-country variation of fiscal policy adjustments (Hübscher and Sattler 2017).



Several theoretical accounts address the external balances of developing countries. Macroeconomic theory postulates that resource-rich developing countries with exhaustible natural resources should save their resource windfalls abroad, thus smoothing their consumption over time and accumulating current account surpluses (Araujo et al. 2016). In practice, however, this does not always hold, partly due to the existence of pressing developmental needs in these countries. Case in point, Das (2016) identified a *negative* relationship between current account balance and commodity prices, indicating that resource windfalls often fail to translate into surpluses. At the same time, the ‘stages of development’ hypothesis postulates that developing countries with low capital–labor ratios and higher marginal productivity of capital, tend to import capital and run current account deficits as they move to intermediate levels of development, with capital flowing “downhill” from wealthier economies. Having reached an advanced stage of development, they are expected to generate surpluses so as to repay accumulated external liabilities (Gruber and Kamin 2007). However, this hypothesis is at odds with empirical evidence, in that many of the large, advanced economies, particularly the U.S., run persistent and wide current account deficits, while major developing economies, particularly in East Asia, frequently maintain external surpluses.

An alternative explanation, grounded in financial market imperfections, highlights the excess demand for safe financial assets in developing countries, suggesting that capital flows “uphill” from developing to developed nations (Caballero et al. 2017). In this view, fast-growing but capital-scarce emerging economies, constrained by underdeveloped financial systems, invest in safe assets issued by capital-abundant developed countries. This dynamic contributes to current account surpluses in emerging economies while exerting downward pressure on long-term interest rates in developed nations (Caballero et al. 2008), adding to the global “savings glut” (Bernanke 2005). Again, scholarship has not established a consensus regarding the importance of this dynamic. Chinn and Ito (2007) find that increasing financial development leads to higher, rather than lower, savings in East Asia. Ahrend et al. (2018) report no observable bias in emerging economies towards the assets of financially developed countries, despite disproportionately high allocations to U.S. securities. One possible explanation for this finding is the higher transaction costs of international investment in developing countries (Martin and Rey 2004).

Finally, global imbalances have been partly attributed to mercantilist policies aimed at promoting export-led growth through real exchange rate devaluation, designed to maintain competitiveness (Dooley et al. 2005). The presence of mercantilist strategies, along with precautionary self-insurance motives, are often cited as key factors behind the sizeable hoarding of international reserves by the emerging economies, particularly in East Asia (Aizenman and Lee 2008; Chol et al. 2009). Accordingly, current account balance was found to exert a positive influence on the level of international reserve holdings (Aizenman and Lee 2008; Nor et al. 2011).

Nasir and Jackson (2019), analyzing a selected group of major surplus and deficit countries, found that exchange rate misalignment has some, albeit limited, explanatory power with regard to the current account balance. Mbaye (2012) reports a robust and significant association between currency undervaluation and improvements in domestic trade balances, noting that such undervaluation negatively impacts the



trade balances of other countries. Similarly, estimations by Costamagna (2014) show a long-term relationship between the trade balance and the real exchange rate depreciations in a sample of Latin American countries. Manger and Sattler (2020) argue that domestic bargaining institutions among industrialized nations play a significant role in explaining external imbalances through their effect on trade balances. In countries with coordinated wage bargaining, wage growth in export industries is restrained to ensure competitiveness, leading to persistent trade surpluses. This suggests that domestic political and institutional factors are often at the root of what is perceived as mercantilist strategies.

Exchange rate regime policies could be considered as an obvious first-order instrument to both pursue competitiveness-preserving strategies and adjust to excess levels of imbalances that pose risk to financial stability. However, the literature is inconclusive regarding the effects of ERRs on external balances. In *The Case for Flexible Exchange Rates* (1953), Friedman proposed that flexible ERRs enable a faster mean reversion of the current account due to their ability to act as orderly adjustment mechanisms. Supporting this view, Ghosh et al. (2008) found that flexible ERRs are associated with smaller external imbalances in absolute value and less frequent large and abrupt external reversals. Some scholars, though, have questioned this argument. In particular, the seminal study by Chinn and Wei (2013) finds no strong relationship between ERR flexibility and the rate of current account reversion, after accounting for the degree of economic development, as well as trade and capital account openness.

In response, several attempts to refine the investigation regarding the effects of ERR do find evidence supporting Friedman's hypothesis and show that flexible ERRs imply less persistent current account dynamics. The divergence from Chinn and Wei (2013) findings have been explained by research design choices, especially the classification of exchange rate regimes used in empirical models. Ghosh et al. (2013) argue that ERR flexibility matters if trade-weighted bilateral exchange rate volatility is taken into account. Martin (2016), using the classification elaborated by Ilzetzki et al. (2019) and controlling for the occurrence of sudden stop episodes, finds that flexible regimes allow for faster adjustment among non-industrial economies.

Several studies analyzed the interaction between ERRs and LMIs in affecting external balances, focusing on the competitiveness channel. Most of them looked at the euro area and argued that the combination of a membership in the euro area (a form of hard currency fix) and differences in LMI in the European North and South have led to the formation of substantial intra-EMU imbalances (Berger and Nitsch 2014; Brancaccio 2012; De Ville and Vermeiren 2016; Hancké, 2013; Johnston and Regan 2016; Zemanek et al. 2010). Manger and Sattler (2020) focus on the impact of wage bargaining coordination on external imbalances and explore the potential moderating effect of ERR in the developed countries' sample. However, they do not find a significant moderating influence of ERR and argue that wage bargaining coordination has strong effects under both flexible and rigid ERR.



Theory

Our theoretical argument is based on the competitiveness channel. A (more) rigid ERR limits (or eliminates, under currency pegs) competitiveness changes among trade partners due to shifts in the nominal exchange rate. Fixed ERRs could therefore be prone to persistent deficits by preventing the current account adjustment. This increases the importance of domestic factors that enhance or worsen competitiveness.

Competitiveness is determined by the real exchange rate (RER). As shown by Gervais et al. (2016), episodes of current account reversals from deficit to surplus have been associated with sizable RER depreciations. The more rigid the ERR, the more RER is affected by the relative inflationary and productivity differences among trading countries. As discussed by Friedman (1953), the domestic adjustment mechanisms are difficult to employ given the rigidity of domestic wages and prices. Conversely, under a (more) flexible ERR, competitiveness divergences stemming from productivity or price differentials can be (potentially very quickly) reduced or even eradicated by adjustments in nominal exchange rates.

LMIs are a prime domestic political-institutional variable to account for how competitiveness is determined (Clar et al. 2007a, 2007b; Martin and Scarpetta 2012). We define LMF broadly as encompassing several dimensions: how fast labor can be reallocated (labor mobility), wage flexibility, and worktime flexibility (Dorel and Daniela 2010, p. 159), which are in turn dependent on LMIs. These can substantially affect RER, especially under (more) rigid ERR, thus influencing external balances (see the Literature Review regarding the mercantilist explanations of global external imbalances).

First, LMF can positively influence productivity (Davis and Haltiwanger 2014). Rigid LMI can slow down workforce adjustment and disincentivize job creation, thus hindering productivity (Martin and Scarpetta 2012). Conversely, if labor is mobile, workers can move faster from less productive sectors to more productive sections of the economy, facilitating structural transformation (Brixiova and Égert 2012). In this way, countries with higher LMF can enable the process of “creative destruction”, as more productive companies replace less productive ones within and across sectors (Caballero and Hammour 1994; Melitz 2003). Besides, high LMF, by lowering firms’ adjustment costs, can spur “technologically advanced innovation” (Griffith and Macartney 2014). In contrast, low LMF can lead to specialization in the lower stages of the product life-cycle, limiting productivity gains (Saint-Paul 1997).

Overall, an economy with a flexible labor market can obtain higher average productivity, which in turn leads to lower unit labor costs and a lower RER. As productivity increases, wages can rise without eroding competitiveness, and firms can adjust more efficiently to market conditions, preventing wage rigidities that could otherwise lead to misalignments in the RER. The economy gains a price advantage, leading to an increase in exports and a decline in imports, which improves the external balance (Kennedy and Sløk, 2005; Zemanek et al. 2010).



Second, LMF can also affect domestic wages and prices (Clar et al. 2007a, 2007b). Rigid LMIs can generate competitiveness losses in the first place and hinder subsequent adjustment. During economic expansion, rigid LMIs can contribute to wage growth, adding to deteriorating competitiveness and external deficits and further exacerbating them by stimulating domestic demand (Abbritti and Fahr 2013; Boltho and Carlin 2013). Besides, once the need to adjust arises, rigid LMIs can slow down this process making it economically (and politically) costlier. As shown by Artha and de Haan (2011), higher hiring costs increased output losses during the global financial crisis. Similarly, Kohlscheen et al. (2024) find that countries where labor markets are flexible experience more complete recoveries after a recession as measured by the unemployment rate. Clar et al. (2007a, b) used meta-analytical techniques to evaluate 27 studies and concluded that increasing union density, centralization of collective bargaining, EPL, and the tax wedge negatively affect the response of real wages to unemployment.

LMI's effect on wages and prices, like the effect on productivity, can affect the RER. Rigid LMIs may lead to persistent RER misalignments by limiting downward wage flexibility and slowing the pace of cost adjustments. Conversely, flexible labor markets enable corrections in real wages and domestic prices, allowing for a smoother and more efficient external rebalancing process, particularly in response to asymmetric shocks and global economic fluctuations (Arpaia and Pichelmann 2007). Empirical cross-country evidence identifies a relationship between LMF and RER, showing that LMF is associated with a lower RER (Du and Liu 2015).

Given the above, LMF is expected to have a positive influence on external balances. The literature does provide supporting evidence in this regard, showing that labor market deregulation leads to larger current account balances (see, for instance, Bertola and Lo Prete 2015; Duval et al. 2022).

We build on the theory of Optimum currency area (OCA) to explain how LMF can interact with ERRs (Mundell, 1961; De Grauwe & Ji, 2016; Mongelli, 2002). Originally developed to assess whether a country is a suitable candidate for joining a currency union, OCA theory can also help determine when it is economically efficient to adopt a fixed exchange rate regime (Kuokštis, Asali, and Spurga, 2022, p. 1). The central insight is that the cost-benefit trade-off of such a decision depends on the structural characteristics of a country. OCA theory identifies several key criteria: the symmetry of business cycle fluctuations among countries fixing their currencies, the degree of fiscal integration, and the mobility of capital and labor. The greater the synchronicity of business cycles, the deeper the fiscal integration, and the higher the factor mobility, the more advantageous it is to pursue exchange rate fixity.

LMF emerges as a key factor within this framework due to its effects on productivity, wages, and prices (Baas and Belke 2014; De Grauwe and Ji 2016). By fostering real wage and price flexibility, LMF can act as a substitute for nominal exchange rate depreciation, securing competitiveness gains (especially during crises) and enhancing the effectiveness of rigid ERR. Based on this logic, the International Monetary Fund (IMF) has argued that countries in the Southern Eurozone should reform and liberalize their labor markets to better align with the requirements of a fixed ERR (IMF 2011). Accordingly, the interaction between ERR and LMF may affect external (im)balances. For instance, Fadinger et al. (2024) showed that



Germany's labor market liberalization in the early 2000s led to its manufacturing boom at the expense of other Eurozone members and contributed to the current account imbalances, which were strongly influenced by the existence of a hard currency fix (membership in the Eurozone).

To summarize the theoretical considerations above, we submit the following hypothesis:

The higher the labor market flexibility, the more positive effect exchange rate rigidity will have on trade and current account balance.

We are not aware of any study which would systematically test the hypothesis of the moderating influence of labor market flexibility on the exchange rate regime-external balance nexus within a panel dataset framework that includes both fixers and non-fixers. In the subsequent section, we turn to our methodological approach to investigate our hypothesis.

Data and Methods

We assembled a global time-series cross-sectional dataset using annual observations (see Table 6 in the Annex for descriptive statistics). Our independent variable is ERR rigidity, measured using the four-scale (coarse) classification from the database by Ilzetzi et al. (2019). For clarity, we reverse the scale so that higher values (1 to 4) indicate increasing levels of ERR fixity. The moderating variable is LMF, specifically OECD's EPL indicator (OECD 2024), which measures the strictness of regulation of individual dismissal of employees on regular contracts. OECD's EPL index is a widely used measure of LMF in the literature (Arestis et al. 2023; Avdagic 2015; Bennett 2016; Clar et al. 2007a, b; Duval et al. 2020; Duval and Furceri 2018). Dismissal regulation is an important determinant of the incentives driving job creation and job destruction and, as a consequence, of labor market adjustments that define LMF (Gnocchi et al. 2015). We invert the index so that higher scores (ranging from 0 to 5) represent less strict regulation (increasing LMF). EPL data is available for 70 countries, both developed and developing, with the earliest starting in 1985 and ending in 2019.

In robustness checks, we also use Fraser Institute's Labor Market Regulation index (Gwartney et al. 2023). Compared to the EPL index, the Fraser measure captures a broader range of labor market dimensions. It includes seven components that span wage-setting mechanisms, employment protection rules, regulation of working hours, costs associated with dismissals, compulsory military service, and restrictions related to both domestic and foreign hiring practices. It has also been widely used in various avenues of research to estimate the effects of labor market flexibility (Agnello et al. 2014; Artha and de Haan 2011; Bernal-Verdugo et al. 2012). Unlike EPL, the Fraser index is based on various sources, including surveys, as opposed to coding information from legal provisions. Using a composite indicator has an advantage over EPL given the complexity of labor market regulation and "the evidence that improvements in labor market efficiency are likely to require reforms in more than one area of the labor market" (Bernal-Verdugo et al. 2012, p. 252).



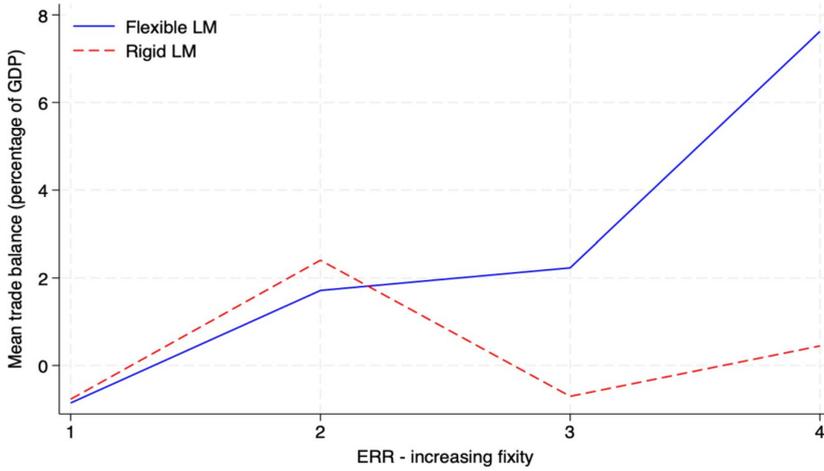


Fig. 1 Mean trade balance for different ERR rigidity in country-years under high and low LMF (above and below the sample average value of 2.9 for the EPL variable)

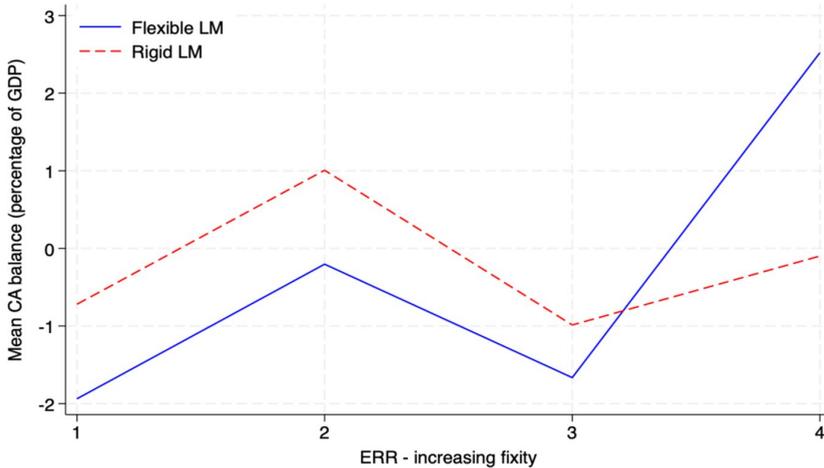


Fig. 2 Mean CAB for different ERR rigidity in country-years under high and low LMF (above and below the sample average value of 2.9 for the EPL variable)

Furthermore, the Fraser index data allows building a larger sample that includes a heterogeneous group of economies. The Fraser data is available for 165 countries, first at 5-year intervals (1970, 1975, 1980, 1985), and then on a yearly basis from 1990 to 2021.



Table 1 Hierarchical models including interactions with labor regulations (EPL)

	Model 1 (trade)	Model 2 (trade)	Model 3 (CAB)	Model 4 (CAB)
ERR_{t-1}	-5.471*** (0.934)	-4.995*** (0.814)	-4.532*** (0.833)	-4.254*** (0.753)
EPL_{t-1}	-2.529*** (0.925)	-3.655*** (0.842)	-3.293*** (0.853)	-3.748*** (0.768)
$ERR_{t-1}\#EPL_{t-1}$	1.873*** (0.290)	1.825*** (0.263)	1.548*** (0.268)	1.664*** (0.242)
$\text{LogPopulation}_{t-1}$		0.668 (0.423)		0.382 (0.316)
LogGDPpc_{t-1}		3.624*** (0.622)		2.610*** (0.546)
$\text{FiscalBalance}_{t-1}$		0.0713** (0.0306)		0.107*** (0.0356)
Openness_{t-1}		0.698*** (0.159)		-0.0133 (0.174)
GDPgrowth_{t-1}		-0.130*** (0.0409)		-0.145*** (0.0468)
FuelExports_{t-1}		0.0743*** (0.0219)		0.0434** (0.0202)
AgeDepRatio_{t-1}		-0.0972** (0.0389)		-0.0856* (0.0465)
IIPtoGDP_{t-1}		-1.684*** (0.201)		1.096*** (0.230)
_cons	5.351* (2.877)	-35.87*** (10.01)	7.200*** (2.668)	-22.38*** (8.087)
P	0.000	0.000	0.000	0.000
N	1095	996	1018	946

Standard errors in parentheses. Time FE included but not shown

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The dependent variables are trade balance and CAB, both in percent of GDP¹. To ensure robust estimation—and increase the causal credibility of our models—we adjust for several additional control variables, discussed in the literature review and commonly used to explain external balances. These includes fiscal balance, as fiscal deficits are often associated with current account deficits; the logarithm of population size and the ratio of people older than 64 to the working-age population to capture demographic determinants; fuel exports as percentage of merchandise exports to control for structural dependence on export earnings generated by

¹ We omit extreme values of trade and current account balance above 50% and below negative 50 in percent of GDP.



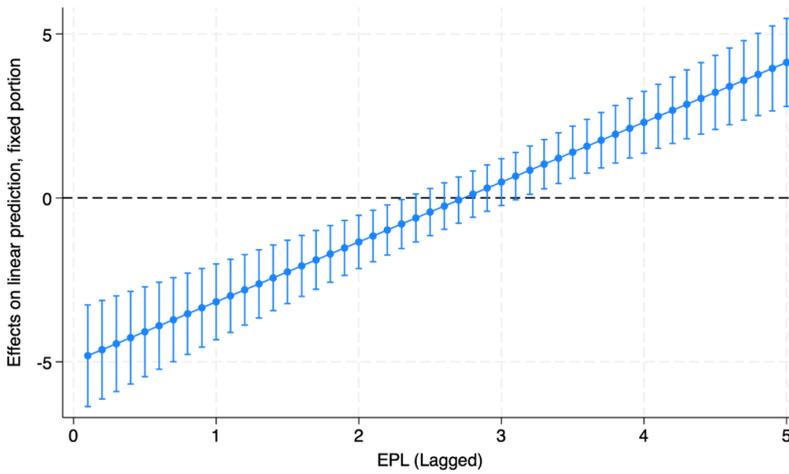


Fig. 3 The marginal effect of higher ERR fixity on trade balance at different levels of LMF. Note: Based on Model 2 of Table 1

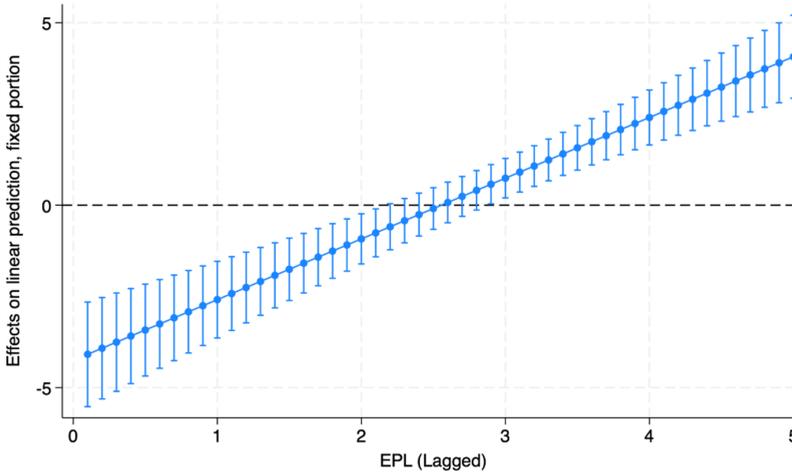


Fig. 4 The marginal effect of higher ERR fixity on the CAB at different levels of LMF. Note: Based on Model 4 of Table 1

commodities; a measure of capital account openness that reflects the constraints on the current account. We also include the logarithm of GDP per capita and GDP growth to account both for stages of development hypothesis and financial imperfections that lead to excess capital flowing to more developed financial markets. As



Table 2 Hierarchical model results excluding one country at a time (effects on trade balance)

Variable	Obs	Mean	Std. dev.	Min	Max
Coefficient ERR _{t-1} #EPL _{t-1}	70	1.56	0.078	1.094	1.795
P value	70	6.97e-06	0.000058	4.48e-10	0.0004849

Based on Model 2 in Table 1

Table 3 Hierarchical model results excluding one country at a time (effects on CAB)

Variable	Obs	Mean	Std. dev.	Min	Max
Coefficient ERR _{t-1} #EPL _{t-1}	70	1.667	0.121	0.794	1.963
P value	70	0.000027	0.000226	4.15e-14	0.0018904

Based on Model 4 in Table 1

in other empirical studies, we also include the balance of the international investment position (the stock of net foreign assets), which is a crucial initial condition determining income on external assets and liabilities that influences future current accounts. Finally, in robustness tests, we adjust for measures of product market regulation and institutional quality. We lag all right-hand side variables by one year to mitigate potential endogeneity issues.

We employ hierarchical (multi-level) models as our primary method (Gelman and Hill 2006). Hierarchical models can be useful when observations are grouped within higher-level units, such as yearly observations within countries, with country serving as the grouping unit (Snijders and Bosker 2011). They allow for the simultaneous estimation of both within-unit (e.g., country) and between-unit effects (how groupings differ from each other on average), accounting for dependencies in the data. Hierarchical models do not impose the assumption that all units share the same intercept and coefficient of the independent variables. By incorporating random effects, hierarchical models enable variation in intercepts and slopes across groupings, improving model flexibility and inference. This structure is especially advantageous when some key variables exhibit limited (or none) within-unit variation but meaningful cross-unit differences (Heisig and Schaeffer 2019).

We follow a similar approach to Manger and Sattler (2020: 644) who used hierarchical models to study external balance. This choice was motivated by several factors. First, *substantially*, we are interested in long-run differences in persistent macroeconomic (im)balances across countries. Second, empirically, ERR rigidity and LMI exhibit low variation over time, with many countries showing little to no change in these variables. Hierarchical models allow us to leverage variation across both time and countries, while the inclusion of unit fixed effects would eliminate all cross-country variation. At the same time, hierarchical models are flexible in modeling the presence of both highly time variant and slowly (or rarely) changing variables. Furthermore, they allow the specification of random coefficients, permitting effect heterogeneity across units. Specifically, we treat the intercept and the



coefficient on the ERR as random (i.e. allow them to vary by country), while keeping all other coefficients fixed. Our model is specified as follows:

$$y_{jt} = \beta_{0j} + \beta_{1j} \cdot \text{ERR}_{j,t-1} + \beta_2 \cdot \text{EPL}_{j,t-1} + \beta_3 \cdot (\text{ERR}_{j,t-1} \cdot \text{EPL}_{j,t-1}) + \sum_{k=1}^K \beta_{4k} \cdot X_{j,t-1,k} + d_t + \epsilon_{jt}$$

where y_{jt} is trade or current account balance for country j at time t , β_{0j} is random intercept that varies by country, β_{1j} is random slope on the ER variable that varies by country, β_2 is the coefficient on EPL, β_3 is the coefficient of interest on the interaction term between ERR and EPL, β_{4k} denotes the coefficients on the control variables, d_t are the year dummies, and ϵ_{jt} is the error term.

As an alternative, we also test our main hypothesis by looking at how *changes* in the ERR affect changes in the external balance. This approach addresses a conceptually different, although closely related, question focusing on the effects of ERR policy reforms rather than persistent external balances. While it does not address the important and large substantive cross-country differences, its advantage is a narrower definition of the causal effect of interest, as well as the ability to control for time-invariant confounders. This approach relies on a different set of causal identification assumptions, namely the parallel trends assumption. To implement this, we adopt a panel Difference-in-Differences (panel DiD) approach. Given the well-documented issues with traditional two-way fixed effects models under staggered adoption and heterogenous treatment effects (Roth et al. 2023), we employ the local-projections DiD (LP-DiD) method proposed by Dube et al. (2023). This approach provides a more flexible way to estimate dynamic treatment effects and avoids biases of standard TWFE specifications. Furthermore, it offers advantages compared to other heterogeneous panel DiD methods in terms of implementation simplicity, the option of a broad range of controls (including the dependent variable values), as well as flexibility in defining the set of control units. The LP-DiD model is specified as follows:

$$y_{j,t+h} - y_{j,t-1} = \beta_h^{LP\ DiD} \Delta \text{ERR}_j + \delta_t^h + \gamma_1^h y_{j,t-1} + \epsilon_{j,t}^h$$

where y_{jt} is trade or current account balance for country j at time t , $\beta_h^{LP\ DiD}$ is the DiD estimand for the dynamic ATT h periods after treatment, γ_1^h is the coefficient on the the first lag of the dependent variable (only included in some specifications, and sometimes substituted for the first difference of the outcome variable), δ_t^h are common time-specific effects, and $\epsilon_{j,t}^h$ is the error term. This model is run separately for high and low labor market flexibility countries.

Empirics

Figures 1 and 2 describe the general patterns in the sample and show that more rigid ERRs are strongly associated with higher trade and CAB under high LMF but not under low LMF. We define low/high LMF country-years as those with EPL values below/above the average sample value. Under high LMF, there is a clear tendency for the ERR-trade balance relationship to become more positive; for the current



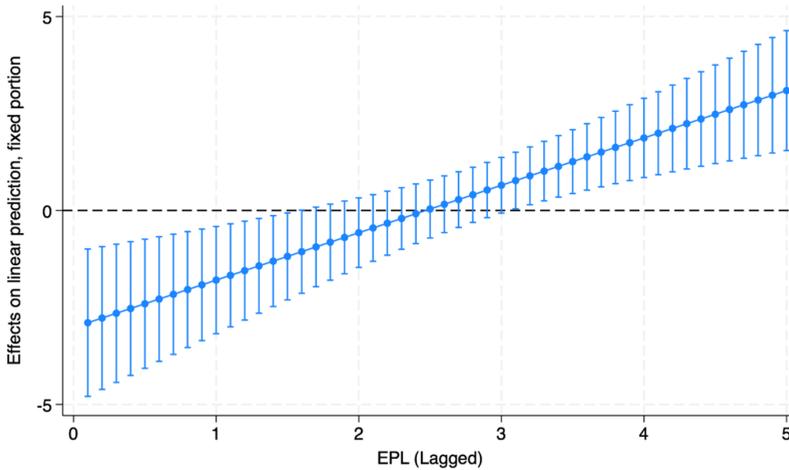


Fig. 5 The marginal effect of higher ERR fixity on trade balance at different levels of LMF and excluding the euro area countries. Note: Based on hierarchical effects model generated from specifications that adjust for the same variables as Model 2 in Table 1

account, the broad tendency is less smooth, although there is still a stark difference between the highest and lowest levels of ERR rigidity. The correlation coefficient between ERR and trade and CAB are -0.11 and -0.07 respectively under low LMF, while standing at 0.44 and 0.32 under high LMF.

Hierarchical models show that, when LMF is not considered, more ERR rigidity is not significantly associated with higher trade and the positive relationship with CAB is dependent on the specification (detailed output in Appendix, Table 7). By contrast, the interaction term between ERR and LMI is positive and highly significant regardless of specification, as predicted by our hypothesis, for both trade and CAB (Table 1): fixed ERRs tend to be associated with higher trade and current account balances at higher levels of LMF. The size of the coefficient of the interaction coefficient indicates that the moderating effect of LMF is not only statistically significant but also economically meaningful. For instance, at very high EPL (EPL=5), an increase of ERR fixity by one on a coarse scale (1–4) increases the trade balance by 4.13% points and CAB by 4.07% points on average. Accordingly, moving from the most flexible (1) to the most rigid (4) ERR is associated with a substantial 12.39% point increase in the trade balance and a 12.21% point increase in the CAB.

Among the control variables, GDP per capita has a statistically significant and positive effect on both trade and CAB, supporting the notion of “uphill” capital flows into wealthier economies. Conversely, GDP growth, typically higher in lower-income countries, exhibits a significant and negative association with external balances. As expected, fiscal balance and international investment position are on average positively associated with the CAB. Other controls, such as openness, fuel exports, and the age dependency ratio, show varying levels of significance



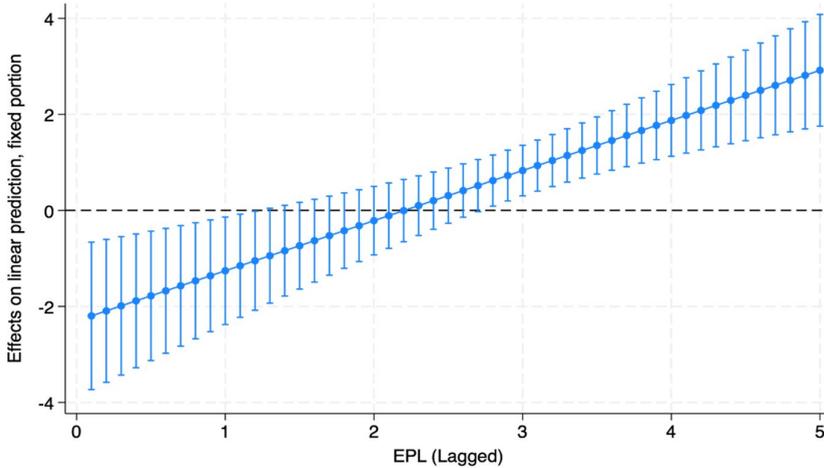


Fig. 6 The marginal effect of higher ERR fixity on CAB at different levels of LMF and excluding the euro area countries. Note: Based on hierarchical model generated from specifications that adjust for the same variables as Model 4 in Table 1

depending on the model specification. Overall, the results support the hypothesis that labor market flexibility moderates the relationship between fixed ERRs and external balances: the negative effect of exchange rate fixity at low levels of LMF becomes positive at higher levels of LMF.

To illustrate the interaction effect, we provide the marginal effects plots of increasing ERR fixity on trade balance (Fig. 3) and current account (Fig. 4) at different levels of LMF. They show that at higher LMF, more rigid ERRs have a positive effect on the external balance. The sign is *reversed* at low LMF, showing that increasing ERR fixity is associated with weaker external balance in the case of rigid LMIs. Again, we can see that the results strongly support our theoretical predictions (Tables 2 and 3).

Second, we check whether the results are driven by particular countries or membership in the euro area and find that they are not. Tables 2 and 3 demonstrate the robustness of the hierarchical models' results to the exclusion of individual countries with EPL data from the analysis. The mean coefficients suggest a consistently positive sign of the interaction term, with very low mean *p* value, underscoring the stability in the estimated effects across the samples.

Figures 5 and 6 below report the marginal effects of increasing ERR fixity on the trade balance and CAB across different levels of LMF, excluding euro area countries. The exclusion of euro area countries does not change our results. At lower LMF levels, the marginal effects are negative, suggesting a negative impact of ERR fixity on the external balance under rigid LMI. Conversely, the relationship of ERR fixity and external balance is positive at higher levels of LMF.

We also checked whether the results hold when the lagged dependent variable is included and found that the interaction effect of interest remains significant, albeit



at lower levels (at 1% for trade and 5% for the CAB, respectively) (Table 8 in the Appendix). Furthermore, we found that the results hold both in the developed and the developing countries sample (Table 9 in the Appendix). Finally, we checked whether our results are robust upon the inclusion of additional control variables. Importantly, we can interpret our hierarchical models' results causally under the *selection on observables* assumption. Therefore, we included the main theoretically grounded alternative drivers of trade and current account balances based on literature review and theory. In addition, there are several potential confounding variables that lead to a lower sample size, and thus were not included in the main models. Concretely, these are institutional quality and product market regulation. Institutional quality can be important in determining trade and current account balances, as well-functioning institutions support policy credibility, enhance contract enforcement, reduce transaction costs, and attract capital flows (Acemoglu et al. 2005; Silva et al. 2021). To account for institutional quality, we employ World Bank's Worldwide Governance Indicators (see Table 6 in the Annex for data sources), namely Regulatory Quality and Control of Corruption indices. As shown in Table 10, the inclusion of these variables does not affect the robustness of our results.

The potential effects of product market flexibility on external balances are not straight-forward. On the one hand, it can have similar effects on the competitiveness channel as LMF by increasing productivity and the responsiveness of prices and wages to market developments (Zemanek et al. 2010). However, evidence from Duval et al. (2022) suggests that product market deregulation can, depending on the macroeconomic environment, weaken the current account. This is because reducing barriers to entry in product markets increases aggregate investment with new firms entering the market, leading to higher import demand and external deficits (Cacciatore et al. 2016; Kennedy and Sløk, 2005). Overall, omitting product market regulation risks confounding the estimated effects on external balances.

The OECD's Energy, Transport, and Communications Regulation (ETCR) index is often utilized in economic research to assess the impact of regulatory frameworks on various economic outcomes (see, for instance, Anderton et al. 2019). The main advantage of ETCR is that it provides annual observations, while the broader OECD's Product Market Regulation index is available at 5-year intervals only. It covers non-manufacturing sectors such as energy and transport, in which anti-competitive regulation tends to concentrate the most. The ETCR index spans from 0 to 6.023, with lower values corresponding to lighter regulation (see Table 6 in the Appendix).

Table 4 reports the results of hierarchical models that include the ETCR index. The results do not alter our conclusions. In addition to controlling for product market regulation as a confounder, we tested specifications by including the interaction effect between product market regulation and ERR and even a triple interaction among LMI, product market regulation, and ERR, and only found our main effect of interests—the interaction effect between LMI and ERR—to be significant.



Table 4 Hierarchical models including OECD's energy transport communications regulation index (ETCR)

	Model 1 (trade)	Model 2 (trade)	Model 3 (trade)	Model 4 (CAB)	Model 5 (CAB)	Model 6 (CAB)
ERR _{t-1}	-3.618*** (0.772)	-4.179*** (0.853)	-2.479* (1.386)	-4.818*** (1.000)	-5.536*** (1.114)	-5.292*** (1.620)
EPL _{t-1}	-2.340*** (0.794)	-2.400*** (0.825)	-0.363 (1.510)	-3.445*** (1.092)	-3.544*** (1.153)	-2.337 (1.774)
ERR _{t-1} #EPL _{t-1}	1.368*** (0.245)	1.433*** (0.255)	0.929** (0.421)	1.740*** (0.323)	1.842*** (0.341)	2.066*** (0.497)
ETCR _{t-1}	-1.088*** (0.255)	-1.595*** (0.385)	0.568 (1.457)	-0.655** (0.320)	-1.151** (0.487)	-0.581 (1.687)
LogPopulation _{t-1}	-0.543 (0.447)	-0.584 (0.477)	-0.672 (0.472)	-0.682 (0.723)	-0.896 (0.807)	-0.464 (0.577)
LogGDPpc _{t-1}	1.910** (0.760)	1.551* (0.806)	1.416* (0.804)	1.059 (1.074)	0.335 (1.168)	1.479 (0.984)
FiscalBalance _{t-1}	0.0931*** (0.0325)	0.0961*** (0.0325)	0.0990*** (0.0326)	0.144*** (0.0391)	0.146*** (0.0390)	0.150*** (0.0388)
Openness _{t-1}	0.615*** (0.162)	0.659*** (0.163)	0.808*** (0.191)	0.0458 (0.193)	0.126 (0.195)	0.0602 (0.223)
GDPgrowth _{t-1}	-0.138*** (0.0426)	-0.140*** (0.0425)	-0.144*** (0.0427)	-0.161*** (0.0494)	-0.163*** (0.0492)	-0.191*** (0.0494)
FuelExports _{t-1}	0.0621*** (0.0240)	0.0601** (0.0243)	0.0537** (0.0245)	0.0420 (0.0293)	0.0363 (0.0298)	0.0367 (0.0283)
AgeDepRatio _{t-1}	-0.119*** (0.0407)	-0.124*** (0.0411)	-0.143*** (0.0433)	-0.163*** (0.0590)	-0.162*** (0.0602)	-0.116* (0.0595)
IIPtoGDP _{t-1}	-1.225*** (0.221)	-1.256*** (0.221)	-1.273*** (0.221)	1.362*** (0.260)	1.315*** (0.260)	1.274*** (0.259)
ERR _{t-1} #ETCR _{t-1}	0.138* (0.0820)	0.138* (0.0820)	-0.418 (0.395)	0.147 (0.106)	0.147 (0.106)	0.464 (0.463)



Table 4 (continued)

	Model 1 (trade)	Model 2 (trade)	Model 3 (trade)	Model 4 (CAB)	Model 5 (CAB)	Model 6 (CAB)
$EPI_{t-1} \# ETCR_{t-1}$			-0.666 (0.438)			0.0607 (0.509)
$ERR_{t-1} \# EPI_{t-1} \# ETCR_{t-1}$			0.177 (0.128)			-0.213 (0.153)
_cons	4.062 (11.58)	10.24 (12.46)	6.346 (12.59)	15.72 (17.42)	28.31 (19.37)	3.343 (15.51)
<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000
<i>N</i>	843	843	843	793	793	793

Standard errors in parentheses. Time FE included but not shown

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$



Panel DiD Analysis

We now switch to the analysis of *changes* in ERR. Our treatment is dichotomous, operationalized as is the shift in ERR to the highest fixity category (hard fix, ERR=4), which includes regimes with no separate legal tender, currency board arrangements, and de facto pegs. We focus on switches to a hard-fixed ERR to analyze their distinct economic impacts as described in the literature (e.g. Terrones 2020; Manger and Sattler 2020). Furthermore, Figs. 1 and 2 suggest that the strongest interactive effects come at the highest level of ERR.

To minimize causal heterogeneity, we focus on the developed countries' sample. We allow for switches into and out of fixed ERR. We use both not-yet-treated and never treated as the control groups, and do not allow composition effects. Another advantage of the LP-DiD method is that it allows to control for the past values of the dependent variable. We consider specification with 1-year lag of the dependent variable and a 1-year lag of the first difference of the dependent variable. We specify the pre-treatment window of 5 years, and the post-treatment window of 10 years. As for other control variables, our default is not to include any, unless the hypothesis of no pre-trend differences is rejected (suggesting a violation of the key parallel trends' assumption), while the inclusion of control variables leads to its rejection. We separate the sample in two groups—with relatively rigid LMI, and relatively flexible LMI—and estimate the conditional average treatment effect on the treated (CATT) for both groups. We first start by simply dividing the groups into below and above EPL average of 2.9. Appendix Figs. 11 and 12 show the treatment effect plot and the distribution of countries.

Figure 7 illustrates the dynamic CATT. Under relatively rigid LMIs, switching to a fixed ERR leads to a negative trade balance, but the effect is insignificant throughout the estimation period. Conversely, under flexible LMIs, switches to a hard fix lead to a significant expansion of the trade balance over the horizon of 7 years. Similarly, the current account also increases significantly, but the results cannot be trusted given clear differences in pre-trends. The inclusion of the lagged outcome does not substantially change any of the above results (see Fig. 13 in the Appendix). As for the CAB under flexible LMI, a specification that includes control variables (the same ones as in our hierarchical models) and uses the not-yet-treated as the control group, reveals no significant pre-trends (Fig. 14 in the Appendix). The results of this specification are compatible with theoretical expectations, namely that switching to a fixed ERR leads to a more positive CAB.

As for rigid LMI, conclusions regarding the significance and substantive importance strengthen when we lower the threshold for LMI rigidity. When we reduce it from 2.9 to 2.4, and thus exclude countries such as Germany, France, and Finland from the “rigid” group (see Fig. 15 in the Appendix for the treatment status plot), the LP-DiD estimates very substantial and significant effects on both trade and CAB (see Fig. 8). Again, conclusions hold when the lagged value of the dependent variable is adjusted for.

Overall, we can conclude that switches to a fixed ERR under substantially low levels of LMI produce significant and substantial negative external balance;



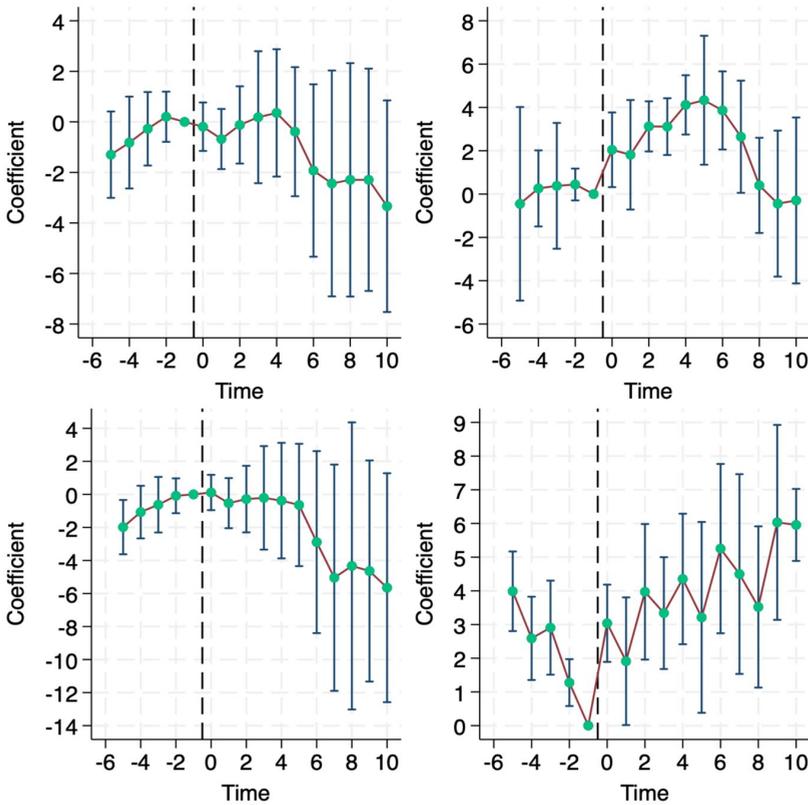


Fig. 7 The effect of switching to a fixed exchange rate on trade and CAB. Dynamic treatment effects derived from LP-DiD models. Note: Top left and top right panels show the CATT for the trade balance under rigid and flexible labor markets respectively. Bottom left and bottom right panels show the CATT for the CAB under rigid and flexible labor markets respectively

conversely, under high LMI, fixed ERRs lead to a large positive trade and CAB, although the estimates on the latter are more sensitive to specification. Thus, we find support for our hypothesis not only in terms of general variation in external balance (based on hierarchical models), but also in terms of ERR policy reforms.

Robustness with Fraser Index

We check whether the results can be generalized to a broader sample using an alternative measure of LMF—Fraser Institute’s Labor Markets Regulation Index (Table 5). Using hierarchical models, the results based on Fraser’s Index are very similar to the ones using the EPL index, as the positive effect of ERR rigidity



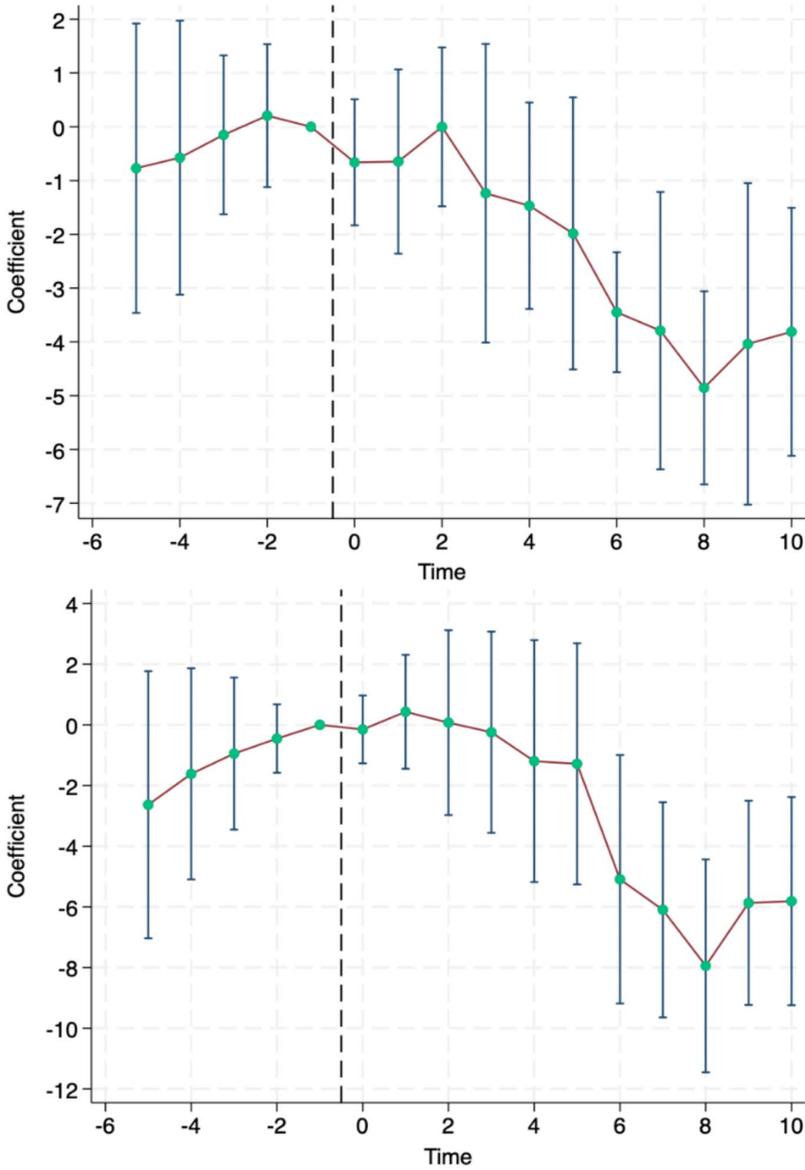


Fig. 8 The effect of switching to a fixed exchange rate on trade and CAB under very rigid labor markets (EPL < 2.4). Dynamic treatment effects derived from LP-DiD models. Note: The top panel and the bottom panel show the CATT for trade and CAB respectively



Table 5 Hierarchical models including labor markets regulations (Fraser index)

	Model 1 (trade)	Model 2 (trade)	Model 3 (CAB)	Model 4 (CAB)
ERR _{t-1}	-4.343*** (1.074)	-3.599*** (1.089)	-3.073*** (0.927)	-4.040*** (0.930)
FraserLabor _{t-1}	-1.687*** (0.554)	-1.516*** (0.558)	-0.874* (0.476)	-1.566*** (0.469)
ERR _{t-1} #FraserLabor _{t-1}	0.729*** (0.160)	0.657*** (0.162)	0.508*** (0.141)	0.672*** (0.139)
LogPopulation _{t-1}		1.055*** (0.394)		0.628*** (0.239)
LogGDPpc _{t-1}		4.498*** (0.476)		1.856*** (0.333)
FiscalBalance _{t-1}		0.271*** (0.0309)		0.374*** (0.0292)
Openness _{t-1}		-0.216 (0.195)		-0.558*** (0.170)
GDPgrowth _{t-1}		-0.0592* (0.0354)		-0.114*** (0.0350)
FuelExports _{t-1}		0.120*** (0.0139)		0.0843*** (0.0112)
AgeDepRatio _{t-1}		0.0437 (0.0602)		0.0551 (0.0490)
IIPtoGDP _{t-1}		-1.154*** (0.188)		-0.0732 (0.173)
_cons	1.843 (3.884)	-51.07*** (8.823)	2.838 (3.862)	-20.73*** (6.033)
<i>P</i>	0.000	0.000	0.000	0.000
<i>N</i>	3083	2547	3050	2567

Standard errors in parentheses. Time FE included but not shown

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

increases with higher LMF, while it is negative at low LMF. The models contain larger samples and include more developing economies, given the broader coverage of the Fraser index. While the interaction coefficients are smaller compared to those using the EPL index, this reflects the wider range of the Fraser Index (1 to 10). The use of the Fraser Index increases the statistical significance of additional controls, such as population, fuel exports, and capital account openness, underlining the importance of accounting for broader macroeconomic dynamics in developing economies.

Figures 9 and 10 show the marginal effects of hierarchical effects models generated from specifications that adjust for the same variables as the models with the EPL index. Furthermore, the results with the Fraser index are robust to the same sensitivity checks presented above for EPL models' results: exclusion of euro area



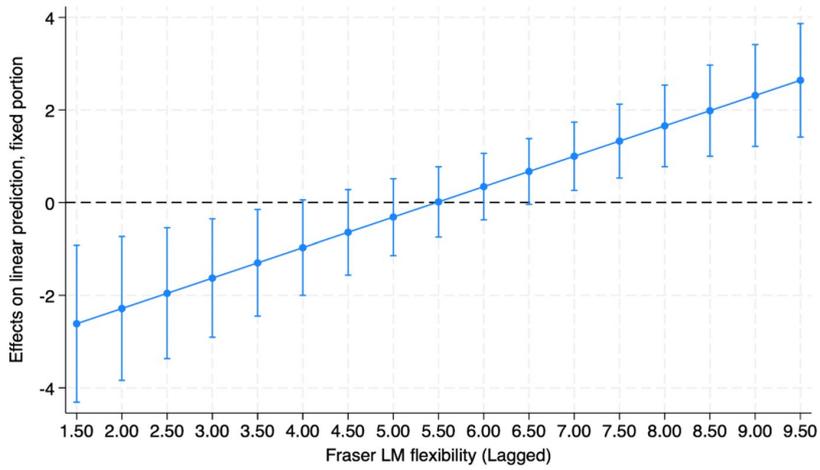


Fig. 9 The marginal effect of higher ERR rigidity on trade balance at different levels of LMF (Fraser Index). Note: Estimates based on Model 2 of Table 5

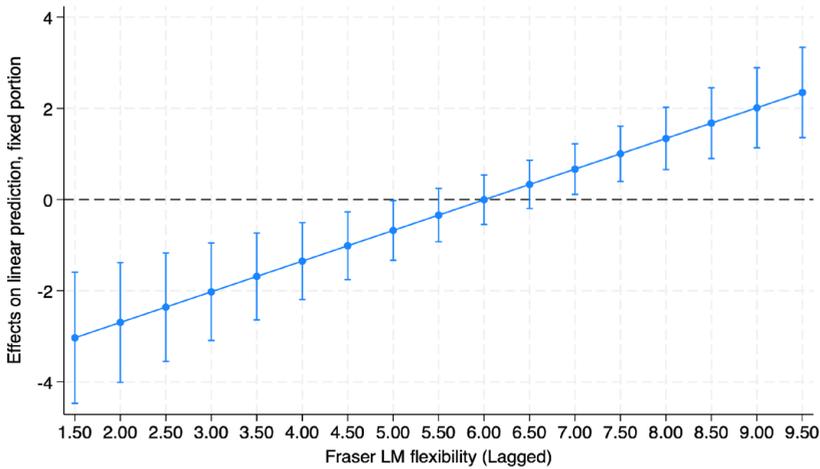


Fig. 10 The marginal effect of higher ERR rigidity on the CAB at different levels of LMF (Fraser Index). Note: Estimates based on Model 4 of Table 5

countries, adjustment for lagged dependent variable, estimation for the developed versus developing countries sample².

² Results provided in the replication file on Harvard Dataverse.



Running LP-DiD models using the Fraser Index presents both advantages and drawbacks. On the one hand, it allows expanding the sample, resulting in more changes in treatment status³. On the other hand, it does present more challenges in terms of higher sample heterogeneity, encompassing countries with very different background conditions, and makes it somewhat harder to justify the parallel trends' assumption. We divide the sample into relatively rigid and flexible LMI (under and over the sample median of 6.11). We run the same model specifications as with the EPL measure.

Broadly, the results are similar to the DiD estimations using the EPL index, although the robustness of the results is somewhat more dependent on the specification, while, as expected, the parallel trends assumption is harder to justify (based on the pre-trend patterns). First, we find that switching to a fixed ERR under rigid LMI leads to lower external balances, and the results are especially robust for CAB. Estimating the effects under flexible LMI is more challenging given that the models without the lagged dependent variable fail to pass the test of no significant pre-trends (see Fig. 16). However, once the lagged value of the first difference of the dependent variable is controlled for, pre-trends are no longer significant, which increases the credibility of the estimates; in this case, we can observe that the effects on both trade and CAB are positive, and are especially robust in the case of trade balance (see Fig. 17). Overall, in terms of DiD models, using the Fraser measure supports our main conclusions, although it is somewhat more challenging to justify parallel trends' assumptions due to the increased heterogeneity of the sample.

Conclusions

The literature is inconclusive regarding the effects of ERRs on external balances. While Friedman (1953) argued that flexible exchange rate regimes (ERRs) facilitate faster adjustments of current account imbalances, this view has received mixed empirical support. In the euro area, scholarship maintains that interactions between membership in the currency union and LMIs have exacerbated regional imbalances, with studies attributing the intra-EMU imbalances to differences in LMI. However, Manger and Sattler (2020) found no significant moderating effect of ERRs on wage bargaining coordination, suggesting robust LMI effects across regime types.

This article provides strong empirical evidence that ERR rigidity significantly influences external balances. However, the size and even direction of this relationship depend on domestic institutions, particularly labor market flexibility (LMF). Our findings align with the theoretical predictions of Optimal Currency Area (OCA) theory, which emphasizes the role of LMIs in shaping the operation of ERRs. Specifically, hierarchical models reveal that the interaction between ERR rigidity and LMF is both positive and significant. Under high levels of LMF, increasing ERR

³ To increase the sample further, we first fill in the missing data of Fraser before 2000 with the values of the last available year.



rigidity is associated with substantially higher trade and current account balances. By contrast, when LMI are inflexible, more rigid ERRs weaken external balances.

Robustness checks confirm these results across various specifications and samples. The results using hierarchical models work both with the widely used OECD's EPL measure and the alternative Fraser Index of labor market regulations, and are robust to different modelling specifications. LP-DiD models that analyze the *changes* of external balances following *changes* in ER regimes further corroborate those insights.

This study makes several key contributions. First, it provides the first rigorous empirical tests of a key prediction of the OCA theory, which has informed policy discussions for decades but has lacked empirical verification. By linking theoretical insights with robust empirical evidence, this research fills an important gap in understanding the conditional effects of ERR rigidity. Second, it highlights the empirical importance of the interaction between ERR rigidity and LMF, demonstrating that the effects of ERRs on external balances vary significantly depending on labor market characteristics.

Third, it extends findings beyond the Eurozone, challenging the view that the ERR-LMF relationship is unique to advanced economies of the euro area. By showing that this relationship holds in broader samples, including developing countries, the study generalizes its implications for a wider set of contexts. Fourth, it revises some conclusions from prior research, notably Manger and Sattler (2020), finding that ERRs do not meaningfully influence external imbalances. Fifth, the results can contribute to the literature on the politics of ERR choice by presenting a mechanism of why countries with more LMF tend to have more rigid ERRs (Kuokštis et al. 2022). This choice may reflect political and public preferences for achieving stronger trade and current account balances (McKibben and Taylor 2020).

The results carry important implications for both domestic and international policy. They underscore the critical role of domestic labor market institutions in shaping the performance of international macroeconomic regimes. Policymakers should consider labor market reforms in conjunction with ERR adjustments to achieve desired external balance outcomes. Rigid ERRs can enhance external balances, but only when paired with flexible labor markets.

This integrated approach is relevant for addressing global imbalances, where ERR adjustments alone may fall short. International organizations, particularly the IMF, should look into the potentially important role of labor market reforms under rigid ERRs not only within adjustment programs for specific member states, but also as part of broader efforts to address global external imbalances. In particular, promoting more flexible LMIs in deficit countries with rigid ERRs could help reduce structural vulnerabilities across the global economy.

To mitigate competitiveness risks associated with adopting a rigid ERR in economies with less flexible labor markets, domestic policymakers could pursue targeted labor market reforms such as easing employment protection legislation, enhancing wage bargaining flexibility, or improving labor mobility. Given the interaction between exchange rate regimes and labor market flexibility, fixed ERR adoption should be accompanied by institutional assessments to ensure that domestic labor markets can support the necessary adjustments so as not to exacerbate external deficits.





Appendix

See Tables 6, 7, 8, 9, 10 and Figs. 11, 12, 13, 14, 15, 16, 17.

Table 6 Descriptive statistics

Variable	No. of countries	Observations	Mean	Sd	Min	Max	Source
Current account balance (% of GDP)	194	7005	-3.035	9.838	-49.732	49.980	WDI
Trade balance (% of GDP)	189	8291	-4.112	13.269	-49.993	49.766	WDI
Exchange rate regime (ERR) (1-4)	194	12857	3.475	0.810	1	4	Ilzetzki et al. (2019)
Exchange rate regime (ERR) (0-1)	194	12857	0.659	0.474	0	1	Ilzetzki et al. (2019)
EPL index	70	1121	2.902	0.887	0.093	5	OECD
Fraser labor market flexibility index	165	3866	6.118	1.452	1.505	9.610	Gwartyney et al. (2023)
Population (log)	207	13011	14.982	2.323	8.430	21.072	WDI
GDP per capita (log)	204	9979	8.350	1.486	4.811	12.340	WDI
Fiscal balance (% of GDP)	193	5957	-2.724	13.879	-557.499	47.827	IMF WEO
Capital account openness (Chinn-Ito)	181	7947	-0.001	1.533	-1.931	2.299	Chinn and Hiro (2023)
GDP growth	205	9921	3.674	6.339	-64.047	149.973	WDI
Fuel exports (percent of merchandise exports)	193	7104	15.915	30.859	0	722.763	WDI
Age dependency ratio, old (% of working-age population)	207	13011	10.573	6.890	0.200	70.360	WDI
Net International Investment Position (% of GDP)	193	8645	-0.188	1.321	-18.367	15.699	Lane and Milesi-Ferretti (2018)
OECD energy transport communications regulation index (ETCR)	33	1452	3.570	1.589	0.540	6.023	OECD
Control of corruption indicator	207	4831	-0.014	1.001	-1.937	2.459	WGI
Regulatory quality indicator	207	4809	-0.016	0.997	-2.548	2.252	WGI

Sources: World Bank's World Development Indicators (WDI), World Bank's Worldwide Governance Indicators (WGI), IMF WEO database, OECD Indicators of Employment Protection, OECD Product Market Regulation (PMR) indicators, M. Chinn & Hiro (2023); Gwartyney et al. (2023); Ilzetzki et al. (2019); Lane & Milesi-Ferretti (2018)

Table 7 Hierarchical models on the effects of ERR excluding measures of LMI

	Model 1 (trade)	Model 2 (trade)	Model 3 (CAB)	Model 4 (CAB)
ERR _{t-1}	0.0802 (0.414)	0.167 (0.360)	0.0158 (0.287)	0.616** (0.259)
LogPopulation _{t-1}		0.372 (0.441)		0.122 (0.291)
LogGDPpc _{t-1}		3.057*** (0.640)		2.229*** (0.519)
FiscalBalance _{t-1}		0.0703** (0.0315)		0.104*** (0.0366)
Openness _{t-1}		0.728*** (0.160)		-0.0255 (0.173)
GDPgrowth _{t-1}		-0.112*** (0.0422)		-0.126*** (0.0482)
FuelExports _{t-1}		0.0934*** (0.0225)		0.0498** (0.0195)
AgeDepRatio _{t-1}		-0.109*** (0.0392)		-0.0947** (0.0461)
IIPtoGDP _{t-1}		-1.988*** (0.202)		0.952*** (0.231)
_cons	-3.149*** (1.076)	-37.01*** (10.40)	-2.882*** (1.064)	-26.16*** (7.629)
P	0.000	0.000	0.000	0.000
N	1095	996	1018	946

Standard errors in parentheses. Time FE included but not shown. The intercept and the coefficient on the ERR are allowed to vary across countries

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$



Table 8 Models with lagged value of the dependent variable

	Model 1 (trade)	Model 2 (CAB)
TradeBalance _{t-1}	0.878*** (0.0323)	
CAB _{t-1}		0.838*** (0.0351)
ERR _{t-1}	-1.046*** (0.353)	-0.773** (0.338)
EPL _{t-1}	-1.098*** (0.312)	-0.879*** (0.262)
ERR _{t-1} #EPL _{t-1}	0.356*** (0.124)	0.259** (0.104)
LogPopulation _{t-1}	-0.0897 (0.0630)	-0.0715 (0.0633)
LogGDPpc _{t-1}	0.573** (0.226)	0.659*** (0.244)
FiscalBalance _{t-1}	-0.0484 (0.0447)	-0.0261 (0.0542)
Openness _{t-1}	0.117 (0.0796)	-0.0621 (0.113)
GDPgrowth _{t-1}	-0.129*** (0.0393)	-0.178*** (0.0497)
FuelExports _{t-1}	-0.00688 (0.0102)	-0.00200 (0.0104)
AgeDepRatio _{t-1}	-0.0508** (0.0200)	-0.0317 (0.0201)
IIpGDP _{t-1}	-0.0677 (0.127)	0.0706 (0.242)
_cons	-0.486 (2.243)	-2.588 (2.793)
P	0.000	0.000
N	996	939

Ordinary least squares models. Standard errors in parentheses. Time FE included but not shown

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$



Table 9 Estimation results for developed vs. developing country samples

	Model 1 (trade)	Model 2 (trade)	Model 3 (CAB)	Model 4 (CAB)
ERR _{t-1}	-3.711*** (0.741)	-5.236** (2.560)	-4.031*** (0.905)	-3.354* (1.879)
EPL _{t-1}	-2.384*** (0.747)	-7.449*** (2.669)	-2.852*** (0.961)	-4.217** (1.706)
ERR _{t-1} #EPL _{t-1}	1.460*** (0.231)	1.891** (0.901)	1.593*** (0.284)	1.412** (0.650)
LogPopulation _{t-1}	-0.599 (0.410)	1.753*** (0.656)	-0.199 (0.567)	0.641 (0.428)
LogGDPpc _{t-1}	2.250** (0.941)	7.515*** (1.301)	0.923 (1.212)	1.445 (0.966)
FiscalBalance _{t-1}	0.104*** (0.0333)	-0.167** (0.0780)	0.128*** (0.0407)	-0.0443 (0.0754)
Openness _{t-1}	0.521*** (0.173)	1.358*** (0.388)	-0.267 (0.208)	0.902*** (0.330)
GDPgrowth _{t-1}	-0.139*** (0.0455)	-0.107 (0.0922)	-0.129** (0.0534)	-0.159* (0.0887)
FuelExports _{t-1}	0.0753*** (0.0257)	0.0467 (0.0374)	0.0751** (0.0312)	0.0121 (0.0243)
AgeDepRatio _{t-1}	-0.127*** (0.0411)	-0.0870 (0.157)	-0.149** (0.0593)	-0.104 (0.104)
IIPtoGDP _{t-1}	-1.634*** (0.201)	3.764** (1.744)	1.108*** (0.239)	5.569*** (1.372)
_cons	-4.616 (11.03)	-74.96*** (19.04)	2.994 (14.52)	-15.91 (13.75)
<i>P</i>	0.000	0.000	0.000	0.000
<i>N</i>	800	196	750	196

Standard errors in parentheses. Models 1 and 3 refer to the developed country sample while Models 2 and 4 refer to developing country sample. Time FE included but not shown. Hierarchical models where the intercept and coefficient on the ERR are allowed to vary across countries

p* < 0.1, *p* < 0.05, ****p* < 0.01



Table 10 Hierarchical models including World Bank's governance indicators

	Model 1 (trade)	Model 2 (CAB)	Model 3 (trade)	Model 4 (CAB)
ERR _{t-1}	-4.357*** (0.995)	-3.209*** (0.873)	-4.656*** (0.959)	-3.503*** (0.835)
EPL _{t-1}	-2.918*** (1.078)	-1.631* (0.919)	-3.412*** (1.022)	-2.203*** (0.854)
ERR _{t-1} #EPL _{t-1}	1.734*** (0.317)	1.451*** (0.279)	1.751*** (0.306)	1.466*** (0.268)
Corruption _{t-1}	-2.344*** (0.628)	-2.382*** (0.613)		
LogPopulation _{t-1}	0.900** (0.450)	0.454 (0.335)	0.764* (0.434)	0.361 (0.314)
LogGDPpc _{t-1}	5.126*** (0.863)	3.064*** (0.758)	5.000*** (0.785)	3.239*** (0.675)
FiscalBalance _{t-1}	0.0760** (0.0367)	0.115*** (0.0390)	0.0691* (0.0364)	0.106*** (0.0387)
Openness _{t-1}	0.722*** (0.243)	0.410* (0.241)	0.958*** (0.239)	0.632*** (0.237)
GDPgrowth _{t-1}	-0.115** (0.0467)	-0.154*** (0.0494)	-0.112** (0.0462)	-0.148*** (0.0489)
FuelExports _{t-1}	0.0756*** (0.0262)	0.0546** (0.0227)	0.0711*** (0.0258)	0.0474** (0.0217)
AgeDepRatio _{t-1}	0.00995 (0.0576)	0.0857 (0.0544)	0.0173 (0.0562)	0.0881* (0.0520)
IIPtoGDP _{t-1}	-1.884*** (0.222)	0.598** (0.235)	-1.701*** (0.224)	0.787*** (0.235)
Regulation _{t-1}			-3.532*** (0.673)	-3.801*** (0.666)
_cons	-56.29*** (11.46)	-34.07*** (9.205)	-50.23*** (10.78)	-31.17*** (8.388)
P	0.000	0.000	0.000	0.000
N	742	729	742	729

Standard errors in parentheses. Time FE included but not shown. Hierarchical models where the intercept and coefficient on the ERR are allowed to vary across countries

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$



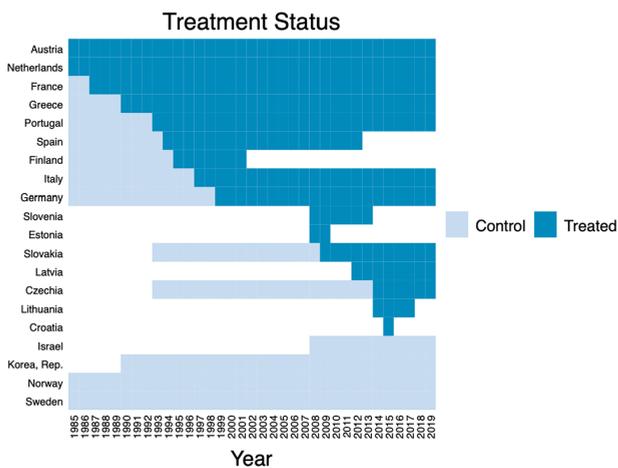


Fig. 11 Treatment status (switch to a fixed exchange rate) for countries with rigid labor markets (EPL<2.9). Outcome is trade balance

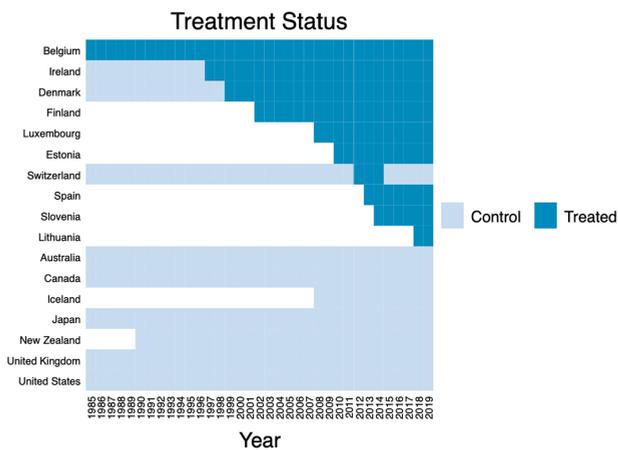


Fig. 12 Treatment status (switch to a fixed exchange rate) for countries with flexible labor markets (EPL>2.9). Outcome is trade balance



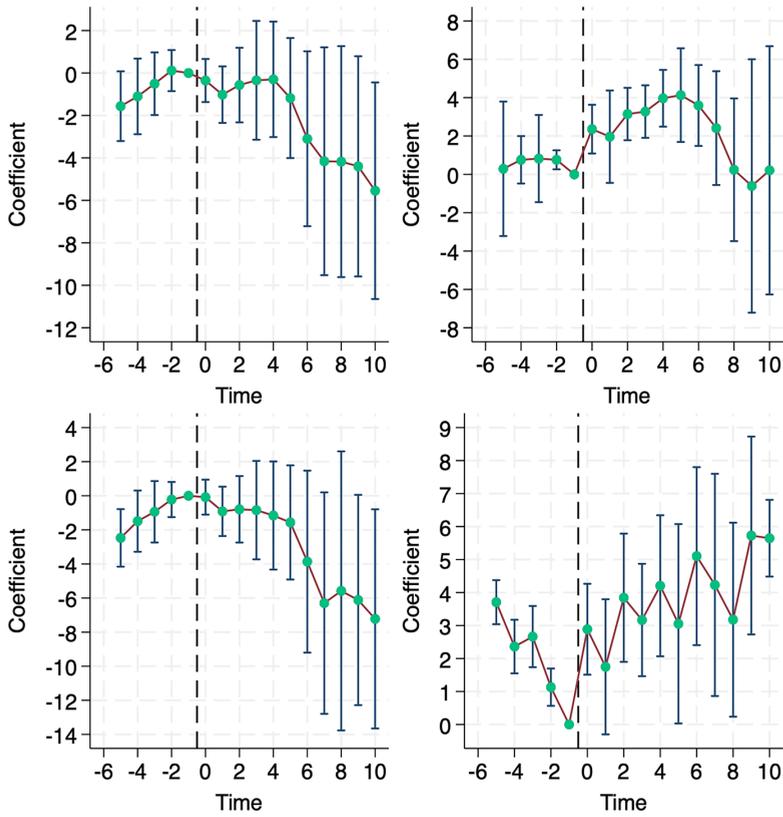


Fig. 13 The effect of switching to a fixed exchange rate on trade and current account balance. Lagged dependent variables are included as covariates in the estimation. Top left and top right show the CATT for the trade balance under rigid and flexible labor markets respectively (below and above EPL of 2.9). Bottom left and bottom right panels show the CATT for the current account balance under rigid and flexible labor markets respectively (below and above EPL of 2.9)



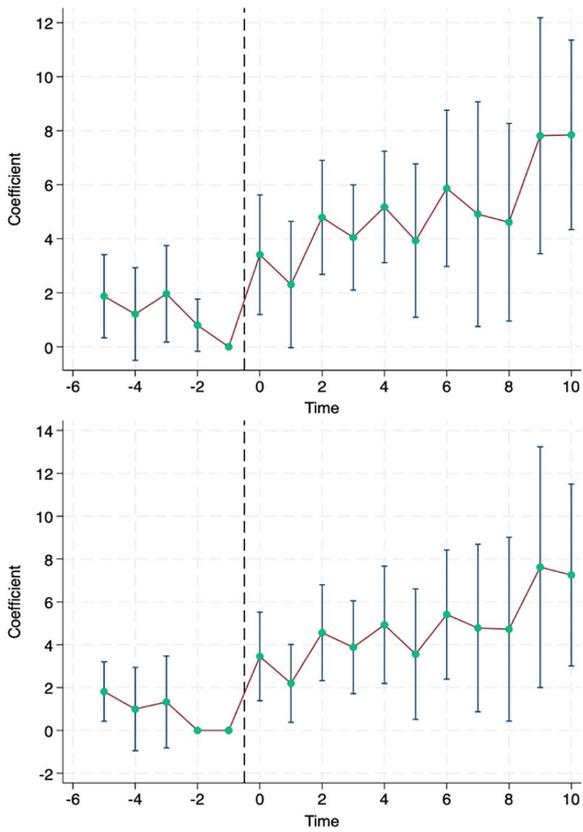


Fig. 14 The effect of switching to a fixed exchange rate on current account balance (with control variables from model 2 in Table 1). Control units are set at “not yet treated”. Both top and bottom panels show the CATT for the CAB under flexible labor markets (EPL>2.9). Lagged outcome variable is excluded in the top panel but included in the bottom panel



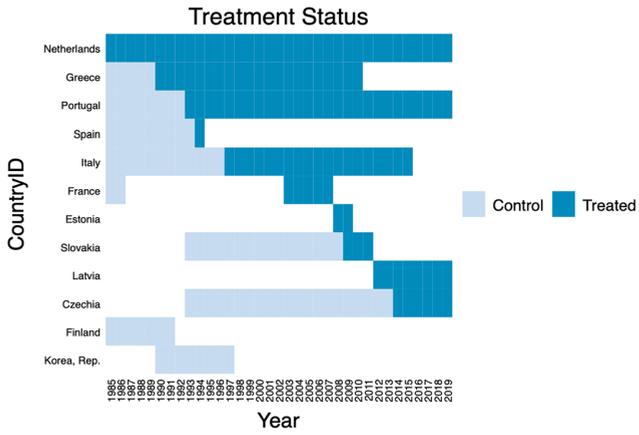


Fig. 15 Treatment status for countries in very rigid labor markets (EPL < 2.4). Outcome is trade balance



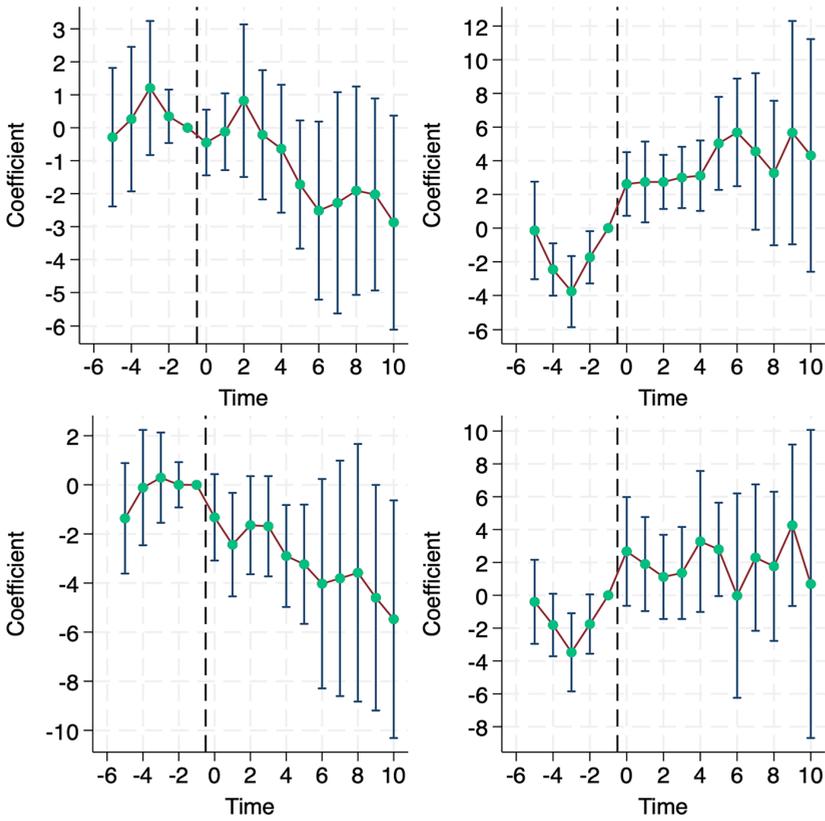


Fig. 16 The effect of switching to a fixed exchange rate on trade and current account balance. Dynamic treatment effects derived from LP-DiD models. Top left and top right show the CATT for the trade balance under rigid and flexible labor markets respectively (as measured by the Fraser labor market flexibility index). Bottom left and bottom right panels show the CATT for the CAB under rigid and flexible labor markets respectively



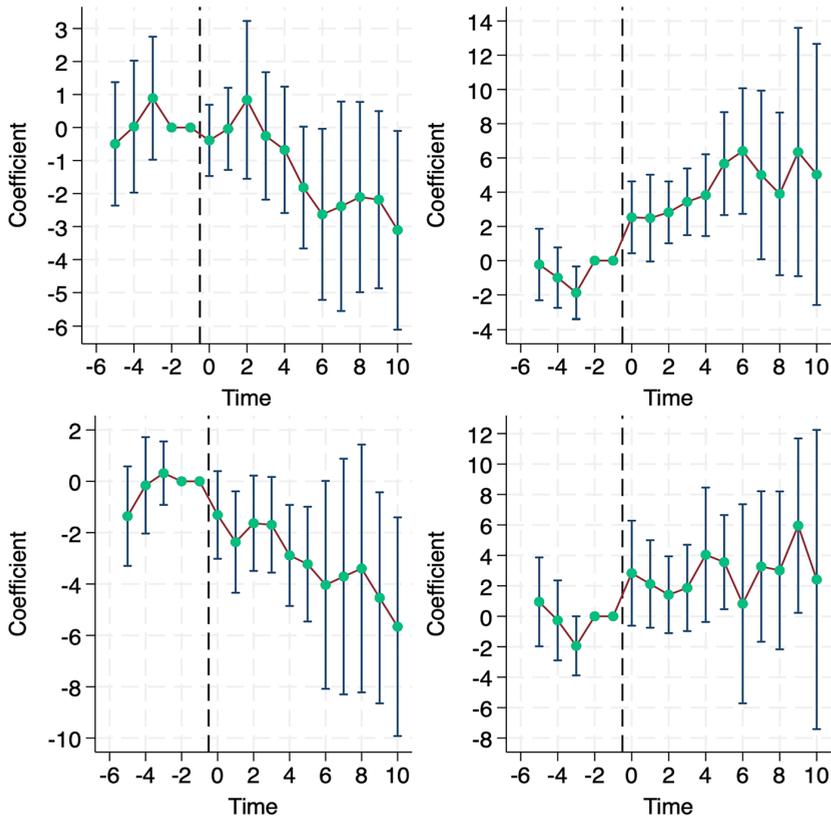


Fig. 17 The effect of switching to a fixed exchange rate on trade and current account balance. Dynamic treatment effects derived from LP-DiD models. Note: The lagged values of the first difference of the dependent variable are included as covariates in the estimation. Top left and top right panels show the CATT for the trade balance under rigid and flexible labor markets respectively (as measured by the Fraser labor market flexibility index). Bottom left and bottom right panels show the CATT for the CAB under rigid and flexible labor markets respectively

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Declarations

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Ethical Approval Ethical approval was not required for this submission.

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The Baltic growth model: Balanced growth under the EMU playbook

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Abstract

This article analyses the growth model (GM) of the Baltic States. Contrary to prevailing accounts in the literature, it argues that following the GFC, the Baltic States transitioned to a balanced GM. While austerity facilitated adjustment during the crisis, the subsequent balanced growth path was conditioned by an increasing wage share, a broad distribution of wage gains across both sheltered and exposed sectors, consumption growth, and robust export performance despite the rising real effective exchange rate. The paper identifies Lithuania as the most clear-cut case of balanced growth over the period 2010–22. Overall, the outcome of the Economic and Monetary Union’s macroeconomic governance regime depends on the institutional features of the economy and may not necessarily result in purely export-led growth. Furthermore, balanced GMs can emerge without strong wage coordination but can be supported by alternative configurations, with labour market flexibility playing a prominent role in the Baltics.

Keywords

Baltic States, growth model, balanced growth, Economic and Monetary Union, euro area, labour market flexibility

Introduction

The Baltic States constitute a successful story of convergence with the European Union (EU) average. Following a deep contraction in 2009, they experienced sustained growth up to the global pandemic in 2020, quickly moving up the ladder of income. From 2010 to 2022, they grew from 2.26 (in Latvia) to 3.45% (in Lithuania) on average (IMF WEO; see [Online Appendix](#) for data sources mentioned in the text), overtaking even some of the older EU member states in Southern Europe as measured by purchasing power-adjusted GDP per capita (Eurostat).

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How can we account for these macroeconomic developments in the Baltics from the perspective of Comparative Political Economy (CPE)? In the years before and after the Global Financial Crisis (GFC), a significant share of scholarly attention to the Baltic States laid within the Varieties of Capitalism (VoC) approach (Hall and Soskice, 2001). Although based on micro foundations, the VoC was seen as able to provide insights on macroeconomic issues (Behringer and Van Treeck, 2022; Hope and Soskice, 2016; Kuokštis, 2015; Soskice, 2007). Among these insights was that ‘purer’ models of capitalism should be able to outperform hybrid modes of coordination – hence the laggard post-crisis growth of the Mediterranean Mixed Market Economies (MMEs) such as Greece, Spain, or Italy (Hall and Gingerich, 2009; Hancké et al., 2007: 14). The Baltics were often characterized as close to Liberal Market Economy (LME)-type, although short of several important elements, such as developed equity markets and dispersed shareholder ownership (Feldmann, 2013; Kuokštis, 2011; Norkus, 2008). Lacking institutional coherence from the VoC perspective, one would expect sub-par performance of the Baltics. Nevertheless, growth outcomes have surprised on the upside.

The more recent CPE scholarship has shifted its focus from supply-side firm-centred institutional equilibria in VoC to demand-side growth models (GMs), grounded in post-Keynesian assumptions about macroeconomics (Baccaro et al., 2022; Baccaro and Pontusson, 2016, 2020; Hall, 2018; Johnston and Regan, 2018). In this strand of literature, the Baltic States were previously seen as a domestic demand-led GM that generated a boom-bust cycle before the GFC (Bohle, 2018; Dünhaupt and Hein, 2019). It is sometimes seen as having maintained a domestic consumption orientation after the GFC (Bohle and Regan, 2022), putting the Baltics’ growth prospects into question due to the lack of major new FDI after the end of pre-crisis inflows, dependence on external EU financing (Bohle and Jacoby, 2017), as well as high inflation and its negative effects on price competitiveness (Medve-Bálint and Szabó, 2024).

During the post-crisis period, the Baltic States have implemented the macroeconomic regime of the Economic and Monetary Union (EMU) in terms of its fiscal rules and macroeconomic and financial stability measures. As suggested by Blyth and Matthijs (2017), linking macroeconomic regimes with GMs is necessary to generate insights into the economic policy drivers of the different modes of growth. Within the GM literature, the post-crisis EMU macroeconomic regime is seen as promoting export-led growth (Bramucci, 2023; Hein and Martschin, 2021; Johnston and Matthijs, 2022; Regan, 2017). Indeed, there is substantial evidence that the role of exports in the Baltics has increased significantly after the GFC in driving economic expansion (Baccaro and Hadziabdic, 2023; Dünhaupt and Hein, 2019; Kalanta, 2020, 2024; Picot, 2020).

The export-led strategies are seen as having faltered in the Mediterranean economies, which, just like the Baltics, had been domestic demand-led before the GFC (Hein and Martschin, 2021). This under-performance has been attributed to the aggregate demand policies supported by the EMU (Stockhammer and Novas Otero, 2023). While increasing the role of net exports by suppressing imports, they are deemed as having delivered stagnation rather than a genuine reorientation towards export-led growth (Kohler and Stockhammer, 2021). In this regard, one may have expected a similar result in the Baltics.

This paper aims to locate the Baltic States within the classification of the different GMs, focusing on the period 2010–22. Contrary to prevailing accounts that prescribe either a domestic demand-led or export-led model to the Baltics, it argues that the Baltic States ran a *balanced* GM, although one can certainly differentiate between the ‘stronger’ and ‘weaker’ cases among Lithuania, Latvia, and Estonia as regards the adherence to the criteria of balanced growth. While there was a clear strengthening of orientation towards exports in these economies, this facilitated growth of domestic consumption, with the trade-offs between the two demand components mitigated. The wage share increased significantly on the back of robust wage gains that were broadly distributed between the sheltered and exposed sectors. The balanced GM replaced the pre-GFC consumption-led model and

underpinned the economic convergence without generating major pre-crisis imbalances. I further show that among the three Baltic States, Lithuania was an exemplary case of balanced growth over the period observed which was reflected in its strong macroeconomic performance even during the pandemic.

The balanced GM in the Baltics was a result of the interplay of several factors. First, the three countries sustained export growth despite the increasing real effective exchange rate (REER), although sources of non-price competitiveness are easier to identify in Lithuania and Estonia, while they remain less apparent in Latvia. Second, the Baltic countries implemented the EMU's macroeconomic regime after the GFC, which mitigated several demand sources of growth, particularly through constraints on the credit channel, resulting in a transformation of their GM. Third, the EMU's regime interacted with the Baltic States' institutional landscape. The highly flexible and decentralized labour markets conditioned the broad distribution of wage increases and ruled out wage moderation.

This article's contribution is severalfold. First, it adds to the debates on the diversity of growth models in Europe. Second, it presents an alternative account of the post-GFC GM in the Baltics. The strong adjustment during the crisis did not produce a clear-cut case of export-led growth, as the post-crisis growth path was broadly balanced, with consumption supported by robust wage gains. Finally, the paper shows how the GM perspective can accommodate a plethora of institutional and macroeconomic configurations, while still retaining its useful parsimony. The EMU macroeconomic governance regime may not lead to export-led growth depending on the distribution of wage gains and the ability to rely on non-price competitiveness factors, while balanced GMs can emerge without strong wage coordination.

The paper proceeds with a review of the relevant literature regarding the GM in the Baltic States and lays out the main features of balanced growth. Subsequently, I present an empirical analysis of the Baltic GM regarding growth contributions, sources of financing consumption, and the price and non-price competitiveness. I also show how the macroeconomic regime promoted by the EMU translated into a balanced, rather than purely export-led growth. Finally, this is followed by conclusions.

Theory and the case of the Baltics in the literature

The post-Keynesian GM framework has brought back the examination of the sources of expansion of aggregate demand that are mobilized to secure economic growth. In the Baccaro–Pontusson framework applied in this article, three key factors help determine a growth model: (a) the relative importance of consumption and exports; (b) different ways of financing consumption; and (c) the presence or absence of trade-offs between consumptions and exports (Baccaro and Pontusson, 2016: 199; Hassel and Palier, 2020: 12; Baccaro et al., 2022: 12). In Baccaro and Pontusson (2016, 2020), these trade-offs are analysed by evaluating the price sensitivity of exports.

Scholarship generally discusses the dichotomy of two foundational models that replaced the wage-led GM of the Fordist era. The first is domestic demand-led, best exemplified by the United Kingdom and the United States. In this model, growth is (a) driven by domestic demand (in most cases mainly household consumption, therefore consumption-led growth is often used synonymously), which is (b) described as debt-financed, supported by the wealth effect from property prices and credit markets complementing or even substituting wage growth (Reisenbichler and Wiedemann, 2022). Therefore, one of the tendencies of the consumption-led economies is for the current account to show persistent deficits. Finally, (c) exports are not price-sensitive and therefore do not rely on the repression of domestic consumption (Baccaro and Pontusson, 2016: 190).

A prototypical export-led economy (a) relies on foreign demand; therefore, exports play a prominent role in driving growth. In the period 2001–07, the contribution of net exports in Germany

amounted to more than 70% of total growth; an export-led GM also retains a high exports-to-consumption growth ratio (Baccaro and Pontusson, 2016: 187–89). In terms of (b) sources of domestic consumption, corporatist wage-setting institutions promote wage moderation to achieve real undervaluation (Baccaro and Höpner, 2022). This constrains the growth of unit labour costs and thus fosters the external sector's performance, but (c) comes at the expense of depressed demand in the domestic sector. Notably, part of this effect is due to limiting the sheltered sector wage growth relative to wage growth in the manufacturing sector, with Germany being the primary example of this dynamic (Johnston et al., 2014).

The GM framework differentiates between a country's growth strategy and its underlying institutional and political structure, allowing for two parallel strands of change (Streeck, 2016). Growth models are therefore transient arrangements as their evolution does not follow a functionalist logic of optimal efficiency, but instead a path conditioned by both politics and economics. Accordingly, GMs are seen as driven by cross-class social blocks (Amable, 2022) or business-centred growth coalitions (Baccaro and Pontusson, 2022), as well as macroeconomic regimes, which put the combination of economic policy drivers to the forefront (Blyth and Matthijs, 2017; Hein and Martschin, 2021; Kohler and Stockhammer, 2021).

The residual category of MMEs of the Mediterranean is generally described as having transitioned in the direction of export-led growth after the GFC, promoted by the EMU's macroeconomic regime (Baccaro, 2022: 20; Hein and Martschin, 2021; Johnston and Matthijs, 2022; Myrodiadis, 2024). Crucially, scholarship has seen this transition as unsuccessful, as the export sectors of these economies remain too small and uncompetitive (Baccaro, 2022), with the contribution of exports in growth decomposition increasing largely due to domestic demand repression (Kohler and Stockhammer, 2021). The EMU's macroeconomic regime is seen as precluding these economies from generating a domestic demand boost to achieve a higher equilibrium output (Kohler and Stockhammer, 2021).

The GM perspective sheds light on several important issues pertinent to the evolution of modern capitalist economies. It shows that the interaction of export-led and domestic demand-led GMs can generate macroeconomic imbalances. This effect is especially pronounced in a monetary union, where wage moderation in export-led economies cannot be countered by nominal devaluation (Hall, 2018; Iversen et al., 2016; Johnston and Regan, 2016). By putting the distribution of income at the centre of analysis, the growth model literature also argues that export-led and consumption-led growth have distinct implications for income inequality (Behringer and Van Treeck, 2022).

A closely related strand of scholarship has also emphasized the effects of the global trend of financialization on the evolution of growth models. It associates the rise of global finance with a falling wage share, lower investment in capital stock, and increased shareholder power (Hein, 2012). In response, different 'demand and growth regimes under financialization' emerged to cope with these depressive macroeconomic effects (Hein and Martschin, 2021). The regimes are based not only on relative contributions of aggregate demand components but also on sectoral financial balances. The latter allows both a more elaborate discussion of the *sources* of growth component financing and the related financial instabilities, while also helping to establish a more detailed taxonomy of growth regimes (Hein, 2019: 980; Hein et al., 2021; Hein and Martschin, 2021; Kohler and Stockhammer, 2021: 1315).

In the GM literature, the Baltic States are often described as primarily domestic demand-led, especially in the period before the GFC (Bohle, 2018; Dünhaupt and Hein, 2019). Several authors argued that after a deep internal devaluation during the crisis, orientation towards a domestic demand-led model stayed intact (Bohle, 2018; Bohle and Regan, 2022), as suggested by domestic inflationary pressures and a quick return to an appreciating REER (Medve-Bálint and Szabó, 2024).

However, this account merits revisiting. Labelling the Baltics' GM as domestic demand-led post-crisis appears inconsistent with improved external positions, reduced household debt, and strong

export performance, explored in the subsequent sections. Indeed, several scholars have shown that a shift *has* taken place in the Baltic growth model towards export-led growth (Baccaro and Hadziabdic, 2023; Dühaupt and Hein, 2019; Kalanta, 2024; Picot, 2020).

While the role of exports has certainly increased in the Baltic macroeconomic performance, the Baltic economies do not easily fall into the export-led category either. First, consumption continues to be an important driver of growth, resulting in steadily increasing REER. Furthermore, as noted by Kalanta (2020), the Baltics lack the foundation of a prototypical export-led model – namely, wage coordination. This calls for an explanation of drivers of export-led growth, for example, in terms of a macroeconomic regime (Hein, 2019). Overall, the post-GFC developments in the Baltic States GM merits further investigation.

Balanced growth

Scholarship has also identified a balanced GM, exemplified by Sweden (Baccaro and Pontusson, 2016, 2020), but also the broader group of Nordic countries, France, and Ireland before the crisis (Høgedahl et al., 2024; Johnston and Matthijs, 2022: 121). In terms of (a) the relative importance aggregate demand components, balanced growth is driven by both exports and private consumption. A balanced economy *can* be export-led in a sense that exports constitute a primary vehicle for growth. However, under a balanced model, exports allow for more consumption growth than in a purely export-based economy. As put by Erixon and Pontusson (2022: 268):

‘Both economies were export-led but export growth generated more consumption growth in Sweden than in Germany, and thus boosted growth of import-competing goods and sheltered services. It is in this specific sense that the Swedish growth model of 1994 to 2007 can be characterized as “balanced”’.

While the GM framework is more focused on the structural composition of demand components, temporal dynamics can also be important. In a balanced economy, different growth drivers can take the lead over the business cycle. As put by Baccaro (2022: 19), under a balanced model, exports can pull the economy out of a recession, with consumption then driving the expansion. Nevertheless, consumption growth should not crowd out the growth of exports (and vice versa), which means that the growth ratios of these components should remain relatively stable over the long term. This is because under balanced growth, there is no substantial trade-off between the growth of exports and the growth of domestic demand as exports do not rely on wage restraint (Baccaro and Pontusson, 2016: 189), while wage gains are allowed to diffuse across sectors, as discussed below.

As regards (b) financing of consumption, the dynamics of the distribution of wage gains are at the core of the balanced GM’s viability. Barredo and Buendía (2024) showed how private credit growth facilitated a ‘hybrid’ growth model in Sweden during the period of 2000–08. This aligns with Baccaro et al. (2022) who argue that Sweden retains features of wage-led model while also relying on debt-financed consumption. Unlike Germany, Sweden is characterized by a balanced wage growth between the sheltered and exposed sectors (Høgedahl et al., 2024). A ‘German-style dualization’ is avoided, as the service sector in Sweden is well-organized, resulting in service sector wages being stable relative to manufacturing (Thelen, 2020: 214). Coordinated bargaining can thus serve not only as a mechanism of wage restraint but also of wage growth diffusion, supporting consumption.

As for (c) the trade-off between consumption and exports, balanced GM solves it by relying on non-price competitiveness. As argued by Thelen (2020), the structure of organized labour in Sweden, particularly the union strength in lower-end sheltered sectors, contributed to an increased reliance on higher-end, more knowledge-intensive segments of manufacturing and services. As a

result, there is an absence of a significant trade-off between consumption and exports (Baccaro, 2022: 19).

Against this background, I now turn to an empirical analysis of the growth model of the Baltic States, based on the three dimensions discussed above – the relative importance of consumption and exports, the financing of consumption, and the price and non-price competitiveness.

Empirical analysis of the Baltic States' growth model

The relative importance of consumption and exports

Following one of the deepest contractions in the world during the GFC, the Baltics States mounted a strong recovery, defying pessimistic predictions. To what extent can we consider the Baltic GM as export-led in the period after the GFC, as suggested by some CPE scholars? As in the GM literature, Table 1 reports the yearly growth contributions of different aggregate demand components during the analysed period. Table 1 also includes information on financial balances of public, household, and corporate sectors, as well as the current account balance, and distinguishes between three periods: 2001–07, the post-crisis period from 2010 to 2019, and the subsequent years affected by the global pandemic (2020–22). The data for 2010–19 is disaggregated into the immediate post-crisis years 2010–13, and subsequent 3-year periods from 2014–16 to 2017–19.

Several conclusions can be drawn from the data. First, there was a pronounced shift in the Baltics' GM after the GFC. In 2010–2019, the contribution of net exports turned from markedly negative in all the countries to positive in the case of Lithuania, and slightly negative in the case of Latvia and Estonia. It increased during the pandemic in 2020–22 in Lithuania but fell somewhat in both Latvia and Estonia. The deep pre-crisis current account deficits turned to broadly balanced current accounts, becoming positive in Lithuania and Estonia in 2010–19 and slightly negative in Latvia. As shown by Staehr (2024), while GDP growth in the Baltics was associated with a deteriorating current account before the GFC, the reverse was the case after the GFC, as growth was associated with an improving current account. The change in the GM dynamics after the GFC took place primarily on the back of the private sector deleveraging, including by the corporate sector. This aligns with the financialization literature that has captured the change of the previous 'debt-led private demand boom' economies after the GFC due to private deleveraging (Hein, 2019; Hein et al., 2021).

Second, looking at temporal developments, exports played a crucial role in pulling the three countries out of the GFC. Between 2010 and 13, the contribution of exports (without subtracting imports) to growth was higher than in 2001–07 in all three Baltic States, despite the significantly lower GDP growth rates. During this period, real export growth in the Baltics averaged 11.8%, with Estonia and Lithuania leading the EU (AMECO). During this period, the exports-to-GDP ratio increased significantly, rising from an average of 50.0, 38.6, and 61.3% in Lithuania, Latvia, and Estonia 2001–07 to 74.5, 61.3, and 79.0% in 2010–22, respectively (Eurostat). Export contributions declined in 2014–16 due to Russia's military intervention in Ukraine, prompting the Baltics adjust further away from the Russian market. Export contribution bounced back strongly in Lithuania in 2017–19, while the subsequent increase was somewhat lower in Latvia and Estonia.

Finally, despite the importance of exports, net exports' contribution to growth over 2010–22 was relatively low, or slightly negative in the case of Latvia and Estonia, reflecting the strong performance of imports and, in turn, domestic consumption. Table 1 reports the ratios of real export growth (A) to consumption growth (B) (A/B ratio). The ratio was low (below 1.5) in the run-up to the GFC in all three economies, reflecting the dynamics of a domestic demand-led model relying on rapid consumption expansion. The ratio increased post-crisis, averaging 3.07 in Lithuania, 2.01 in

Table I. Indicators on the Growth Model of the Baltic States.

	Lithuania					
	2001–7	2010–13	2014–16	2017–19	2010–19	2020–22
Real GDP growth	8.11	3.79	2.67	4.23	3.61	2.9
Consumption contr.	6.04	0.92	2.46	1.92	1.68	1.26
Investment contribution	3.43	1.25	0.84	1.67	1.25	1.42
Government contribution	0.53	-0.07	0.03	-0.02	-0.03	0.07
Exports contribution	6.33	7.90	1.23	7.22	5.70	7.31
Imports contribution	-8.64	-6.74	-2.71	-5.39	-5.13	-6.20
Net exports contribution	-2.31	1.15	-1.48	1.84	0.57	1.11
Current account balance	-7.78	-0.84	0.03	1.72	0.19	0.85
Public sector balance	-1.35	-4.68	-0.84	0.49	-1.98	-2.73
Household sector balance	-0.50	0.49	-2.91	-2.75	-1.50	2.93
Corporate sector balance	-5.60	7.35	5.48	5.17	6.14	2.40
Real exports growth (A)	13.78	12.27	1.85	10.14	8.50	9.69
Real consump. growth (B)	9.40	1.57	4.00	3.16	2.77	2.29
A/B	1.47	7.82	0.46	3.21	3.07	4.23
Latvia						
Real GDP growth	8.97	1.79	2.72	2.63	2.32	2.06
Consumption contr.	6.52	2.56	1.32	1.25	1.79	1.52
Investment contribution	4.83	1.05	-1.01	1.67	0.62	0.22
Government contribution	0.79	-0.24	0.50	0.69	0.26	0.69
Exports contribution	4.40	4.74	2.83	2.15	3.39	4.38
Imports contribution	-8.34	-5.50	-1.78	-3.55	-3.80	-5.17
Net exports contribution	-3.94	-0.76	1.04	-1.41	-0.41	-0.79
Current account balance	-13.04	-2.14	0.07	0.30	-0.74	-2.17
Public sector balance	-1.27	-4.0	-1.08	-0.61	-2.10	-5.39
Household sector balance	-3.86	-2.14	-1.20	1.24	-0.84	3.0
Corporate sector balance	-6.72	6.51	4.34	0.82	4.15	1.77
Real exports growth (A)	10.94	9.05	4.51	3.43	6.00	6.73
Real consump. growth (B)	10.53	4.24	2.21	2.10	2.99	2.80
A/B	1.04	2.13	2.04	1.63	2.01	2.40
Estonia						
Real GDP growth	7.72	3.87	2.75	4.35	3.68	1.44
Consumption contr.	5.13	1.54	2.29	1.91	1.88	1.54
Investment contribution	4.76	2.66	-0.10	2.54	1.79	0.84
Government contribution	0.64	0.35	0.44	0.40	0.39	0.41
Exports contribution	6.83	9.86	1.55	3.16	5.36	5.37
Imports contribution	-10.29	-10.10	-1.62	-3.23	-5.49	-6.79
Net exports contribution	-3.47	-0.24	-0.07	-0.08	-0.14	-1.42
Current account balance	-11.63	0.27	1.01	1.41	0.83	-3.34
Public sector balance	1.66	-0.10	0.34	-0.41	-0.06	-3.02
Household sector balance	-4.67	0.20	1.54	2.08	1.17	-1.0
Corporate sector balance	-6.97	3.22	1.01	1.46	2.03	4.8
Real exports growth (A)	11.23	13.99	2.00	4.24	7.47	7.70
Real consump. growth (B)	9.35	3.03	4.41	3.71	3.65	3.07
A/B	1.20	4.62	0.45	1.14	2.05	2.51

Sources: Data for real GDP growth is from the IMF WEO database. Data for growth contributions, current account balance, public sector balance, and exports/consumption are from the AMECO database: online data codes CVGD0 (consumption contribution), CVGD2 (investment contribution), CVGD1 (government contribution), CVGD6 (exports contribution), CVGD8 (imports contribution), CVGD9 (net exports contribution), BPM6 (current account balance), UBLG (public sector balance), OXGS (exports at constant prices), and OCPH (household consumption at constant prices). Data for household sector balance and corporate sector balance are from OECD (Net lending/borrowing by sector).

Latvia, and 2.05 in Estonia in the period 2010–19, prior to the pandemic. These values are comparable to Sweden's (2.7) as reported in Baccaro and Pontusson (2016: 187), a balanced model, but lower than Germany's (8.6), an export-led model, and higher than the UK's (1.4), a domestic demand-based economy.

Examining the temporal developments of the A/B ratio over the post-crisis period, consumption growth did not appear to crowd out export growth (or vice versa) during 2010–22. In 2010–13, exports grew rapidly in Lithuania and Estonia, far outpacing consumption. This trend reversed in 2014–16, when consumption surged, and the ratio of exports-to-consumption growth (A/B) fell below 1.0. Despite this, exports bounced back in subsequent periods, with the ratio exceeding 3.0–4.0 in Lithuania and 1.0–2.5 in Estonia during 2017–19 and 2020–22, respectively. This suggests no clear trade-off between the growth of the two components during post-GFC, as exports recovered despite robust consumption expansion. These dynamics are in line with the stipulation by Baccaro (2022: 19) discussed in the theoretical Section 2.1, namely that under a balanced model, the impact of exports and consumption can vary depending on the stage of the business cycle, but over the long term, one component should not permanently crowd out the other. In Latvia, the ratio has remained somewhat more stable across the analysed period, from 1.63 in 2017–19 to 2.40 in 2020–22, also supporting the view that consumption and exports grew hand-in-hand. If a trade-off existed, a negative correlation between consumption and export growth would be expected. Instead, correlation coefficients are weakly positive in Lithuania (0.069) and Estonia (0.014), and moderately positive in Latvia (0.395) over 2010–22. The [Online Appendix](#) provides a scatter plot visualizing this relationship after the GFC, with fitted trend lines for each country. Section 3.3 further examines the export–consumption trade-off in terms of price and non-price competitiveness.

Overall, the post-GFC trajectory of all three Baltic States is consistent with a balanced growth path, although to a differing extent across countries.¹ Exports were an engine of growth, especially immediately after the GFC, as reflected in exports contributions and the increased exports-to-GDP ratio. However, the orientation towards exports went together with robust consumption growth which did not cause current account imbalances typical of domestic demand-led economies. Lithuania's stronger export performance from 2017 onwards, with positive net exports and small current account surpluses, renders Lithuania the most strongly balanced economy over the entire period observed. Estonia and Latvia may have been transitioning to domestic demand-led growth over 2020–22, even though the household sector balances did not deteriorate significantly over this period (and improved in the case of Latvia).

Sources of financing consumption

Domestic demand under a balanced model can be sustained by two principal sources: credit and wages. In terms of the former, a clear structural break can be seen in the data for the Baltics, with household debt substantially decreasing and stabilizing at lower levels than before the crisis (see [Figure 1](#)).

Although the credit channel was mitigated, household consumption continued to be supported by wage gains. [Figure 2](#) maps indices for real hourly labour compensation in services and manufacturing, with values set to 100 in 2009. It includes the Baltic States, as well as Sweden and the Southern economies of Italy and Greece for comparison, based on the theoretical insights regarding the application of the EMU macroeconomic governance regime. Looking at the case of the Baltics, wage growth in lower-end services did not trail behind the manufacturing sector – on the contrary, it was closely aligned. This shows a striking similarity to the case of Sweden, a prototypical case of a balanced GM. By contrast, in Italy and Greece, wages in services trail behind manufacturing – a dynamic similar to wage restraint prevalent in export-led economies (as discussed by [Afonso et al. \(2022\)](#), Mediterranean countries showed some capacity for wage restraint after the GFC).

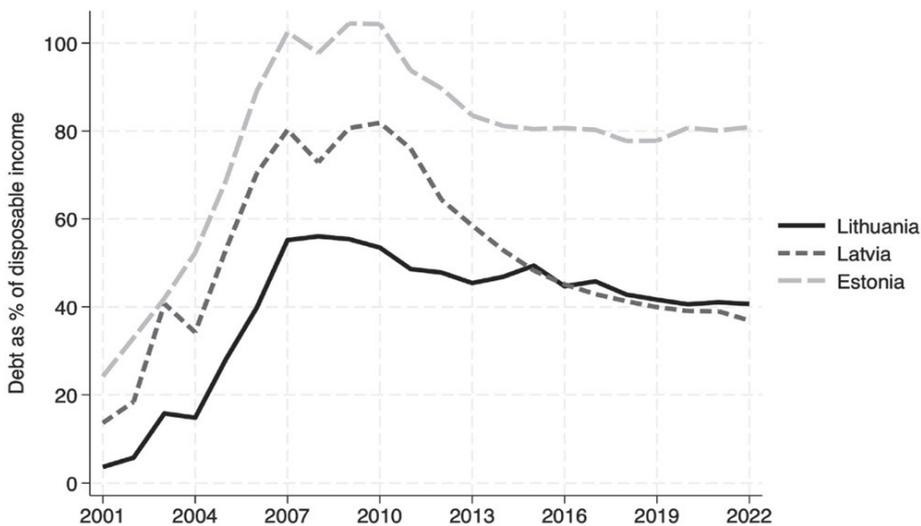


Figure 1. Household debt in the Baltic States (% of net disposable income), 2001–2022.

Source: OECD National Accounts Statistics.

In the case of the Baltics, broad-based wage increases resulted in increasing wage share, positively affecting domestic demand, as seen in consumption contribution figures in Table 1. Indeed, over the period of 2010–22, including the inflationary pandemic shock, the *real* average annual wage growth amounted to 2.84% in Estonia, 3.84% in Latvia, and 3.85% in Lithuania (OECD). Figure 3 shows how the wage share significantly decreased in the Baltics during the crisis and its immediate aftermath, but was steadily increasing afterwards (with Latvia and Estonia even overtaking Sweden).

The broad-based distribution of wage increases in all three Baltic States helped achieve a more balanced growth that did not rely solely on exports. The wage dynamics suggest that wage growth in the tradable sector, unlocked by productivity increases on the back of external demand, spilled over to real wage increases across sectors. This would be in line with Balassa–Samuelson effects which were observed in the Baltics (IMF, 2014; Meshulam and Sanfey, 2019; Wolf, 2016). The GM in the Baltics was therefore balanced in the sense that increasing exports helped create more demand than in a prototypical export-led economy with wage moderation.

Price and non-price competitiveness in the Baltics

Balanced growth typically rests on non-price competitiveness factors to support external performance without negatively affecting domestic demand (Baccaro and Pontusson, 2020; Erixon and Pontusson, 2022). As discussed by Barredo and Buendía (2024), non-price competitiveness strategies were key in running Sweden’s ‘hybrid’ model during 2000–08.

All three Baltic States experienced a significant drop in real unit labour costs and REER after the GFC, which eventually caught-up with pre-crisis levels in 2017–18. This is to be expected, given the robust real wage developments in these economies. However, this did not prevent a robust export performance. Figure 4 plots the log of exports of goods and services at constant prices and REER, with base value in 2009 set to 100. From 2012 onwards, both exports and REER were growing simultaneously in all three economies.

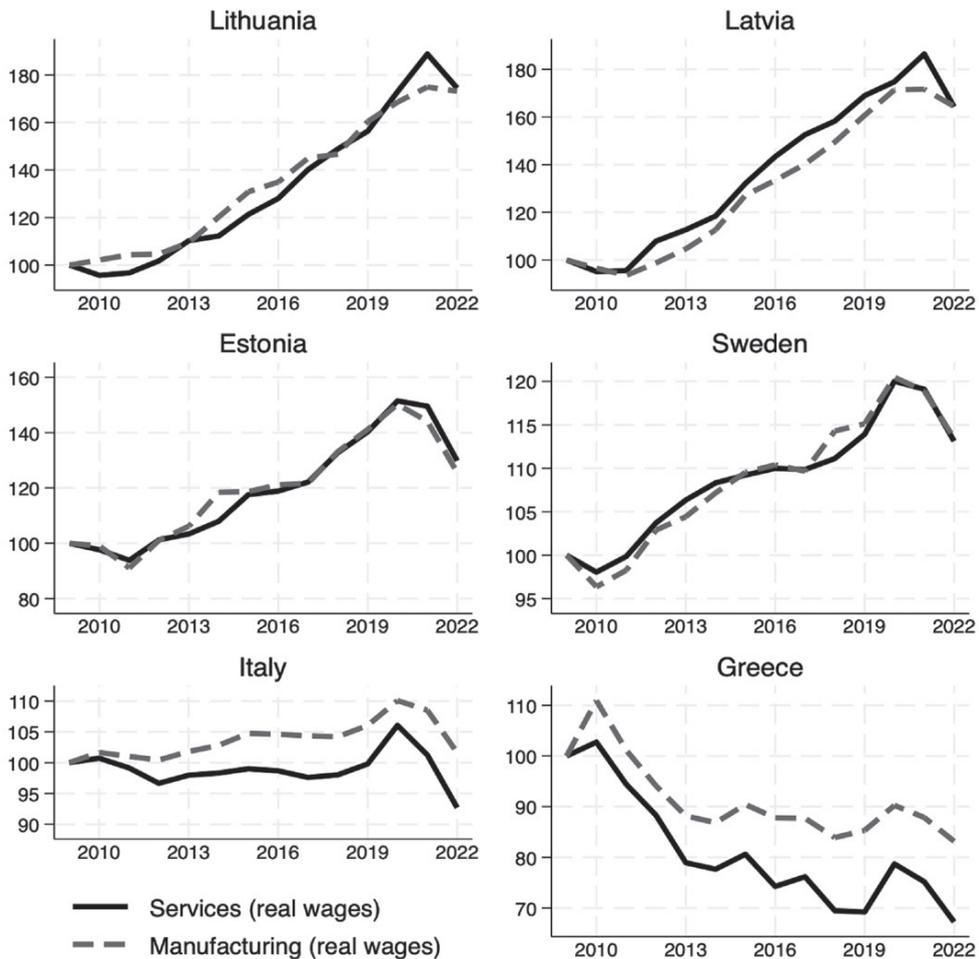


Figure 2. Real hourly labour compensation (manufacturing and services), 2010–2022.
 Note: ‘Manufacturing’ includes sectors under ISIC Rev. 4 Section C. ‘Services’ includes sectors under ISIC Rev. 4 Sections G–I: Wholesale and retail trade, Transportation and storage, Accommodation and food service activities. Source: OECD Compendium of Productivity Indicators and IMF WEO.

Table A1 in the Appendix reports the results of models estimating the yearly log change in real exports for goods and services separately on the yearly log change in REER (ULC-based), controlling for EU growth. The analysis follows the approach of Baccaro and Pontusson (2016, 2020) and provides further (and more heterogeneous) insights into the price sensitivity of Baltic exports over the period 2010–2022. In Lithuania, neither goods nor services exports were price-sensitive at conventional levels of statistical significance, with the REER coefficient for goods exports significant only at the 10% confidence level. For Latvia and Estonia, goods exports were negatively associated with REER, with a highly significant negative coefficient (in Latvia, a 1% increase in REER was associated with a 1.1% decrease in *growth* of goods exports, and a corresponding 2.26%

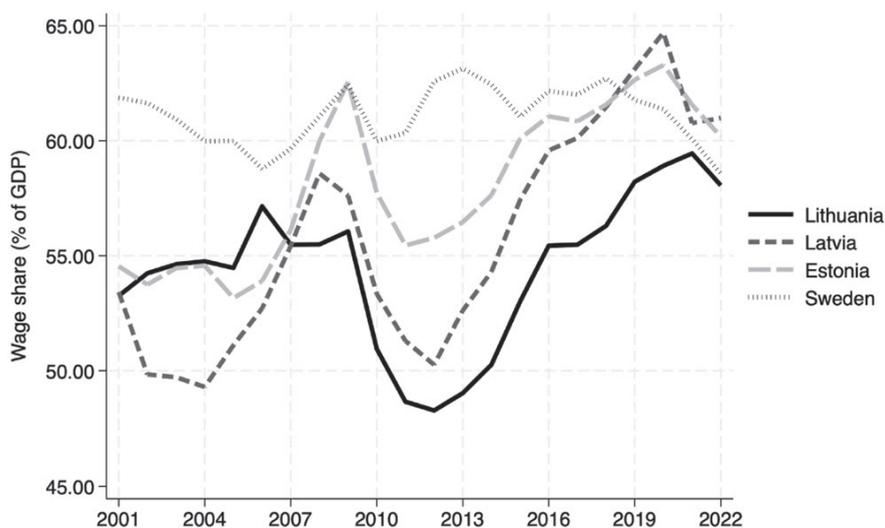


Figure 3. Adjusted wage share as percentage of GDP at current factor cost for the Baltic States and Sweden (2001–2022).

Source: Data from the AMECO database (online data code: ALCD2).

decrease in Estonia). In terms of service sector exports, they were not price-sensitive in Estonia, as indicated by the non-significant REER coefficient. In Latvia, services exports were positively associated with REER, suggesting that a real appreciation was linked to higher services exports. This indicates that rising prices did not negatively impact demand for Latvia's services.

While a deeper investigation is warranted regarding the price-sensitivity factors, separate explanations for the three economies lie behind the robust export performance in view of appreciating REER. Figure 5 plots labour productivity in the exposed manufacturing sector and medium and high-tech manufacturing value added in the Baltic States during 2009–2022. The figure shows that all three countries managed to substantially increase labour productivity in the tradable goods sector over the analysed period, which allowed for increases in real wages, although the productivity gains were largest in Lithuania and Estonia, with Latvia lagging behind.

As suggested by the figure, the productivity increase in Lithuania can be associated with an increased share of medium and high-tech manufacturing value added. More specifically, looking at the available Eurostat data, it was the medium–high technology manufacturing that increased the most: from 2010 to 2020, the share of medium–high manufacturing value added at factor cost in total manufacturing value added increased from 19.1% to 25.2%, while the share of high-technology manufacturing only increased from 3.9 to 5.1% (Eurostat). Such upgrading could be associated with strong capital deepening in the post-crisis period, sustaining Lithuania's balanced GM. From 2010 to 2022, net capital stock per person employed increased by 36.7% (AMECO).

In Latvia, medium and high-tech manufacturing value added grew less than in Lithuania, while the net capital stock *decreased* by 6.1%. However, Latvia has a lower share of capital-intensive industries compared to the other Baltic States (IMF, 2024). Less capital-intensive sectors experienced stronger post-GFC labour productivity growth, benefiting from technological advancements without significant capital deepening. Nevertheless, evidence in Table A1 suggests that price competitiveness factors did play a role in Latvia's goods exports. This, together with manufacturing

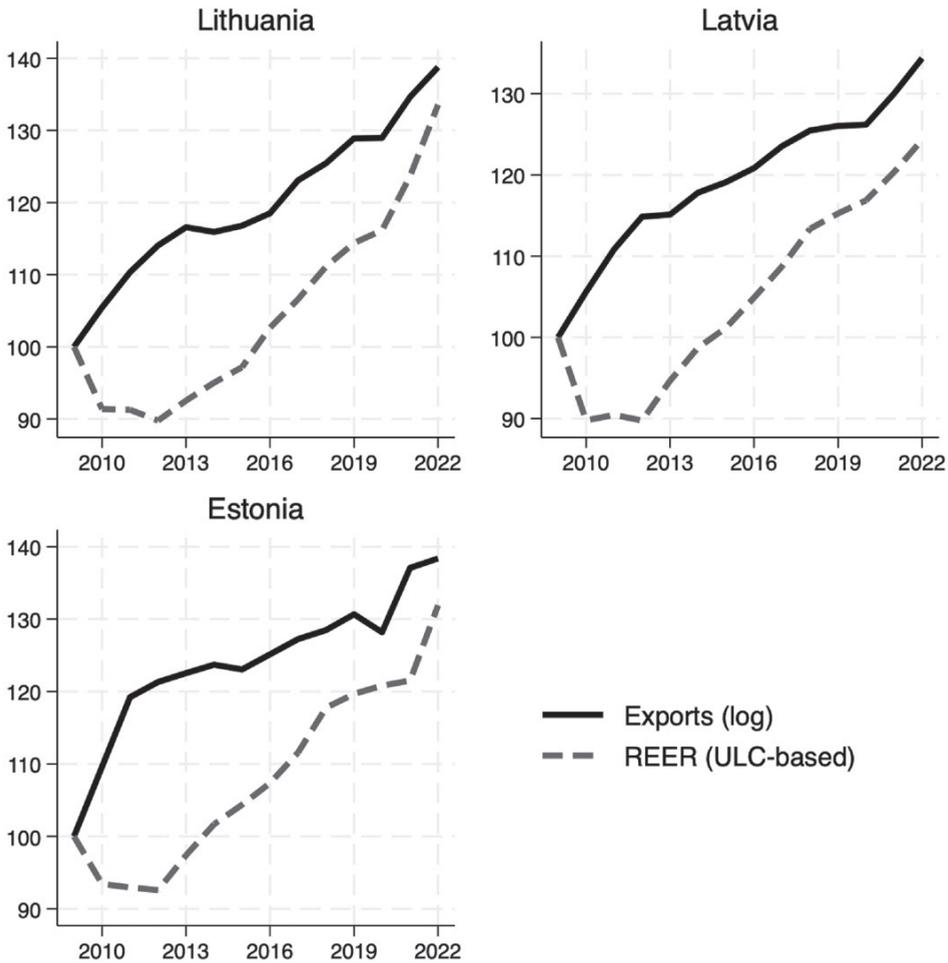


Figure 4. Exports (log) and REER (ULC-based) in the Baltic States (2010–2022).

Source: Elaborations on data from AMECO (Exports of goods and services at constant prices, online data code: OXGS) and DG ECFIN (Real Effective Exchange Rate, Price and Cost Competitiveness data).

productivity gains being the lowest among the Baltics, aligns with the overall poorer economic growth performance of Latvia over 2010–22 compared to Lithuania and Estonia.

In Estonia, an important source of non-price competitiveness stemmed from outside of the manufacturing sector. As documented by Kalanta (2024), dynamic and particularly ICT service exports significantly contributed to Estonia's growth during post-crisis period, more so than in the other Baltic countries. The share of ICT and financial and insurance activities in Estonia's gross value added stood at 11.9% in 2022, compared to 9.4% in Latvia and 7.9% in Lithuania (Eurostat). Service exports as percentage of total exports were highest in Estonia over 2010–22 and averaged 32.5%, compared to 28.5% in Latvia and 24.7% in Lithuania (AMECO). As shown in Table A1, service exports in Estonia were not price-sensitive.

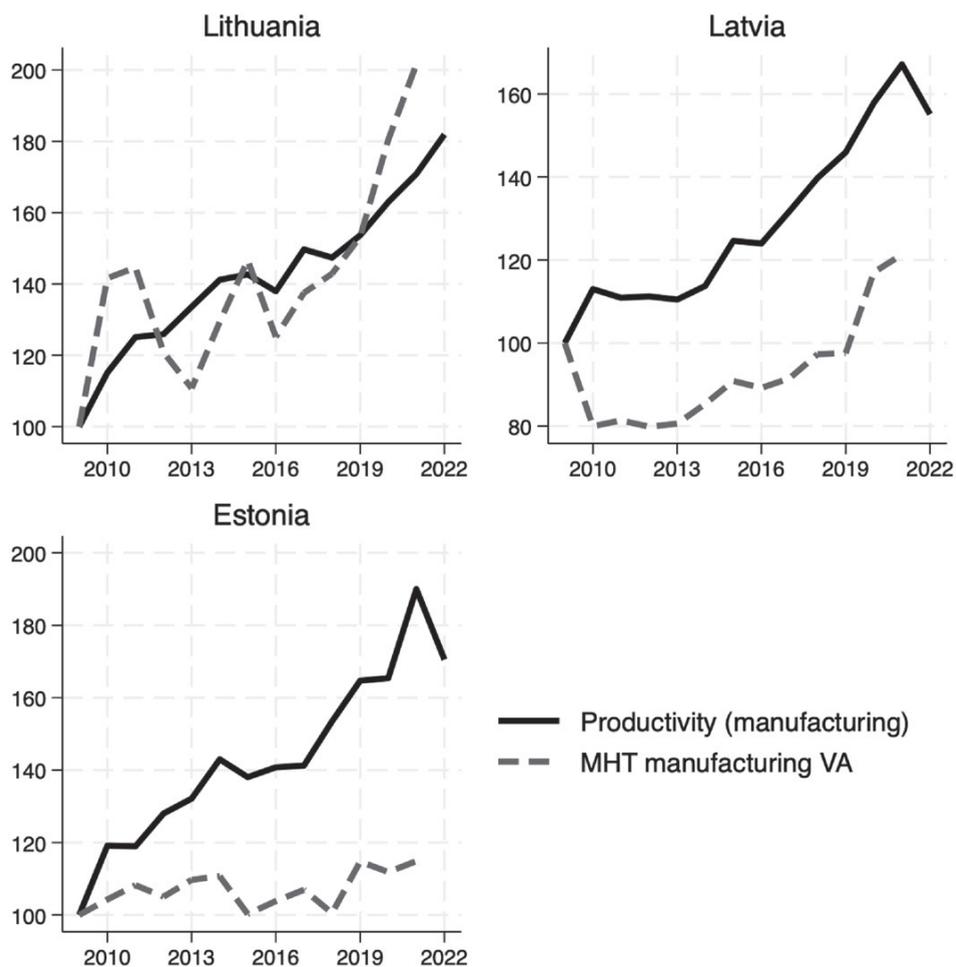


Figure 5. Labour productivity and medium and high-tech manufacturing value added in the Baltic States (2010–2022).

Note: The figure displays the evolution of gross value added in manufacturing per hour worked (constant prices) and medium and high-tech manufacturing value added as a share of manufacturing value added. Source: Own elaborations on data from OECD Compendium of Productivity Indicators and World Development Indicators.

Overall, in all three countries exports grew despite the appreciating REER, though the degree of reliance on non-price competitiveness factors varied. These factors were strongest in Lithuania, which saw upgrading in the tradable goods sector, and Estonia, in which higher value-added dynamic services played a more prominent role. This facilitated balanced growth, as export performance supported robust wage gains and allowed a sizable contribution of consumption to GDP growth. While Latvia's manufacturing sector saw productivity increases post-GFC, the lack of upgrading made its exports more susceptible to price pressures. Accordingly, real wage growth (and economic growth) was lowest in Latvia over 2010–22.

Considering the empirical evidence presented in these sections, all three Baltic States followed a balanced growth path after the GFC. However, Lithuania can be considered as an exemplary case as it best fits the related criteria of a balanced GM, while Latvia aligns the least, with Estonia falling in between.

EMU's macroeconomic regime in the Baltics

To better account for the dynamics outlined in the previous section, I proceed with the underlying macroeconomic regime analysis of the Baltics. The post-Keynesian notion of macroeconomic regimes considers the complete macroeconomic policy mix of monetary, wage and fiscal policies, as well as their interactions within a specific institutional context (Blyth and Matthijs, 2017; Hein and Martschin, 2021).

The pre-crisis consumption-led growth generated major imbalances in the form of large and persistent current account deficits. From 2003–07, cumulative net capital inflows were 85% of 2003 GDP in Lithuania, 111% in Estonia, and 166% in Latvia (Bakker and Gulde, 2010). Expansionist policies and capital inflows, while enabling domestic demand-led growth, drove credit expansion, real estate bubbles, and foreign-currency denominated external debt. The latter was an important factor behind the three countries refusing to devalue their currencies and instead undertaking a heavily front-loaded internal devaluation when the crisis hit (Walter, 2016).

Post-crisis, the macroeconomic regime shifted, primarily guided by the EMU's macroeconomic governance rules, in particular the Stability and Growth Pact. The commitment to macroeconomic rebalancing initially stemmed from the goal of meeting the euro adoption criteria (Dandashly and Verdun, 2020). It was spurred on by the painful crisis experience outside of the single currency area: the government bond spreads rose rapidly, reflecting the risk of currency devaluation. More broadly, the geopolitical context and strong pro-European sentiment ensured that the 'EU leash' on macroeconomic policy remained largely uncontested (Medve-Bálint and Szabó, 2024).

Throughout 2010–19 (before fiscal expansion induced by the pandemic), the Baltics pursued relatively conservative fiscal policies. In 2010–19, structural balances improved in 5 of 10 years in Estonia (which maintained positive structural balances even before the crisis), 6 years in Latvia, and 7 years in Lithuania. Average annual changes were +0.01, +0.42, and +0.72 percentage points, respectively (IMF WEO). Policymakers adhered to the EMU's fiscal rulebook without providing significant demand stimulus.

A key structural shift occurred in financial stability policy. From 2007 to 2019, all three Baltic States implemented macroprudential measures to curb mortgage credit growth, one of the main engines of the domestic demand-led model prior to the GFC, including loan-to-value ratios, debt service-to-income limits, and loan maturity caps (European Systemic Risk Board, 2024). This comprehensive set of macroprudential instruments is one of the largest in the EU and is considerably wider than in demand-based economies, such as the United Kingdom. Accordingly, household debt stabilized at lower levels after the GFC, as shown in Figure 1.

Overall, policymaking in the Baltics focused on avoiding macroeconomic imbalances that resulted in the painful crisis experience. After the GFC and up to 2022, only Estonia (once in 2016) was identified as warranting an 'in-depth review' under the EU's Macroeconomic Imbalance Procedure (European Commission, 2024). However, the top-down application of EU macroeconomic policy stance did not kill off domestic demand which would have resulted in an export-led model, as explained below.

The importance of labour market flexibility

From a GM perspective, the key institutional domain is labour market institutions and collective bargaining structures, as they directly affect income distribution brought into the forefront by the GM literature. In the case of the Baltic States, the literature characterizes them as having a very high degree of labour market flexibility (LMF) (Masso et al., 2015; Staehr, 2017). First, the existing regulations are characterized by a lax enforcement. As put by Eamets (2013), even where regulation is formally rigid, a high degree of flexibility is observed in practice at the micro level.² This stems from a somewhat limited state capacity to impose formal rules and a strong position of the employers vis-à-vis their employees (Kuokštis and Vilpišauskas, 2022; Purifield and Rosenberg, 2010), which can in part be explained by the predominance of small and medium enterprises (SMEs) with concentrated ownership (Kalanta, 2020).

Second, the bargaining structure in the Baltics is extremely decentralized, with very low bargaining coverage and union density. Bargaining coverage stands at 26.6, 27.1, and 19.1%; and union density at 10.0, 11.6, and 6.0% in Lithuania, Latvia, and Estonia, respectively (OECD/AIAS ICTWSS). These figures are in direct contrast to Sweden, a balanced GM, where the corresponding estimates are 88.0 and 65.2%. However, as per Calmfors–Driffill hypothesis, both highly centralized and decentralized systems can perform similarly in terms of the macroeconomic outcomes (Calmfors and Driffill, 1988; Soskice and Iversen, 2000). This is evident in various labour market outcome variables. Rusinova et al. (2015) showed that real wage flexibility is highest among the deregulated economies (which include the Baltics in their sample) and countries with centralized bargaining structures. According to the IMF, there is a close long-term relationship between real wages and productivity in the Baltics, explained by LMF (IMF, 2023: 49).

How does this relate to the dynamics of broad wage distribution as shown in Figure 2? The distribution of wages aligns with the Balassa–Samuelson effect observed in the Baltics, where wages in the non-tradable sector are catching up with those in the more productive tradable sector (IMF, 2014; Meshulam and Sanfey, 2019; Wolf, 2016). A precondition for this effect is competitive labour markets. In the Baltic context, LMF creates a uniform market for labour, which is reinforced by an education system oriented towards generalist skills, thus facilitating the fungibility of workers (Feldmann, 2013; Kuokštis, 2011, 2015; Norkus, 2008). Decentralized bargaining prevents the emergence of labour dual markets, where outsiders experience worse employment and wage outcomes than insiders, often protected by unions (Seo, 2021). This dualization dynamic has been observed by CPE scholars with regard to a prototypical export-led case of Germany (Thelen, 2014). At the same time, the Baltic manufacturing sector lacks the coordinating capacities that would prevent wage growth in the sheltered sectors (Kalanta, 2020). This facilitates the broad distribution of wage increases, which is not coordinated, but is rather led by market forces.

Overall, the case of the Baltic States demonstrates that the EMU macroeconomic policy regime can deliver balanced growth, but under a particular set of conditions. First, there must be a sufficient political consensus to adopt the recommended policies, even if this means a turn away from the earlier GM. The Baltic political elite consolidated around the goal of adopting the euro, which necessitated macroeconomic policies that mitigated several demand sources of growth in terms of fiscal policy and the credit channel. Second, a source of robust external performance should be found that supports export growth against the REER appreciation. Third, the key instrument for income distribution – the labour market institutions – must allow sheltered sector wages to follow tradable sector wages. Table 2 briefly summarizes Lithuania’s balanced GM (as best exemplifying balanced growth in the Baltics), compared to the classic case of Sweden.

Table 2. Balanced Growth in Sweden Vs Lithuania.

	Sweden	Lithuania
Sources of aggregate demand to support growth	Net exports and consumption	Net exports and consumption
Sources of financing consumption	Credit, wages	Wages
Non-price competitiveness factors	Knowledge-intensive, high-value-added goods and services	Upgrading in the manufacturing sector (medium–high technology goods)
Mechanism for the diffusion of wages	Wage coordination between sheltered and exposed sectors	Flexible labour markets

Source: Own compilation.

Conclusions

This paper contends that over the period 2010–22, the Baltic States represented a case of a balanced GM. After a strong adjustment to the crisis, they were able to maintain robust export performance and increase exports-to-GDP ratios despite the appreciating REER, although non-price competitiveness factors were most evident in Lithuania and Estonia. The rise in exports went hand-in-hand with consumption growth (with no apparent trade-off between the two), and increasing wage share, which did not result in persistent current account deficits pertinent to consumption-led economies. Among the three Baltic States, Lithuania can be considered as the most clear-cut case of balanced growth over the entire period observed, owing to its strong external performance and economic growth from 2017 onwards, as well as the upgrading in its manufacturing sector.

Contrary to what may be expected, the EMU macroeconomic regime did not produce an obvious case of export-led growth in the Baltics. Compared to the MMEs of the Mediterranean, the institutional landscape in the Baltics allowed achieving a more Pareto-efficient equilibrium. At the core of the balanced GM is the wage channel that supports domestic consumption. As in a prototypical balanced GM, the Baltics saw a broad distribution of wage increases across both sheltered and exposed sectors. This paper argues that labour market flexibility was the key institutional domain that allowed for this wage dynamic to unfold.

The Baltic case provides interesting insights into the growth model framework. Contrary to the prevailing consensus in the growth model literature, the EMU macroeconomic governance regime may not lead to export-led growth, depending on the wage–competitiveness nexus. At the same time, a balanced GM may emerge without strong wage coordination, but on the back of alternative institutional arrangements. This suggests that the GM perspective is flexible enough to accommodate substantially different institutional and macroeconomic configurations, while still retaining its useful parsimony.

The paper opens several avenues for further research. The key area for additional inquiry is the sources of non-price competitiveness in the Baltics (including at industry or sectoral level), which would contribute inter alia to the upgrading literature (Kummritz et al., 2017). Crucially, a link between labour market flexibility on the one hand, and productivity gains needed to sustain balanced growth on the other, could be explored. This link could work through at least two channels. First, the broad wage diffusion in competitive labour markets can create pressures on the private sector to shift towards higher value-added goods and services (e.g. through investing in productive capital). Second, labour market flexibility can also facilitate

productivity-enhancing reallocation in the labour market across jobs and sectors (Kuokštis et al., 2022; Martin and Scarpetta, 2012).

Furthermore, research on the specific mechanisms behind labour market flexibility and the wage distribution nexus could be a promising avenue in the literature of political economy of wage distribution (Pontusson et al., 2002). Additionally, in terms of growth contributions and the external position, the trajectories of Lithuania on the one hand, and Estonia and Latvia on the other, seem to have begun diverging over 2020–22. This will merit an assessment on whether a genuine divergence of GMs is taking place. Finally, an account of the politics of the Baltics' GM after the crisis could flesh out the growth coalitions that enabled balanced growth (Baccaro and Pontusson, 2022), given that after the internal devaluation during the GFC, the Baltics generally did not embrace a path based on price competitiveness.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. Applying the typology of Hein (2019), one could assign 'export-led mercantilist' model to Lithuania from 2010 onwards, and 'weakly export-led' to Estonia in 2010–19. Similarly, analysing the demand contributions would result in Sweden's designation as a mercantilist export-led regime in 2010–19, and weakly export-led regime in 2020–22. However, these designations appear relatively sensitive to the cyclical factors of external demand. Applying the Baccaro–Pontusson framework, Sweden is a balanced GM based on the same criteria applied to the Baltic States in Sections 3.1–3.3.
2. OECD's EPL indices report a similar level of labour market flexibility in the Baltics and Sweden, although rigidity of regulations is lower in Lithuania and Estonia compared to Latvia. However, it is important to consider that existing regulations are characterized by a lax enforcement in the Baltics, as discussed in the text.

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Appendix

Table A1. Impact of Change in REER (ULC-Based) on the Growth of Export Volumes for Goods and Services (2010-2022), Lithuania, Latvia, Estonia.

	(1)	(2)	(3)	(4)	(5)	(6)
	Lithuania	Lithuania	Latvia	Latvia	Estonia	Estonia
	Goods	Services	Goods	Services	Goods	Services
REER	-0.529*	-0.450	-1.140***	0.429**	-2.263***	-0.537
	(0.278)	(0.404)	(0.0990)	(0.185)	(0.400)	(0.482)
EU growth	0.0116**	0.0172**	0.00323	0.0198**	0.0106**	0.0388***
	(0.00495)	(0.00692)	(0.00234)	(0.00678)	(0.00371)	(0.00900)
Constant	0.0682***	0.0930***	0.0808***	0.00686	0.100***	0.00885
	(0.0154)	(0.0216)	(0.00850)	(0.0162)	(0.0230)	(0.0235)
Observations	13	13	13	13	13	13
R-squared	0.270	0.376	0.724	0.557	0.671	0.717

Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: AMECO database for exports of goods (online data code: OXGN) and services (online data code: OXSN) at constant prices; DG ECFIN for REER (Price and Cost Competitiveness data); IMF WEO database for EU growth.

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