UNIVERSIDADE DE LISBOA

ISEG — Lisbon School of Economics and Management

Essays on Macroeconomics and Structural Change in the Eurozone

JOÃO ANDRÉ FERREIRA ALCOBIA

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Prof. Doutor Ricardo João Nunes dos Santos Cabral

Tese especialmente elaborada para obtenção do grau de Doutor em Economia

[Documento Provisório]

2024

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2024

Statement of Work

I confirm that an earlier version of Chapter 2, "The Dutch Disease of the Euro Area peripheral member-states", was published as REM Working Paper No. 0257-2022 and the current version of Chapter 2 has been twice reviewed and resubmitted for publication in the *Review of Political Economy* (SJR Q1).

I confirm that an earlier version of Chapter 3, "The promised land or a mirage? The puzzling divergence of the Euro Area's periphery", was published as REM Working Paper No. 0273-2023, and that the current version of Chapter 3 is under review for resubmission to the *European Journal of Economics and Economic Policies* (SJR Q3).

I confirm that an earlier version of Chapter 4, "What could have been? A synthetic control evaluation of the effect of the Economic and Monetary Union on the net external wealth of peripheral member-states" is under review for resubmission to the *Economic Systems* (SJR Q2).

I confirm that an earlier version of Chapter 5, "Falling labor share and anaemic growth in Portugal: A Post-Keynesian econometric analysis", was published as REM Working Paper No. 0247-2023, and it was published in *The Economic and Labour Relations Review* (2023). https://doi.org/10.1017/elr.2023.24.

Presentation of Work

Earlier versions of Chapters 2, 3, 4, and 5 of this thesis have been presented at one or more of the following academic conferences:

1. Annual IPPE Conference in Political Economy @Kadir Has University, Istanbul, Turkey – 4-7 September 2024 (Chapter 4).
2. 12th UECE Conference on Economic and Financial Adjustments [accepted for presentation] @ISEG, Portugal – 19 July 2024 (Chapter 4).
3. YSI-pré conference @2024: "Why inequalities grow" @Milan University, Milan, Italy – 27-29 june 2024 (Chapter 4).
4. Annual IPPE Conference in Political Economy @Universidade Rey Juan Carlos, Madrid, Spain – 6-8 September 2023 (Chapter 3).
5. 11th UECE Conference on Economic and Financial Adjustments @ISEG, Portugal – 21 July 2023 (Chapter 3).
6. YSI-pré conference @2023: " Rethinking Economic policies" @Aldo Moro University, Bari, Italy – 14-17 June 2023 (Chapter 3).
7. ISEG PhD 9th Seminar @ISEG, Portugal – 22 May 2023 (Chapter 3).
8. 6th Annual Political Economy Meeting. "Dependências, Assimetrias e Territórios" @Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal– 27-28 January 2023 (Chapter 2 and Chapter 5).
9. ISEG PhD 7th Seminar @ISEG, Portugal – 6 December 2022 (Chapter 2).

Funding

This work was supported by the FCT – Fundação para a Ciência e a Tecnologia [doctoral grant number UI/BD/150768/2020].

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João André Ferreira Alcobia nasceu a 18 de fevereiro de 1993 em Loures.

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Biographical Note

João André Ferreira Alcobia was born on February 18, 1993, in Loures, Portugal.

In 2014, he completed his Bachelor's degree in Economics at the Lisbon School of Economics and Management, University of Lisbon (ISEG-ULisboa).

Between 2015 and 2020, he worked at DECO - the Portuguese Association for Consumer Protection, the Portuguese Securities Market Commission (CMVM), and Banco Montepio.

In 2018, he completed his Master's degree in Monetary and Financial Economics at ISEG-ULisboa with the dissertation titled "Functional and Interpersonal Distribution of Income and Economic Growth in Portugal".

In 2020, he completed an Executive Master's in Finance at the Catholic University of Lisbon.

That same year, he began the PhD Program in Economics at ISEG-ULisboa.

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Agradecimentos

Esta tese de doutoramento é o culminar de muitos anos de interesse e de estudo na área da Economia. No entanto, a verdadeira aventura começará a partir da entrega e defesa da Tese.

Considero que os anos que trabalhei em instituições do sector financeiro antes de iniciar o programa de doutoramento em economia foram importantes para crescer pessoalmente e profissionalmente, permitindo-me realizar este projeto com sucesso. Numa dessas instituições conheci um amigo que ainda mantenho, o Alexandre.

Gostaria de agradecer aos orientadores Ricardo Cabral e Nuno Sobreira pela disponibilidade, orientação, apoio e sugestões.

Agradeço à organização e aos participantes das conferências Annual IPPE Conference in Political Economy 2023, Annual IPPE Conference in Political Economy 2024, 11th UECE Conference on Economic and Financial Adjustements, YSI-pré conference @2023: "Rethinking Economic policies”, YSI-pré conference @2024: "Why inequalities grow", e ao 6º Encontro Anual de Economia Política.

Agradeço ao Research Economic and Management (REM) pelo apoio financeiro e logístico que me permitiu participar em conferências nacionais e internacionais reputadas.

Agradeço à Fundação para a Ciência e Tecnologia (FCT), o apoio financeiro indispensável à realização da Tese de Doutoramento.

Agradeço os comentários apresentados por pares anónimos que reveram os artigos que constituem os ensaios desta tese que foram submetidos às revistas Review of Political Economy, Structural Change and Economic Dynamics e The Economic and Labor Relations Review.

Agradeço ao ISCTE e à Escola Superior de Comunicação Social (ESCS) a possibilidade de lecionar durante o período do Doutoramento. A este respeito destaco os conselhos e o apoio da Professora Doutora Maria José dos-Santos, regente da cadeira de Análise Económica que lecionei.

Agradeço aos funcionários e professores do ISEG pelo apoio prestado durante o período de realização do Doutoramento.

Agradeço também aos meus colegas/amigos Ana Figueiras, Eduardo Fortes, Diogo Martins, Ricardo Barradas e Vicente Ferreira pelas leituras e sugestões, que permitiram que a tese estivesse com um nível de rigor mais elevado.

A investigação conducente à elaboração de uma tese de doutoramento é um processo bastante solitário. Os convívios, passeios, saídas à noite, momentos de risota, mas também de desabafo, foram essenciais para me motivar, para me reforçar a confiança e para contrabalançar o trabalho intenso exigido ao longo destes quatro anos. Agradeço aos colegas de doutoramento, sobretudo ao André Teixeira e Lucas Menescal. Agradeço aos amigos de longa data, nomeadamente ao Fábio Magalhães, Tiago Sequeira e Rita Silva. E agradeço também a importantes pessoas que conheci durante este processo, sobretudo em fases complicadas da minha vida – Marcos, Francisco Biscainho, Ana Figueiras.

Por último agradeço aos meus pais e irmã que me acompanharam e apoiaram nas vicissitudes deste trajeto de forma regular.

Aplica-se a usual ressalva.

Acknowledgements

This doctoral thesis is the culmination of many years of interest and study in the field of Economics. However, the real journey will begin with the submission and defense of the thesis. I believe that the years I spent working in financial sector institutions before starting the PhD program in Economics were crucial for my personal and professional growth, enabling me to successfully complete this project. In one of these institutions, I met a friend I still keep to this day, Alexandre.

I would like to thank my advisors, Ricardo Cabral and Nuno Sobreira, for their availability, guidance, support, and suggestions.

I am grateful to the organizers and participants of the Annual IPPE Conference in Political Economy 2023, Annual IPPE Conference in Political Economy 2024, 11th UECE Conference on Economic and Financial Adjustments, YSI-pre conference @2023: "Rethinking Economic Policies”, YSI-pre conference @2024: "Why Inequalities Grow", and the 6th Annual Meeting on Political Economy.

I thank Research in Economics and Management (REM) for the financial and logistical support that allowed me to participate in reputed national and international conferences.

I am also grateful to the Foundation for Science and Technology (FCT) for the indispensable financial support for the completion of this PhD thesis.

I appreciate the comments made by anonymous reviewers who reviewed the articles constituting the essays of this thesis, which were submitted to the journals *Review of Political Economy*, *Structural Change and Economic Dynamics*, and *The Economic and Labor Relations Review*.

I thank ISCTE and the School of Communication and Media Studies (ESCS) for the opportunity to teach during the PhD period. In this regard, I would like to highlight the advice and understanding provided by Professor Maria José dos-Santos.

I am also grateful to the staff and faculty of ISEG for their support during the PhD period.

Special thanks to my colleagues/friends Ana Figueiras, Eduardo Fortes, Diogo Martins, Ricardo Barradas, and Vicente Ferreira for their reviews and suggestions, which contributed to the higher level of rigor in this thesis.

The research leading to the development of a doctoral thesis is a rather solitary process. Social gatherings, outings, nights out, moments of laughter, but also moments of venting, were essential to keep me motivated, boost my confidence, and balance the intense work required over these four years. I would like to thank my fellow doctoral colleagues, especially André Teixeira and Lucas Menescal. I also thank my long-time friends, particularly Fábio Magalhães, Tiago Sequeira, and Rita Silva.

I also want to acknowledge the important people I met during this process, especially during challenging times in my life — Marcos, Francisco Biscainho and Ana Figueiras.

Finally, I thank my parents and sister, who regularly accompanied and supported me through the ups and downs of this journey.

The usual disclaimer applies.

“Pessimismo da razão, optimismo da vontade” (António Gramsci)

Resumo

Esta tese de Doutoramento procura investigar o impacto da intensificação do processo de integração económica Europeia ocorrido desde meados dos anos 1990 nos denominados estados-membros da Periferia (Espanha, Grécia, França, Itália e Portugal), com particular destaque para o estabelecimento da União Económica Monetária (UEM).

A integração económica Europeia visava e deveria em teoria contribuir para um aumento da taxa de crescimento económico e a convergência económica real dos estados-membros menos desenvolvidos da UEM, ao promover um aumento da concorrência e da taxa de crescimento do comércio internacional entre estados-membros, ao criar novas oportunidades de expansão de negócios e ao facilitar a transferência de tecnologia e conhecimento.

A partir de 1992, com o Tratado de Maastricht, a União Europeia (UE) criou as bases para o estabelecimento de uma moeda única, o euro, e uma política monetária comum através do Banco Central Europeu (BCE).

Contudo, a crescente integração económica das últimas décadas foi acompanhada por um processo de crescente polarização económica, social e política no seio da UE e da Área do Euro, exacerbada pela Grande Recessão de 2007-2009 e pela Crise das Dívidas Soberanas Europeia de 2010-2012, aumentando as desigualdades de rendimento entre os países e resultando numa trajetória de divergência das taxas de crescimento dos mesmos. No mesmo período, do ponto de vista social, verificou-se uma tendência de queda do peso dos salários (aumento do peso dos rendimentos de capital), em paralelo com uma tendência de estagnação económicas.

Os quatro ensaios desta tese de doutoramento apresentam uma linha condutora comum, argumentando que falhas de governação e da arquitetura económica da União Económica e Monetária (UEM), a perda de importantes instrumentos de política económica (como sejam a política monetária e cambial) ou ainda a a definição de regras europeias de política orçamental, podem ter contribuído para um fraco ou mesmo negativo desempenho económico dos estados-membros da periferia da Área do Euro.

No primeiro ensaio procedemos a uma caracterização do desempenho económico

(negativo) dos estados-membros da periferia da Área do Euro desde meados da década de 1990 até ao período pré-covid-19 e a uma revisão da literatura sobre os factores explicativos para este desempenho económico. No entanto, este ensaio investiga e propõe um fator explicativo adicional, pouco explorado na literatura, o designado efeito de Doença Holandesa, que contribuiu para uma tendência de apreciação da taxa de câmbio real interna e uma alteração estrutural do perfil de especialização destas economias. Ao contrário do efeito de Doença Holandesa original, esta situação não se deveu à descoberta de campos de gás natural e posterior exportação desta matéria-prima. Pelo contrário, este ensaio argumenta que o principal fator que despoletou o efeito de Doença Holandesa foi a disponibilidade de fluxos de capitais externos de volume em teoria ilimitados associados à participação desses estados periféricos na UEM desde meados dos anos 1990s. Paradoxalmente, esse choque aparentemente favorável, que resultou numa redução das taxas de juro reais e num aumento do investimento privado e público, teve os efeitos adversos acima identificados.

O segundo ensaio, que recorre ao Modelo de Crescimento restringido pela Balança de Pagamentos e ao Modelo de Convergência/Divergência de Produtividade de Ali e Pérez-Caldentey (2011, 2007), estima a possibilidade de convergência económica e de produtividade dos estados-membros da periferia da Área do Euro face aos estados-membros do centro da Área do Euro (e face a todos os países da Área do Euro). O ensaio conclui que no período pós crise de 2009, estes países apresentaram uma tendência de divergência de produtividade devido aos menores retornos crescentes à escala. Entre os fatores que podem ter contribuído para menores taxas de crescimento da produtividade incluem-se a implementação de políticas de austeridade orçamental (mais intensa no primeiro grupo de países), ou a mudança estrutural verificada neste grupo de países, com um aumento da preponderância de setores de reduzida intensidade tecnológica, como o turismo ou o imobiliário.

No terceiro ensaio, através da utilização do método de controlo sintético, procedemos a uma análise contrafactual do efeito da UEM na Posição de Investimento Internacional Líquida (PIIL) dos estados-membros da periferia da Área do Euro. Concluímos que em 2010, os PIIL destes países apresentariam uma melhoria acentuada face à situação verificada estimada, em média ponderada, em 42% do PIB de 2010. O ensaio argumenta que as diferenças de estruturas produtivas na Área do Euro traduzem-se em transferências orçamentais implícitas dos estados-membros da periferia para os estados-membros do Centro que não sendo compensadas por transferências orçamentais explícitas no sentido oposto, resultam em desequilíbrios externos recorrentes com a concomitante deterioração da PIIL dos estados-membros da periferia.

No quarto ensaio, investigamos dois factos observados na generalidade das economias desenvolvidas. Em primeiro lugar, estas economias têm apresentado nas últimas décadas uma tendência de crescimento económico cada mais vez mais anémico, ao mesmo tempo que o peso dos salários no produto tem também diminuído. Aplicando ao caso da economia Portuguesa, procuramos avaliar empiricamente a relação entre o crescimento do peso dos salários e o crescimento económico, através de uma análise econométrica de séries temporais. O ensaio concluí que o crescimento do peso dos salários contribui para uma aceleração do crescimento económico porque os efeitos positivos no consumo privado mais do que se sobrepõem aos efeitos adversos no consumo privado e nas exportações líquidas.

Palavras-Chave: Estados-membros periféricos da Área do Euro; Doença Holandesa; Falhas institucionais e de arquitetura da União Económica e Monetária; Método de Controlo Sintético; Regime de Crescimento Liderado pelos Salários.

Abstract

This doctoral thesis seeks to investigate the impact of the intensification of the European economic integration process that has taken place since the mid-1990s on the so-called peripheral member-states (Spain, Greece, France, Italy, and Portugal), with particular emphasis on the establishment of the Economic and Monetary Union (EMU).

European economic integration aimed, and theoretically should have contributed, to increasing the economic growth rate and real economic convergence of the less developed EMU member-states by promoting increased competition, the growth of international trade among member-states, creating new business expansion opportunities, and facilitating the transfer of technology and knowledge.

Starting in 1992, with the Maastricht Treaty, the European Union (EU) laid the foundations for the establishment of a single currency, the euro, and a common monetary policy through the European Central Bank (ECB).

However, the increasing economic integration of recent decades has been accompanied by a process of growing economic, social, and political polarization within the EU and the Euro Area, exacerbated by the Great Recession of 2007-2009 and the European Sovereign Debt Crisis of 2010-2012. This has heightened income inequalities between countries and resulted in a trajectory of diverging growth rates among them. During this same period, from a social perspective, there has been a trend of declining wage shares (with an increasing share of capital income) alongside economic stagnation.

The four essays in this doctoral thesis share a common thread, arguing that governance failures and the economic architecture of the Economic and Monetary Union (EMU), the loss of important economic policy instruments (such as monetary and exchange rate policies), and the establishment of European fiscal policy rules may have contributed to the poor or even negative economic performance of the peripheral member-states of the Euro Area.

In the first essay, we characterize the (negative) economic performance of the Euro Area peripheral member-states from the mid-1990s until the pre-COVID-19 period and review the literature on the factors explaining this economic performance. However, this

essay investigates and proposes an additional explanatory factor, less explored in the literature: the so-called Dutch Disease effect, which contributed to a trend of internal real exchange rate appreciation and a structural shift in the specialization profile of these economies. Unlike the original Dutch Disease effect, this situation was not due to the discovery of natural gas fields and subsequent export of this raw material. On the contrary, this essay argues that the main factor triggering the Dutch Disease effect was the availability of theoretically unlimited volumes of external capital flows associated with these peripheral states' participation in the EMU since the mid-1990s. Paradoxically, this seemingly favorable shock, which resulted in lower real interest rates and increased private and public investment, had the adverse effects identified above.

The second essay, drawing on the Balance-of-Payments-Constrained Growth Model and the Ali and Pérez-Caldentey (2011, 2007) Productivity Convergence/Divergence Model, estimates the possibility of economic and productivity convergence of the Euro Area peripheral member-states relative to the core member-states (and relative to all Euro Area countries). The essay concludes that in the post-2009 crisis period, these countries showed a trend of productivity divergence due to lower increasing returns to scale. Factors that may have contributed to lower productivity growth rates include the implementation of fiscal austerity policies (more intense in the first group of countries) or the structural shift observed in this group of countries, with an increased prevalence of low-tech sectors such as tourism or real estate.

In the third essay, using the synthetic control method, we conduct a counterfactual analysis of the EMU's effect on the Net International Investment Position (NIIP) of the Euro Area peripheral member-states. We conclude that by 2010, these countries' NIIPs would have shown a significant improvement compared to the actual situation, estimated at an average of 42% of 2010 GDP. The essay argues that differences in productive structures within the Euro Area translate into implicit fiscal transfers from peripheral member-states to core member-states. These, not being compensated by explicit fiscal transfers in the opposite direction, result in recurring external imbalances with the concomitant deterioration of the NIIP of the peripheral member-states.

In the fourth essay, we investigate two observed phenomena in most developed economies. First, these economies have shown a trend toward increasingly anemic economic growth in recent decades, while the share of wages in GDP has also declined. Applying this to the case of the Portuguese economy, we empirically assess the

relationship between the growth of the wage share and economic growth through a time-series econometric analysis. The essay concludes that wage share growth contributes to an acceleration of economic growth because the positive effects on private consumption more than offset the adverse effects on private investment and net exports.

Keywords: Euro-Area peripheral member-states; Dutch Disease; Institutional and architectural failures of the Economic and Monetary Union; Synthetic Control Method; Wage-Led Growth Regime.

List of Abbreviations

ADF - Augmented Dickey and Fuller

ECB - European Central Bank

ECI - Economic Complexity Index

EEC - European Economic Community

EMU- Economic and Monetary Union

EU - European Union

FDI - Foreign Direct Investment

FE - Fixed Effects

GDP - Gross Domestic Product

GMM - General Method of Moments

GNI - Gross National Income

GVA - Gross Value Added

IMF - International Monetary Fund

LOO - Leave-one-out

MSPE - Mean Squared Prediction Error

NAFTA - North American Free Trade Agreement

NIIP - Net International Investment Position

OCA - Optimum Currency Area

OCDE - Organization for Economic and Co-operation and Development

OEC - Observatory of Economic Complexity

OLS - Ordinary Least Squares

PP - Phillips and Perron

RE - Random Effects

R&D - Research & Development

SCM - Synthetic Control Method

2SLS - Two-Stage Least Squares

3SLS - Three-Stage Least Squares

TWFE - Two-way fixed effects

ULC - Unit Labor Cost

UK - United Kingdom

US - United States

WTO - World Trade Organization

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1. Introduction

In the aftermath of World War II, there was a marked intensification in the economic integration of economies globally. In Europe, economic integration was significantly promoted in 1957 with the creation of the European Economic Community (EEC)[1] through the signing of the Treaty of Rome.

One of the main purposes of creating the EEC was to establish a common European market ensuring the free movement of goods, services, capital, and people. This included the elimination of customs tariffs for member countries and the establishment of common customs tariffs for third countries. A key rule regarding the common market was that it would apply to all EEC member countries, regardless of their economic and technological development levels.

With the subsequent enlargement of the EEC to Mediterranean countries, including the inclusion of Greece in 1981, Portugal and Spain in 1986, the fall of the “Iron Curtain” in 1989 and the Soviet Union in 1991, and the later integration of Eastern European countries starting in 2004, the economic and technological heterogeneity among EU countries increased.

In the context of European integration, achieving economic convergence is an essential factor in promoting economic and social cohesion among the Union's countries. In this regard, and according to Article 130a of the Single European Act signed in February 1987, "In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion."

To stimulate economic convergence among countries and regions within the EU, a set of policies were established, namely the so-called "structural funds" for regions of member-states with GDP per capita levels below the 90% of EU average.

One of the main assumptions in conventional economics is that increased economic integration will contribute to accelerated economic growth (Roviera-Batiz and Romer,

[1] In 1992, with the signing of the Maastricht Treaty, it was renamed to European Union (EU).

1991; Obstfeld and Rogoff, 1996; Barro and Alesina, 2002). There are several reasons for this outcome.

By contributing to increased competition, greater economic integration can encourage economic agents (especially the state and companies) to become more efficient and innovative in order to maintain external and internal competitiveness (Balassa, 1967). Being integrated into larger economic regions increases opportunities for business expansion and exports, thereby taking advantage of economies of scale through the reduction of unit production costs (Scitovsky, 1958). Greater economic integration can also facilitate the transfer of technology and knowledge, which can occur through Foreign Direct Investment (FDI) (Fagerberg et al., 2009).

In recent decades, there has been not only an increase in the number of EU member countries but also a rise in economic integration within the EU. In this regard, the initial highlights include the liberalization of the labor and product markets and significant restrictions on the adoption of an active industrial policy by national states.

Subsequently, in 1992, with the signing of the Maastricht Treaty, the foundations were laid for the creation of a single currency, the Euro, and a single monetary policy established by an independent central bank (the European Central Bank (ECB)), membership of which was restricted to member-states that complied with what became known as the Maastricht convergence criteria, which were defined as pass/fail nominal thresholds for a set of specific economic variables, such as inflation differentials, budget deficit and public debt levels.

Despite the increase in economic integration within the EU, the last decades have been marked by growing economic, social, and political polarization within the countries of the European Union and the Euro Area, both among different states and among individuals within a given state.

From an economic perspective, the negative consequences of the Great Recession and the European Sovereign Debt Crisis have exacerbated income inequalities among various countries (Celi et al., 2018; Gräbner and Hafele, 2020; Simonazzi et al., 2013).

Meanwhile, from a social perspective, there has been a decreasing (increasing) trend in the share of wages (profits), with negative economic and social impacts on most economies (Barradas, 2019; Dünhaupt, 2011; Karabarbounis and Neiman, 2014; Kristal, 2010; Lin and Tomaskovic-Devey, 2013; Stockhammer, 2012, 2017; Stockhammer and Wildauer, 2016).

Despite individual peculiarities in each country, we can subdivide the Euro Area into several groups of member-states, namely the Euro Area core, peripheral, catch-up, and financial-hub member-states (Gräbner and Hafele, 2020; Chapter 2 and Alcobia and Cabral, 2023).

The core member-states had similar characteristics, including high GDP per capita, relatively high weight of exports to GDP, a considerable importance of industrial production, the production of highly sophisticated (or technologically complex) goods and services, and low unemployment rates. In contrast, the peripheral member-states had low GDP-per-capita, low export-to-GDP weights, a relatively high average unemployment rate, a high level of public debt, and, lastly, persistent current account deficits.

In this thesis, we will focus on the economic performance of the so-called Euro Area peripheral member-states – Greece, Spain, Italy, Portugal, and France – in comparison with the Euro Area core member-states – Germany, Belgium, Austria and Finland – (Gräbner et al. 2020).

Including France in the group of peripheral Euro Area member-states can be problematic due to it being a significant global economy and an important political actor within the European Union. However, the structural weaknesses of this country in recent decades are well-documented in the literature (Celi et al., 2018; Gräbner and Hafele, 2020; Celi et al., 2019). In this regard, Celi et al. (2018) highlight the fact that the French economy has shown a prolonged divergence trend compared to Germany, notably considering the deindustrialization in this country, systematic current account deficits, and technological regression that has occurred over the last decades.

As mentioned, the weak economic performance of the Euro Area peripheral member-states in recent decades (and especially since the Great Recession) is widely recognized. However, it is important to analyze the impact of the policies established by the EU and the EMU on this group of countries. This is because the increase in economic integration can also have negative consequences (especially for economically and technologically weaker countries).

One of the most important factors is the loss of sovereignty of the states (Verdun, 1998), especially the Euro Area peripheral member-states, particularly in the implementation of exchange rate, monetary, fiscal, and trade policies, as well as in controlling capital flows, thereby limiting the possibility for states to implement independent national policies.

Additionally, other authors argue that increased economic integration may not foster economic convergence and may, on the contrary, lead to economic divergence (Krugman, 1991; Aglietta, 2012). This is because the reduction of trade barriers can have asymmetrical impacts on groups of economies. For example, the enlargement of the EU to the Eastern European Countries benefited the Euro Area Core member-states by increasing the size of export markets for this group and representing a cheap production platform for intermediate goods, while at the same time harming the Euro Area Peripheral member-states by increasing their external competition (Celi et al., 2018; Gräbner and Hafele, 2020).

The main objectives of the thesis are to investigate the impacts of the intensification of the European Integration process since the mid-1990s on the so-called Euro Area Peripheral member-states, with particular emphasis on the period of nominal convergence leading to the establishment of the EMU and on the period after the launch of the euro on January 1, 1999.

The PhD thesis thus consists of four essays.

The first essay entitled “The Dutch disease of the Euro Area peripheral member-states” presents an explanatory theoretical analysis of the factors leading to the underperformance of the Euro Area peripheral member-states. Although the peripheral member-states experienced robust economic growth in the years before and after the launch of the EMU, particularly between 1995 and 2000, this growth was not sustainable and was fueled by rising indebtedness of private economic agents. The chapter identifies a number of hypotheses for the negative economic performance of the Euro Area peripheral member-states, namely the deterioration of price-external competitiveness, the difference in technological intensity compared to the core member-states or even institutional and architectural failings of the EMU. We explore an additional factor for the poor long-term economic performance of the first group of countries - a Dutch disease-like effect, which is known as financial Dutch disease (Botta 2015, 2021; Batavia and Nandakumar 2016; Comunale 2017; Botta, Yajima, and Porcile 2023) that resulted from membership in the EMU. This resulted in an overvalued internal real exchange rate and contributed to a shift of productive factors towards non-tradable sectors, which are characterized by lower productivity growth potential. However, contrary to the original Dutch Disease effect, the termed financial Dutch Disease was not due to the discovery of a natural gas field and subsequent export of this com. Instead, this essay (Chapter 2) argues and points out that EMU membership was akin to an in theory favorable economic shock – much as natural gas exports were an in-theory favorable economic shock to the Dutch economy of the 1960s – whereby de facto unlimited capital inflows were available on demand (Lavoie 2015). We characterize the mechanism by which the peripheral banking systems were used to intermediate the channeling of credit-based capital inflows that were used to finance large recurring current account deficits and the refinancing of growing levels of net external liabilities. We point out that these capital inflows were mostly directed to non-tradable sectors. We therefore argue that large and sustained foreign capital inflows since the mid-1990s have been the main factor contributing to the financial Dutch Disease effect (Batavia and Nandakumar, 2016).

The second essay entitled “The promised land or a mirage? The puzzling divergence of the Euro Area’s periphery” explores the theoretical and practical contradictions of the EU and of the Euro Area. As repeatedly stated above, the EU and the Euro Area in particular, are foremost economic integration projects, based on the voluntary transfer of economic sovereignty of key domestic economic policies competencies and powers to European central authorities. As such, the EU and the Euro Area aimed to: (i) more rapid joint or combined economic growth; and (ii) real economic convergence of the less-developed member-states to the level of the more advanced core member-states. This essay investigates whether the Euro Area has achieved the second of the above economic goals, i.e., whether it has promoted economic development of the less internationally competitive member-states, allowing the peripheral member-states to achieve the living standards of the more advanced ones, through real economic convergence.

To do so, the essay focuses on whether the EMU has resulted in real convergence of real GDP and real labor productivity of the peripheral economies’ relative to that of the core economists. While neoclassical theory suggests that greater integration leads to real economic convergence (Roviera-Batiz and Romer, 1991; Obstfeld and Rogoff, 1996; Barro and Alesina, 2002; Balassa, 1967), critics argue that it can exacerbate divergence by concentrating economic activities in the more advanced member-states (Krugman, 1991; Aglietta, 2012; Mrydal, 1957; among others). Through the use of the Balance-of-Payments Constrained Growth Model (Thirlwall, 1979) and the productivity convergence/divergence Model (Ali and Pérez-Caldentey 2011, 2007), we empirically analyzed the economic and productivity performance of the Euro Area peripheral member-states in comparison to all Euro Area member-states (and with that estimated for Core member-states), from 1992 to 2019. We found evidence of economic divergence of peripheral member-states between 1992 and 2019. Although we find evidence of labor productivity divergence among the peripheral member-states between 1992 and 2019, there is evidence of labor productivity convergence between 1992 and 2008. The labor productivity divergence observed between 2009-2019 was driven by a more pronounced reduction in the income elasticity of exports compared to the income elasticity of imports, and by a reduction in the importance of economies of scale.

The third essay entitled “What could have been? A synthetic control evaluation of the effect of the Economic and Monetary Union on the net external wealth of peripheral member-states” seeks to empirically contribute to the debate on whether the Euro Area falls into the category of an Optimal Currency Area (OCA), according to the contributions of Mundell (1961), Meade (1957), Scitovsky (1958), McKinnon (1963), Kennen (1969), among others. This now classical literature resulted in the consensus perspective that focuses on the importance of trade, similarity of shocks and business cycles, factor mobility, and fiscal transfers between economies of regions or countries adopting a common currency (Frankel and Rose, 1997). Additionally, according to the MacDougall Report (1977), we introduce one last factor - differences in the productive structures of regions in a common currency area - which are not only static but dynamic and also result in differences in productivity growth trends (Perotti and Soons, 2022). These differences in productive structures, in our view, will lead to the existence of quasi-fiscal subsidies from the peripheral to core member-states that will need to be compensated by explicit fiscal transfers from wealthier (core) member-states to poorer (peripheral) member-states (Barba and de Vivo, 2013). Using a synthetic control method (SCM), we found that by 2010, peripheral member-states' net international investment positions would show an improvement of, on weighted average, 42% of GDP, which is equivalent to a combined 2.2 trillion of 2010 euros. The econometric results are robust to standard SCM sensitivity tests. This finding suggests that, on the one hand, the EMU is not likely to comply with the OCA criteria and, on the other hand, that level of existing fiscal transfers between core and peripheral member-states is negligible and clearly insufficient. In particular, the absence of significant fiscal transfers has resulted in very large cumulative external imbalances among core and peripheral member-states, with the Euro Area becoming a monetary union of creditor and debtor member-states, a fact with very significant economic and political implications. Finally, we discuss why the EMU may have led to such a severe deterioration in the net external wealth position of the peripheral member-states.

The fourth and final essay entitled "Falling labor share and anaemic growth in Portugal: A post-Keynesian econometric analysis" analyzes two similar trends observed in recent decades in most developed countries, and more specifically in one specific peripheral member-states - Portugal. On the one hand, Portugal has exhibited a timid and declining economic growth rate in recent decades (Barradas, 2020, 2022), while the labor share has shown a decreasing trajectory - this trend is visible not only in Portugal but also in most developed countries (Abreu, 2020; Barradas and Lagoa, 2017). These two realities seem to contradict the claims of the dominant current about the existence of a negative relationship between labor share growth and economic growth. Therefore, this chapter addresses the impact of labor share growth on economic growth in Portugal from 1971 to 2021 through a time series econometric analysis. The growth model was estimated using the estimation methodology popularized by Hansen (1982), namely, the Generalized Method of Moments (GMM) estimator. Some of the conclusions of this essay are that the Portuguese economy followed a wage-led growth regime instead of a profit-led growth regime; that is, a rise in wages increases aggregate demand and, therefore, boosts economic growth because its beneficial effect on private consumption more than compensates for a prejudicial effect on private investment and on net exports.

2. The Dutch disease of the Euro Area peripheral member-states

2.1. Introduction

The single currency was introduced in the Euro Area, among other key aims, to increase economic growth and private investment and to promote real economic convergence between member-states (European Commission, 1990).

However, many authors (e.g., Eichengreen, 2010; Gräbner and Hafele, 2020; Gräbner et al. 2020; Simonazzi et al. 2013) argued that the euro has failed to achieve that aim, resulting in growing economic divergence. They suggested that the euro explains, or at least contributes to, poor economic performance, particularly in Italy, Portugal, and Greece. This study explores the reasons behind the economic underperformance of the Euro Area's peripheral states.[2, 3] It also investigates to what extent the Euro Area's catch-up states experienced adverse economic effects from Economic and Monetary Union (EMU) membership.

Euro Area economies experienced considerable growth in the years before and immediately after the launch of the EMU, with a real average yearly growth of 2.3%

[2] Hereinafter, following the literature (e.g., Gräbner and Hafele, 2020), peripheral Euro Area member states include Greece, Spain, Italy, and Portugal. France is also included in this group due to its declining industrial sector, reduced non-price competitiveness, and deteriorating external accounts (Celi et al. 2018). Core member states include Germany, Belgium, Finland, and Austria (Gräbner and Hafele, 2020). Catch-up member states include Estonia, Latvia, Lithuania, Croatia, Slovenia, and Slovakia (Gräbner and Hafele, 2020). Financial hub member states include Ireland, the Netherlands, and Luxembourg (Gräbner and Hafele, 2020). Excluding France from the peripheral member states does not materially affect the results.

[3] Croatia was included in the group of catch-up member states even though it only became a Euro Area member state in 2023, while our data cutoff date is 2019. The analysis is robust to the exclusion of Croatia from our group of catch-up economies.

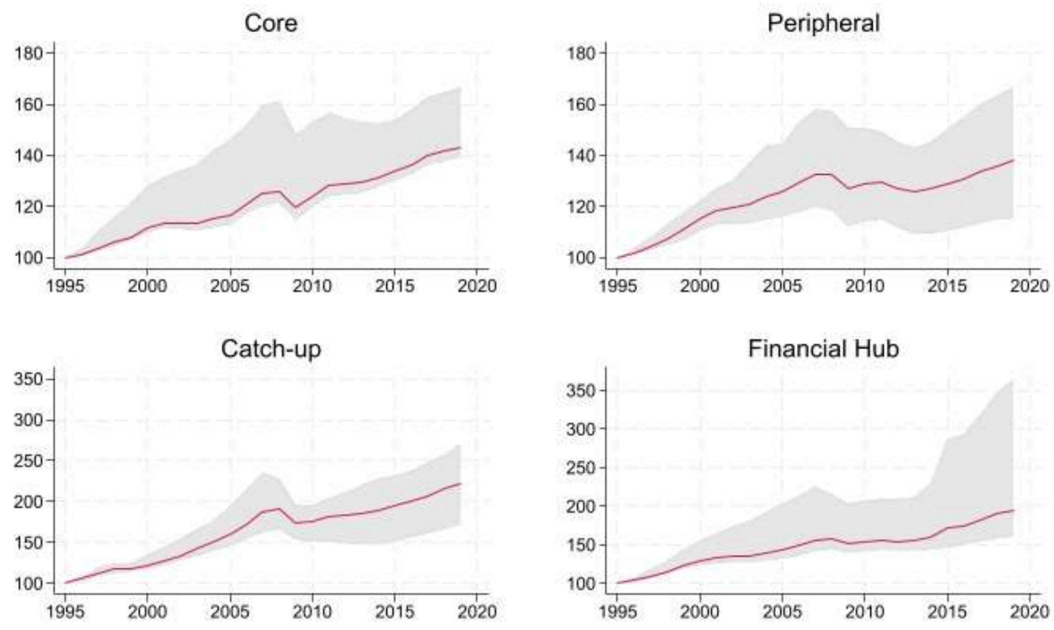
between 1995 and 2007. However, the 2010-2012 euro crisis suggests this growth may have been unsustainable, driven by a private sector debt bubble in peripheral member-states and a mercantilist strategy of wage suppression in core member-states, particularly in Germany (Storm and Naastepad, 2016; Flassbeck and Lapabitsas, 2013).

Between 2011 and 2016, the slowdown of the Euro Area affected peripheral member-states more intensely, leading to a short recession between 2011 and 2013 and economic stagnation between 2007 and 2018. Real GDP only surpassed the 2007 peak in 2017 (see Figure 2.1). Euro Area core and peripheral member-states have seen real incomes diverge, rather than converge, with Italy and Greece experiencing particularly poor economic performance.

Further, Figure 2.1 shows that the catch-up and financial hub member-states have exhibited the strongest cumulative growth since 1995 among these groups of countries.[4]

[4] The economic performance of the financial hub member states was significantly influenced by the revision of Ireland's annual GDP growth in 2015, caused by the transfer of preexisting intangible assets by multinationals based in Ireland (Khder et al. 2020), signaling the lack of comparability of statistics in these so-called low-tax jurisdictions. Therefore, while we present the relevant economic statistics for the financial hub member states, we refrain from analyzing potential Dutch disease-like effects.

Figure 2.1: Real GDP (1995=100) [5]



Source: AMECO; authors' own calculations.

Between 1995 and 2010, the peripheral and catch-up economies had persistent current account deficits, accumulating net external debt and experiencing a deteriorating net international investment position.

This study identifies and analyzes several possible explanations for the economic performance of the peripheral and catch-up member-states. These include the deterioration of their external price competitiveness (Shambaugh, 2012), the non-price competitiveness that arises from the technological gap they face (Botta, 2014), different stages of initial economic development (Aglietta, 2012), misguided (fiscal austerity) policies (de Grauwe and Ji, 2013), and the lack of macroeconomic policy instruments to respond to (temporary) asymmetric shocks arising from a flawed EMU architecture (e.g.,

[5] Figures 2.1 through 2.18 present data for core, peripheral, catch-up, and financial hub member-states of the Euro Area, except where otherwise noted. For each economic variable and each group of Euro Area member-states, gray areas represent observations between the minimum and maximum values, and the weighted average is represented by a continuous line.

de Grauwe and Ji, 2013; Lavoie, 2015; Cabral and Louçã, 2019; Barba and de Vivo, 2013; Beneito and Cháfer, 2020).

The main argument of this study is that, in addition to the explanations identified in the literature, the long-term underperformance of peripheral member-states was primarily due to a Dutch disease-like effect, termed financial Dutch disease (Botta, 2015, 2021; Batavia and Nandakumar, 2016; Comunale, 2017; Botta et al. 2023) that resulted from membership in the EMU.

The Dutch disease traditionally describes a mechanism by which, paradoxically, a favorable exogenous shock results in long-term economic malaise. In the original Cordon and Neary (1982) model, the discovery of natural gas reserves in the Netherlands led to real exchange rate appreciation and a lagging tradable goods sector performance (see detailed explanation in Section 2.4).

In this paper, we show and argue that, much like the original Dutch disease, EMU membership—an economic shock with favorable effects on interest rates, availability of foreign capital, reduced trade costs, and macroeconomic stability— resulted in long-term economic malaise primarily in the peripheral states but also, to a lesser extent, in the catch-up economies of the Euro Area. This occurred because EMU membership, through a 'spending effect' and a 'resource movement effect' (see Section 2.4 and Cordon and Neary, 1982) contributed to a relative increase in the prices of non-tradables compared to tradable goods, i.e., an appreciation of the internal real exchange rate of the peripheral member-states (Corden and Neary, 1982; Blecker, 2023). This appreciation negatively impacted price competitiveness relative to foreign countries, deteriorating the external real exchange rate, the peripheral states real unit labor costs (Burstein et al. 2006; Comunale and Hessel, 2014) - see Figures 2.8 and 2.9, and contributing to a lagging tradable goods sector, symptoms similar to those of the original Dutch disease.

This study argues that the financial Dutch disease syndrome resulted not from gains in trade from a specific commodity export, but from sustained foreign capital inflows since the mid-1990s (Batavia and Nandakumar, 2016), which induced an adverse structural shift in productive structures, contributing to significantly lower productivity growth (Batavia and Nandakumar, 2016). The financial Dutch disease hypothesis identified in this paper is considered distinct from explanations based solely on the real exchange rate appreciation hypothesis (Magud and Sosa, 2013).

This study focuses on theoretical explanations for the deterioration of the tradable sectors in peripheral member-states and its consequences for economic development, including lower productivity and economic growth paths.

The theoretical explanations identified in this paper, particularly the financial Dutch disease mechanism, are supported by a growing body of empirical evidence. This literature shows that EMU membership resulted in the appreciation of the real exchange rates of peripheral member-states (El-Shagi et al. 2016), resulting in reduced competitiveness of tradable goods and services. Hope (2016) found that EMU membership had a considerable and permanent adverse effect on the current account balances of peripheral member-states. Gabriel and Pessoa (2024) assessed the impact of the euro's introduction on Euro Area member-states, concluding that peripheral member-states were disadvantaged compared with counterfactual situations.

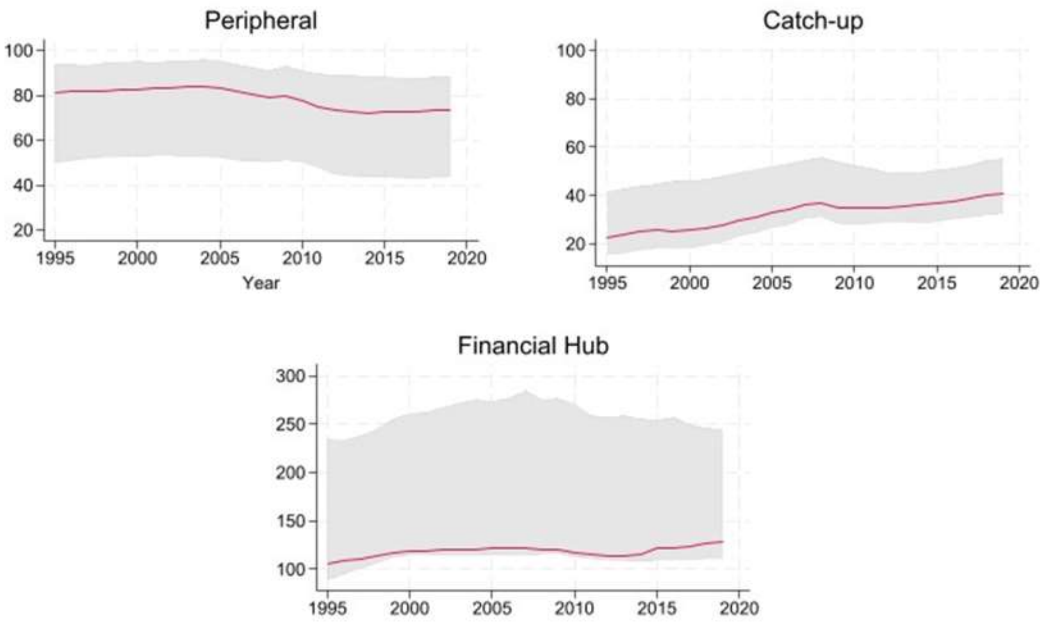
The remainder of this paper is organized as follows. Section 2.2 characterizes the problem, presenting data that shows the underperformance of the Euro Area peripheral member-states since the mid-1990s vis-à-vis its more internationally competitive core member-states. Following a comment from an anonymous referee, this paper also provides data on the catch-up and financial hub economies. Section 2.3 discusses several existing explanations from the literature regarding the underperformance of these economies. Section 2.4 presents a theoretical explanation of the economic underperformance of peripheral member-states of the Euro Area based on the financial Dutch disease mechanism. Section 2.5 presents the main conclusions of the paper.

2.2. Underperformance of the peripheral member-states

The economic disparity between the Euro Area's peripheral and core member-states predates the introduction of a single currency, as evidenced by socioeconomic indicators like real GDP per capita, 10-year average annual growth rate of real GDP per capita, and the Economic Complexity Index (ECI). More importantly, the euro's introduction has led to divergent macroeconomic indicator trajectories, underscoring the underperformance of peripheral states relative to core states.

For example, focusing on real GDP per capita, a relevant gap remains between core and peripheral member-states (see Figure 2.2). Moreover, the core states outgrew the peripheral ones between the onset of the 2007-2009 Great Recession and 2019. Conversely, the catch-up countries have shown convergence with core member-states due to factors including integration into core countries' global value chains, availability of cheap and skilled labor, and favorable geography (Mamede, 2020; Stöllinger, 2016; Ban and Adascalitei, 2020). Lastly, the financial hub countries had a slightly higher GDP per capita compared to the core member-states.

Figure 2.2: Real GDP per capita, peripheral, catch-up, and financial hub member-states of the Euro Area (core member-states =100)



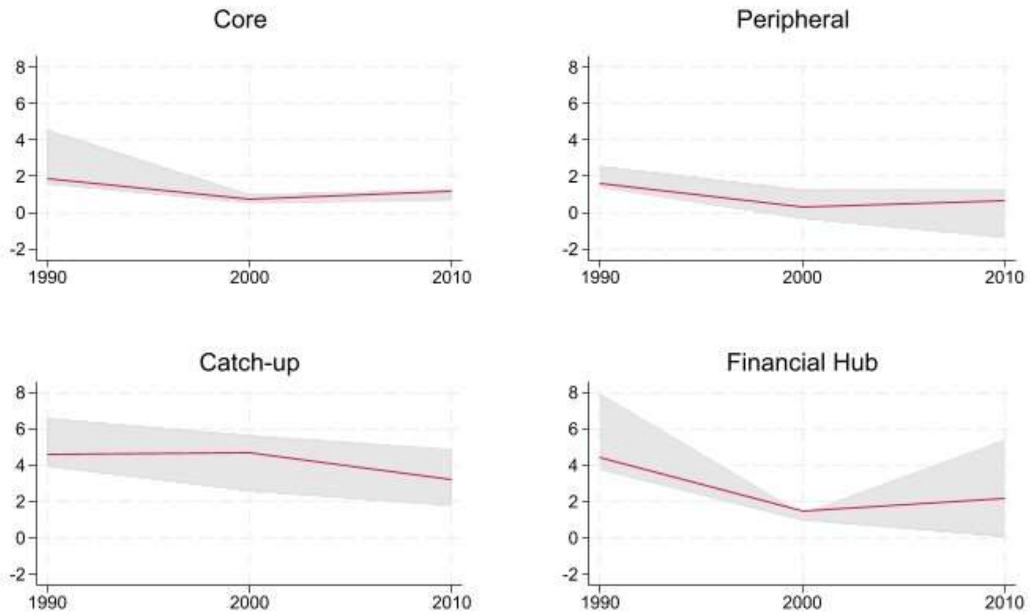
Source: AMECO, GDP per capita in Euros; authors' calculations.

The economic convergence of the peripheral member-states observed in the late 1990s and 2000s was short-lived and dependent on asset price bubbles (Buendía, 2020; Holinski, Kool, and Muysken, 2012).[6] The peripheral member-states were most affected

[6] Stockhammer and Otero (2022) additionally concluded that non-price competitiveness was not a

by the Great Recession (2007-2009) and the euro crisis (2010-2012), experiencing a more significant drop in real GDP per capita growth rates compared to the core member-states (see Figure 2.3).

Figure 2.3: 10-year average annual growth rate of real GDP per capita (%)



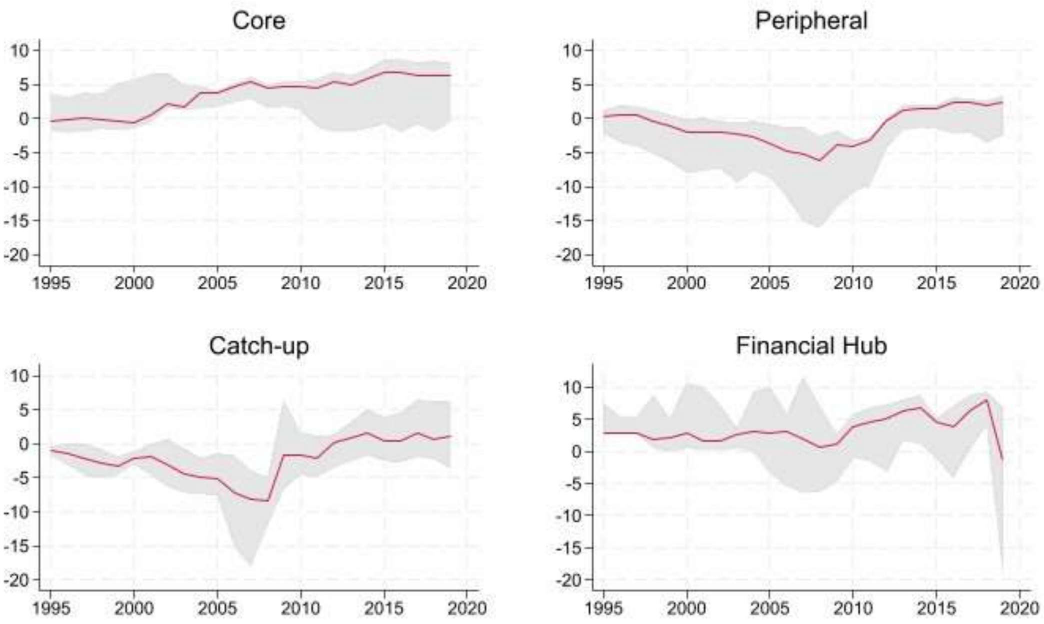
Source: AMECO; authors' own calculations.

Starting in the mid-1990s, Euro Area peripheral member-states began reporting recurrent and large current account deficits, while core member-states saw increasing surpluses (see Figure 2.4). The peripheral economies' current account deficits were driven by a marked deterioration in the goods balance, partially ameliorated by a growing surplus in the services balance, largely due to tourism exports. Simultaneously, the Euro Area's catch-up members experienced widening current account deficits, which can be attributed to higher investment returns due to their economic convergence (Belke et al. 2009). The core states' current account balances improved markedly following the launch

significant factor in explaining the robust economic growth of the peripheral member-states during this period.

of the euro, whereas it deteriorated significantly in the peripheral economies until 2008, raising questions about the single currency's role in this outcome (Pérez-Caldentey and Vernengo, 2012). The Great Recession and the euro crisis led to fiscal austerity programs in the peripheral economies, resulting in a stark improvement in their current account balances. However, this was only sufficient to stabilize their Net International Investment Positions (NIIP), which remained at negative levels (see Figure 2.5).

Figure 2.4: Current account balance (% of GDP)



Source: AMECO; authors' own calculations.

The large recurrent current account deficits of the peripheral and catch-up member-states and the growing external surpluses of the core member-states have distinct impacts on the evolution of the NIIP (see Figure 2.5).[7]

Although the correlation is not causative, Figure 2.5 illustrates how the Euro Area, likely due to the single currency, became a creditor-debtor monetary union. Core

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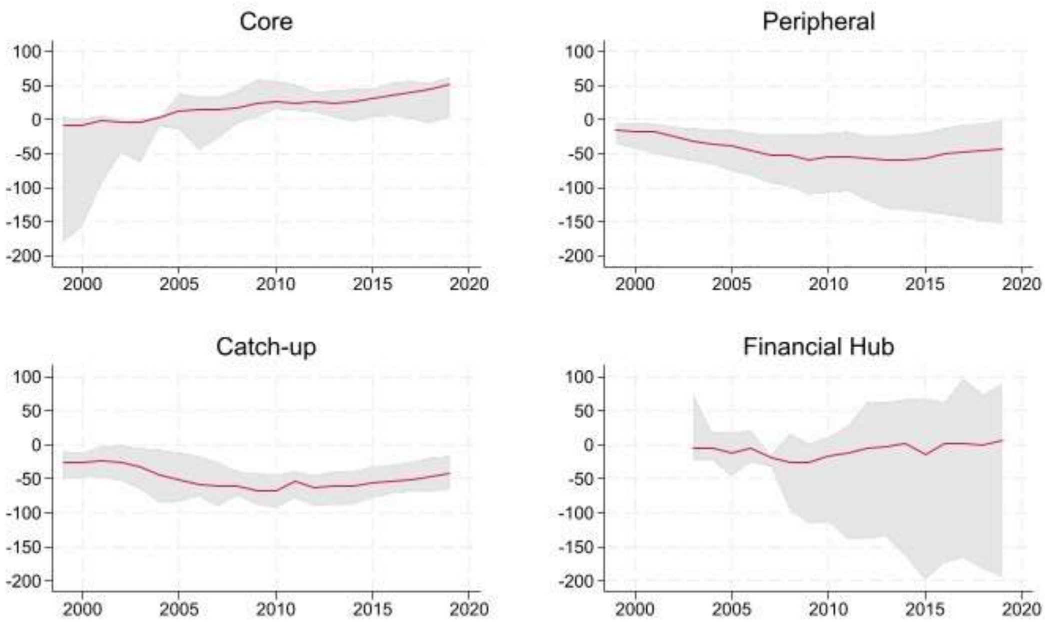
[7] Italy reversed the decline in its NIIP from -20% of GDP in 2010 to nearly balanced by 2019. In contrast, France's NIIP gradually deteriorated.

member-states shifted from debtors (negative NIIP) to creditors, while peripheral and (to a lesser extent) catch-up member-states moved from a nearly balanced position to a highly indebted one. This shift resulted in peripheral member-states experiencing economic underperformance, accompanied by growing external debt and liabilities, whereas core member-states became net creditors.

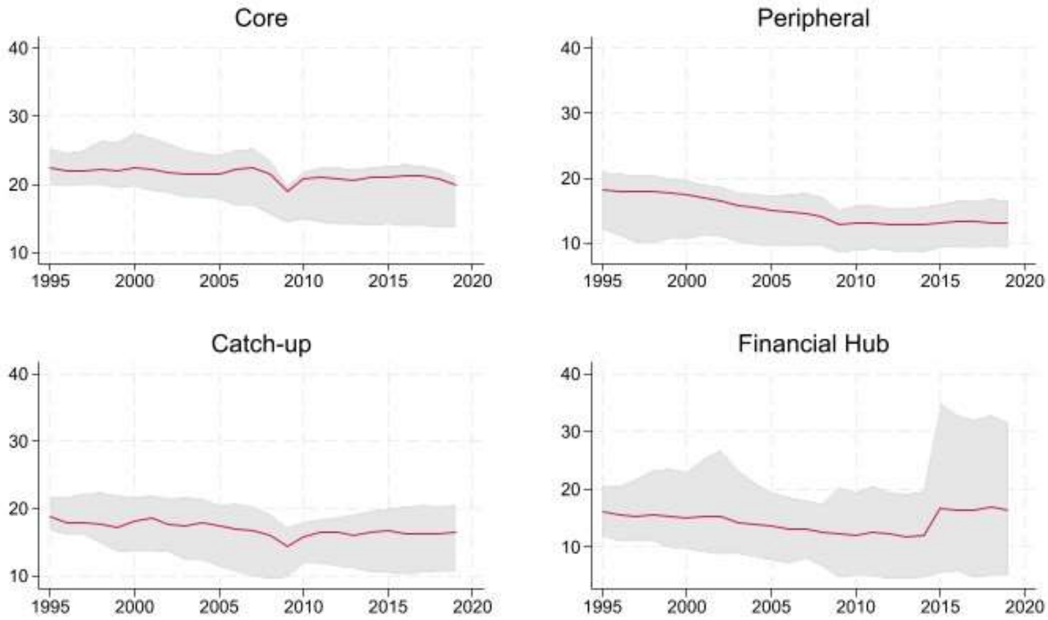
Figure 2.5: NIIP (% of GDP)



Source: Eurostat; authors' calculations.

Finally, the manufacturing sector's share declined significantly more in the peripheral member-states than in the core and catch-up member-states (see Figure 2.6), even though the peripheral member-states grew somewhat less than the core and catch-up member-states during this period. The financial hub member-states also experienced declining industrial output until 2015. The increase in gross value-added (GVA) after 2015 in the finance hub states is due to 'statistical anomalies' observed in Ireland.

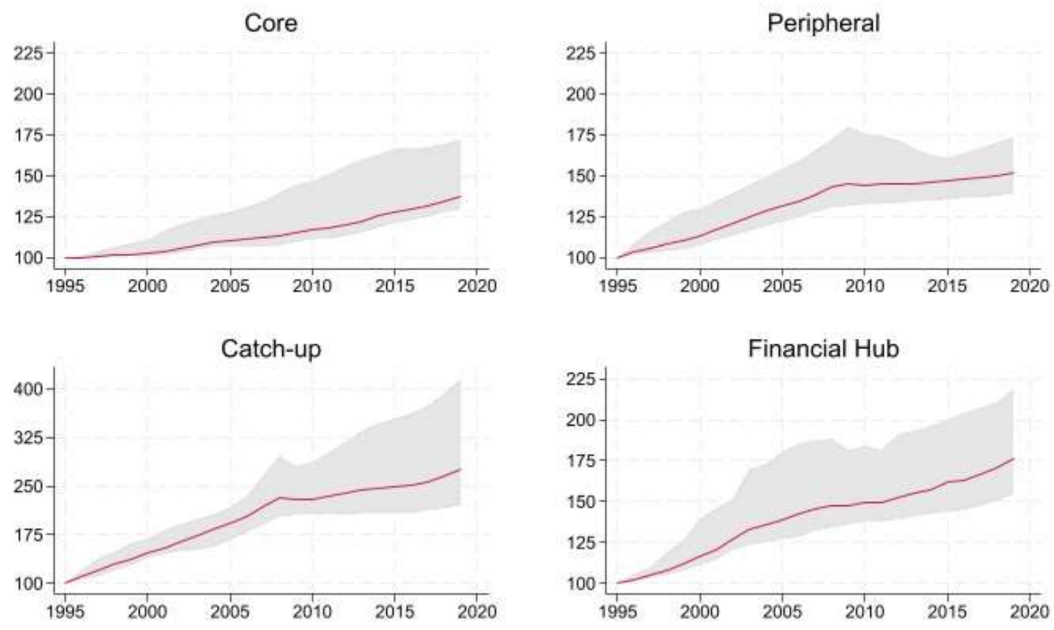
Figure 2.6: Industrial GVA (% of total GVA)



Source: World Bank; authors' calculations.

Figure 2.7 illustrate the fact that the launch of the euro was accompanied by a relative and an absolute deterioration Unit Labor Costs (ULC) of the peripheral member-states vis-à-vis the core member-states, with the weighted average ULC of core member-states falling to 88% of its 1995 value by 2019, while growing to 104% of its 1995 value in the peripheral member-states, a large 17 percentage point differential, relative to 1995, in the evolution of ULC in core vs peripheral member-states, notwithstanding the austerity programmes adopted in the latter from 2010 onwards.

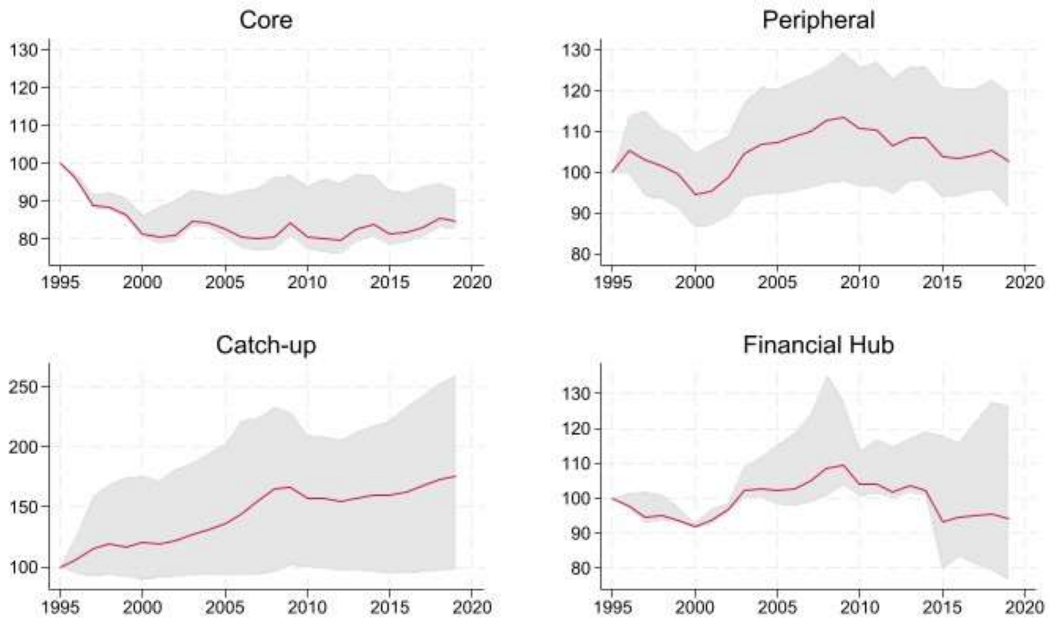
Figure 2.7: Internal real exchange rate (1995=100)



Source: AMECO; authors' calculations

Figure 2.8 shows that in the period following the establishment of the euro, the core member-states experienced a depreciation of their external real exchange rate. Conversely, the peripheral and catch-up member-states experienced a significant appreciation in the external real exchange rate, resulting in a widening price competitiveness differential between these groups of countries. The appreciation of the external real exchange rate of the peripheral states occurred despite the absence of a booming tradable sector, as the lagging tradable sector lost competitiveness, as proxied by industry GVA (Figure 2.6) or by rising and recurring current account deficits (Figure 2.4).

Figure 2.8: External real exchange rate (relative to the rest of 37 industrial countries) (1995=100)

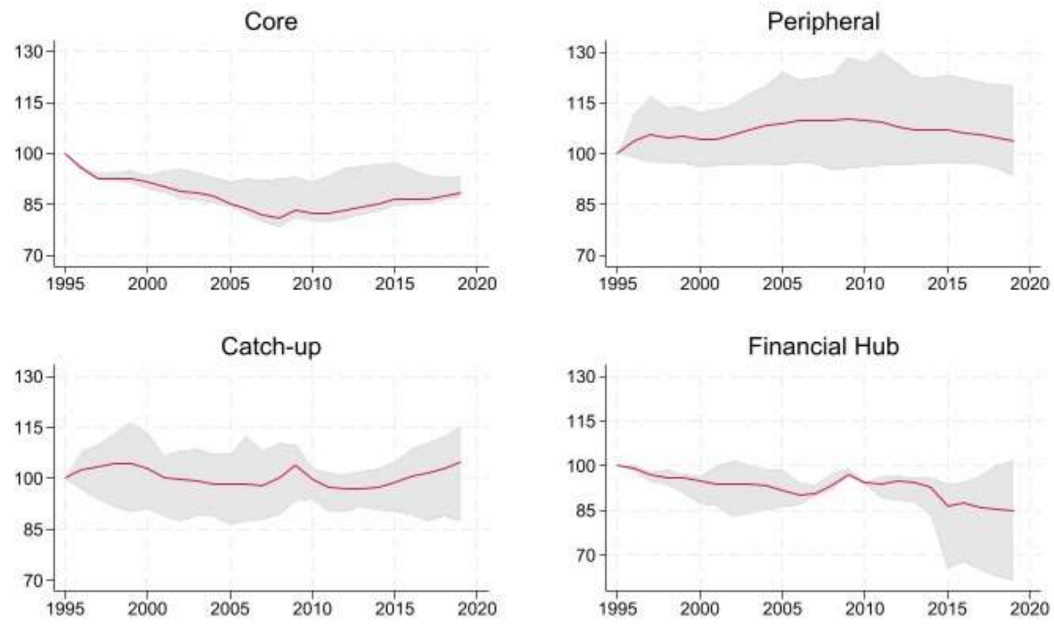


Source: AMECO; authors' calculations

Figure 2.9 illustrates that the launch of the euro was accompanied by a relative and absolute deterioration in real unit labor costs (ULC)—our third measure of real exchange rate appreciation—for peripheral member-states vis-à-vis core member-states. By 2019, the weighted average real ULC for core member-states fell to 88% of its 1995 value, while it rose to 104% of its 1995 value for the peripheral member-states, resulting in a 17 percentage points differential. This suggests improved productivity and competitiveness in the core member-states' tradable sectors compared to those of the peripheral and catch-up economies. This competitiveness differential occurred despite austerity programs adopted by peripheral states from 2010 onwards.

However, in the case of catch-up member-states (Figure 2.8), the deterioration in competitiveness measured by the real ULC was much less significant than suggested by the external real exchange rate trends of this group of countries.

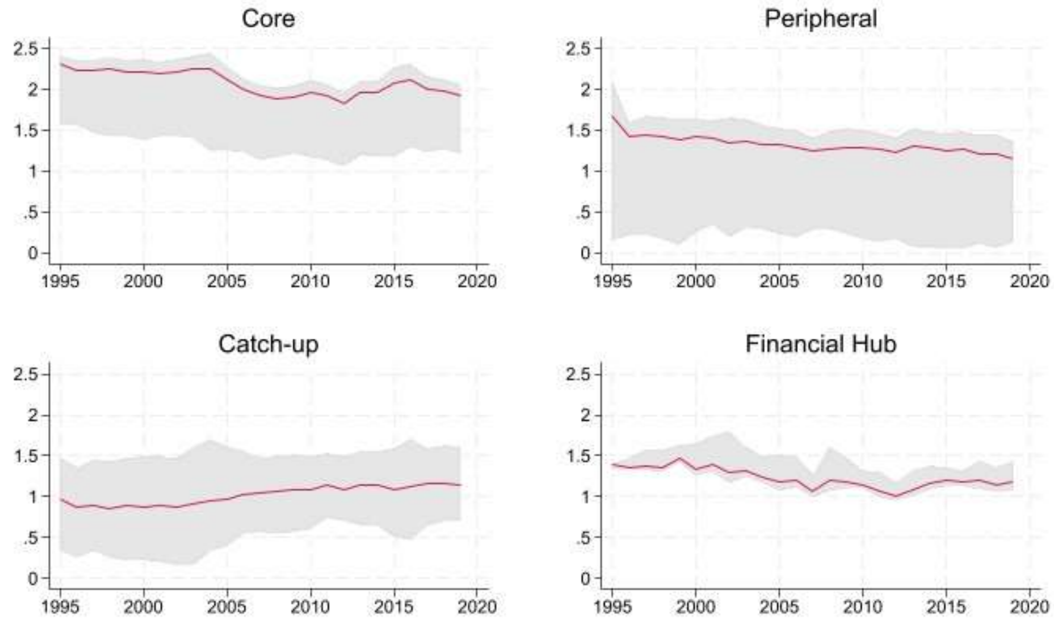
Figure 2.9: Real ULC (1995=100)



Source: AMECO; authors' calculations.

The ECI shows that peripheral member-states produce goods with much lower technological complexity than core member-states (see Figure 2.10). This further suggests that the technological complexity of manufacturing goods in peripheral member-states has steadily deteriorated. During this period, catch-up member-states significantly increased the technological complexity of their manufactured goods. For instance, catch-up member-states have enhanced the relative importance of the automotive industry (particularly its components) to the detriment of peripheral member-states (Gracia and Paz, 2017).

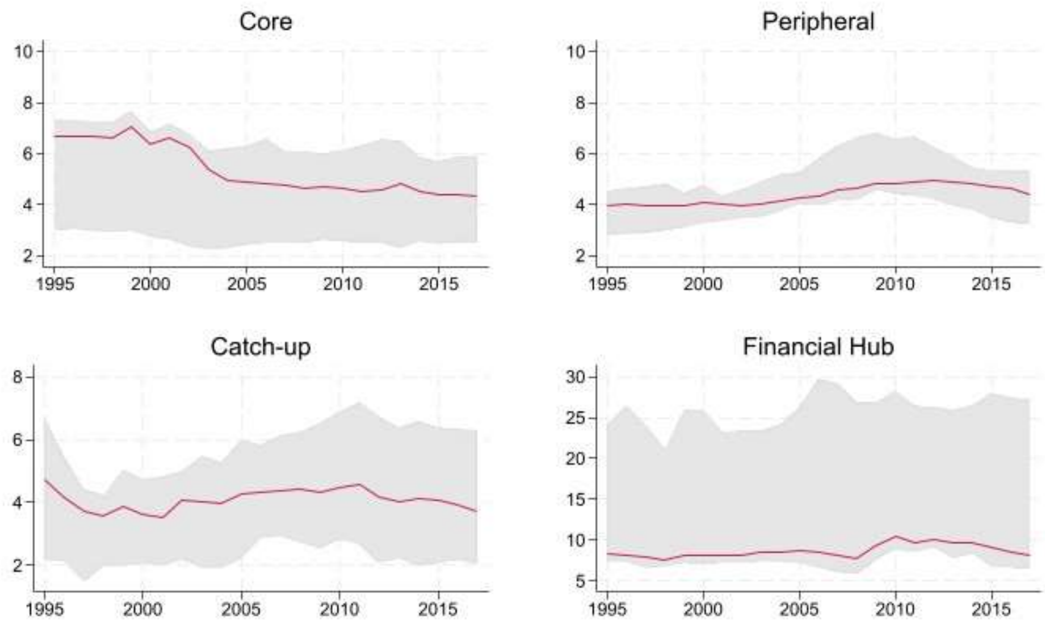
Figure 2.10: ECI



Source: Atlas of Economic Complexity (Observatory of Economic Complexity); authors' calculations.

Figure 2.11 suggests a change in the trend of the GVA of financial services across the four groups of countries. In the peripheral and catch-up member-states, this economic activity has slightly increased in relevance, while in core member-states, its weight has markedly decreased. The GVA of financial services is quite substantial, particularly in Luxembourg. However, the GVA of financial services across various member-states became more comparable over time, suggesting a more integrated financial sector within the Euro Area.

Figure 2.11: Financial services GVA (% of total GVA)



Source: EU Klems; authors' calculations.

A developed financial sector is key for promoting sustainable economic growth, as it allows entrepreneurs to reallocate savings into investments (Sawyer, 2014). Ang (2008) and Arestis et al. (2015) highlighted that a developed financial system is crucial for sustained economic growth by mitigating information asymmetry, reducing transaction costs, selecting and monitoring investments, and diversifying investor risks. However, according to several authors (Barradas, 2022; Ang, 2008; Arestis et al. 2015; Dabla-Norris and Srivisal, 2013), the excessive growth of the financial sector has resulted in harmful consequences for most economies, namely financial crises.

In core member-states, the non-financial private sector debt-to-GDP ratio remained relatively stable, showing a similar pattern to the evolution of the GVA in financial services (see Figure 2.12).

In contrast, peripheral member-states experienced a significant rise in the private sector debt-to-GDP ratio, particularly until the Great Recession, with Greece’s private sector debt-to-GDP almost tripling.

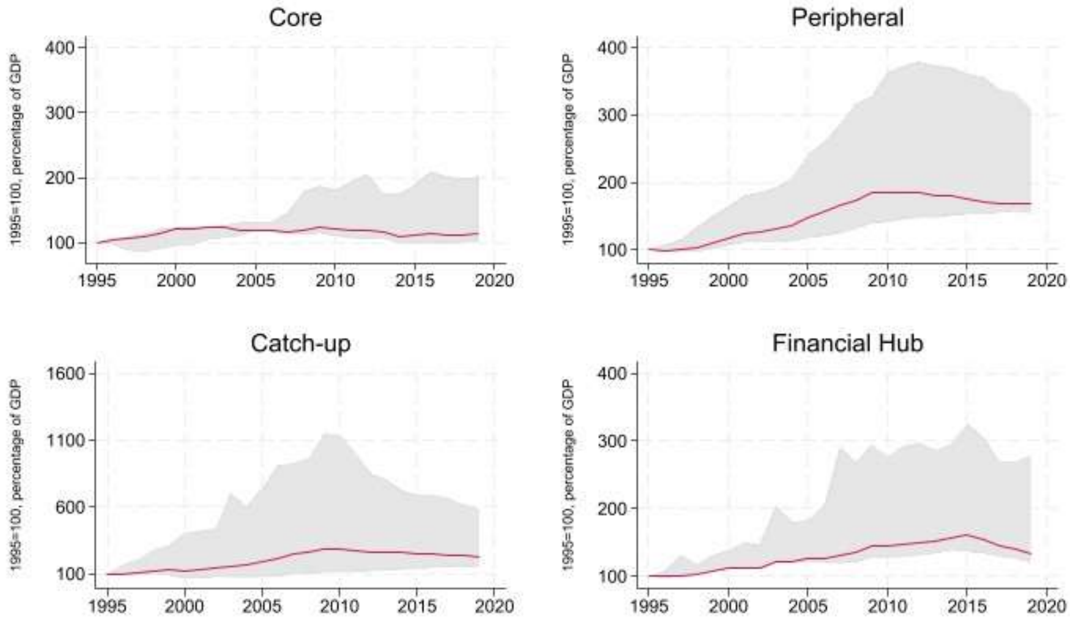
Between 1995 and 2020, peripheral economies experienced economic underperformance, marked by rapid increases in private and public debt-to-GDP ratios and a marked deterioration in NIIP to approximately -35,2% of GDP. The core member-states' average NIIP improved to approximately +52,4% of GDP, with their private and public debt-to-GDP ratios remaining stable. This disparity is partly due to current account flows and the balance of payments accounting identity within the Euro Area. Peripheral member-states' net borrowing from public and private sectors contributes to the net lending capacity of core member-states, contributing to lower public plus private borrowing requirements in core member-states, *ceteris paribus*. Thus, the accumulation of flows explains both the growing private and public sectors' debt-to-GDP ratios and the growing level of net external liabilities (more negative NIIP) in peripheral member-states (see Figures 2.4, 2.5, 2.12, and 2.13). The mirror image of this effect is relatively lower private and public sectors' debt accompanied by growth in the net external assets (NIIP) of core member-states.

In catch-up member-states, the necessity to moderate wage growth to sustain external competitiveness, coupled with the privatization of national financial systems, led to a significant expansion in credit issuance from 1995 to 2009 (Ban and Adascalitei, 2020), as shown in Figure 2.12.[8]

By 2010, the weighted NIIP of peripheral and catch-up member-states had deteriorated to roughly -50% of GDP. Euro Area policy changes, namely fiscal governance rules favoring fiscal austerity measures, played a key role in halting this trend (Flassbeck and Lapabitsas, 2013; Meloni, 2017).

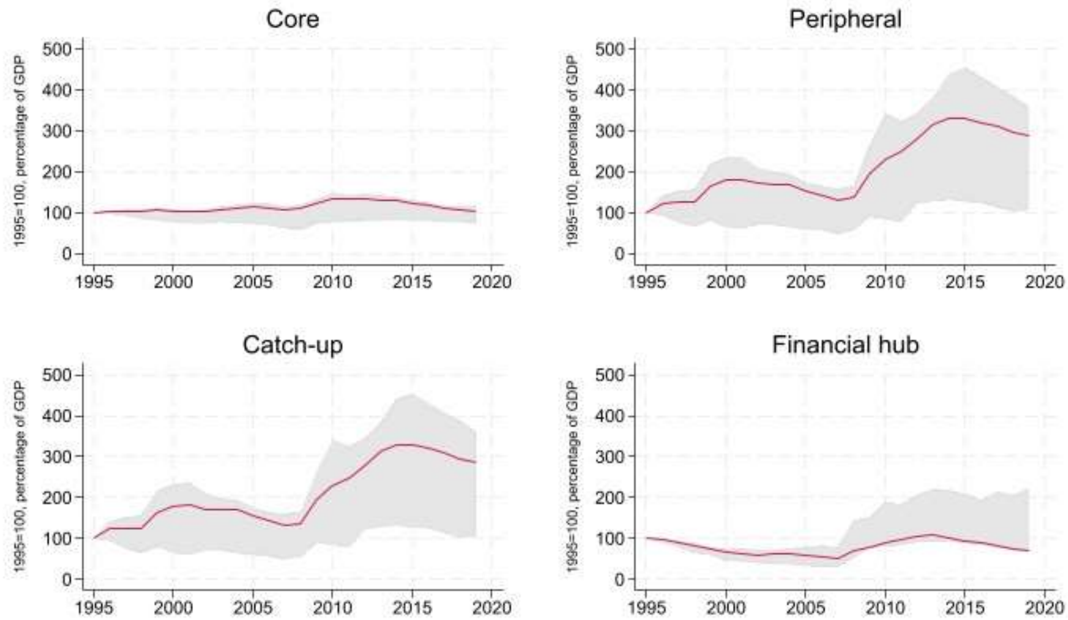
[8] Note that, since the catch-up member-states were planned economies until 1989, their initial levels of non-financial private sector debt were relatively small.

Figure 2.12: Private non-financial sector debt (1995=100) (% of GDP)



Source: AMECO; authors' calculations

Figure 2.13: General government debt (Maastricht criteria) (1995=100) (% of GDP)



Source: AMECO; authors' calculations.

The economic divergence between the peripheral and core economies of the Euro Area reached a climax after the Great Recession, as direct interbank lending through the European repo market gradually seized up (Sinn, 2020; Lavoie, 2015) leading to the euro crisis in 2010-2012 (see also Section 2.4.5).

In summary, we argue that the different economic indicators presented in this section suggest economic divergence between core and peripheral member-states, and support the thesis of significant economic underperformance in peripheral member-states. The remainder of this paper will address the research question of what explains peripheral member-states' relative (and absolute) economic underperformance.

2.3. Literature review

A significant body of literature predating the single currency augured poor perspectives for the Euro Area (Feldstein, 1997; MacDougall, 1977; MacDougall, 1992). Following the euro's launch, increasing economic divergence between member-states inspired a growing body of literature to understand its causes.

The economic underperformance of the Euro Area's peripheral member-states relative to the performance of core member-states is likely driven by multiple factors. This study identifies and summarizes five main explanatory theses and strands of the literature.

The first strand argues that divergence is driven by differences in real ULC growth rates. According to some authors (e.g., Shambaugh, 2012), the structural deterioration of external price competitiveness in peripheral states, with their real ULC rising much faster than that of core member-states, contributed significantly to this divergence, particularly before the euro crisis in 2010.

Felipe and Kumar (2014) argued that the divergence in real ULC does not necessarily indicate robust wage increases in peripheral member-states, as the labor share of GDP remained stable or even declined between 1980 and 2007. Piton (2017a) suggested that the real ULC increase in these states can be explained by the expansion of non-tradable sectors, which are shielded from international competition and firms have greater market power to influence prices (Felipe and Kumar, 2014; Piton, 2017a; Gaulier and Vicard, 2012). Since the mid-1990s, the consumer price index has risen more rapidly in the peripheral member-states than in the core member-states. One possible explanation for this is the Balassa-Samuelson effect (Balassa, 1964; Belke et al. 2009; Van der Schaar, 2019), which posits that countries with higher productivity levels and productivity growth rates tend to experience higher domestic price levels and inflation rates. High productivity growth in the tradable goods sector results in higher wages in that sector. As labor moves from the tradable to the non-tradable sector, it also affects wage growth rate in the non-tradable sector. With limited productivity growth in the non-tradable sector, higher wage growth rates contribute to more rapid growth in domestic prices. Mamede (2020) noted that in the 1990s some peripheral member-states (especially Greece and Portugal) experienced faster productivity growth than core member-states, contributing to a positive differential in domestic inflation. Figure 2.8 shows a similar pattern in the catch-up member-states, with significant appreciation in the external real exchange rate. A subset of this first strand of literature focuses on the role of the divergence of real ULC in the growing real exchange rate misalignment in these economies. Bresser-Pereira and Rossi (2015) considered that the misalignment of external exchange rates, driven by the divergence in the evolution of real ULC within the Euro Area, significantly impacted the negative performance of peripheral member-states.

Although there was once a macroeconomic consensus that external real exchange rates were irrelevant in explaining long-term economic growth, recent empirical literature shows that real exchange rate overvaluation negatively impacts long-term growth.

Rodrik (2008) argued that a competitive external real exchange rate helps overcome market and institutional failures that hinder the expansion of the tradable sector, constituting an example of second-best economic policy necessary to promote structural change. This effect is more pronounced in less developed countries.

Baldwin (1988) made a pioneering contribution in this area, concluding that a temporarily overvalued external real exchange rate can have hysteresis effects, causing permanent negative effect on exports. A competitive external real exchange rate directly benefits the economy by diversifying domestic production, making a wider variety of goods profitable to produce reducing the need for imports.

An indirect effect of external real exchange rate overvaluation is its negative impact on profit rates and productive investment levels (Barbosa-Filho et al. 2011). Additionally, it will have detrimental impacts on the capacity utilization level of firms through a decrease in exports and an increase in imports that substitute domestic production. The profit squeeze negatively affects capital accumulation since retained earnings influence self-financing and enable firms to gain access to external financing, which is a necessary condition to support capital accumulation (Lima, 2010; Missio and Jayme, 2012).

Oreiro (2016) argued that the benefits of a competitive external real exchange rate go beyond the positive effects on net exports in the short-term. By enabling returns to scale, increased exports generate dynamic externalities that spill over into the rest of the economy. These learning-by-doing practices, with their positive economic and technological externalities, require time to develop and spread. Therefore, the overvaluation of the external real exchange rate limits these positive impacts, influencing the productive specialization of the economy, and thus, the influence of the long-term growth path.

Finally, Guzman, Ocampo, and Stiglitz (2018) argued that a stable and competitive external real exchange rate creates a more favorable environment. It provides firms with greater flexibility to handle uncertainty and generate income to cover fixed costs. The authors claimed that this framework supports the development of new tradable goods sectors and those reliant on learning-by-doing, aligning with the literature that emphasizes the importance of maintaining a stable and competitive external real exchange rate.

The misalignment of external real exchange rates in the Euro Area led to increased imports and reduced exports, contributing to current account deficits and excessive private and public sector debt in peripheral member-states. This misalignment also exacerbated productive asymmetries between Euro Area member-states. While productive specialization in manufacturing with a higher technological level and higher value-added was reinforced in the core member-states, the peripheral member-states specialized in productive capacity in non-tradable sectors.

Jeong et al. (2010) estimated the external real exchange rate that would preserve internal and external balances, concluding that, in 2008, the euro was overvalued for most peripheral member-states (Portugal, Spain, Greece, France, and Italy) and undervalued for core member-states (Belgium, Austria, and Germany). At the EMU’s inception, some peripheral member-states adopted the euro at an overvalued conversion rate for their national currencies. Furthermore, productivity growth potential in the tradable goods industry was lower in peripheral member-states than in core member-states (Perotti and Soons, 2020). The overvalued conversion rate and productivity growth divergence contributed to industry relocation to lower-wage- countries and diminished foreign direct investment (FDI) attractiveness. For example, Portugal, which had one of the most overvalued external real exchange rates at euro adoption (Jeong et al. 2010), was one of the most adversely affected by increased competition from China, following its World Trade Organization (WTO) entry in 2001, and from Eastern European countries, motivated by their EU entry in 2004, resulting in a large decline in employment in manufacturing (Mamede, 2015).

The second strand of literature addresses institutional and architectural failings within the Euro Area, which have asymmetric effects on member-states' economies.

Whyte (2010) and Simonazzi et al. (2013) considered that the Euro Area had certain dysfunctionalities, namely, the absence of mechanisms to correct external imbalances that have affected member state economies since the first decade of the 2000s. They suggested that Germany's substantial external surpluses were not due to strong external competitiveness but rather to German labor market reforms[9] that reduced wage growth. This, in turn, contributed to lower aggregate demand growth in Germany and negatively impacted the economic and social performance of Germany's Euro Area trading partners[10] (Stockhammer and Sotiropoulos, 2014). Germany began to register recurrent and exceptionally large current account surpluses of 6% to 9% of its GDP. External surpluses of this magnitude are historical anomalies, even in Germany (Behringer et al. 2020; Gräbner et al. 2020).

Since the early 2000s, the Euro Area has maintained a balanced current account, whereby the external deficits of peripheral member-states were symmetric to the external surpluses of core member-states. According to de Grauwe (2013b), between 2000 and 2012, Germany's current account surplus (€192.2 billion) was approximately identical to the combined current account deficits of Greece, Italy, Portugal, and Spain.

Tabellini (2016) argued for Euro Area reforms, including increasing the federal budget, establishing counter-cyclical fiscal transfers to allow member-states' fiscal policy to respond to systemic financial crises, and stricter fiscal rules to ensure fiscal discipline of member-states. These policies would help reduce economic instability and promote convergence across economies (e.g., de Grauwe and Ji, 2013; Barba and de Vivo, 2013; Beneito and Cháfer, 2020). These authors contend that a central problem of the EMU is the lack of instruments to manage temporary asymmetric shocks, leading to divergent

[9] Promoted through the implementation of a social pact between unions and labor confederations with the stated aim of making the labor market more flexible, the so-called Agenda 2010 of the Schröder Government in the early 2000s (Streeck and Trampusch, 2005).

[10] These problems were amplified by the strict application of the Maastricht criteria, which meant that Germany's trading partners in the Euro Area could not use fiscal policy to counteract the macroeconomic imbalances that resulted from Germany's domestic labor market policies.

external imbalances (i.e., external deficits in some countries and external surpluses for others). Without these tools, deficit countries have had to implement internal devaluation policies with negative impacts on growth and unemployment (to correct these external imbalances). These asymmetric shocks had a stronger negative impact on peripheral member-states.

Barba and de Vivo (2013) posited that a currency zone is only viable if it accommodates persistent current account imbalances without balance of payments constraints. They highlighted that an important difference between the Euro Area and the United States (US) concerns the weight of the federal budget. In the US, both total federal expenditures and revenues were approximately 20% of Gross National Income (GNI), whereas in the European Union, these figures accounted for only 1% of GNI.

In the US, substantial federal taxes enable the redistribution of funds among states, helping to manage external imbalances and prevent unsustainable debt trajectories for individual states. Conversely, in the Euro Area, where taxes are collected by individual states, interstate redistribution is minimal and not significant.

The Euro Area lacks fiscal integration—a federal mechanism for regional or local spending to address asymmetric shocks—making it suboptimal as a monetary zone (Kenen, 1969; Mundell, 1961).

Lastly, de Grauwe (2013b) warned of a second EMU problem, in this case of a financial nature. EMU members issue public debt in a currency over which they have no control, increasing their vulnerability to speculative crises. During the euro crisis, this constraint led Euro Area governments to implement pro-cyclical fiscal austerity policies and labor and product market reforms in order to decrease borrowing needs, hoping to regain financial market confidence (Flassbeck and Lapabitsas, 2013; Perez and Matsaganis, 2018).

Gasparotti and Kullas (2019) used a synthetic control method to determine which countries benefited or lost from the creation of the euro, highlighting the EMU's asymmetric impacts. Between 1999 and 2017, they estimated Germany and the Netherlands benefited the most (+ EUR 23,116 and + EUR 21,003 per capita, respectively). Conversely, Portugal, France, and Italy experienced the largest costs (EUR 40,604, 55,996, and EUR 73,605 per capita, respectively).

Perotti and Soons (2020) argued that, since market prices and trade flows adjust faster than wages, productivity, and production structures, the euro resulted in persistent implicit and non-visible redistributive effects. They claimed the euro resulted in the appreciation of the external real exchange rate in peripheral member-states and a depreciation in core member-states. They concluded that since the euro is a system of implicit tax transfers through its effects on member-states' external real exchange rates, it should be balanced by explicit tax transfers from the rich, more internationally competitive economies, i.e., the core member-states to the poor, and less internationally competitive economies, i.e., peripheral member-states.

The third strand of the literature argues that indicators of price competitiveness (external real exchange rate) or wage competitiveness (real ULC) lack explanatory power, focusing on the importance of non-price competitiveness indicators. For example, evidence from Ban and Adascalitei (2020) and Bierut and Kuziemska-Pawlak (2017) shows that significant deterioration in these indicators did not hinder export share growth in international markets. That is, price competitiveness indicators such as the external real exchange rate fail to consider structural changes like shifts in sector weights or improvements in production quality, making it an imperfect and often biased predictor of economic performance.

Indeed, it is well established that countries with the most significant declines in price competitiveness often saw the largest increases in export market shares.[11] This phenomenon is known as the Kaldor Paradox (Kaldor, 1978).

Thus, non-price competitiveness is likely to be part of the explanation. A fundamental premise of the so-called North-South model posits that Southern countries are distant from the technological frontier due to factors like lower educational levels in the labor force, infrastructure quality, level of capitalized firms, and different productive structure of a given economy (Verspagen, 1991). Consequently, firms in these countries cannot operate at the 'state of the art' technological level, resulting in the production of

[11] The export market share is the weight of a given country's exports in total world exports. This indicator is a measure of the competitiveness of a country's exports.

lower quality goods and/or less technological intensity (Verspagen and Wakelin, 1993).

While Euro Area peripheral member-states are considered developed economies and not fully comparable to underdeveloped countries in North-South models, an analogous mechanism of non-price competitiveness may explain their economic underperformance relative to core member-states. Metrics like the ECI (Hidalgo and Hausmann, 2009) suggest that firms in peripheral member-states generally exhibit lower technological levels than firms in core member-states, particularly Germany (Botta, 2014). As these countries specialize in goods of low technological level, there is less room for product differentiation, making external competitiveness more reliant on price competitiveness, and hence on low wages.

The problem for Euro Area peripheral member-states stems from the lack of competitiveness of their production vis-à-vis Germany, akin to the 'middle income trap' where they are not price competitive compared to developing countries and cannot compete on quality (Rodrik, 2016; Storm and Naastepad, 2015; Felipe and Kumar, 2014).

Therefore, reducing wages to regain competitiveness is not a viable solution. Even if lower wages would improve price competitiveness, *ceteris paribus,* a questionable proposition, it would require a significant decrease in living standards which would be politically unfeasible.

A related argument is that peripheral member-states were disproportionally impacted by external shocks. Notably, the enlargement of the European Union to Eastern European countries and China's entry into the WTO exacerbated the relocation of industrial units away from the Euro Area's peripheral member-states and decreased new industrial FDI inflows. This relocation negatively impacted the technological level of production structures in these countries, constituting an adverse economic shock (Botta and Tippet, 2022; Gräbner and Hafele, 2020; Mamede, 2015). The entry of Eastern European countries in the EU and China's entry into the WTO were asymmetric shocks, disproportionately affecting the peripheral member-states due to their productive structures at the time. Similarly, technological levels of exports and imports may explain current account imbalances through their impact on long-term export growth rates. Missio and Jayme (2012), Soukiazis et al. (2017), and Romero and McCombie (2016) found that exports from technology-intensive sectors have higher income elasticities, making them relatively more sensitive to global demand and relatively less sensitive to variations in export prices.

The less technologically sophisticated economic structures of the European peripheral member-states made them more vulnerable to the euro’s appreciation in the mid-2000s, as their foreign competitiveness is more sensitive to export price variations.

The fourth strand of the literature argues that economic divergence is due to different initial development stages in the context of economies of scale, scope, and networks. For Aglietta (2012), the increasing integration of economies with different levels of development tends to aggravate these differences instead of promoting convergence. This occurs through Verdoorn's law, which posits a positive relationship between output growth and labor productivity growth due to increasing returns, especially in manufacturing (Verdoorn, 1949). Thus, countries with higher initial technological and economic growth levels can sustain growth, aggravating disparities among economies.

According to this literature, economic divergence in the Euro Area results from integrating into an incomplete monetary union without significant fiscal transfers between countries with significantly different levels of economic and technological development (de Grauwe, 2013b; Gräbner et al. 2020).

The fifth strand of the literature examines the impact of misguided Euro Area or national economic policies, particularly the differential effects of Euro Area budgetary policies on the peripheral member-states’ economic development. For example, fiscal austerity policies—the Stability and Growth Pact and, following the euro crisis, the so-called Fiscal Compact—, may have exacerbated the technology gap (Botta et al. 2018). Fiscal austerity increased unemployment, especially long-term unemployment, harming human capital and resulting in a loss of labor skills. Additionally, the expected technology spillovers from capital accumulation diminished during periods of declining private investment. Finally, adjustment programs often involved privatizing public monopolies at distressed prices, negatively impacting the overall efficiency of these economies (Hudson, 2021).

2.4. Dutch disease: Causality channels

In addition to the explanations discussed in Section 2.3, this paper argues that a financial Dutch disease, caused by capital inflows, significantly contributed to the economic divergence of the peripheral member-states after adopting the euro.

We argue that the Dutch disease literature and theory provide a distinct explanation, separate from the unit labor costs and external real exchange rate literature (Blecker, 2023). A growing body of literature treats the Dutch disease as a standalone theory (Magud and Sosa, 2013; Comunale, 2017). The Dutch disease literature also differs from the alternative explanations identified in Section 2.3.

2.4.1. What is the Dutch disease?

The Dutch disease hypothesis, first theorized through the core model (Corden and Neary, 1982; Corden, 1984), was designed to explain the sudden deindustrialization in the Netherlands during the 1960s following the discovery of a natural gas field and subsequent export of this commodity.

The model's key insight is that a favorable economic shock can lead to long-term macroeconomic malaise (Brahmbhatt et al. 2010; Comunale, 2017) by adversely affecting the productive structure of tradable goods sectors, productivity growth trends, and the internal real exchange rate, as measured by the price of non-tradables vis-à-vis tradables.

The Dutch disease model describes a small open economy with three sectors: a booming tradable goods sector, a lagging tradable goods sector, and a non-tradable sector (Corden and Neary, 1982; Corden, 1984; Brahmbhatt et al. 2010).

The growing exports of the booming tradable goods sector lead to higher domestic income, an increase in aggregate demand, and an appreciation of the internal real exchange rate (measured by the price of non-tradables versus the price of tradables) as domestic prices and wages rise while tradable sector prices remain approximately constant due to international competition. The rise in domestic prices and wages (and eventually the appreciation of external real exchange rate as a result of booming sector exports) reduces the profitability of the lagging tradable sector. This constitutes what Corden and Neary (1982) termed the 'spending effect.'

Further, growing exports from the booming tradable goods sector trigger a reallocation of production factors from the lagging tradable goods sector and from the non-tradable sector to the booming sector. The decrease in labor and capital allocated to the non-tradable sectors and the increase in wages causes a reduction of output of the non-tradable sector and of the lagging tradable sector. This contributes to the appreciation of the internal real exchange rate as non-tradable prices rise relative to tradable prices. This process is known as the 'resource movement effect' (Corden and Neary, 1982; Brahmbhatt et al. 2010).

In Corden and Neary's (1982) model, the 'spending effect' positively impacts the non-tradable sector, while the 'resource movement effect' negatively impacts it. Both effects negatively impact the lagging tradable goods sector.

It is widely accepted that the Dutch disease mechanism applies even when the booming tradable goods sector is not extractive, with Corden and Neary (1982) defending this view. Palma (2019) concurred, arguing that the Dutch disease can also result from other capital inflows such as FDI, emigrant remittances, tourism revenues, speculative capital inflows, or relevant changes in export commodity prices.

2.4.2. In the absence of a booming exports sector, could sustained capital inflows cause the Dutch disease?

As noted by two anonymous referees, it is important to understand whether the Dutch disease mechanism adequately explains the impact of EMU membership on the economic trajectory and underperformance of the peripheral and, to a lesser extent, catch-up economies, given its dissimilitude to Corden and Neary's (1982) model. Specifically, it is important to understand whether sustained (gross) capital inflows can give rise to what is termed here and elsewhere a financial Dutch disease when there is no booming tradable goods sector.

We argue that the financial Dutch disease model explains well the performance of peripheral economies (and, to a lesser extent, catch-up economies) since adopting the euro. EMU membership, theoretically a favorable shock to the peripheral economies that results in lower real interest rates, availability of capital inflows, lower trade costs, and improved macroeconomic stability, had a long-term adverse impact on macroeconomic performance by resulting in appreciating internal (and external) real exchange rates (measured by rising non-tradable versus tradable prices) and negatively impacting the peripheral member-states, including their tradable goods sectors, productivity structures, and productivity growth trends.

In peripheral economies participating in the EMU, the spending effect of the financial Dutch disease mechanism is still present. Capital inflows to the non-tradable sector led to increased income, a shift in aggregate demand, and higher prices and wages in that sector. The resource movement effect also exists, albeit in a weaker form than in the original Dutch disease model. Rising wages and profits in the non-tradable sector, associated with the spending effect, cause a shift of resources from the lagging tradable goods sector to the non-tradable sector (Gopinath et al. 2017; Botta et al. 2023), even without a booming tradable goods sector (see also the discussion in Section 2.4.5).

Furthermore, a growing body of literature argues that Dutch financial disease spending and resource shifting effects can occur in the absence of a booming tradable sector.

For example, Brahmbhatt et al. (2010, p.1) argued that ‘sustained […] capital inflows’ constitute a favorable economic shock that can cause a Dutch disease-like effect, in what is now known as a financial Dutch disease mechanism (Brahmbhatt et al. 2010; Magud and Sosa, 2013; Botta, 2015; Botta, 2021; Comunale, 2017; Botta et al. 2023).

Further, Batavia and Nandakumar (2016) contend that EMU membership and the euro’s adoption caused a structural change in the peripheral economies through a Dutch disease-like mechanism. The euro exacerbated foreign capital inflows and contributed to the growing financialization[12] (see Figure 2.11) of these economies (Rodrigues, Santos,

[12] Following Epstein (2005), financialization is hereinafter understood as ‘the rising importance of financial markets, financial motives, financial institutions, and financial elites in the functioning of the economy and its governing institutions, both nationally and internationally.’

and Teles, 2016). Batavia and Nandakumar (2016) argued that Dutch disease can occur in the absence of a booming tradable sector due to external capital inflows alone.

Finally, Botta et al. (2023) analyzed the impact of capital inflows (primarily, portfolio investment and external lending) and found evidence of adverse impacts on the lagging tradable sector, even if the capital inflows are temporary. They argued that recipient economies could suffer from financial Dutch disease-like transmission mechanisms, leading to a decline in technological levels and a shift of resources toward non-tradable goods, particularly with the deterioration in the production of technology-intensive tradable goods. Ultimately, capital inflows can increase economies' vulnerability to external shocks by jeopardizing the sophistication of productive structures.

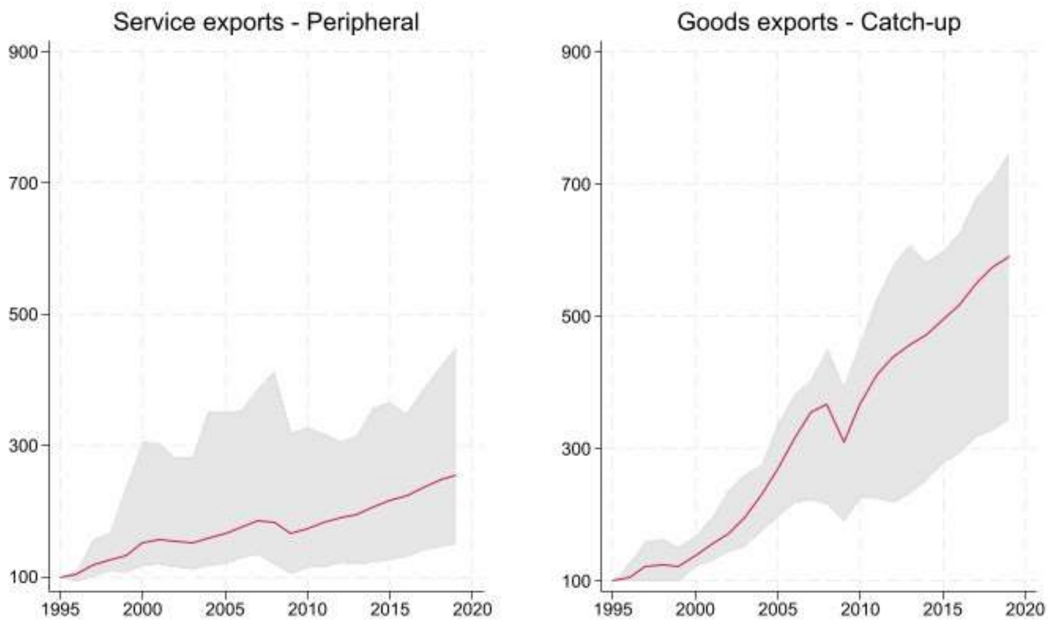
2.4.3. Possible peripherals' and catch-ups' booming exports sectors

Although the financial Dutch disease model seems appropriate in the absence of a booming tradable goods sector (Brahmbhatt et al. 2010; Magud and Sosa, 2013; Botta, 2015; Batavia and Nandakumar, 2016; Comunale, 2017; Botta et al. 2023), the peripherals' growing tourism exports—a low-productivity tradable services sector—may substitute for the booming tradable goods sector in the original model, as suggested by an anonymous referee.

Furthermore, the 'Mexican maquiladora' industry model in some catch-up economies,[13] integrated with higher GVA German industry, may have served as the catch-up economies' booming tradable goods sector. This still fits within the financial Dutch disease model induced by EMU membership (see further discussion below).

[13] 'The [...] IMMEX maquiladora program, allows foreign manufacturers to import raw materials and components into Mexico, tax and duty free, under the condition that 100% of all finished goods will be exported out of Mexico within a government-mandated time frame.' (retrieved from https://napsintl.com/manufacturing-in-mexico/the-immex-program-manufacturing-in-mexico/).

Figure 2.14: Euro Area peripheral member-states real exports of services and catch-up member-states real exports of goods (1995=100)



Source: AMECO; authors' calculations.

The tourism sector is increasingly significant in terms of GVA and employment for peripheral member-states (see Figure 2.14). Bürgisser and Di Carlo (2023) contend that, following the European sovereign debt crisis, peripheral member-states have relied more on international tourism for economic growth and to derive export revenues that contribute to balance current account deficits. In the post-crisis era, while core member-states have enjoyed current account surpluses from exporting manufactured goods or high-tech products, peripheral member-states have exhibited rising surpluses in their services balance, primarily due to a surge in tourism exports, which have more than offset goods balance deficits.

Capó et al. (2007a, 2007b) investigated whether the tourism exports of Spanish territories over-specialized in tourism activities, such as the Balearic and Canary archipelagos, could act as the booming tradable sector inducing Dutch disease model spending and resource movement effects. They found that this specialization led to a reallocation of resources from the tradable goods sectors (agriculture and industry) to the tourism sector, negatively impacting long-term innovation and productivity. Additionally, they found that increased tourism exports led to higher relative prices of non-tradable goods and services, causing internal (and external) appreciation of the real exchange rate in these regions and reducing the competitiveness of the tradable sector.

Romão et al. (2016) found similar Dutch disease effects in Portugal's Algarve region, where tourism is the main industry, employer, and exports source.

Among the catch-up member-states, only Slovenia and Slovakia exhibit substantial integration into the complex, high-GVA German industry (Celi et al. 2018; Gräbner and Hafele, 2020). In contrast, Croatia's significant tourism sector, comparable to that of peripheral member-states in terms of GVA and employment, may contribute to the Dutch disease phenomenon (Broz and Dubravcic, 2011). Lastly, the Baltic countries, namely Latvia, Lithuania, and Estonia, exhibited a pronounced trend toward deindustrialization by promoting the privatization of the banking sector and liberalization of capital movements, alongside other liberalizing policies such as currency boards and the absence of customs tariffs. Concurrently, they encouraged FDI in the banking and real estate sectors, significantly impacting household and firm indebtedness (Bohle, 2017; Bohle and Greskovits, 2012). This dynamic, akin to that observed in peripheral member-states, may have triggered Dutch disease in some catch-up economies (Comunale, 2017; Andrade and Duarte, 2017).

The view that FDI in the tradable goods sectors of catch-up economies may have played the role of booming tradable goods sector in a financial-Dutch disease model is likely more controversial and complex, as such FDI is widely seen as beneficial.

Core member-states, particularly Germany, have invested in the tradable goods sectors of catch-up economies, boosting their goods exports (see Figure 2.14), GDP (Figure 2.1), and the Economic Complexity Index (Figure 2.10). German industrial firms have increased industrial FDI in new Eastern European Union member-states to benefit from the comparative advantages of low labor costs, a high skilled labor force, and geographic proximity to their industrial base. This economic strategy is similar to that of US and Western firms benefiting from the Mexican maquiladora program under the North

American Free Trade Agreement (NAFTA).

Thus, as evidenced by the rapid growth in goods exports in catch-up economies (see Figure 2.14), it is likely that FDI in their tradable goods sectors function as a booming tradable goods sector, at least for some catch-up economies. This could induce the spending and resource-shifting effects predicted by the Dutch disease model.

The FDI tradable goods sector likely has higher productivity and growth potential than the tourism industry in peripheral economies.[14] For example, Botta (2015) argued that FDI, with its focus beyond short-term returns, can enhance labor productivity and contribute to domestic gross capital formation. Additionally, FDI introduces new techniques and accelerates human capital through technology transfer and spillovers, which is an important stimulus for economic growth (Iamsiraroj, 2016). Thus, core member-states' industrial FDI in catch-up economies may mitigate Dutch disease pressures and partly explain their somewhat better performance relative to peripheral ones, as discussed in Section 2.2.

However, it is important to note that FDI in the tradable goods sector is neither a panacea nor a perfect approach for ensuring growth and income convergence. It results in significant dividend and interest outlays by the beneficiary country, which mitigates the effect of higher goods exports on the current account balance (Ramirez, 2006; Vu and Pavelková, 2023). Furthermore, Lartey (2011) found that in more financially open economies, an increase in FDI flows, even into the tradable goods sector, contributes to a greater degree of external real exchange rate appreciation. Figures 2.4 and 2.5 suggest that despite growing goods exports, catch-up economies experienced current account deficits and a deteriorating NIIP until 2010, a trend similar to that of the peripheral economies.

This might explain why the catch-up member-states, despite their different economic development model, also experienced growing macroeconomic imbalances and Dutch disease-like effects, including internal (and external) real exchange rate appreciation, and

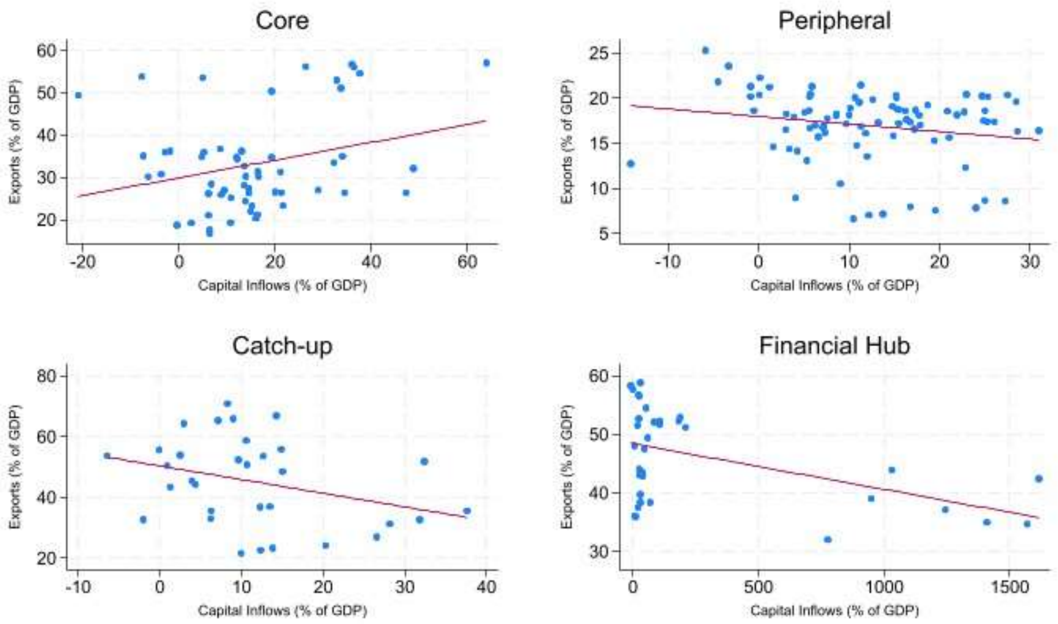
[14] According to Ban and Adascalitei (2020), the positive impacts of FDI inflows in catch-up member-states have been limited, as only low- and medium-skill production was relocated to these countries.

lagging tradable sector performance.

2.4.4. The effect of capital inflows on the lagging tradables sector

Following Forbes and Warnock (2012), we measure gross capital inflows as the sum of gross inflows of FDI, portfolio investments, and other investments. However, to account for the impact of FDI on the tradable sector, which mitigates Dutch disease pressures, we exclude FDI directed toward the underperforming tradable sector (proxied by industrial FDI) from the gross capital inflows measure (see Figure 2.15), as suggested by an anonymous referee.

Figure 2.15: Relationship between the share of goods exports and capital inflows (excluding industrial FDI) (% of GDP)



Source: IMF-BOP, OECD and AMECO; authors' calculations.

Figure 2.15 illustrates a negative and statistically significant relationship between the share of goods exports and capital inflows (excluding industrial FDI) for peripheral member-states. This finding is partly consistent with the predictions of the financial Dutch disease model, suggesting that these financial inflows are correlated with a decline in the weight of the tradable goods sectors of peripherals economies. The Dutch disease transmission mechanism was likely amplified by nominal exchange rates being fixed within a band from 1995 and 1998 and irrevocably fixed from 1999 onwards.

In this context, capital inflows, per the balance of payments accounting identity, must correspond to current account outflows of the recipient member-states, *ceteris paribus*.

One key macroeconomic adjustment variable is the goods trade balance. If the capital inflow shock is sufficiently large, it is likely to be transmitted through rising goods imports and falling goods exports, which negatively impacts the tradable goods sector of member-states experiencing large capital inflows, as predicted by the Dutch disease model (Corden and Neary, 1982; Corden, 1984).

Between 1995 and 2012, the relative share of financial services in GVA, which Krippner (2005) considered a key metric of financialization, increased significantly in the peripheral member-states compared to the evolution of the weight of financial services in core member-states (see Figure 2.11).

In the 1990s, there was an intensified integration of the financial markets of the founding members of the Euro Area. The Maastricht Treaty mandated the removal of restrictions on capital movements and cross-border payments after January 2004 and aimed to harmonize banking sector regulations, often to the least common denominator. This effectively led to the liberalization of the financial system.

The elimination of exchange rate risk led to significant foreign capital inflows from the core to the peripheral Euro Area member-states, attracted by interest rate spreads. This influx, facilitated by the financial deregulation underlying the Maastricht Treaty, reduced interest rate spreads within the EU (Blanchard and Giavazzi, 2002; Pérez-Caldentey and Vernengo, 2012). While these inflows could have benefited the tradable sectors, they were primarily directed toward non-tradable sectors. This preference for the non-tradable sectors was due to their lower perceived risk, as financial sector credit to non-tradable sectors was deemed less risky (Felipe and Kumar, 2014; Piton, 2017a). The literature identifies various possible explanations as to why capital inflows were channeled toward non-tradable sectors. First, since the credit market was underdeveloped in the European periphery, banks were unable to lend funds to tradable sectors due to collateral constraints (Reis, 2013). As guarantees at the collateral level are greater in non-tradable sectors, credit tended to flow into these sectors.

2.4.5. Sustained capital inflows: A byproduct of the EMU architecture

We have argued that EMU membership resulted in sustained capital inflows that caused the financial Dutch disease, resulting in internal and external real exchange rate appreciation, falling real interest rates, and a lagging tradable goods sector in the peripheral economies.

The sustained capital inflows were a consequence of the Euro Area's design (Sinn, 2011, 2020; Sinn and Wollmershäuser, 2011; Lavoie, 2015; Cabral and Louçã, 2019). In the absence of federal debt securities, the architects of the euro designed the single currency aiming to prevent fiscal transfers and minimize the risk of monetizing public debt by the monetary authority (Issing, 2008; de Grauwe, 2008; Cabral and Louçã, 2019).

They introduced private market discipline to sovereign debt markets through several mechanisms. First, domestic commercial banks could obtain liquidity from Eurosystem refinancing operations, providing domestic sovereign debt (or other private sector debt) as collateral. Second, from November 9, 2005, sovereign debt use as collateral in Eurosystem refinancing operations was subject to minimum ratings by one of four international rating agencies (Buiter and Sibert, 2006; Cabral and Louçã, 2019). Thus, in the EMU architecture, domestic banking systems played a key role in intermediating the financing of member-states' economies.

This mechanism was the primary channel through which sustained capital inflows materialized, enabling: (i) the financing of recurring large current account deficits; and (ii) the seamless refinancing of growing external debt levels (Sinn, 2020; Lavoie, 2015).

Some authors viewed this process as numbing or even repressing sovereign credit risk (Buiter and Sibert, 2006; Sinn and Wollmershäuser, 2011; Cabral and Louçã, 2019).

This explanation is consistent with the assumption of money endogeneity (Moore, 1988; Lavoie, 2009). For example, in responding to households' and firms' demand for credit, banks create new deposits when they extend new loans (Moore, 1988; Lavoie, 2009; Kohler, 2024). In a second phase, a part of these deposits was used for payments to core member-states for net imports of goods and services, interest, or dividends (Kohler 2024). In such a setting, the peripheral commercial banks lost reserves at the Eurosystem, while the core banks increased their reserves.

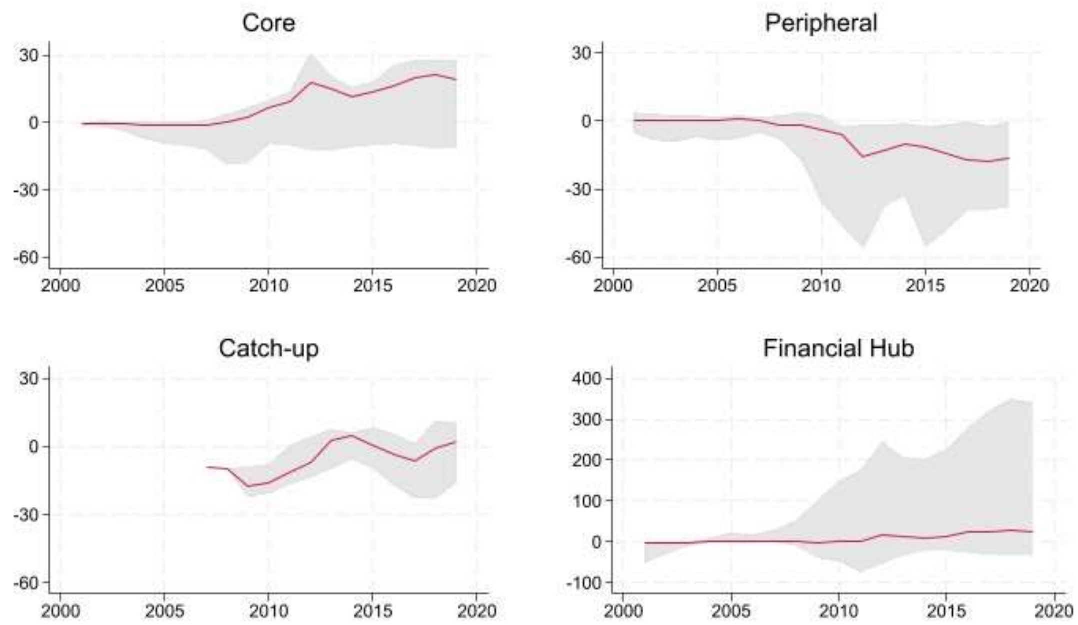
Domestic banks of peripheral economies and other member-states obtained foreign loans to replenish their euro reserves either through the European repo market (International Capital Market Association 2006), which was the dominant form of collateralized financing until 2007-2008 (e.g., EUR 5,883 billion outstanding repo contracts in December 2005) or through Eurosystem refinancing operations (e.g., an average credit outstanding volume of EUR 853 billion in 2005).

The large, sustained capital inflow feature of the EMU is key to understanding the financial Dutch disease. The sustained increase in aggregate demand directed for the non-tradable sector, especially between 1999 and 2008, was supported by the seamless availability of foreign loans, which were secured using domestic collateral denominated in euros (Sinn, 2011, 2020; Lavoie, 2015; Cabral and Louçã, 2019).

Inflation in domestic asset prices, particularly in real estate and other non-tradable sectors (Aliber and Kindleberger, 2015; Kohler, 2024) provided sufficient collateral for securing external borrowing (see also Section 2.4.6 on the effects of capital inflows on asset price inflation).

Access to Eurosystem lending facilities, using domestic financial assets as collateral, and the ability of peripheral states' national central banks to maintain theoretically unlimited negative balances vis-à-vis the TARGET2 system (Lavoie, 2015) allowed domestic banking systems (and their customers) to access, on demand, substantial capital inflows from core member-states, providing quasi-contingent foreign credit lines. Prior to 2007, most external borrowing by banks in peripheral member-states bypassed the Eurosystem and TARGET2 system as they borrowed directly from banks in core member-states via the European repo market (see Figures 2.16 and 2.17), using domestic debt securities, primarily Euro Area sovereign debt securities, as collateral (International Capital Market Association 2006). After 2007, the banks of the peripheral member-states increasingly resorted to Eurosystem refinancing operations (and in some cases to Emergency Liquidity Assistance from their respective national central banks), as they were gradually excluded from the European repo market (Sinn, 2020).

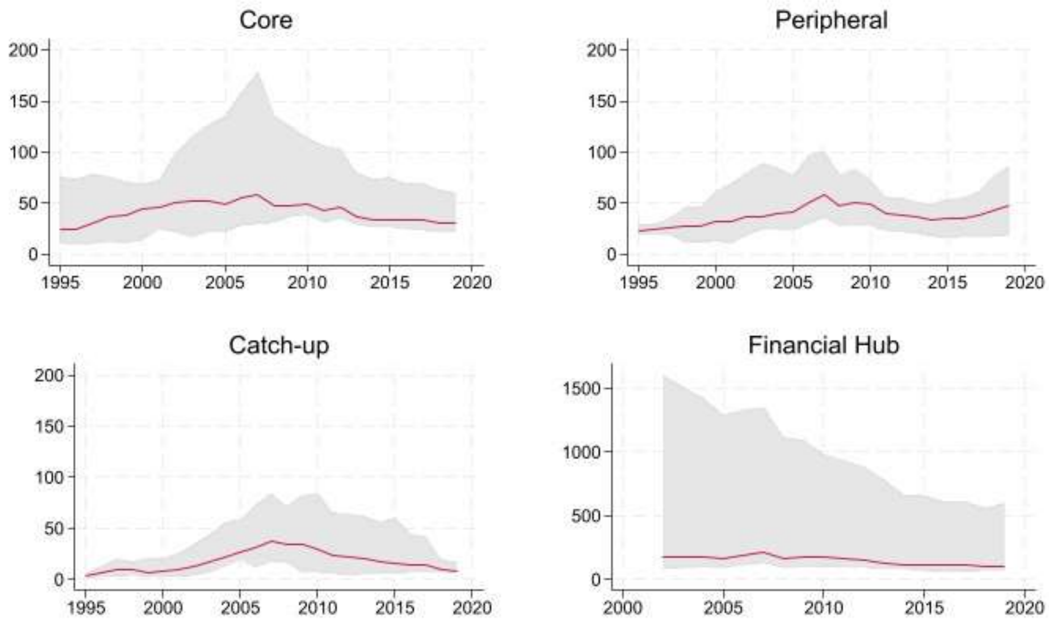
Figure 2.16: TARGET2 balances (% of GDP)



Source: ECB; authors' calculations

In practice, the reserves that were borrowed by the banks of the peripheral countries were primarily the excess reserves owned by commercial banks in core member-states (see Figure 2.16). This borrowing process, especially after 2007, was intermediated by the TARGET2 system and the national central banks of both peripheral and core member-states (Febrero et al. 2019; Cabral and Louçã, 2019), giving rise to growing TARGET2 balances. Prior to 2007, this situation was fundamental for the increase in interbank repo market flows from core to peripheral member-states. Figure 2.17 suggests that between 1999 and 2007, the banking sector’s external debt increased across all member state groups, with the most significant rise in peripheral and catch-up member-states.

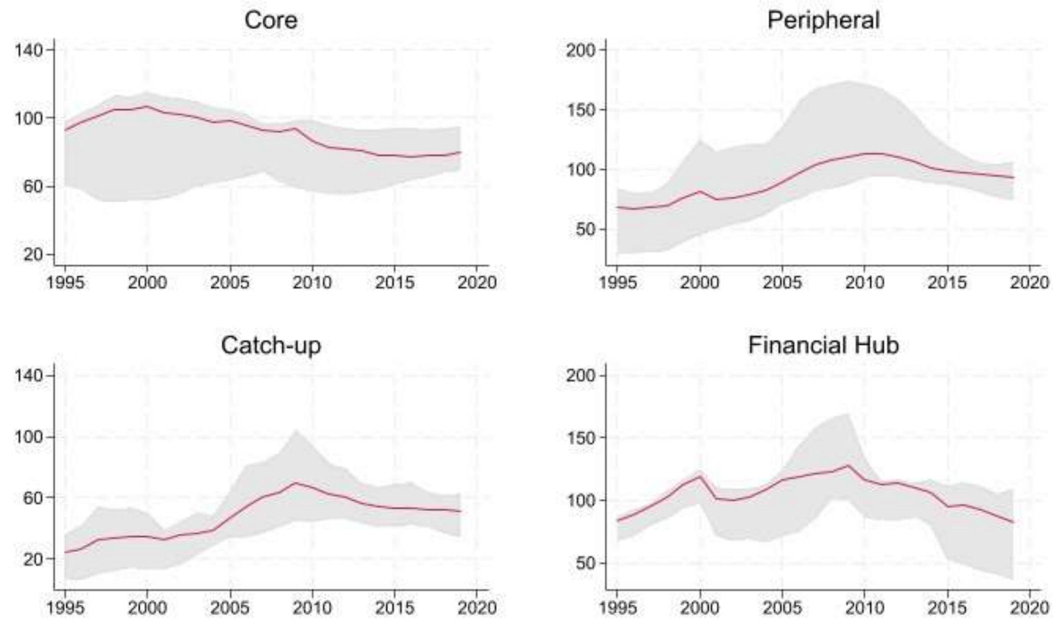
Figure 2.17: Banking sector external debt (% of GDP)



Source: IMF-BOP; authors' calculations

While the external debt of core member-states’ banking sectors also increased between 1999 and 2007, this did not translate into increased private sector credit provision, as illustrated in Figure 2.18.

Figure 2.18: Domestic credit to non-financial private sector (% of GDP)



Source: World Bank; authors' calculations

TARGET2 balances particularly in 2010-2014 also in part reflected capital flight from the peripherals and from Ireland, as economic agents feared the breakup of the Euro Area and the end of the euro (Sinn, 2020).

Nonetheless, the TARGET2 balances after 2010 are in a significant part the symptom and the consequence of the sustained capital inflows from the core member-states to the peripheral member-states, which, between 1995 and 2010, financed large recurrent current account deficits by the latter (Barba and de Vivo, 2013; Sinn, 2020) and which facilitated the refinancing of the peripheral member-states external net liabilities (large negative NIIP). The TARGET2 balances appeared and became necessary once the private-sector European repo market ceased to refinance those net external liabilities of the peripheral member-states, a form of foreign public financing replacing foreign private financing (Sinn, 2020; Lavoie, 2015).

Lavoie (2015) points out that since TARGET2 balances were theoretically unlimited, the peripheral member-states’ current account deficits and negative external liabilities could always be financed and refinanced, respectively, even during the Great

Recession and the euro crisis. Thus, still according to Lavoie, the euro crisis did not fulfill all conditions enumerated by Cesaratto (2013) to be considered a balance of payments crisis. Instead, market agents rationally and correctly anticipated that the ECB would refuse to act as a lender-of-last-resort until the last moment possible, thus unwittingly promoting a speculative attack against the peripheral member-states' sovereign debt.

In that sense, the TARGET2 balances functioned as a public financing backstop (Sinn, 2020) that prevented a default of the peripheral member-states on private foreign lending extended by core private sector banks.

Thus, what initially appeared as a favorable shock—the availability of nearly unlimited credit and sustained foreign capital inflows intermediated by the banks (repo market lending) or by the banks, the national central banks and the TARGET2 system—had adverse macroeconomic consequences for both peripheral economies and catch-up economies' long-term development.

2.4.6. The effect of capital inflows on the non-tradables sector

Additionally, domestic credit expansion, which, as pointed out by Febrero et al. (2019) and by Kohler (2024) and explained in Section 2.4.5, resulted in growing external capital inflows that in its turn contributed to asset price inflation, especially in financial and real estate sectors (Aliber and Kindleberger, 2015; Kohler, 2024).

Consequently, the balance sheets of firms in non-tradable sectors were 'artificially' inflated, facilitating further financing and a shifting capital and labor toward these sectors (Botta et al. 2023). Thus, capital inflows increased the expected return on investments in non-tradable sectors. These two situations are examples of the effects of resource movement effect.

According to Gopinath et al. (2017), capital inflows directed toward firms with higher net worth, rather than the most productive firms, led to a misallocation of resources and negatively impacted productivity in these countries.

However, the effect of lower interest rates is not equally transmitted to the tradable and non-tradable sectors. While increased demand for tradable goods can be satisfied by importing goods, this is not possible for the non-tradable goods. The only way to meet this increase in demand is through a shift in productive resources to this sector. On the other hand, Dornbusch (1983) argued that foreign capital inflows influence the relative prices of the two sectors; as real interest rates decline and aggregate demand increases, the price of non-tradable goods rises. Similarly, Gaulier and Vicard (2012) noted that aggregate demand shocks have a positive impact not only on the volume of transactions of non-tradable goods and services (e.g., construction boom), but also on their prices (e.g., real estate bubbles), as supply is sticky.

In contrast, an aggregate demand shock in a small open economy has a negligible impact on tradable goods prices, which are determined exogenously at the international level.

As mentioned above, external capital inflows contributed to the convergence of interest rates in Euro Area and to demand-led credit growth.[15] This does not imply that banks will lend to all applicants. Credit rationing may still occur, with banks lending only to creditworthy borrowers (Lavoie, 2009).

The significant decline in real interest rates in peripheral member-states, coupled with rising real incomes and greater confidence in economic agents (resulting from the period of strong economic growth), stimulated both the demand for and the supply of credit. Asset price inflation, potentially driven by speculative dynamics (Minsky, 1982), increased the value of collateral, encouraging banks to extend more credit to borrowers (Reis, 2013; Kohler, 2024). The increase in credit likely contributed to a more significant growth in the prices of non-tradable goods and services in these economies (Piton, 2017b). Additionally, the reduction in real interest rates in peripheral member-states resulted in a significant reduction in public expenditure on interest. Thus, the governments of the Euro Area peripheral member-states benefited from a significant increase in their fiscal space (Lane, 2006), which they used to promote increases in primary discretionary public expenditure. Froot and Rogoff (1991) argued that this increase in public non-interest spending tends to raise the relative price of non-tradable

[15] Between 1995 and 2007, the average reductions in real interest rates were about 7.7 and 2.9 percentage points for the peripheral and the core member-states, respectively (Piton, 2017a).

goods because this spending is concentrated in non-tradable sectors.

Earlier literature considered that the contribution of non-tradable sectors played a minor role in explaining the volatility of the Euro Area's external real exchange rate (Engel, 1999; Chari et al. 2002; Blecker, 2023).

However, subsequent research for both OECD and Euro Area countries concluded that changes in the relative prices of non-tradable sectors significantly impact the external real exchange rate (Blecker, 2023), explaining up to 50% of its variation in this indicator (Burstein et al. 2006; Comunale and Hessel, 2014). Several macroeconomic models show that changes in the relative prices of tradable and non-tradable goods (internal real exchange rates) can also influence external real exchange rates with relevant macroeconomic impacts (Obstfeld and Rogoff, 2000, 2007; Ruscher and Wolff, 2009).

Thus, an increase in the relative price of non-tradable goods will cause an appreciation of the external exchange rate, exerting additional pressure on exporting sectors, especially those reliant on price competitiveness. This scenario often encourages specialization in non-tradable sectors such as construction or real estate.

Benigno and Fornaro (2014) argued that foreign capital inflows typically worsen the current account balance while driving up employment and output in non-tradable sectors (mainly construction), resulting in stagnant productivity growth. They termed this effect the 'financial resource curse.'

Other literature emphasizes that tradable sectors, particularly manufacturing, have greater potential for productivity growth (e.g., Szirmai, 2012; Tregenna, 2009; Rocha, 2018; Rodrik, 2016).

When considering the existence of the Dutch disease from foreign capital inflows, the focus is often on portfolio investments due to their short-term nature and the rapid reversal of flows. In contrast, FDI capital flows are widely seen as virtuous.

However, as noted in Section 2.4.3, the benefits of FDI depend on how it is integrated into the national production system and its role in capital accumulation (Lall, 2000). Therefore, economic growth is influenced by the sectoral composition of FDI (Dutt, 1997; Martins and Mamede, 2022). Consequently, FDI in natural resources or non-tradable sectors has fewer positive impacts compared to FDI in the manufacturing sector.

2.5. Conclusions

This study reviews the main explanations advanced in the literature for the poor economic performance of the peripheral member-states of the Euro area since the 1990s and argues that one of the primary causes is a financial Dutch disease mechanism. This economic malaise, which occurred following what would theoretically be a favorable shock associated with participation in the EMU, is caused by the continued availability of contingent capital inflows in theoretically unlimited volumes, stemming from the architecture of the EMU. These capital inflows resulted in substantial reduction in real interest rates in peripheral member-states and enabled the financing of high and recurring current account deficits between 1995 and 2010-2012, as well as the refinancing of increasing levels of external debt. Additionally, they contributed to the appreciation of the internal exchange rate and an increase in demand directed toward the non-tradable sector, alongside a decrease in demand for the lagging tradable sector. These effects, in turn, led to an appreciation of the external exchange rate, an increase in real ULC, and an adverse impact on the traditional tradable goods sector, with long-term consequences for the peripheral member-states' productive structure and productivity growth potential. We argue in this paper that this mechanism effectively explains the underperformance of peripheral member-states following membership in the EMU.

Furthermore, we contend that the financial Dutch disease mechanism can also explain the economic performance of the catch-up member-states of the Euro Area. Despite a development model that, for some of these economies, was based on industrial FDI originating from Germany and other core member-states that somewhat reduces Dutch disease pressures on the tradable goods sector, the economic malaise effects predicted by the Dutch disease are observed, such as real external exchange rate appreciation and increasing macroeconomic imbalances, particularly until the euro crisis of 2010-2012.

Our thesis that persistent capital inflows caused a financial Dutch disease and increasing macroeconomic imbalances is problematic because it can be interpreted as suggesting the need to restrict these capital flows from core to peripheral states. However, this would not be a solution compatible with the EMU, as it would result in its end. A currency zone is only viable if it accommodates persistent current account imbalances without balance of payments constraints (Barba and de Vivo, 2013).

Thus, a possible response to address the financial Dutch disease syndrome that could be investigated in further research is whether foreign capital inflows—typically lending, FDI in non-tradable sectors, or, at best, FDI in tradable sectors—should be replaced or complemented with fiscal transfers from a federal budget aimed at alleviating the pressures of the Dutch disease effects on the lagging tradable sectors, i.e., fiscal transfers targeted at improving the performance of the peripheral economies' tradable sectors.

3. The promised land or a mirage? The puzzling divergence of the Euro Area's periphery

3.1. Introduction

The European Union (EU) – Germany's liberal empire in the words of Wolfgang Streeck (2019) – is a peaceful 67-year-old multi-nation-state economic integration project based on two key propositions: more rapid joint economic growth; and, foremost, economic convergence, whereby poorer EU (and Euro Area) member-states could aspire to achieve the standards of living of the most advanced EU (and Euro Area) member-states economies.

If successful on the second proposition, that is, if its deeds matched its aims, the EU would become a revolutionary (liberal) empire in the sense that centers of power of the empire would promote the economic development of the regions (and the peoples) that voluntarily and willingly ceded sovereignty (that is, political, legislative, executive, and judicial powers) to central authorities. Thus, the EU approach to the integration of nation-states would be unlike, say, the European colonial empires that existed foremost between the XVIth and the XXth centuries, which most literature views as exploiting the colonies, exacting tributes or extracting economic resources, with large long-term costs to those colonies' economic development (Acemoglu and Robinson, 2017; Bergh et al., 2018; Cooray, 2009).[16] It would also be a showcase for the idea that enlightened centralized EU economic policy making would be able to export successful development policies and institutions to the peripheral EU member-states. If the EU brought about more rapid economic development and economic convergence, the EU would imitate the achievements of past, but rare, successful federations and large economies.

[16] See Ertan et al. (2012) for an opposing perspective. Acemoglu and Robinson (2017, p.82) argue that the development of the colonies depended on institutional settings, with adverse outcomes when colonization was "based on the control of and the extraction of rents from indigenous peoples".

This essay focuses on the second proposition and on the less developed (peripheral) member-states of the Euro Area.

The economic and productivity convergence issue is particularly pertinent for those member-states that have more closely aligned economic policy making and have further integrated economically and monetarily, that is, member-states that participate in the EMU.

Thus, the research question this essay investigates is whether EMU policy framework, indeed promotes the more rapid economic and labor productivity growth of the nation-states 'distant' to the centers of power and of economic policy making. In other words, do the EMU economic policies contribute to the economic and labor productivity convergence of the less economically developed and least internationally competitive peripheral member-states of the Euro Area or is the promised land a mirage?

The determinants of long-term economic growth and economic convergence of different countries is a widely studied topic in economic theory by different schools of economic thought (Kaldor 1970, 1966; Thirlwall, 1979; Romer, 1986; Aghion et al., 1998; Solow, 1957).

In the context of the EU's integration process, achieving economic convergence is an essential pillar in establishing social and economic cohesion within the EU. For example, according to Article 130a of the Single European Act signed in February 1987, “In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion”. Several policies have been established to facilitate economic cohesion in the EU, namely through relatively small fiscal transfers of so-called 'structural funds' for (regions) of member-states with per capita GDP levels lower (less than 90%) than the EU average.

One of the main assumptions of neoclassical growth theory is that increased economic integration will lead to greater economic convergence among different countries (Roviera-Batiz and Romer, 1991; Obstfeld and Rogoff, 1996; Barro and Alesina, 2002). According to this view, the EU’s economic policies that translate in the elimination of trade barriers between member-states and in the establishment of coordinated monetary and fiscal policies produce efficiency gains that induce a higher level of economic growth (Balassa, 1967), addressing the first aim of raising joint economic growth of EU and of Euro Area member-states.

In the last decades, Euro Area member-states have established a set of policies to increase economic integration, including labor and capital market liberalization, and the introduction of significant constraints on industrial policy. Further, as is well known, among other key economic policies, Euro Area member-states have adopted a single currency and a single monetary policy controlled by an independent central bank (the ECB), they have reinforced economic governance aimed foremost at compliance with fiscal rules arising from the Maastricht convergence criteria, and they have adopted a single banking sector policy under the Banking Union, the Capital Requirements Directive and Regulation, and the 2013 State Aid guidelines for the banking sector.

While the economic underperformance of the peripheral member-states in the last two decades has been widely noted, the debate on whether the EMU policies have had positive effects in Euro Area peripheral member-states continues.[17] Several economists have argued that there is evidence of growing economic polarization at the EU and at the Euro Area level, especially with the divergence of the southern European Union member-states relative to core member-states (Celi et al., 2018; Gräbner and Hafele, 2020; Simonazzi et al., 2013; Alcobia and Cabral, 2023).

Krugman (1991) and Aglietta (2012) argue that increasing economic integration in countries with large development differentials will not enable economic convergence among countries and may instead contribute to increasing economic divergence. These authors point out that with the reduction of trade barriers, the more technologically sophisticated economic activities will tend to be concentrated in countries that have comparative advantages in the production of these goods, that is, the Euro Area core member-states.[18] Since these technologically-advanced sectors exhibit significant

[17] The marked divergence in real GDP growth between the peripheral economies and the Euro Area– see Figure 3.1 — suggests that the implementation of economic policies according to the neoclassical theory does not seem to have produced the expected effects in terms of economic convergence. This result implies that the analysis of this problem of economic convergence should be extended to include other theoretical approaches.

[18] Musto (1986) was one of the first to argue that the occurrence of a regional concentration of economic activities in the core countries would increase divergence within the EU and that it might in time lead to a

increasing returns to scale (Verdoorn, 1949) and higher productivity growth potential the concentration of these industries in the Euro Area's more advanced economies may contribute to a widening trend of economic divergence among its member-states.

Additionally, another important assumption of neoclassic growth theory is that economic convergence across countries is driven by supply-side factors and aggregate demand is hardly relevant to explain these dynamics.

In contrast, and according to some Kaldorian theories (Kaldor 1970, 1966; Thirlwall, 1979), long-term economic growth is strongly influenced by the evolution of aggregate demand, particularly the growth rate of exports, the main autonomous component of aggregate demand.[19]

The continued growth of exports would make possible the existence of increasing returns to scale (static and dynamic) that would favor the cumulative growth of economies (Kaldor, 1970, 1966; Myrdal, 1957).

One of the most relevant Kaldorian-influenced Models is the Balance-of-Payments Constrained Growth Model, also known as "Thirlwall's law" (Thirlwall, 1979). According to this Model, differences in economic growth between countries are attributable to differences in the ratio of income elasticity of exports and imports.

Structural change aimed at increasing the importance of the production of technologically sophisticated tradable goods would contribute to an increase in the growth rate of output (Gouvêa and Lima, 2010; Araujo and Lima, 2007).

The essay focuses on the economic performance of the so-called Euro Area peripheral member-states[20], analyzing the economic convergence of these countries that

crisis.

[19] Kaldor (1970) also identified the importance of continued export growth to establish a cumulative growth dynamic by making it possible to finance imports, a necessary condition for economic growth.

[20] Hereinafter, Euro Area peripheral member-states refers to, France, Greece, Spain, Italy, Portugal following the literature (Gräbner et al., 2020). Euro Area core member-states refers to Germany, Belgium, Finland and Austria, again following the literature (Gräbner et al., 2020).

estimated for all Euro Area member-states (and with that estimated for Euro Area core member-states), from 1992 to 2019.

The analysis of this period corresponds to the moment from which the process of nominal convergence to the creation of the Economic and Monetary Union occurred, also covering other relevant moments, namely the so-called euro crisis of 2010-2012.

To analyze the role of increasing returns in the convergence process we empirically test the productivity convergence/divergence Model for the economies of the peripheral member-states and for the all member-states of the Euro Area (Ali and Pérez-Caldentey, 2011, 2007).

This research contributes to the literature as follows. To the best of our knowledge, this essay is the first to investigate the process of economic convergence/divergence of the Euro Area peripheral member-states through demand-side factors, namely through the ratio of elasticities of income to exports and of income to imports and the magnitude of increasing returns to scale in these countries.

The essay is structured as follows: Section 3.2 presents the literature review concerning to the various convergence Models, namely the Balance of Payments Constrained Growth Model (Thirlwall, 1979) and the productivity convergence/divergence Model developed by Ali and Pérez-Caldentey (2011, 2007). Section 3.3 presents the database used and an economic overview of the Euro Area peripheral member-states. Section 3.4 introduces the estimated empirical results. Section 3.5 summarizes the previous results and presents the conclusions of the essay.

3.2. Literature review

Different schools of economic thought approach the subject of economic growth and economic convergence with what can be considered as nearly opposing views.

3.2.1 Neoclassical models of economic convergence

A necessary condition for the possibility of convergence between economies is that the output growth rate of the catching-up country is higher than the growth rate of a high-income level country.

According to the assumptions of the early Models of neoclassical theory, economic convergence is justified by the fact that the various productive factors (labor and capital) face diminishing marginal returns (Solow, 1957). As a result, poor, less-economically developed countries, with a lower level of capital-labor coefficient, tend to present higher marginal productivity of capital, theoretically enabling a process economic convergence with the wealthier, more economically developed countries.[21] Additionally, the existence of trade and productive factors mobility also allows for the economic convergence process due to the tendency of factor prices equalization.

Since knowledge is considered a non-rival good without the possibility of exclusion, the convergence process would also be triggered because countries below the technological frontier are able to replicate internally and without additional costs the technology used by developed countries.

There is a diverse empirical literature analyzing the possibility of β-convergence and σ-convergence among economies (Barro and Sala-i-Martin, 1991).[22]

Some studies demonstrate the existence of economic convergence processes within the EU (e.g., Borsi and Metiu, 2015; Bolea et al. 2018). However, these economic convergence processes may hide important differences among groups of countries. Therefore, this process may not have benefited all the countries in this economic bloc in a homogeneous way. Espiñosa (2022) and Alcidi (2019) studied the possibility of β-convergence and σ-convergence for the countries of the European Union and concluded that the convergence process experienced in the EU was mainly due to the good performance by Eastern EU member-states, which departed from a much lower

[21] Soukiazis and Castro (2005) argue that the long-term growth rate of economies will tend to converge to a given steady level of capital and GDP per capita. According to this view, absolute economic convergence among countries is an inevitable process.

[22] β-convergence means that the poorer countries' real growth rate will tend to be higher than that of wealthier more developed countries. Conversely, σ-convergence refers to the decrease in income dispersion across countries on an international scale in the long run.

development stage following the collapse of the Soviet Union in 1991.

The economic convergence process experienced for Eastern EU member-states can be justified by the accession of these countries to the EU since 2004. This fact allowed the integration of these economies into the value chains of the productive structure of the EU's core economies (Gräbner and Hafele, 2020; Simonazzi et al., 2013; Celi et al., 2018).[23]

One caveat of absolute β-convergence is that it merely supposes that different countries reach the same steady state level in the long run if they have identical structural characteristics, namely in terms of the savings rate, Research & Development (R&D) expenditures, education level, investment rate, and technological level, among others.

To address the previous criticism, the New Growth Theory introduced the concept of Conditional β-convergence (Barro and Sala-i-Martin, 1991; Mankiw et al., 1991).

One of this theory's main arguments is that endogenous factors will influence the possibility of economic convergence ("Conditional Convergence"). Thus, the production of knowledge and the accumulation of human capital would be essential (Becker, 1962), namely through greater investment in training, educational level of the population, and increased allocation of resources to R&D activities. In this way, it would be possible to prevent diminishing marginal returns, and the long-term output growth would be stimulated by economic policies that encourage technological progress, learning by doing, and innovative activities (Romer, 1986; Aghion et al., 1998).

One of the conclusions of this new neoclassical inspired theory is that economic convergence processes between countries with different productive structures are unlikely to occur. In this case, developed and poor countries will converge into different steady-states.

For this reason, in the context of conditional convergence, the equalization of per capita income levels among the different economies will not occur.

[23] This essay focuses on the effect of EMU policies on the performance of peripheral member states that were founding members of the EMU, therefore excluding all Eastern EU member states.

3.2.2 Demand side approach: Kaldorian models of convergence

Unlike most the neoclassical theory of economic growth, which generally assumes the hypothesis of constant returns to scale[24], Kaldorian inspired theories of economic growth initially developed by Myrdal (1957), among others, are based on the hypothesis of increasing returns to scale. Myrdal justifies economic disparities between countries or regions due to the possibility that some economies experience a cumulative growth trend.

Given initial differences in income and technology, productive factors do not move from rich to poor countries, but the opposite may happen. The author argues that the labor factor moves from poor countries to rich countries seeking better wages, and capital factor moves to rich countries seeking lower economic risks, a greater supply of skilled labor, and thus, greater opportunities for economic returns, since more advanced economies benefit from more significant increasing returns to scale. In parallel, trade would have an asymmetric impact, benefiting mainly high-income countries, because they produce goods with higher value added and higher increasing returns to scale.[25]

Kaldor (1966, 1970) developed his growth theory based on the principles previously stated by Myrdal. The author also highlighted the role of increasing returns to scale through the existing relationship with Verdoorn's law, that is, the existence of a positive relationship between the growth rate of productivity and the technical progress that occurs due to increasing aggregate demand (Verdoorn, 1949).[26] There is extensive empirical support for Verdoorn's law hypothesis (Storm and Naastepad, 2012, 2017).[27] The

[24] The notable exception is the New Growth Theory (Romer, 1986; Aghion et al., 1998).

[25] Increased economic integration between countries accentuates these divergence-inducing effects (Krugman, 1991; Aglietta, 2012).

[26] These increasing returns to scale are particularly intense in the manufacturing sector. Kaldor (1966) identified the manufacturing sector as the engine of economic growth due to the observed causal relationship between output growth and productivity growth in manufacturing.

[27] De Oliveira and Lima (2022) highlight the negative impact of the concentration of pollution (which tends to be stronger in more dynamic economies) on the evolution of labor productivity, negatively influencing Verdoorn's law. For the sake of simplicity, we will disregard the impact of pollution on labor productivity.

increasing returns to scale would arise from gains from productive specialization, allowing technical progress (Young, 1928).

The algebraic formalization of the previous Model was developed by Dixon and Thirlwall (1975) through the Dixon-Thirlwall Model. In this Model, the authors consider exports the main autonomous component leading to economic growth, to the extent that the volume of exports does not depend on the level of domestic economic activity, influenced by a range of factors, including price, technological sophistication of the goods produced, among others. Thus, differences in economic growth are explained by differences in the income elasticity of exports and the level of increasing returns to scale.

Thirlwall extended the previous model to include the import function and thus the balance of payments equilibrium through developing the Balance-of-Payments constrained growth model (Thirlwall, 1979).

3.2.3 The Balance-of-Payments constrained growth model

The Balance-of-Payments constrained growth model is influenced by the early work of Harrod (1933), in which it is assumed that an exogenous change in exports has multiplier effects on output and employment.

In this model, the current account balance may constrain the output growth rate below the potential output level. Thus, it can be seen that there may be a demand restriction on economic growth (McCombie and Thirlwall, 1994).[28]

In the simple version of Thirlwall's law, it is considered that there are no external capital flows, and for that reason, the current account balance must remain in equilibrium. Equation (3.1) specifies the balance of payments constraint without capital flows:

$$P_{d,t}X_t = E_tP_{f,t}M_t \tag{3.1}$$

[28] The achievement of an external equilibrium may not allow for the fulfillment of the internal equilibrium, that is, the level of aggregate demand lower than the level of potential output (Swan, 1956).

By applying a logarithmic to both sides of the Equation and deriving it, we obtain Equation (3.2) specified in terms of growth rates:

$$p_{d,t} + x_t = e_t + p_{f,t} + m_t \tag{3.2}$$

where, $p_{d,t}$ and $p_{f,t}$ represent the growth rates of the national and foreign price indexes (exogenous component), respectively, e_t represents the rate of change of the nominal exchange rate, and m_t represents the growth rate of imports.

Thus, the export and import functions (time differentiated) can be described by the following expressions:

$$x_t = \eta_t (e_t + p_{f,t} - p_{d,t}) + \varepsilon_t\ z_t \qquad \eta_t > 0\ ,\ \varepsilon_t > 0 \tag{3.3}$$

$$m_t = \theta_t\ (e_t + p_{f,t} - p_{d,t}) + \pi_t y_t \qquad \theta_t < 0,\ \pi_t > 0 \tag{3.4}$$

where η_t and θ_t represent the price elasticity of exports and imports, ε_t and π_t represents the income elasticity of exports and imports, y_t and z_t represents the growth rate of domestic and foreign output, respectively.

Substituting expressions (3.3) and (3.4) into (3.2), we obtain:

$$y_{BP,t} = \frac{(\eta_t + \theta_t - 1)\left(e_t + p_f - p_{d,t}\right) + \varepsilon_t\, z_t}{\pi_t} \tag{3.5}$$

where $y_{BP,t}$ represents the output growth rate consistent with the balance of payments constraint:

When $y_t > y_{BP,t}$, the effective growth rate is higher than the output growth rate consistent with the balance of payments constraint. In this way, growing external imbalances will occur, which are not sustainable in the long run, even with foreign capital inflows.

In this situation, the adjustment variable tends to be aggregate income, which must be reduced, mainly through an increase in unemployment, with negative economic and social impacts.

The empirical evidence available in the literature suggests that the price elasticity of exports (and imports) is not relevant, either because estimated elasticity coefficients are usually not statistically significant or their magnitude is small or negligible. In general, relative prices are considered to be neutral in the long run (Léon-Ledesma, 2002; Soukiazis et al., 2013; Carvalho and Lima, 2009).[29] Additionally, the literature shows that the deterioration of price-competitiveness does not prevent an increase in the export market shares of some economies (Ban and Adascalitei, 2020; Bierut and Kuziemska-Pawlak, 2017). [30, 31]

Thus, if we assume that relative prices are neutral in the long run ($e_t + p_{f,t} - p_{d,t} \approx 0$), then, given (3.3), expression (3.5) becomes:

$$y_{BP,t} = \frac{\varepsilon_t \, z_t}{\pi_t} \quad (3.6) \qquad \text{or} \qquad y_{BP,t} = \frac{x_t}{\pi_t} \quad (3.7)$$

In Thirlwall's law, the ratio of elasticities of income to exports and of income to imports (hereinafter, for simplification, the ratio of elasticities), that is, $\frac{\varepsilon_t}{\pi_t}$, can be considered a proxy for the non-price competitiveness of economies, being influenced by the production specialization profile, quality and technological intensity of the goods produced (Cerqueira and Soukiazis, 2012; Thirlwall, 2011). Several studies have used Thirlwall's law to analyze the international competitiveness of Euro Area peripheral member-states, namely Portugal (Soukiazis et al., 2013; Soukiazis and Antunes, 2011), Spain (Alonso, 1999; Léon-Ledesma, 1999), Italy (Soukiazis et al., 2014; Bagnai, 2016), Greece (Soukiazis et al., 2018) and France (Charles et al., 2022).

[29] Bahmani et al. (2013) empirically demonstrated that the Marshall-Lerner condition tends not to hold.

[30] The export market share is the weight of a given country's exports in World aggregate exports. This indicator is a measure of the international competitiveness of a country's exports.

[31] This situation is defined as the Kaldor Paradox (Kaldor, 1978).

3.2.4 Model of convergence/divergence of productivity under Balance-of-Payments constraint

Several studies address the possibility of cumulative growth trends as a determinant for a dynamic of convergence or divergence among countries (Amable, 1993; Atesoglu, 1994; Léon-Ledesma, 2002).

Léon-Ledesma (2002) developed a growth Model in which opposing economic effects will drive the possibility of economic convergence or divergence between countries. The possibility of economic convergence would be influenced by the existence of technological gaps between economies, that is, the possibility for countries far from the technological frontier to absorb the "state of the art" technological level through knowledge transfer (Verspagen, 1991). In contrast, differences in the level of increasing returns, different allocations of resources to R&D activities and learning-by-doing have contributed to more significant economic divergence between countries.

Following Léon-Ledesma's assumptions, Ali and Pérez-Caldentey (2007, 2011) developed a Model that introduces the possibility of convergence or divergence, encompassing principles of cumulative growth. These convergence or divergence processes are induced by technological transfers between the leader and the follower country.

Thus, due to various factors, namely differences in the educational level of the labor force, capitalization of firms, quality of infrastructures and sophistication of the productive structure, the follower country cannot operate at the technological frontier (Verspagen, 1991). Therefore, the capacity of the follower country to take advantage of technological transfers from the leader will depend on its ability to mobilize resources to transform its institutions and specialization profile (Fagerberg and Verspagen, 2002).

Another particularity of Ali and Pérez-Caldentey (2007, 2011) Model is the inclusion of the balance of payments constraint, according to Thirlwall's (1979) assumptions for the follower country.

One of the assumptions of the model is that the technological gap between the leader and the follower is given by the productivity ratio (in logarithms). Algebraically, the

Model is specified as:

$$GAP_t = \ln\left(\frac{P_{l,t}}{P_{f,t}}\right) \tag{3.8}$$

The gap growth rate, g_t, is given by the difference in the growth rate of productivities between the two economies:

$$g_t = p_{l,t} - p_{f,t} \tag{3.9}$$

The productivity function is given by an autonomous term (q_t) and the Verdoorn coefficient (Verdoorn, 1949; Dixon and Thirlwall, 1975):

$$p_{l,t} = q_{l,t} + \lambda_{l,t} z_{,t} \tag{3.10}$$

$$p_{f,t} = q_{f,t} + \lambda_{f,t} y_{f,t} \tag{3.11}$$

where $p_{l,t}$ and $p_{f,t}$ represent the productivity growth in the leader and follower countries. $\lambda_{l,t}$ and $\lambda_{f,t}$ is referred to as the Verdoorn coefficient in the leader and the follower countries and captures the effect of the increasing returns that occur due to productive specialization. Thus, we expect that the Verdoorn coefficient is more intense in the leader than in the follower (that is, $\lambda_{l,t} > \lambda_{f,t}$).

Thus, by substituting expression (3.5) into (3.11) and substituting expressions (3.11) and (3.10) into expression (3.9), we can construct the productivity convergence Model:[32]

$$g_t = (q_{l,t} - q_{f,t}) + z_t \left(\lambda_{l,t} - \lambda_{f,t} \frac{\varepsilon_t}{\pi_t}\right) \tag{3.12}$$

Several economic mechanisms will influence the possibility of economic convergence or divergence between different countries. On the one hand, a higher growth rate of the leader country leads to a divergence trend due to the Verdoorn coefficient ($z_t\lambda_{l,t}$).[33] For this reason, the leader country's output growth rate contributes to an

[32] For simplification we will consider that $q_{l,t}$ and $q_{f,t}$= 0.

[33] Also referred to as the Kaldor effect.

increase in the productivity gap of magnitude $\lambda_{l,t}$.

On the contrary, growth in the leader country also generates a convergent effect by influencing the economic growth rate in the follower country. The strength of this signal will depend on the relative elasticities ($\frac{\varepsilon_t}{\pi_t}$), weighted by the Verdoorn coefficient ($\lambda_{f,t}$).[34]

As shown, the follower country's growth rate will be influenced by the growth rate of the leader country. In cases where the leader is in recession, this will also negatively impact the follower's growth rate.

If $g_t > 0$, there is a divergence between the follower and the leader country, and if $g_t < 0$, the opposite scenario occurs.

The Model concludes that the possibility of convergence or divergence will depend on the relative intensity of Kaldor's and Thirlwall's effects.

Since it is assumed that the Verdoorn coefficient is more intense in the leader country than in the follower country (that is, $\lambda_{l,t} > \lambda_{f,t}$), the likelihood of convergence depends on the fact that the Verdoorn coefficient ratio is less unfavorable than the income elasticities ratio ($\frac{\lambda_{l,t}}{\lambda_{f,t}} < \frac{\varepsilon_t}{\pi_t}$).

Economic divergence occurs through the cumulative growth trend (Kaldor effect) and convergence occurs due to Thirlwall's law (Thirlwall effect).

3.3. Database and analysis of the peripheral member-states

The empirical analysis developed here will test Thirlwall's law for the so-called Euro Area peripheral member-states. Additionally, it will estimate the coefficients of Ali and Pérez-Caldentey Model (2007, 2011) to analyze the possibility of convergence against the GDP of all Euro Area founding members and of Greece in the periods between 1992 and 2008 and between 2009 and 2019, given the significance of the global financial crisis of 2007-2009, which marked the beginning of what graphically seems like a structural

[34] Also referred to as the Thirlwall effect.

break in the long term trends of GDP growth of the Euro Area and, particularly, of the Euro Area peripheral member-states (see Figure 3.1). We will test the possibility of multiple structural breaks in the different regressions (Bai and Perron, 2003). The test of economic convergence for the peripheral member-states against all Euro Area founding members + Greece (hereinafter, simply Euro Area-12) seems appropriate since, the peripheral member-states economies – here identified as France, Greece, Italy, Portugal and Spain, following other literature (Gräbner et al., 2020) – had similar characteristics during these periods, namely a low export share, a relatively high average unemployment rate, a high level of public debt, and, lastly, persistent current account deficits.[35]

The reason for the sub-period analysis lies in the fact that these economies were heavily affected in the context of the global financial crisis of 2007-2009 and of the euro crisis of 2010-2012. Some of the peripheral member-states avoided default through EU-IMF bailouts (loans with strict conditionality), which implied adjustment programs based on a strategy of fiscal austerity (Storm and Naastepad, 2015; Flassbeck and Lapabitsas, 2013).

The data covers 1992-2019, and the primary source is AMECO, the European Commission's main macroeconomic database. Additionally, World Bank data have also been used. A summary Table with the description of the variables can be found in the Appendix (Table 8.1).

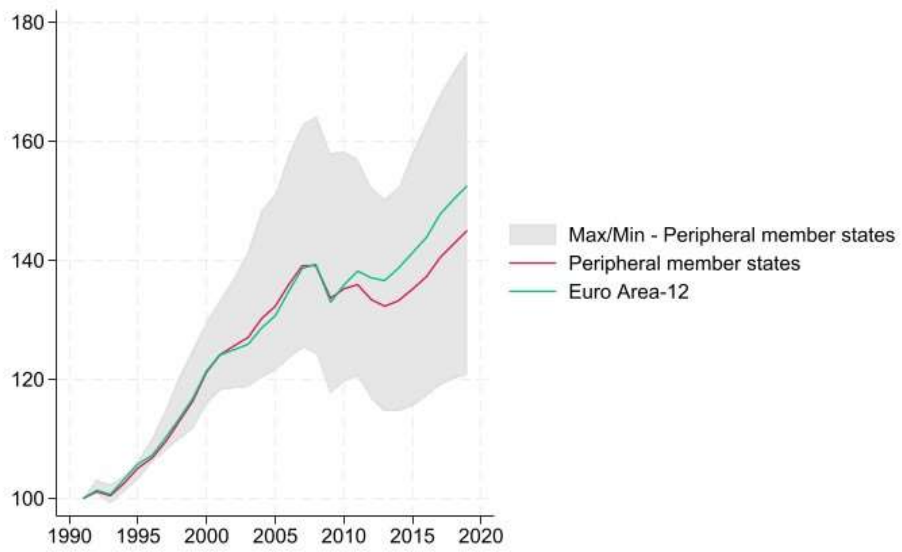
We assume that the variables are stationary. Two reasons sustain this decision. The first, the variables used are expressed in growth rates (exports, imports, economic growth, labor productivity, foreign growth, relative prices), which suggests that the variables are stationary in levels. Second, unit root tests display low predictive power for small samples (Greene, 2003).

In order to compare the economic convergence/divergence of the Euro Area peripheral member-states with that of the Euro Area-12 we will examine the relationship between growth performance and the current account balance. Thus, according to Thirlwall's law, a country's economic growth may be constrained by the sustainability of

[35] Gräbner et al. (2020) compared the four indicators in these groups of countries for the period 2000-2015.

external accounts.

Figure 3.1: Real GDP of the Euro Area-12 (total) and of the Peripheral member-states (weighted average) (1991 = 100)



Source: AMECO; authors' own calculations.

Figure 3.1 and Figure 3.2 compare the output growth and the current account balance of the peripheral member-states with that of the Euro Area-12 between 1992 and 2019.

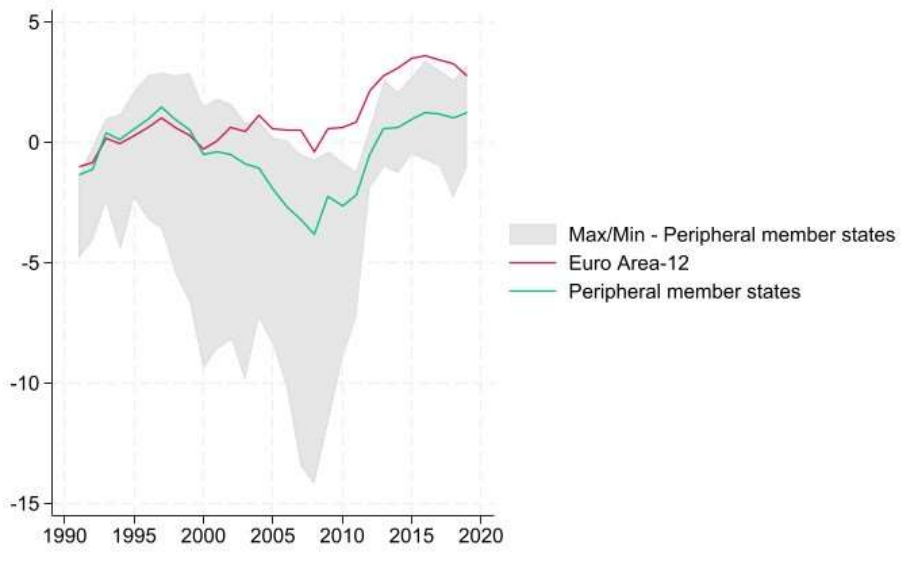
Figure 3.1 suggests that between 1992 and 2009, the peripheral economies' real GDP did not converge to the Euro Area-12, but at least it did not diverge, with both groups of economies real GDP growing similarly.[36] Beginning in 2008-2009 and, particularly, between 2010 and 2012, following the adoption of a fiscal austerity strategy by EU and Euro Area authorities, including bailouts and adjustment programs of some peripheral member-states, the economic divergence of these countries became even more pronounced. A more detailed analysis of the actual causes of these countries' economic

[36] Until the 2008, several countries, namely Greece or Spain, continued to exhibit a trajectory of economic convergence. However, this good performance was largely influenced by the development of asset bubbles, particularly in the real estate sector (Buendía, 2020; Holinski et al., 2012; Botta, 2014).

divergence is beyond the scope of this essay.[37]

Figure 3.2 presents current account data in percentage of GDP for the peripheral member-states and the Euro Area-12 for the same period. It finds that, particularly in the pre-2008 period, the peripheral member-states ran significant current account deficits, and thereby failed to satisfy the intertemporal balance of payments constraint (Hein et al., 2012). In the 2009-2019 period, the implementation of fiscal austerity policies likely contributed to reducing the current account deficits of these countries. In contrast to the previous 1992-2008 period, the acceleration of economic growth in these countries ceased to be associated with an increase in current account deficits.

Figure 3.2: Current account balance in percentage of GDP, Euro Area-12 versus peripheral member-states (weighted averages[38])



Data: AMECO; authors' own calculations.

[37] There is extensive literature covering the reasons for the underperformance of these economies since the mid-1990s (e.g., Gräbner and Hafele, 2020; Celi et al., 2018; Alcobia and Cabral, 2023; Rossi and Bresser-Pereira, 2015).

[38] To calculate the respective weighted averages, real variables were used.

3.3.1 Estimation of the Thirlwall Law for the peripheral member-states

In this section we will estimate Balance-of-Payments constrained growth model following Thirlwall (1979). First, we estimate the export and import demand functions according to the following expressions:

$$x_t = \alpha + \eta_t rp_t + \varepsilon_t z_t + \rho_t \tag{3.13}$$

$$m_t = \varphi + \theta_t rp_t + \pi_t y_t + \Omega_t \tag{3.14}$$

Thus, the growth of real exports will depend on the relative growth of foreign income $\boldsymbol{z_t}$ (EU-28 GDP[39] growth rate subtracted by the GDP of the individual peripheral member state) and the growth rate of relative prices $\boldsymbol{rp_t}$. that is, the difference between the growth rate of the price of exports and the price of imports. Therefore, it is expected that $\eta_t < 0$ and that $\varepsilon_t > 0$.

Real import growth depends on domestic GDP growth $\boldsymbol{y_t}$ and also the relative growth $\boldsymbol{rp_t}$. It is expected that $\theta_t > 0$ and that $\pi_t > 0$. In the case of the export demand function, relative prices and foreign income are assumed to be exogenous and we could proceed to the estimates through Ordinary Least Squares (OLS). On the contrary, and concerning the import demand function, the literature addresses endogeneity problems between the GDP growth and import growth rates (Atesoglu, 1993, 1994; Soukiazis and Antunes, 2011; Charles et al., 2022). For this reason, it would be necessary to employ the Two-Stage Least Squares (2SLS) estimator in order to obtain consistent estimators.

However, in order to capture the interactions between the different equations in our Model, we used the Three-Stage Least Squares (3SLS) estimator (Zellner and Theil, 1962).[40] The advantage of this estimator is that the equations are estimated simultaneously, which makes the Model as consistent and even more efficient than using the 2SLS estimator, by considering the correlation of the error terms of the different

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[39] Considering that the weight of intra-EU exports of the most EU member states was between 50 and 75 per cent of total, it appears to be an adequate proxy for foreign income.

[40] We use the “reg3” command from Stata software.

estimated expressions.[41] This methodology has been used in the context of balance-of-payments-constraint Models (Soukiazis et al., 2018; Soukiazis et al., 2013).

It should be noted that, in order to prevent from exhibiting large prediction errors and the lack of reliability of the Model, we followed the methodology of Bai and Perron (2003) and tested for the presence of multiple structural breaks in the various expressions.[42] In the cases where structural breaks were observed, we included a time dummy to correct this issue.

Table 3.1 present the estimates through a system of equations. For this purpose, it was necessary to use a set of instrumental variables. In these cases, we will consider as instrumental variables, all exogenous variables in our Model, and additionally, the growth rate of the GDP deflator, growth rate of real gross fixed capital formation and the growth rate of government spending.[43] On the contrary, as we mentioned, we considered imports, exports and GDP as endogenous variables.

We implemented a range of diagnostic tests, namely, the Sargan's test[44] (Sargan, 1988), that is, a test to over-identify restrictions to demonstrate that the chosen instrumental variables were valid.[45] In addition, we tested if the errors were autocorrelated, the hypothesis of homoscedasticity of the residuals and, finally, if the regression residuals were normally distributed. In the cases where the regressions present heteroscedasticity problems, the estimates became inconsistent. For this reason, in those cases we proceeded with estimations through a system Generalized Method of Moments (GMM) estimator (Wooldridge, 2010).[46]

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[41] For more information on the 3SLS estimator, see for example Davidson and MacKinnon (1993) and Greene (2018).

[42] We use the “xtbreak” command from Stata software (Ditzen et al., 2021).

[43] These instrumental variables are quite common in the literature (e.g., Soukiazis and Antunes, 2011; Dallery and Marie, 2022; Leško and Muchová, 2020; Léon-Ledesma, 1999).

[44] We use the “overid” command from Stata software.

[45] We use the “lmareg3”, “lmhreg3” and “lmnreg3” commands from Stata software.

[46] Unlike the 3sls estimator, the GMM estimator allows for Heteroskedasticity-consistent standard errors.

Table 3.1: Estimations of the export and import functions (equation 3.13 and 3.14)

	France	**Greece**	**Italy**	**Portugal**	**Spain**
Exports	(1)	(2)	(3)	(4)	(5)
η_t	-0.569*	-1.112	-0.921***	0.0951	-0.578***
	(0.312)	(0.680)	(0.206)	(0.219)	(0.158)
ε_t	1.802***	3.770***	2.188***	1.997***	1.991***
	(0.197)	(0.703)	(0.334)	(0.259)	(0.164)
1995			-0.0469***		
			(0.0170)		
1998	-0.0221**	\			-0.0732***
	(0.0105)				(0.00858)
Constant	0.0193**	-0.00449	0.0310**	0.0111	0.0787***
	(0.00957)	(0.0167)	(0.0158)	(0.00726)	(0.00651)
Observations	28	28	28	28	28
R-squared	0.741	0.540	0.795	0.604	0.842
Imports					
θ_t	-0.426	-0.471	0.195	0.959***	-1.027***
	(0.369)	(0.762)	(0.245)	(0.280)	(0.312)
π_t	2.608***	2.505***	3.211***	2.178***	2.847***
	(0.240)	(0.532)	(0.365)	(0.244)	(0.274)
1995			0.0190		
			(0.0195)		
1999		-0.0452			-0.0566***
		(0.0390)			(0.0105)
2001				0.0155	
				(0.0109)	
2004		0.0227			
		(0.0406)			
2009		0.0546			
		(0.0445)			
2010				-0.00361	
				(0.0118)	
2011	-0.00696				
	(0.00595)				
Constant	0.0328***	0.0213	-0.0111	-0.00611	0.0328***
	(0.0126)	(0.0268)	(0.0185)	(0.00836)	(0.0126)
Observations	28	28	28	28	28
R-squared	0.806	0.441	0.760	0.735	0.762
Sargan test	χ^2= 12.415	χ^2= 14.942	χ^2= 10.712	χ^2= 13.465	χ^2= 11.782
	(0.134)	(0.093)	(0.098)	(0.097)	(0.161)
Heterocedasticity test	χ^2 =7.715	χ^2 =0.391	χ^2 =0.709	χ^2 =5.560	χ^2 = 4.810
	(0.006)	(0.531)	(0.400)	(0.018)	(0.028)
AR(1) test	χ^2 = 1.160	χ^2 =0.895	χ^2 =1.626	χ^2 =2.186	χ^2 = 1.440
	(0.560)	(0.639)	(0.443)	(0.335)	(0.487)
Normality test	χ^2= 3.579	χ^2= 0.504	χ^2= 2.278	χ^2= 1.559	χ^2= 0.422
	(0.167)	(0.777)	(0.320)	(0.459)	(0.810)

Standard errors in parenthesis. *, **, *** represent statistical significance at levels of 10%, 5% and 1%, respectively.

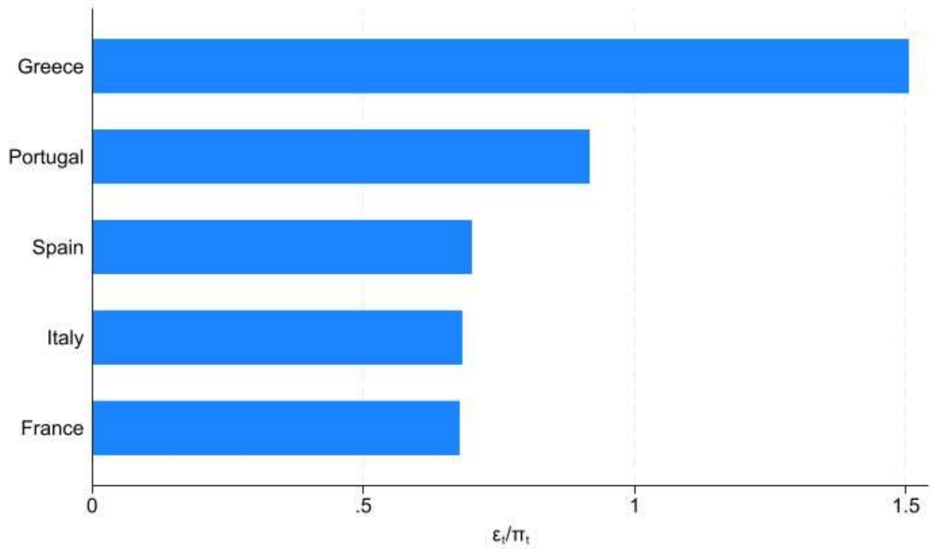
We use the "gmm" command from Stata software.

For the export function, it is confirmed that foreign income is the most relevant explanatory variable of export growth, being significant at 1% in all regressions. That is, our estimates suggests that a higher foreign GDP growth results in a higher rate of growth of real exports of the Euro Area peripheral member-states. In addition, it was also confirmed that the structural breaks were statistically significant.

In the case of import function, our analysis finds that domestic demand is the most relevant explanatory variable which is also statistically significant at the 1% level in all specifications of our Model. Price elasticity of imports is only statistically significant in the case of Portugal and Spain.

As we have concluded through expression (3.6), the possibility of economic convergence is affected by the ratio of elasticities in the different economies. Figure 3.3 shows the ratio of income elasticities for the peripheral member-states. Only in the case of Greece do we estimate the ratio of elasticities to be greater than 1.

Figure 3.3: Ratio of elasticities of the peripheral member-states



Source: Author calculations based on econometric results from Table 3.1.

Carrying out algebraic transformations, expression (3.6) becomes:

$$\frac{y_{BP,t}}{z_t} = \frac{\varepsilon_t}{\pi_t} \tag{3.15}$$

According to expression (3.15), economic convergence with the maintenance of external account balance ($y_{BP,t} > z_t$) requires that the income elasticity of exports is greater than the income elasticity of imports ($\varepsilon_t > \pi_t$).[47]

One of the most relevant models for assessing the possibility of economic convergence is the Convergence Quadrant Diagram developed by Cimoli et al., (2010).[48] According to the authors, the countries can be in the following four situations: sustainable convergence, unsustainable convergence, sustainable divergence, and unsustainable

[47] Known as the 45-degree rule (Krugman, 1989).

[48] Leško and Muchová (2020) also performed the convergence quadrants study for the Central and Eastern Europe Region.

divergence.

Sustainable convergence corresponds to a situation where domestic output growth is higher than foreign output growth, and the current account tends to be balanced or positive. For this scenario to occur, the ratio of income elasticities of exports and imports must be greater than the ratio of growth rates ($\frac{\varepsilon_t}{\pi_t} > \frac{y_t}{Z_t} > 1$).

In the unsustainable convergence situation, despite the fact that the growth of domestic output is higher than foreign output growth, there is a tendency for the accumulation of external imbalances. For this scenario to occur, the ratio of elasticities is lower than the ratio of growth rates ($\frac{\varepsilon_t}{\pi_t} < \frac{y_t}{Z_t} > 1$).

The case of unsustainable divergence is the most harmful scenario, since the domestic output growth is lower than foreign output growth, creating additional external imbalances. For this scenario to occur, the ratio of elasticities is lower than the ratio between the domestic and foreign growth rates, and necessarily lower than unity ($\frac{\varepsilon_t}{\pi_t} < \frac{y_t}{Z_t} < 1$).

Finally, domestic output growth is lower than foreign output growth in sustainable divergence, and external imbalances do not occur. For this scenario to occur, the ratio between the domestic and foreign growth rates are less than one and less than the ratio of elasticities ($\frac{\varepsilon_t}{\pi_t} > \frac{y_t}{Z_t} < 1$).

In Figure 3.4 is analyzed the relationship between the ratio of elasticities (y-axis) compared to the ratio between the domestic and foreign growth rates (x-axis). When the y-axis is greater than 1, we find economic convergence relative to the Euro Area-12, and when the x-axis is greater than 1, the ratio of elasticities is favorable.

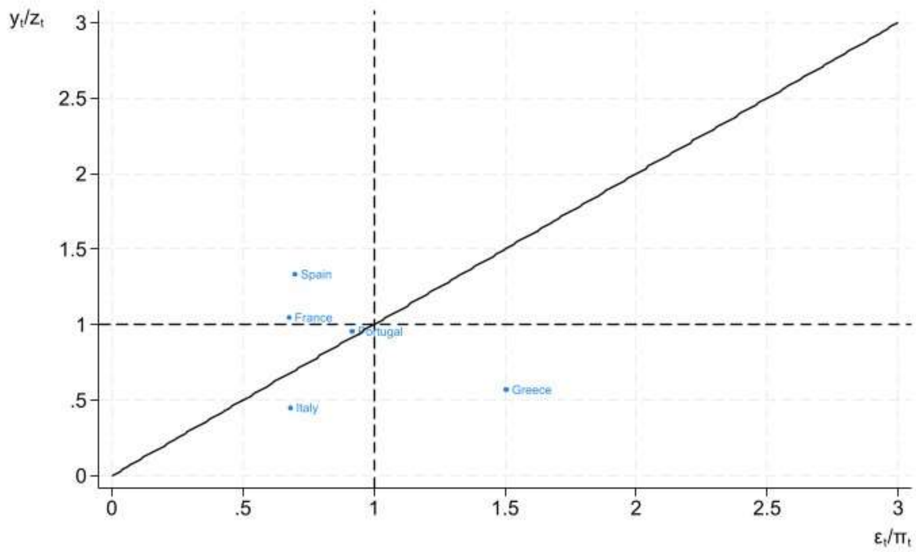
The ratio of elasticities that are derived from our econometric results (see Table 3.1) suggest that between 1992 and 2019 only France and Spain present a tendency of economic convergence to the Euro Area-12. Since the ratio of elasticities was unfavorable [49] also for these two member-states, it eventually revealed an unsustainable convergence

[49] Taking into account that it is lower than the ratio of growth rates.

regime, with the accumulation of external imbalances.

In opposition, Portugal was in unsustainable divergence, and, Italy and Greece were in sustainable divergence scenarios during the entire period of 1992 to 2019. Some authors (Storm and Naastepad, 2015; Felipe and Kumar, 2014; Alcobia and Cabral, 2023) argue that lack of economic convergence of most peripheral member-states is the result of low non-price competitiveness in manufactured goods production.[50]

Figure 3.4: Economic convergence quadrants diagram for peripheral member-states relative to the Euro Area-12, 1992-2019



Source: Author calculations based on econometric results from Table 3.1.

3.3.2 Balance-of-Payments constrained growth equilibrium

After estimating the income elasticities for imports and exports we can verify Thirlwall's law and compare it with the effective growth rate for the 1992-2019 period.

[50] These economies specialize on non-advanced technological goods manufacturing, with a specialization profile closer to emerging countries than to developed countries (Storm and Naastepad, 2015; Felipe and Kumar, 2014).

Table 3.2 presents the effective output growth rate (y_t), the income elasticity of exports (ε), the income elasticity of imports (π), and the output growth rate consistent with the balance of payments constraint ($y_{bp,t}$). Column 5 displays the difference between the growth rate calculated using Thirlwall's law and the actual growth rate, and finally, column 6 displays the current account balance in individual countries (in percentage of GDP).

According to Thirlwall's law it can be seen that some countries, namely Spain have grown above the output growth rate consistent with the balance of payments constraint which has led to the accumulation of growing external imbalances, as shown in column (6).

Portugal and particularly Greece experienced growth rates that were in theory below the output growth rate consistent with the Balance-of-Payments-constraint according to Thirlwall's law. Nonetheless, both countries ran sizeable current account deficits. The reasons for these forecast errors may be related to the assumptions of Thirlwall's law itself, namely the consideration that the external and public accounts are balanced and that relative prices are not neutral in the long run. According to the literature, the Thirlwall's law tend to present forecast errors substantially higher for Greece than for other peripheral member-states, that is, a Thirlwall's law considering that y_t is lower than $y_{bp,t}$, but external imbalances showed an increasing trend (or vice versa).[51] On the contrary, France initially presented current account surpluses, although as it presented an effective growth rate above the output growth rate consistent with the balance of payments constraint, it started to accumulate increasing current account deficits.

Our results suggest that the peripheral countries should establish public policies with the purpose of increasing the income elasticity of exports and decreasing the domestic income elasticity of imports, in order to increase the output growth without jeopardizing the possibility of maintaining balanced external accounts. Changes in the sectoral composition can also affect the performance of an economy at the international trade level

[51] Several studies accept the existence of public and trade imbalances and in which the relative prices are not neutral, and therefore the average forecast errors are much smaller compared to the standard situation (Soukiazis et al., 2018; Soukiazis et al., 2013).

(Gouvêa and Lima, 2010; Araujo and Lima, 2007).[52]

Table 3.2: Balance of payments equilibrium growth rates for Euro Area peripheral member-states, 1992-2019

	y_t	ε_t	π	$y^{**}_{bp,t}=\dfrac{\varepsilon_t z_t}{\pi_t}$	$y_{bp,t}-y_t$	nx_t
Country	(1)	(2)	(3)	(4)	(5)	(6)
France	1.61	1.80	2.61	1.31	-0.30	0.29
Greece	0.87	3.77	2.51	2.60	1,73	-5.40
Italy	0.69	2.19	3.21	1.18	0.49	0.39
Portugal	1.47	2.00	2.18	1.57	0.10	-4.00
Spain	2.05	1.99	2.85	1.17	-0.88	-1.74

3.4 Estimated parameters for the productivity convergence/divergence model

We will again estimate the exports and imports functions for the peripheral member-states. First, we will perform the Hausman (1978) test[53] to decide whether to use the Fixed-Effects (FE), or the Random-Effects (RE) model specifications.[54] In this way, we will check whether the effects are fixed, or random. All the estimates are corrected for autocorrelation and heteroscedasticity.[55] The results of the regressions estimations for the

[52] Several analyses find evidence that economic sectors with greater technology intensity tend to have higher income elasticities of exports (Jayme et al., 2011; da Silva Catela and Porcile, 2012; Cimoli et al., 2014; Romero and McCombie, 2016).

[53] We will implement the command "hausman" from Stata software.

[54] Since we need to estimate $\lambda_{l,t}$, and in order to be consistent, we will not use the 3SLS estimator.

[55] We use the “vce(robust)” option from Stata software.

Export Function for peripheral member-states can be seen in Table 3.3.

We find again that foreign income is statistically significant variable at 1% in both regressions. In the 2009-2019 period, income elasticity of exports in the peripheral member-states has shown a significant reduction, - undermining the possibility of convergence of these economies.

Regarding price-elasticity of exports this variable presents the expected result, although it presents a small coefficient. Thus, it is shown that export adjustments tend to occur mostly through changes in quantities.

Table 3.3: Estimations of the export function for peripheral member-states

	1992-2008	**2009-2019**	**1992-2019**
Variables	(1)	(2)	(3)
η_t	-0.646	-0.546*	-0.536*
	(0.358)	(0.313)	(0.227)
ε_t	3.117***	2.270***	2.483***
	(0.500)	(0.380)	(0.376)
1995	-0.0504***		-0.0406**
	(0.00711)		(0.00954)
Constant	0.0347*	0.00511	0.0415**
	(0.0148)	(0.00788)	(0.0122)
Observations	85	55	140
Number of countries	5	5	5
R-squared	0.341	0.747	0.564
Hausman test	$\chi^2 = 8.90$	$\chi^2 = 4.34$	$\chi^2 = 60.66$

P-value	[0.0117]	[0.114]	[0.000]

Robust standard errors in parenthesis. *, **, *** represent statistical significance at levels of 10%, 5% and 1%, respectively.

In terms of the import demand function, and given the endogeneity problems between GDP growth and import growth rate. We used the Two-Stage Least Squares (2SLS) estimator to obtain consistent estimators.[56, 57] The results can be seen in Table 3.4. It was also confirmed that the structural break was statistically significant.

Again, in both regressions, the income elasticity of imports presents the expected sign, and is statistically significant at 1%. In 2009-2019 period, the income elasticity in the peripheral member-states also presented a significant reduction — positively contributing to productivity convergence in these countries.

Table 3.4: Estimations of the import function for peripheral member-states

	1992-2008	**2009-2019**	**1992-2019**
Variables	(1)	(2)	(3)
θ_t	-0.0734	-0.327	-0.109
	(0.250)	(0.277)	(0.183)
π_t	2.924***	2.133***	2.262***
	(0.299)	(0.236)	(0.171)
2000	-0.0383***	-	-0.0358***
	(0.0112)		(0.0113)

[56] We will use the same instrumental variables.

[57] We use the "xtivreg2" command from Stata software.

2004	0.0241*	-	0.0201
	(0.0123)		(0.0125)
2009	-	-	0.00970
			(0.0107)
Constant	0.00653	0.0159***	0.0213***
	(0.00916)	(0.00570)	(0.00762)
Observations	85	55	140
Number of countries	5	5	5
R-squared	0.534	0.631	0.622
Hausman test	$\chi^2 = 0.77$	χ^2 = 23.21	χ^2 = 3.20
P-value	[0.943]	[0.000]	[0.6691]
Sargan- test	$\chi^2 =$ 1.838	χ^2 = 1.805	χ^2 = 5.224
P-value	[0.399]	[0.406]	[0.073]

Robust standard errors in parenthesis. *, **, *** represent statistical significance at levels of 10%, 5% and 1%, respectively.

Concerning the estimations of the productivity function for the peripheral member-states and the Euro Area-12, we find that the Verdoorn coefficient (λ_t) is statistically significant at the 1% level in all model specifications.

Although, initially the Verdoorn coefficient was similar in the two groups of countries, in the 2009-2019 period this coefficient has dropped significantly in the peripheral member-states.

Table 3.5: Estimations of the labor productivity function for peripheral member-states and the Euro Area-12

	Peripheral member-states			Euro Area-12		
	1992-2008	**2009-2019**	**1992-2019**	**1992-2008**	**2009-2019**	**1992-2019**
Variables	(1)	(2)	(3)	(4)	(5)	(6)
λ_t	0.424***	0.288***	0.424***	0.413***	0.596***	0.529***
	(0.0865)	(0.0729)	(0.0481)	(0.0449)	(0.0408)	(0.0306)
2007				-0.00927***		-0.00230
				(0.00276)		(0.00167)
Constant	0.00227	-7.69e-05	0.00139	0.00354	-0.00167	0.000203
	(0.00329)	(0.00187)	(0.00135)	(0.00216)	(0.00221)	(0.00198)
Observations	85	55	140	204	132	336
Number of countries	5	5	5	12	12	12
R-squared	0.199	0.360	0.360	0.312	0.643	0.517
Hausman test	$\chi^2 = 0.39$	$\chi^2 = 11.21$	$\chi^2 = 0.06$	$\chi^2 = 2.79$	$\chi^2 = 3.08$	$\chi^2 = 0.27$
P-value	[0.533]	[0.0008]	[0.8017]	[0.0951]	[0.0792]	[0.8756]

Robust standard errors in parenthesis. *, **, *** represent statistical significance at levels of 10%, 5% and 1%, respectively.

Table 3.6 presents data about the structural characteristics of the peripheral member-states for the occurrence of convergence of labor productivity with the Euro Area-12 and Euro Area core member-states. While between 1992 and 2008, the estimates parameters suggest a tendency for productivity convergence of the peripheral member-states, in the 2009-2019 period, this previous trend ceased, and this study finds evidence of productivity divergence between the peripheral member-states and Euro Area-12. Finally, for the period between 1992 and 2019, the study results suggest that the productivity growth of the peripheral member-states barely stagnated against the Euro Area-12. The results are robust if we exclude France from the sample.

In the 2009-2019 period, for the occurrence of productivity convergence between the peripheral member-states and Euro Area-12, it would be necessary that the income elasticity of exports, $\boldsymbol{\varepsilon_t} > 3.365$ (higher than the estimated value of 2.270), that the income elasticity of imports, $\boldsymbol{\pi_t} < 1.439$ (lower than the estimated value of 2.133), that the Verdoorn coefficient had been $\boldsymbol{\lambda_{f,t}} > 0.427$ (higher than the estimated value of 0.288), or finally some combination of the different parameters used in the Model.

If we analyze the occurrence of convergence of labor productivity between the peripheral member-states and the core member-states, the divergence of the first group is even more pronounced. Although there was a tendency for convergence in productivity between 1992 and 2008, in the post-crisis period, the divergence in productivity was much more pronounced, which resulted in a divergence in productivity between the two groups of countries throughout the entire period between 1992 and 2019.

Table 3.6: Parameters thresholds required for convergence in productivity according to productivity convergence/divergence Model

	1992-2008		2009-2019		1992-2019	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Productivity convergence versus	EU-12	Core member-states	EU-12	Core member-states	EU-12	Core member-states
Econometric estimates of Verdoorn coefficients						
$\lambda_{l,t}$	0.413***	0.293***	0.596***	0.772***	0.529***	0.626***
$\lambda_{f,t}$	0.424***	0.424***	0.288***	0.288***	0.424***	0.424***

	Econometric estimates of income elasticities of exports and imports					
ε_t	3.117***	3.117***	2.270***	2.270***	2.483***	2.483***
π_t	2.924***	2.924***	2.133***	2.133***	2.262***	2.262***
	Elasticities thresholds for productivity convergence, according to the productivity convergence/divergence Model					
Minimum ε_t for convergence	2.607	1.581	3.365	6.115	-	2.854
Maximum π_t for convergence	3.497	5.766	1.439	0.792	-	1.968
Minimum $\lambda_{f,t}$ for convergence	0.355	0.215	0.427	0.776	-	0.487
	Productivity convergence/divergence Model					
Productivity convergence	Yes	Yes	No	No	Stagnation	No
g_t	-0.16	-0.48	0.17	0.58	0.00	0.12

Source: Author calculations based on the econometric results of Tables 3.3, 3.4 and 3.5.

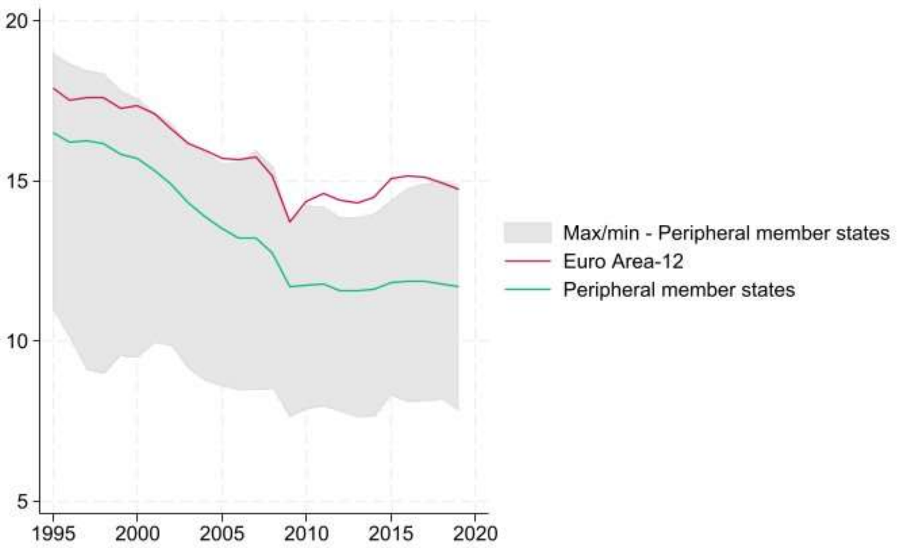
There are several reasons why the ratio of income elasticities and especially the Verdoorn coefficient declined in the peripheral member-states, in the 2009-2019 period.

First, the fiscal austerity from the euro crisis was focused on this group of countries and may have contributed to the widening of the technology gap in these particular countries (Botta et al., 2018). The increased unemployment has negatively impacted human capital, and the decline in private investment in these economies may have prevented the adoption of more efficient technologies.

Additionally, in the 2009-2019 period, the relative weight of economic sectors with low technological intensity such as tourism or real estate activities showed a relevant increase in these countries (Martins and Mamede, 2022; Cárdenas et al., 2020). On the other hand, although this was a gradual process, starting in the early 2000s, the trend towards a decrease in the weight of the industrial sector in these economies continued during this period (Becker et al., 2016).

According to Figure 3.5 we observe that during this period, the de-industrialization trend in this group of countries was much more pronounced than in the Euro Area average.

Figure 3.5: Industry share, GVA in percentage of GDP in the Euro Area-12 and in the peripheral member-states (weighted averages)



Source: AMECO and World Bank Data; authors' own calculations.

This poor performance of the industrial sector of the peripheral economies may negatively impacted the intensity of the increasing returns to scale.[58] This happens because the industrial sector presents special characteristics, namely the possibilities of returns of scale, not only static, but also dynamic, that is, derived from the increased specialization of activities, offering opportunities for the increment of technical progress, being the sector with greater possibilities of backward and forward linkages with other sectors of the economy. For these reasons, the transfer of resources to the industrial sector constitutes a structural change conducive to economic growth and technological convergence (Tregenna, 2009).

[58] Additionally, the industrial sector also tends to be more internationalized, meaning that countries with a greater relative importance of this sector have higher current account balances (Ehmer, 2014).

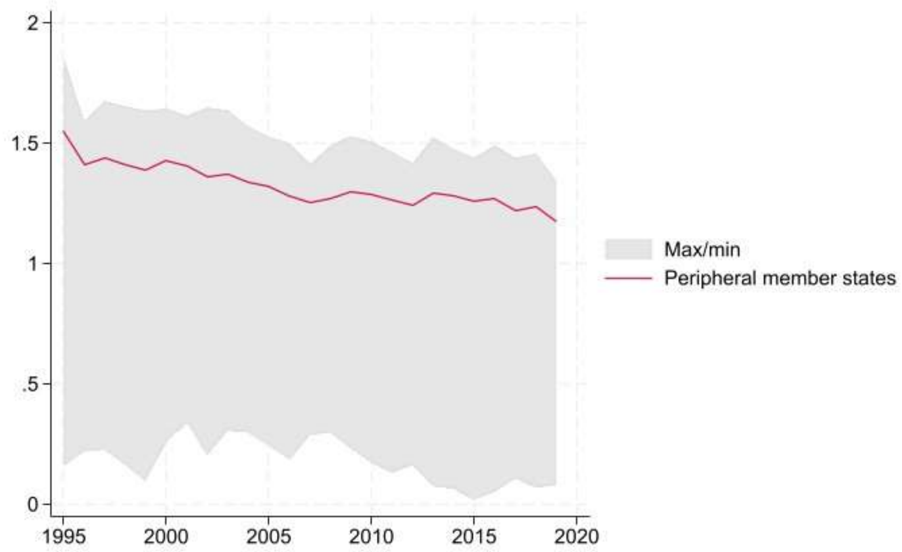
In addition, there are several reasons to assume that the technological sophistication of goods produced by the peripheral member-states decreased significantly during this period. An important indicator that can be used as a proxy for non-price competitiveness is the Economic Complexity Index (ECI).[59] Finally, Figure 3.6 displays the deterioration of this indicator in this group of countries.[60]

Thus, for these countries to return to a convergence process, they need to promote structural changes with a view to producing more technologically intensive goods (Lall, 2000), in order to increase the income elasticity of exports and decrease the elasticity of imports. Additionally, it is also necessary to promote a change in the allocation of funds from non-tradable to tradable sectors, allowing a more significant magnitude of increasing returns and thus enabling a cumulative growth trend.

[59] This indicator was developed by Hidalgo and Hausmann (2009) and is relatively widely used in the literature (Gala et al, 2018; Hartmann et al., 2021; Britto et al., 2019). It can be understood as a proxy of non-price competitiveness, measuring the productive sophistication of an economy.

[60] The literature proposes several possible explanations for the observed trend (Alcobia and Cabral 2023; Gräbner and Hafele, 2020, Gräbner et al., 2020).

Figure 3.6: Peripheral member-states Economic Complexity Index (weighted averages)



Source: Atlas of Economic Complexity (Observatory of Economic Complexity); authors' own calculations.

3.5. Conclusions

The essay analyzed the convergence/divergence process of the EU peripheral member-states –France, Greece, Italy, Portugal, Spain – in the period from 1992 to 2019. During this period, there were significant events of macroeconomic nature, namely the launch of the Euro Area, the Global Financial Crisis of 2007-2009, and the euro crisis of 2010-2012.

In this study, we used Kaldorian-influenced Models in which it is assumed that long-run economic growth depends on the level of aggregate demand, particularly the growth rate of exports. For these Kaldorian models, contrary to neoclassical theory, economic convergence processes are not always guaranteed, and trade might have asymmetric impacts, benefiting higher income countries in relative terms. Thus, one of the factors favoring economic divergence is the magnitude of increasing returns to scale, which favors cumulative economic growth.

One of the most important Kaldorian models used in this essay was the balance-of-payments constrained growth model. In particular, we find that the income elasticities ratio can be considered a measure of the non-price competitiveness of a given economy. In fact, except Greece, in the others peripheral member-states, the ratio of the elasticities of income to exports and of income to imports was below 1 – not complying with the so-called 45-degree rule of that model –, a situation which according to the balance-of-payments-constrained-growth model may have contributed to an increasing accumulation of external imbalances by the peripheral member-states.

Additionally, the role of increasing returns in the convergence process was also analyzed, through the productivity convergence/divergence Model for the peripheral member-states vis-à-vis the Euro Area-12. We find that the effect of increasing returns to scale is weakest in the peripheral member-states.

This essay finds that in the pre-2009 period, that is, between 1992 and 2008, while there was no economic convergence trend between the peripheral member-states and the Euro Area-12, at least the peripheral economies were not diverging from the Euro Area-12. After 2008, that is, between 2009 and 2019, the peripheral member-states diverged from the Euro Area-12, both in terms of economic growth and labor productivity growth. This effect was so strong as to result in a divergent path for both economic growth and productivity growth for the period between 1992 and 2019. Moreover, it is noteworthy that in several peripheral member-states that trend was accompanied by pronounced and unsustainable external imbalances that ultimately led after 2008 to a marked trend of economic divergence between the peripheral member-states and the Euro Area-12. In fact, the 2009-2019 period is characterized by a trend of productivity divergence for those economies due to a sharp decline in the income elasticity of exports (and of the ratio of elasticities) and due to the reduction of the importance of economies to scale. Some of the possible reasons for the deterioration in the income elasticity of exports and in the magnitude of increasing returns to scale were the deepening trend of de-industrialization and the deterioration in non-price competitiveness that these countries experienced in the 2009-2019 period (driven by the implementation of austerity policies).

In conclusion and in answer to the question that motivates the title of this essay, the finding of economic and productivity divergence of the peripheral member-states is troubling as it suggests the EU and the Euro Area are systematically failing to attain one of its key economic policy purposes – convergence – and is in fact attaining an opposite result. This result is surprising as the peripheral member-states are generously defined to include some key member-states – in particular, France, Italy, and Spain – close to the EU power centers and three member-states with veto power on economic policy making.

The implication seems also clear. If EMU (and EU) policies fail to revert the current economic divergence trends found in this essay and in other literature, the basis for peaceful transfer of the peripheral nation-states sovereign powers to central authorities weakens and, with it, the economic, social, and political foundation for greater integration of the EU.

4. What could have been? A synthetic control evaluation of the effect of the Economic and Monetary Union on the net external wealth of peripheral member-states

4.1 Introduction

In January 1999, with the establishment of the European Economic Monetary Union (EMU), the exchange rate between the currencies of the countries belonging to the European Union (EU) became irreversibly fixed and monetary policy became common and defined by the European Central Bank (ECB). The ECB is an independent central bank whose primary objective in implementing economic policy is price stability. Furthermore, the process of transitioning from a national currency to a single common currency, the Euro, began.

One of the main purposes of establishing the EMU is to ensure macroeconomic stability and foster the economic growth of its member-states (European Commission, 1990). Furthermore, a wide range of authors and political decision-makers argued that the creation of the Euro Area would allow the balance of payments (and external debt) imbalances of member-states to be treated as irrelevant (de Cecco and Giovannini, 1989; Blanchard and Giavazzi, 2002). Indeed, de Cecco and Giovannini (1989, p. 11) even argued that these imbalances were merely a "statistical curiosity." To celebrate ten years since the single currency's creation in 2008, the European Commission prepared an extensive report in which it concluded that the Euro Area was "a resounding success" (European Commission, 2008, p. 3).

However, numerous authors did not share this view, pointing out the growing divergence between Euro Area member state economies, particularly in terms of economic growth, external debt, the real exchange rate, or the level of sophistication of the productive structure (Eichengreen, 2010, Simonazzi et al., 2013; Lapavitsas et al., 2010; Flassbeck and Lapavitsas, 2013).

Interestingly, controversies around the EMU are not a recent phenomenon, as various concerns arose, leading to decades-long debates before its momentous launch on January 1, 1999. While Mundell (1961) is cited as the seminal contribution, in specifying the conditions for what became known as the Optimum Currency Area (OCA) theory, he himself cites Meade (1957, p. 385-386) and Scitovsky (1958), who had opposing views on whether conditions for a common currency in Western Europe existed. Other well-known and often-cited contributions include those by McKinnon (1963) and Kennen (1969). This classical literature resulted in a consensus perspective that focuses on the importance of trade, similarity of shocks and business cycles, factor mobility, and fiscal transfers between the economies of regions or countries adopting a common currency (Frankel and Rose, 1997).

Additionally, a report commissioned by the European Commission, written by a panel of independent experts led by Donald MacDougall (1977), pointed out the importance of a fifth factor: differences in the productive structures of regions in the common currency area, which are not only static but also result in differences in productivity growth trends (Perotti and Soons, 2022). The MacDougall report argues that a monetary union would only be feasible with significant fiscal transfers. In a monetary union, these fiscal transfers would flow from more productive regions (with current account surpluses) to less productive regions (with current account deficits), mostly through automatic fiscal stabilizers (Barba and de Vivo, 2013). The MacDougall report pointed out that in the advanced economies of their era, these fiscal transfers typically represented between 3% and 10% of the regional GDP of poorer regions, though could be as high as 30% of the regional GDP. The MacDougall report argued that the single currency could only be launched if the federal budget represented at least 5%–7% of combined GDP, and further stated that a monetary union with the present level of federal budget (less than 1% of GDP) would be "impracticable" (MacDougall, 1977, p. 12).

Many academics (e.g., Feldstein, 1997; Scott, 1998) and decision-makers had a critical view of the EMU before its launch, with some arguing that it did not meet the OCA theory criteria (Eichengreen, 1992; Krugman, 2001). Interestingly, Mario Draghi, in his 1977 doctoral dissertation prepared under the supervision of Franco Modigliani at MIT, argued against the EMU. He later summarized the dissertation’s conclusions as "the single currency was madness, something absolutely not to do" (Judah, 2021, para. 9). Similarly, Karl Otto Pöhl, Bundesbank president between 1980 and 1991 was critical of the EMU project (Protzman, 1991), having warned German Chancellor Helmut Kohl that a single currency without political union would be an "act of madness" (Soromenho-Marques, 2014, p. 143). Karl Blessing, the second Bundesbank president between 1958 and 1969, argued that a monetary union requires common trade, fiscal, budgetary, economic, wage, and social policies. This meant that a monetary union would be a "dangerous fantasy without a political union" (Soromenho-Marques, 2014, p. 143).

These warnings and remediation recommendations of academics, decision makers, and the MacDougall report authors were largely ignored, as is well known. Nearly two and a half decades after the launch of the euro, it is possible to revisit the consequences of ignoring these debates.

The launch of the EMU was a consequential event, not only given the prior academic and policy debate but also given the significant economic divergence between the so-called Euro Area core and peripheral member-states in recent decades (Alcobia and Cabral, 2023; Gräbner and Hafele, 2020; Celi et al., 2018). However, the current dominant perspective, including among economists and policymakers of peripheral member-states, is what we designate as the "meritocracy hypothesis.” In this view, the better economic performance of the core member-states of the Euro Area is a consequence of their higher competitiveness, better governance, and better fiscal discipline relative to that of peripheral member-states, whose lagging economic performance is largely explained, among other factors, by their lack of fiscal discipline and unwillingness to implement structural reforms with high short-term social costs (Wyplosz, 2013; Eggertsson et al., 2014; Alcidi et al., 2016; Sapir et al., 2014).

The alternative perspective, is what we designate as the "implicit fiscal transfers hypothesis." The productive structures, productivity levels, and productivity growth potential between the core and peripheral member-states differed significantly before the adoption of the euro (Storm and Naastepad, 2015; Felipe and Kumar, 2014; Botta, 2014). For example, peripheral member-states tended to specialize in tourism, an industry with lower labor productivity and lower productivity growth potential (Martins and Mamede, 2022). Based on the implicit fiscal transfers hypothesis, the economic divergence between core and peripheral member-states is foremost explained by implicit quasi-fiscal subsidies from the peripheral to core member-states that follow from a monetary union without significant explicit fiscal transfers from wealthier (core) member-states to poorer (peripheral) member-states. That is, member-states with more developed productive structures and higher (potential) productivity growth derive gains from a weak euro, whereas member-states with low productivity and low productivity growth incur costs from a strong euro (MacDougall, 1977; Barba and de Vivo, 2013; Perotti and Soons, 2022).

This essay contributes to the debate between the meritocracy and implicit transfer hypotheses. In particular, we analyze the impact of the Euro Area on the external debt of the countries with the most unfavorable external debt trajectory in the pre-Euro crisis period; that is, the so-called Euro area peripheral member-states of Greece, Spain, Italy, Portugal, and France (Gräbner and Hafele, 2020). Despite France being considered a Euro core member state, we decided to study it due to its economic underperformance over the last few decades (Celi et al., 2018; Gräbner and Hafele, 2020).[61]

To address this research question, we apply the synthetic control method (SCM) (Abadie and Gardeazabal, 2003; Abadie et al., 2010, 2011, 2015; Athey and Imbens, 2017; Abadie, 2021), which two leading econometrics scholars argue “is the most important innovation in the policy evaluation literature in the last 15 years,” (Athey and Imbens, 2017, p. 9) with evidence that it produces more robust econometric estimates than other methods (Gardeazabal and Vega-Bayo, 2017).

The SCM is particularly well suited for analyzing the effects of the EMU, as it allows us to estimate what would have happened to the given economic variables of member-states that opted not to participate in the EMU. Importantly, given that peripheral member-states opted into the EMU, the policy we test is the counterfactual policy decision not to participate in the EMU by a given Euro Area member state. Additionally, SCM is amenable to various robustness test approaches and can account for other possible explanatory factors by augmenting the underlying econometric model with explanatory

[61] According to the authors, Cyprus is classified as a Euro Area peripheral member state. However, due to its limited size, atypical economic structure, and data constraints, we have elected not to include it in this study.

variables relevant to the case study under analysis.

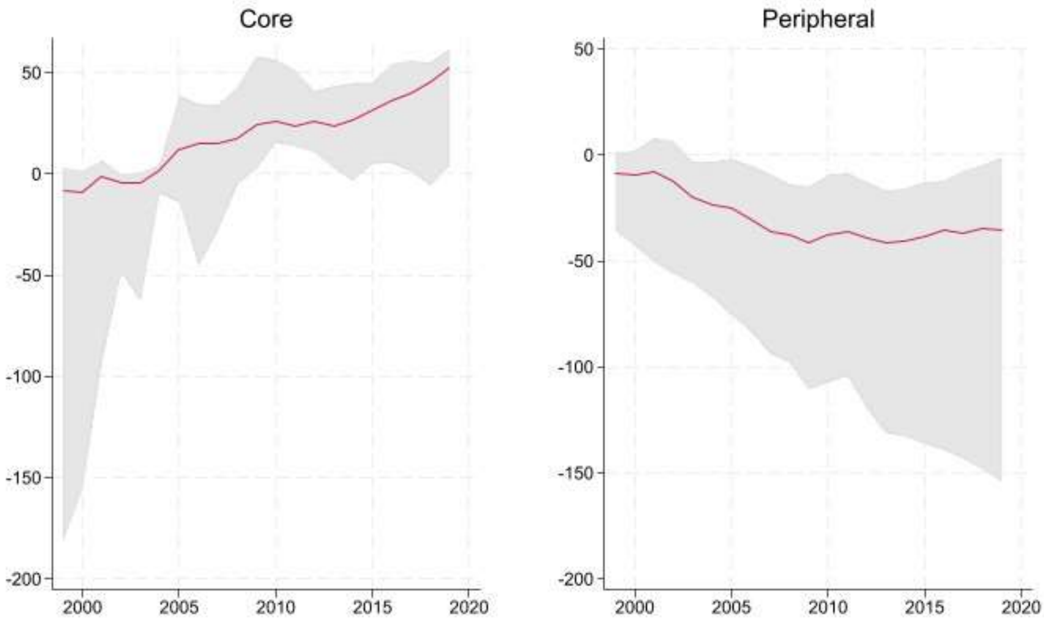
Hence, a growing body of literature examines the effects of the EMU on Euro Area member-states' macroeconomic variables, notably, real GDP per capita (Fernández and Garcia Perea, 2015; Verstegen et al., 2017; Puzzello and Gomis-Porqueras, 2018; Gasparotti and Kullas, 2019), real GDP (Gabriel and Pessoa, 2024), real exchange rates (El-Shagi et al., 2016), an economy's complexity index (Gabrielczak and Serwach, 2020), labor productivity (Zhuang et al., 2023), and the effects of the EMU on current account balances (Hope, 2016).

Our work differs from existing literature in that it focuses on the evolution of an economy's net external wealth, a variable measured by its net international investment position. This is an important macroeconomic variable. Many countries have negative net external wealth, which implies or results in interest and dividend payments to non-resident agents, thereby worsening the balance of income and resulting in the deterioration of the country's macroeconomic imbalances and its external risk perception for investors. Therefore, examining the underlying causes for the significant deterioration of the positive net international investment position is crucial, as numerous scholars contend that the European Sovereign Debt Crisis was fundamentally a balance of payments crisis (Cesaratto, 2013; Cabral, 2013).

By focusing on net external wealth, we also contribute to the existing literature by investigating whether the predictions of the OCA literature and the MacDougall report proved to be accurate. It is well-known that the EMU does not meet most OCA criteria. Differences in the productive structure and productivity growth potential of member-states are also substantial (Frankel and Rose, 1997). Moreover, the EMU was launched with no fiscal stabilizers and very low levels of fiscal transfers from member-states with current account surpluses to those with current account deficits (MacDougall, 1977; Barba and de Vivo, 2013; Perotti and Soons, 2022). In this setting, a key implied prediction of the OCA literature is that the peripheral member-states of the monetary union with weaker productive structures and lower productivity growth trends would see their net financial position deteriorate, accumulating net external liabilities and negative levels of net external wealth. Consequently, in the absence of fiscal transfers from wealthier member-states, peripheral member-states would have to borrow externally or sell (productive) assets to nonresidents to finance their current account deficits.

The available Net International Investment Position (NIIP) data do indeed suggest (Figure 4.1) that the Euro Area has gradually become a monetary union of creditors and debtors, with core member-states becoming net creditors by 2019 (NIIP of around +52% of GDP) and peripheral member-states becoming net debtors (NIIP of around -35% of GDP).

Figure 4.1: Net international investment position (NIIP) of core[62] vs peripheral Euro Area member-states, maximum, minimum and weighted average (in % of GDP)



Source: Eurostat; authors' own calculations.

Note: The core and peripheral NIIP weighted average is calculated by weighing the core and peripheral member-states' NIIP by the respective weight in the combined core and peripheral GDP, respectively. The maximum shaded area is limited by the NIIP of the core and peripheral member-

[62] According to Gräbner and Hafele (2020), we refer to the Core member states as Germany, Belgium, Finland, and Austria.

states, with the highest and lowest NIIP, respectively.

Therefore, this data, as well as the academic and policy debate on the virtues of the EMU leads to the important research question that motivates this essay: To what extent is this change in net external wealth of the peripheral member-states explained by the EMU?

Our empirical results suggest that the peripheral Euro Area member-states would have been wealthier had they opted not to adopt the euro, as implied by the predictions of the OCA literature and by the MacDougall report. Specifically, we estimate that the peripheral member-states' NIIP would, on weighted average, improve by 42% of 2010 GDP, had they opted not to adopt the euro**,** the equivalent to a combined 2.2 trillion of 2010 euros. Moreover, we find that all peripheral member-states displayed a remarkable deterioration of their net external wealth following their participation in the EMU but the magnitude of the effect differs, with Greece, Portugal, and Spain being the member-states with the worse deterioration in net external wealth. We also discuss why the EMU may have led to such severe deterioration in the net external wealth of these peripheral countries.

The remainder of this essay is organized as follows. Section 4.2 describes the methodology, data, and explanatory variables. Section 4.3 presents the empirical results. Section 4.4 concludes.

4.2 Methods and data

4.2.1 Methodology

We apply SCM to analyze the impact of EMU on the net external wealth of the peripheral member-states of the Euro Area. Following Abadie and Gardeazabal (2003) and Abadie et al. (2010, 2011, 2015), among others, we divide the sample countries into two groups: the treated countries subject to intervention or treatment, that is, those that participate in the Euro Area, and the control or donor pool countries. We use these groups to estimate the counterfactual outcome representing the potential outcome in the treated countries without intervention or treatment.

SCM estimates the impact of a structural change in participating in the EMU through the difference between the outcome of the treated country and a weighted average of the outcomes of J carefully chosen donor pool countries that form the synthetic control. The SCM seeks to predict the results of the outcome variable of the treated country in the absence of the structural change. Hence, to apply SCM in our study, we include data from the peripheral member-states of the Euro Area in our sample and set them as treated countries. Then, we obtain the effect in period t for the peripheral member state under analysis of participating in the Euro Area from period T_0 onward, say τ_{1t}, as follows:

$$\tau_{1t} = Y_{1t}^{I} - Y_{1t}^{C}, \ \mathrm{t} \geq T_0, \tag{4.1}$$

where Y_{1t}^{I} denotes the actual value of the variable used to represent the net external wealth for the peripheral country exposed to the policy change at time t, and Y_{1t}^{C} is the value of the same outcome variable in the same country, but in the counterfactual situation of the absence of this policy change. We then estimate Y_{1t}^{C} by the SCM, leading to an estimator for τ_{1t}, $\hat{\tau}_{1t}$, which we can obtain using

$$\hat{\tau}_{1t} = Y_{1t}^{I} - \hat{Y}_{1t}^{C} = Y_{1t}^{I} - \sum_{j=2}^{J+1} w_j \, Y_{jt}, \ \mathrm{t} \geq T_{0.} \tag{4.2}$$

The weights from Equation (4.2) given to each country included in the synthetic control can be stacked into the vector $W = \left(w_2, \dots, w_{J+1}\right)'$. The optimal W is then determined by minimizing

$$(X_1 - X_0 W)' V (X_1 - X_0 W), \tag{4.3}$$

subject to the following restrictions:

$$w_j \geq 0, j = 2, \dots, J + 1 \tag{4.4}$$

$$\sum_{j=2}^{J+1} w_j = 1, \tag{4.5}$$

where X_1 is a vector that stacks the values of the characteristics of the peripheral member-states before transitioning to the Euro; X_0 is a matrix containing the values of the same characteristics in the J donor pool countries throughout the same period; and V is a symmetric and positive semi-definite matrix whose values signal the characteristics in X_1 and X_0, which are relatively more important for explaining the outcome variable.

As Equations (4.3)–(4.5) demonstrate, the optimal synthetic control in each peripheral member state is chosen so that it minimizes the mean squared prediction error (MSPE) that, in this context, measures the distance or gap between the peripheral country under analysis and its corresponding synthetic control before joining the EMU according to the characteristics included in X_1 and X_0.

4.2.2 Data and explanatory variables

Our dataset comprises a balanced panel with annual data on several variables for both the peripheral member-states and selected donor countries, covering the period between 1980 and 2010. To characterize the evolution of the net external wealth of the sample countries, we use the NIIP, excluding gold, as a percentage of GDP as the outcome variable for the calculations of Equations (4.1) to (4.5). This indicator measures a country's net financial assets, defined as the difference between the financial assets and liabilities of residents in that country and those of non-residents (IMF, 2003, 2009). When the value of financial assets is less than that of financial liabilities, the NIIP is negative, and the country has negative net external wealth vis-à-vis the rest of the world.

The treated countries are the peripheral member-states of the Euro Area: Greece, Spain, Italy, Portugal, and France. We include France here given its economic underperformance over the last few decades (Celi et al., 2018; Gräbner and Hafele, 2020). Celi et al. (2018) highlight the decline of the industrial sector, the deterioration of France's current account balance, and its declining technological intensity in recent decades.

However, the results in Section 4.3 remain similar if we exclude France from the set of treated countries.

Our methodology consists of estimating τ_{1t} for each peripheral member state according to Equation (4.3) and interpreting $\hat{\tau}_{1t}$ as the magnitude of the impact of joining the EMU on the net external wealth of the member state under analysis. To do so, we must identify the year when each peripheral member state started its participation in the EMU, T_0, and determine the set of J countries that are part of the donor pool and the set of variables to be included in X_0 and X_1.

The treatment event, T_0, occurred in 1999 for most peripheral member-states, as they participated in the EMU from January 1, 1999, onward as founding member-states. The exception was Greece, which joined the EMU on January 1, 2001, with the treatment set for that year.

The donor pool should be restricted to countries with similar economic and social characteristics as the peripheral member-states (Abadie et al., 2015). Hence, we included the following 17 OECD countries in the control group, considering that peripheral member-states belong to this organization: Australia, Canada, Chile, Colombia, Costa Rica, Denmark, Israel, Korea, Japan, Mexico, New Zealand, Norway, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.[63] This set consists of the remaining OECD countries, except those that joined the EU or the Euro Area in the post-treatment period.[64] We chose this set of donor pool countries to remove the influence of feedback effects; that is, that the countries included in the donor pool are not affected by the treatment.

Finally, the variables included in X_1 and X_0 should be relevant for explaining the dynamics of the NIIP in the sample countries. We thus based the choice of predictors on Hope (2016), who focused on the impact of the EMU on the current account balance, considering a set of different treatment countries. However, selecting predictors that are

[63] Following Hope (2016) and Abadie et al. (2015), we exclude Iceland due to its small size and unusual economic structure.

[64] We exclude most Eastern European OECD member countries from the donor pool because they joined the European Union or the EMU in this period.

similar to those in the aforementioned study was constrained by the availability of data and the predictive power of these variables in our dataset. Specifically, we had to exclude some predictors either because of missing observations for the entire pre-intervention period (domestic credit to the private sector) or because they resulted in a significant deterioration in the pre-intervention MPSE (price level of exports, gross fixed capital formation, agriculture share, manufacturing, population, and complexity index). Hence, we included the following predictors in X_1 and X_0 (see Table 8.2 in Appendix for the data sources): current account balance (in percentage of GDP), nominal exchange rate and real exchange rate for the 65 largest trading partners, public debt (in percentage of GDP), government primary balance (in percentage of GDP), private sector debt (in percentage of GDP), real domestic demand growth rate, real GDP growth rate, degree of openness (in percentage of GDP), and real GDP per capita (in logarithm).

In addition, the lagged outcome variable is usually a predictor of good properties, attenuating the problem of excluding other predictors that could be considered relevant (e.g., Athey and Imbens, 2006, Kaul et al., 2022). Hencefollowing this literature, we included the lagged NIIP as a predictor for some specific years.

Following other SCM empirical analyses (e.g., Hope, 2016), we define 2010 as the end of the post-treatment period because 2010 marks the onset of the 2010-2012 Euro crisis, a very large economic shock that affected the Euro Area member-states, resulting in an important change in the Euro Area's economic policies. Specifically, the EU and national authorities implemented new policies following the introduction of the macroeconomic imbalance procedure aimed at reducing current account deficits and improving the NIIP (and net external wealth) of the peripheral member-states. It is also possible that the shock was so large that it also affected countries in the donor pool with large trade relations with the Euro Area, which would bias the estimates of the overall effects of EMU participation on the NIIP of peripheral member-states.

In addition, a pretreatment estimation window size of 19 years for most countries (21 years for Greece) is considered a sufficiently long period to reduce the risk of overfitting and thus successfully implement SCM. We can thus reduce the impact of an economic shock, as the inclusion of a significant number of pre-treatment periods allows us to use a greater number of outcome predictors (McClelland and Mucciolo, 2022).

4.3. Results

In Section 4.3.1, we present the SCM results showing the evolution of the peripheral member-states' NIIP under the counterfactual policy decision of non-EMU membership (and not adopting the euro) and, consequently, the impact of this policy change on their net external wealth. In Sections 4.3.2, 4.3.3, and 4.3.4, we implement the in-space placebo, in-time placebo, and leave-one-out tests (Abadie et al., 2010, 2015), which are used to infer the significance and check the robustness of the results obtained in Section 4.3.1. As an additional robustness test, Section 4.3.5 adopts a panel data regression approach to estimate the impact of EMU membership on peripheral member-states' NIIP and compare the results of this estimation approach with those of the SCM approach (Section 4.3.1). Section 4.3.6 provides possible explanations for the negative impact of EMU integration on the net external wealth of peripheral member-states reported in Sections 4.3.1 to 4.3.5.

4.3.1 SCM results

To implement the SCM, we used Stata 17.0, with the synth2 command (Yan and Chen, 2023). We used the "nested allopt" option to increase the accuracy of the results following Yan and Chen (2023)

Table 4.1 shows the optimal weights of each synthetic peripheral country in the pre-treatment period; that is, before these countries joined the Euro Area. For example, the optimum weight for "Synthetic Portugal" is 9.7% for Colombia, 4.3% for Costa Rica, 42.4% for Israel, 39.6% for Korea, and 4% for Switzerland, while the remaining countries received a weight of 0%.

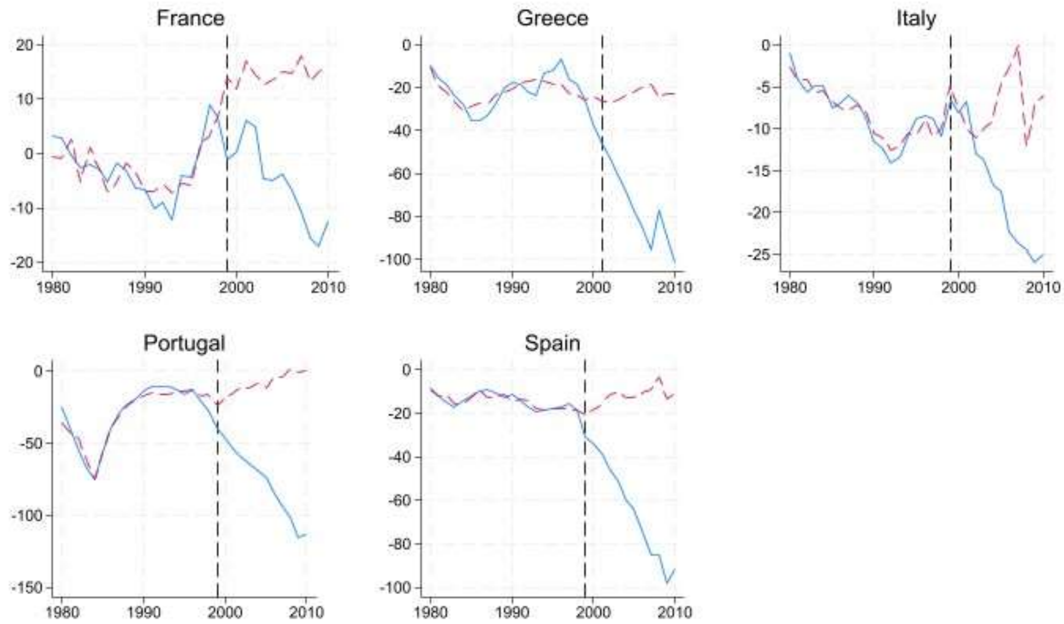
Table 4.1: SCM weights for each synthetic peripheral member state (%)

Donor pool countries	Synthetic France	Synthetic Greece	Synthetic Italy	Synthetic Portugal	Synthetic Spain
Australia	24.8	0	0	0	0
Canada	20.6	0	13.5	0	0.5
Chile	0	30.7	0	0	0
Colombia	0	0	0	9.7	3.4
Costa Rica	0	0.7	0	4.3	3.6
Denmark	13.8	0	11.6	0	0
Israel	0	0	0	42.4	8.1
Korea	0	0	0	39.6	0
Japan	9.1	0	0	0	0
Mexico	0	0	0	0	0
New Zealand	0.4	0	0	0	0
Norway	0	0	0	0	0
Sweden	4.1	0	12.6	0	28.1
Switzerland	27.2	0	6.8	4.0	5.7
Turkey	0	7.2	0	0	24.4
United Kingdom	0	0	1.8	0	26.3
United States	0	61.3	53.7	0	0

Using the weights calculated in Table 4.1, Figure 4.2 shows the evolution of the NIIP (blue) and synthetic NIIP (dashed red) in each peripheral member state from 1980 to

2010. The vertical line indicates the year in which the treatment was applied: 2001 for Greece and 1999 for the remaining countries.

Figure 4.2: Evolution of NIIP (as % of GDP) between 1980 and 2010: Peripheral member-states (blue) versus their synthetic counterparts (dashed red)



The results (Table 8.3 and Figure 4.2) indicate that, during the pre-treatment period, there was a good fit between the synthetic NIIP and the actual (observed) NIIP. In fact, the synthetic NIIP was able to accurately replicate the evolution of the NIIP of each peripheral member state until the year it became a member of the EMU.

Table 8.3 provides descriptive statistics for the pre-treatment period by comparing the mean of each NIIP predictor variable for each treated member state with the mean of the same NIIP predictor variable for the respective synthetic control and with the mean of the same NIIP predictor variable for the average of all donor pool countries. Table 8.3 suggests a good fit of the synthetic control in the pre-treatment period for most NIIP predictor variables, the predictor variables means of the peripheral member-states are much closer to the predictor variable means of their respective synthetic controls than with the predictor variable means of the donor pool countries. Hence, both Figure 4.2 and Table 8.3 validate the use of the synthetic control groups described in Table 4.1 as counterfactuals for the peripheral countries.

However, Figure 4.2 shows a clear and pronounced divergence–an NIIP gap–between the observed and synthetic NIIP following membership in the EMU. In all cases examined, the NIIP of the Euro Area peripheral member-states displayed a marked deterioration trend after joining the EMU. Moreover, the SCM results in Figure 4.2 indicate that the peripheral member-states' NIIP would not have deteriorated because these countries did not join the EMU.

To obtain a more precise idea of the magnitude of the NIIP deterioration following the creation of the Euro Area and to compare the results across the peripheral countries, Table 4.2 presents the differences between the actual NIIP and the counterfactual NIP prediction according to the SCM in GDP percentage points. The differences are remarkable, with Portugal being the country most negatively affected, whereas deterioration was less relevant for Italy. Overall, we estimate that had the peripheral member-states opted not to participate in the EMU, by 2010, they would have been, on weighted average,[65] 42% of 2010 GDP wealthier than they are, an effect that in combined terms represents 2.2 trillion 2010 euros.

Table 4.2: NIIP gap in 2010: Difference between the observed and counterfactual (synthetic) NIIP if peripheral member-states had not joined the EMU

Treated countries	France	Greece	Italy	Portugal	Spain
Gap (in percentage points of 2010 GDP)	-30.4	-83.6	-20.1	-114.1	-80.3

The remarkable divergence between the observed NIIP and the synthetic NIIP in each peripheral country immediately after EMU membership, as shown in Figure 4.2 and

[65] The weighted average is calculated by multiplying the difference between the observed and synthetic NIIP in 2010–the NIIP gap in 2010–for each peripheral member state by the respective weight in the combined 2010 GDP of all peripheral member states.

Table 4.2 indicates that this event had a significantly negative impact on the net external wealth position of these Euro Area member-states.

However, the credibility of this conclusion would be diminished if we implement the SCM as described in Section 4.2 for the donor pool countries or use a date prior to EMU membership and observe similar divergence paths, as in Figure 4.2. Hence, following the literature on SCM (e.g., Abadie et al., 2010, 2015; Firpo and Possebom, 2018) we conduct placebo tests in Sections 4.3.2 and 4.3.3 to try to discard these situations and hence reinforce the credibility of our conclusions.

4.3.2 In-space placebo

This section reports on the results of the in-space placebo tests. It consists of successively relabeling each of the 17 donor pool countries as a treated country while shifting the peripheral member state under analysis to the control group. Then, at each step, τ_{1t} we apply the SCM methodology for each donor pool country, simulating a "fake treatment;" that is, assuming wrongly that this country "had received the treatment" of joining the EMU. This is performed for all donor-pool countries, considering one peripheral member state at a time.

If the estimated effects from this in-space placebo exercise considering a "fake treatment" are irrelevant or, at most, much weaker than the ones described in Section 4.3.1, then this signals that the estimated impacts for the peripheral member-states of joining the EMU have significant value.

To summarize the results a first idea would be to compare the post-EMU membership MSPE of each peripheral country with the "fake treated" countries. However, as Abadie (2021) explained, this is not sufficient to infer that the impact of the treatment was significant. In particular, the pre-EMU membership MSPE should also be relatively low to guarantee that the synthetic control can accurately replicate the evolution of the NIP until treatment occurs, that is, integration into the Euro Area.

For this reason, following Abadie et al. (2010), we obtain and compare the ratio post/pre- EMU membership MSPE for the peripheral and "fake treated" countries. If this ratio is higher in a relevant way for the peripheral country than for the "fake treated," then this reinforces the reliability of the estimated impact of joining the EMU for the peripheral country. The results are shown in Figure 4.3.

Figure 4.3: Ratio between post-EMU membership MSPE and pre-EMU membership MSPE: Peripheral versus donor pool countries

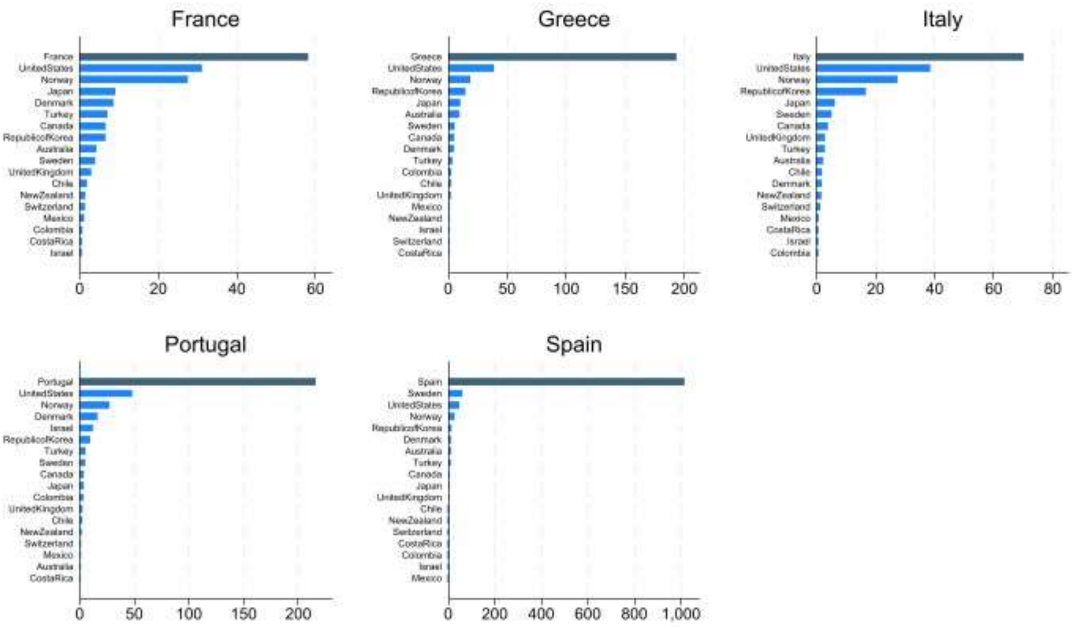
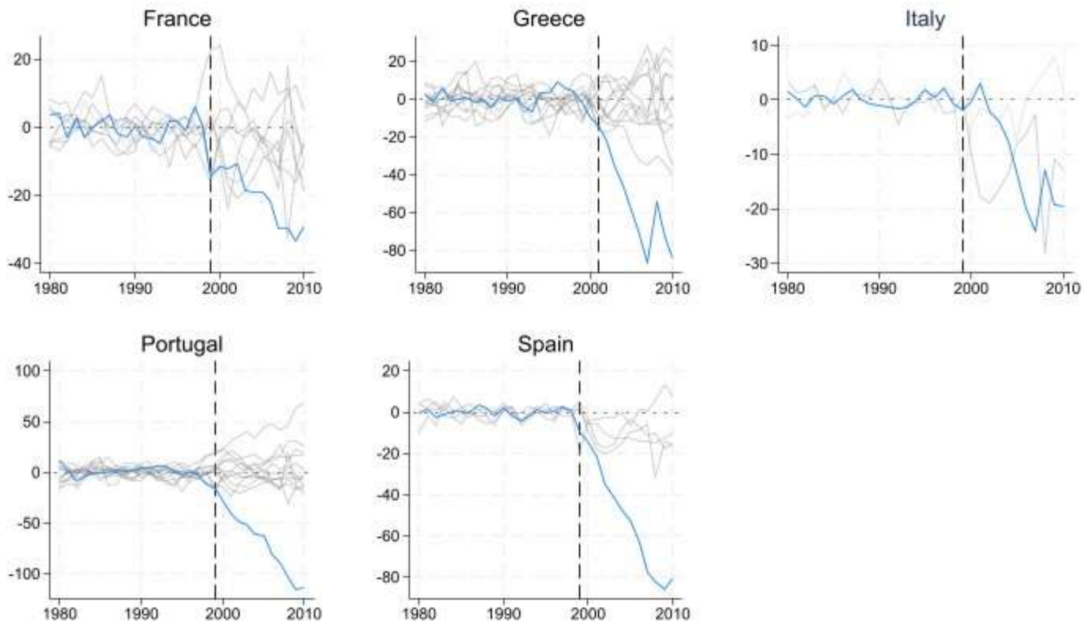


Figure 4.3 shows that among all the sample countries, the peripheral member-states, which were the countries that were actually exposed to the policy change of EMU membership, have the highest ratio of post/pre EMU membership MSPE in most cases by a large margin, suggesting that EMU membership had a significantly higher impact on these countries' NIIP. Indeed, the mean of the post-EMU membership NIIP gap is, on average, 397.7 times higher than the pre-EMU membership NIIP gap. This value clearly contrasts with the NIIP ratios observed in the donor pool countries.

Another way to report the results of the in-space placebo test is to plot in the same graph $\hat{\tau}_{1t}$, *i.e.*, the NIIP gap estimates for the peripheral countries and for the donor pool countries throughout time (assuming falsely they received treatment). The result is illustrated in Figure 4.4. As in Abadie et al. (2010), we exclude from this figure the donor pool countries with a pre-EMU membership MSPE 5 times higher than the peripheral country being analyzed. Figure 4.4 confirms that, with a rare exception in the Italian case, the synthetic NIIP in the peripheral countries was exposed to a much more severe deterioration than in fake treated countries following the EMU membership, and therefore Figure 4.4 reinforces the conclusions from Figure 4.2.

Figure 4.4: NIIP gaps in each peripheral member state (blue) and the corresponding placebo gaps (grey) in the donor pool countries



Note: Only donor-pool countries with a pre-EMU membership MSPE five times lower than their respective peripheral member-states are reported.

Finally, according to the in-space placebo test, we can also check whether the treatment's effect was significant by comparing the ratio of post/pre EMU membership MSPE of the peripheral countries versus the "fake treated" countries and obtaining the p-value. For example, according to Table 8.4, excluding countries with a pre-intervention MSPE 5 times larger than the peripheral country under analysis, if we randomly choose a country from the donor pool, the probability of obtaining a post/pretreatment MSPE ratio as large as Greece's is 1/12 (0.077). Therefore, the treatment effects were statistically significant at the 10% level. Following this reasoning, only Italy and Spain failed to reject the null hypothesis at 10% level. However, if we exclude only the fake-treated countries with a pre-intervention MSPE 20 times higher than that of the peripheral country under analysis, the treatment in Spain also becomes significant.

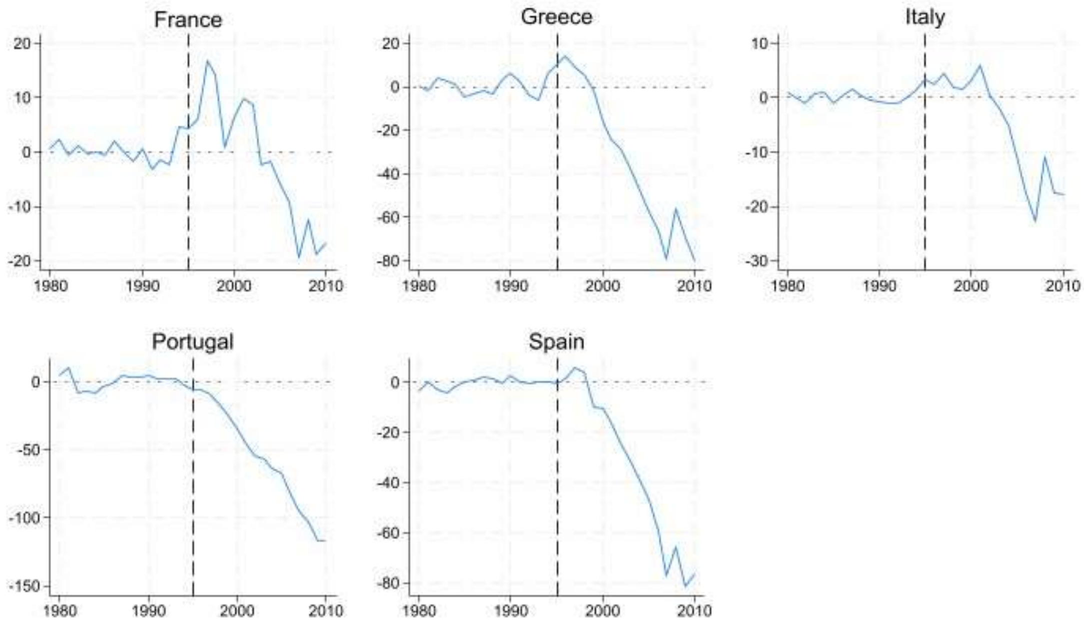
4.3.3 In-time placebo

As is standard in SCM, we can evaluate the credibility of the results in Section 4.3.1 using in-time placebo tests that complement the analysis in Section 4.3.2. In our context, the in-time placebo consists of implementing the SCM and obtaining the NIIP gap estimate, $\hat{\tau}_{1t}$, for each peripheral member state considering a period T_0 before the EMU membership actually took place. If the trajectory of the $\hat{\tau}_{1t}$ using this "fake time of treatment" is remarkably different from the one that is implicit in Figure 4.2 (distance between the two lines corresponding to the observed NIIP and its synthetic counterpart) and shows almost no effect, then this further reinforces the conclusion that the deterioration of the NIIP in these countries is attributable to its participation in the EMU. Hence, we conducted an in-time placebo test in 1995, based on the Madrid Summit, which defined the procedures for establishing the EMU.

The results are shown in Figure 4.5. In contrast to Figure 4.2, we see little evidence of a significant and increasingly negative NIIP gap between 1995 and 1998. Indeed, Figure 4.5 shows that when we falsely assume that the Euro Area was established in 1995, the NIIP gap continues to assume a similar trajectory as before, representing almost no impact or a slightly positive impact before 1998 for most countries. The only relevant exception is Portugal, which depicts a slight deterioration in the NIIP gap that nevertheless represents a considerably lower negative impact than that attributed to EMU participation in Section 4.1.

To further support this reasoning, we estimate the in-time placebo test by considering each year between 1996 and 1997 as the fake time of treatment. We obtained results similar to those shown in Figure 4.5.

Figure 4.5: NIIP gap (in percentage points of GDP) of an in-time placebo test with EMU membership in 1995



Interestingly, given that the establishment of the Euro Area was preceded by the Madrid Summit in 1995, it would be reasonable to expect that, even if only partially, some economic and financial effects of the EMU might have been anticipated and, consequently, already observed in Figure 4.5. Indeed, from that moment on, several countries were already subject to the EMU convergence criteria, namely, nominal objectives regarding the evolution of the consumer price index, the government budget deficit (as a percentage of GDP), the government debt-to-GDP ratio, the stability of the exchange rate, and the evolution of long-term interest rates (Devuyst, 1998).

Hence, we show that, although the establishment of the Euro area was foreseeable in the mid-1990s, and despite the implementation of restrictive macroeconomic policies aimed at stabilizing the exchange rate, inflation, public deficit, and public debt, there were no major anticipatory effects on the evolution of the NIIP of peripheral member-states. One possible explanation is that in mid-1998, the exchange rate among these member-states became irrevocably fixed. Even during the crisis of the European monetary system, there was significant exchange rate depreciation in a few peripheral member-states (Eichengreen, 2019).

4.3.4. Leave-One-Out robustness test

Finally, to analyze whether the main results reported in Section 4.3.1 are overly influenced by a specific country included in the synthetic control, we also carried out the leave-one-out (LOO) robustness test (Abadie et al., 2015).

This test consists of iteratively removing one country included in the synthetic control determined in Section 4.3.1 and subsequently re-estimating the impact of establishing the Euro Area by applying SCM considering only the other countries. For example, the NIIP for synthetic Greece is obtained as a weighted average of the United States, Chile, Turkey, and Costa Rica. In each step, we exclude each of these countries, and re-estimate a new synthetic Greece. If the estimated impacts on the NIIP (NIIP gaps) based on these four new synthetic controls are similar to the effects estimated in Section 4.3.1, then we can conclude that the results are robust. Figure 4.6 plots the results of the LOO test applied in this manner to each peripheral country.

Figure 4.6: Baseline synthetic NIIP gap (blue) and alternative synthetic LOO NIIP gaps (grey)

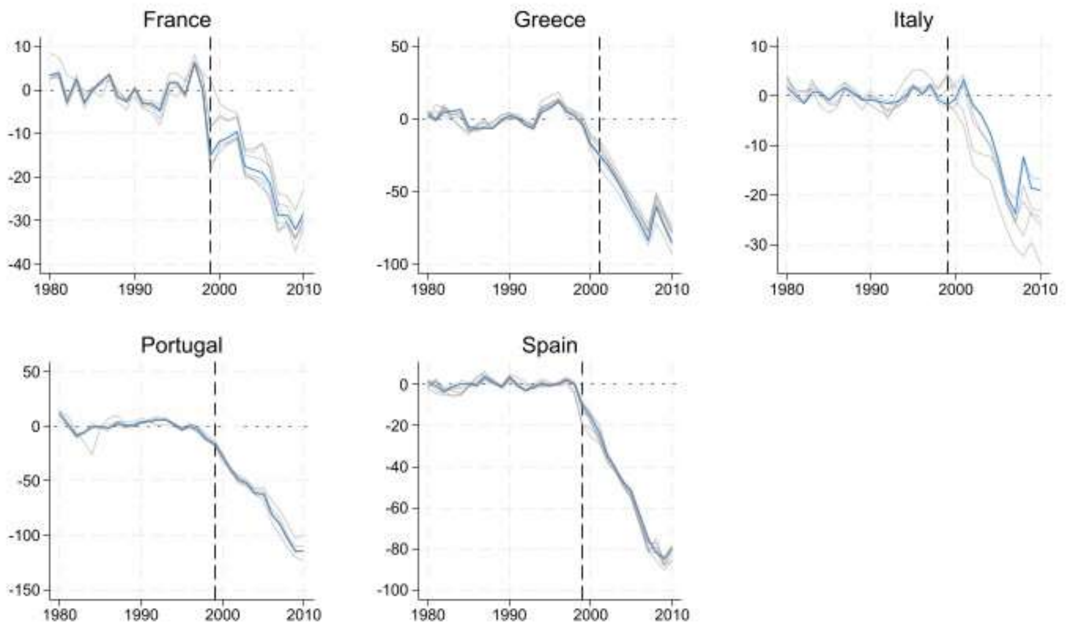


Figure 4.6 shows that the main results are robust to the exclusion of one country at a time from the synthetic control. Although there are some small differences in the case of Italy, we continue to observe that the integration of these countries into the Euro area led to a notorious deterioration in the NIIP for all the countries analyzed.

4.3.5. Panel data regression approach

To further confirm the robustness of the results in Section 4.1, this section uses standard econometric methods for panel data to evaluate the impact of establishing the Euro area on the net external wealth of the peripheral member-states of Portugal, Spain, France, Italy, and Greece.

The sample period is 1980-2010, as in the SCM analysis. The panel dataset includes the five peripheral Euro Area member-states and 17 countries selected to be part of the donor pool (see Section 4.2.2). To implement this approach, we consider the two-way linear fixed effects regression model (TWFE) (Wooldridge, 2010) which, in the context of this essay, can be specified as

$$NIIP_{it} = \beta_0 + \beta_1\, Treat_i{*}EURO_t + \sum_{k=1}^{K} \delta_k X_{k,i,t} + \gamma_t + \alpha_i + u_{it}\ ,\ \ t = 1, \dots T, i = 1, \dots N, \tag{4.6}$$

where indexes *i* and *t* represent country *i* and period *t*, respectively, the dependent variable $NIIP_{it}$ is once again the NIIP as a percentage of GDP (excluding gold reserves), $X_{k,i,t}$ designates the control variable k among K controls, γ_t and α_i are the time and country fixed effects, respectively, and u_{it} is the error term that contains all the remaining factors that influence the NIIP level but cannot be captured by the systematic part of the model in (4.6). The controls used to estimate Equation (4.6) are the same explanatory variables from the SCM analysis detailed in Section 4.2.2 and are described in Table 8.2 (see Appendix). Our main interest is on the β_1 coefficient of the product of two dummy variables $Treat_i{*}EURO_t$. $Treat_i{*}EURO_t$ is equal to one for peripheral member-states in the years of EMU membership. Thus, the β_1 coefficient provides an estimate of the impact of joining the EMU on the NIIP of the peripheral member-states.

The results for the coefficient of $Treat_i$*$EURO_t$ and the corresponding standard errors according to the different specifications of Equation (4.6) are reported in Table 4.3 based on the within estimator for the TWFE (e.g., Baltagi, 2008, Ch. 3). Specifically, Model 1 includes time and country fixed effects, Model 2 also includes the explanatory variables used in the SCM, and finally Models 3 and 4 replicate the specifications of Models 1 and 2, excluding France from the list of peripheral member-states. The intention of estimating Models 3 and 4 is to show that the main result that EMU membership leads to deterioration in the NIIP is robust to the exclusion of France from the set of treated countries.

Table 4.3: Coefficient and standard errors of the variable *$Treat_i$*$EURO_t$* in Equation (4.6) according to different specifications

	Peripheral member-states	**Peripheral member-states**	**Peripheral member-states excluding France**	**Peripheral member-states excluding France**
Variable	(1)	(2)	(3)	(4)
$Treat_i$*$EURO_t$	-45.75***	-22.07***	-52.73***	-26.31***
	(11.178)	(6.538)	(10.519)	(7.632)
Observations	682	625	651	599
R-Squared	0.076	0.265	0.101	0.312
Country fixed-effects	Yes	Yes	Yes	Yes
Time fixed-effects	Yes	Yes	Yes	Yes
SCM estimation predictors	No	Yes	No	Yes

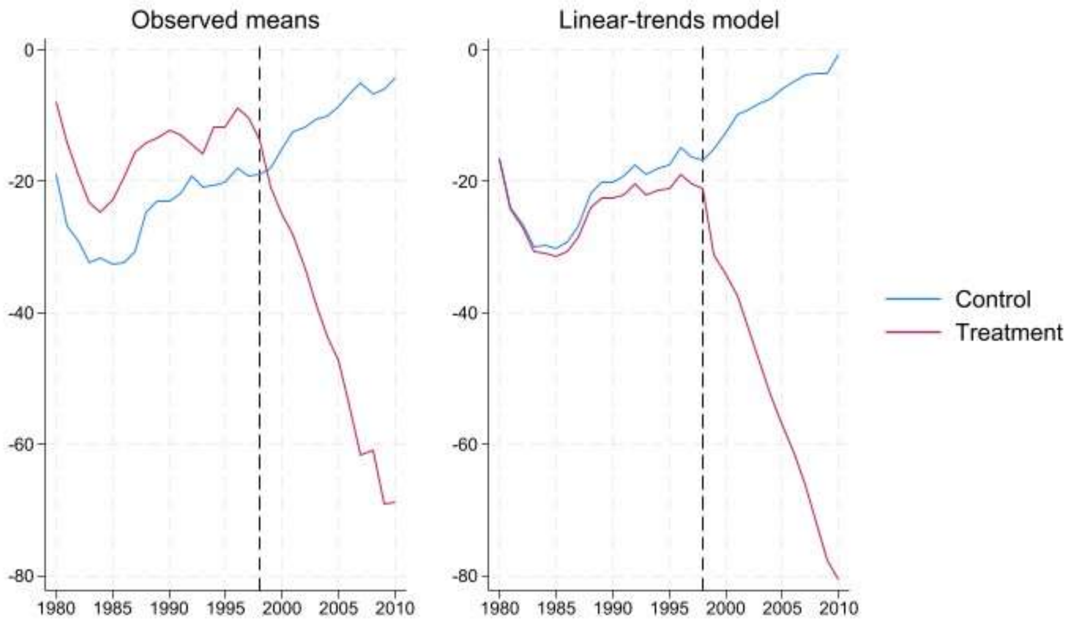
Clustered standard errors are indicated in parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

The estimates confirm that EMU participation has a detrimental and relevant impact on the peripheral member-states' NIIP, which is statistically significant at the 1% level. For example, according to Model 1, membership in the EMU is estimated to have lowered the NIIP of the peripheral member-states by nearly 46% of the GDP percentage points. Including the predictors (Models 2 and 4) reduces the magnitude of the effect. EMU membership has a negative effect on the NIIP, estimated at 22% of the GDP, and is also statistically significant at the 1% level. Finally, when France is excluded from the treated countries (Models 3 and 4), the impact of adopting the euro on peripheral member-states is even more strongly negative.

The left-hand side of Figure 4.7 shows the simple means of the NIIP over time in the treated countries (i.e., peripheral member-states) compared with the donor pool countries (i.e., the control group). On the right-hand side of Figure 4.7, the linear-trends model used for the parallel trends includes the interactions of the time variable with the treatment effect, estimating the model for the peripheral member-states, as well as for the donor pool countries. The results of the linear trend model on the right side of Figure 4.7 support those presented in Table 4.3. In the absence of treatment (i.e., EMU membership), the difference between the treated and control groups would remain constant over time, and the assumption of a parallel trend cannot be not rejected.[66]

[66] We use the "estat ptrends" test after using "xtdidregress" command in Stata. The results are robust to the choice of predictor or the exclusion of France from the treated countries.

Figure 4.7: Graphical illustration of the parallel trends between the treated and control countries



Therefore, the results reinforce the conclusions of the SCM; that is, membership in the EMU contributes to the deterioration of the peripheral member-states' NIIP.

4.3.6 Discussion and implications

Sections 4.3.1 and 4.3.5 highlight the negative effect of EMU membership on the net external wealth of Euro Area peripheral member-states. This section provides possible explanations for the observed deterioration in these member-states' NIIP following their integration into the EMU.

First, peripheral member-states, especially Greece and Portugal, specialize in the production of goods with low technological intensity (Botta, 2014). Consequently, these economies were more negatively affected by the appreciation of the Euro between 1999 and mid-2008 from 1.18 dollars to 1.60 dollars, as well as by the increased competition arising from the emergence of China and Eastern Europe in international trade (Storm and Naastepad, 2015; Felipe and Kumar, 2014). Several authors found evidence in support of or have argued that the degree of sophistication of Euro Area member-states' productive structures has affected the performance of their external accounts since the mid-1990s (Simonazzi et al., 2013; Storm and Naastepad, 2015; Mamede, 2020).

Another possible explanation that may have negatively influenced the peripheral member-states' NIIP is the increased financial integration driven by the nominal convergence process toward creating the Euro Area and the liberalization of capital movement (Rodrigues et al., 2016; Barradas et al., 2018) that these countries experienced. This convergence resulted in higher capital inflows from the core to the peripheral and a tendency for interest rates to converge within the Euro Area (Blanchard and Giavazzi, 2002). However, the importance of the financial integration channel has not been homogeneous across countries, and mainly impacted Greece, Portugal, and Spain. According to Belke et al., (2018), the influx of foreign capital, by reducing financing costs for companies and individuals, led to a boom in consumption in Portugal and Greece and to a sharp increase in investment in construction in Spain, contributing to a deterioration in the current account balance of the peripheral member-states (Gaulier and Vicard, 2012; Belke et al., 2018). Moreover, foreign capital inflows are mainly directed toward non-tradable sectors, namely construction and real estate (Felipe and Kumar, 2014; Piton, 2017). Tradable sectors, particularly industry, tend to be more internationalized, and therefore countries with a more significant weight in these sectors tend to have lower external debt (Ehmer, 2014). These factors stimulated significant increases in domestic demand brought about by the private sector debt bubble in these countries (Storm and Naastepad, 2016; Flassbeck and Lapavitsas, 2013). Increased financial integration also led to a greater divergence in the evolution of unit labor costs in these countries relative to that of the core countries, especially Germany. This situation is particularly severe in Greece, Portugal, Spain, France, and Italy (Flassbeck and Lapavitsas, 2013; Bresser-Pereira and Rossi, 2015; Celi et al., 2018; Shambaugh, 2012).

The diverging evolution of unit labor costs became structural and an embedded feature of the EMU following the adoption of the Euro and the fixed parity it entailed with the former currencies of the member-states. Thus, the depreciation of the exchange rate lost its importance as a policy instrument to enhance the external competitiveness of Euro-area member-states with weaker productive structures. This fact has a growing impact over time, considering the differences in productivity growth potential, given the widely different economic productive structures between core and peripheral Euro Area member-states (Storm and Naastepad 2015; Botta, 2014; Alcobia, 2023).

Finally, the fiscal policies of some countries, especially Portugal and Greece, may have also contributed to the remarkable decline in the peripheral member-states' NIIP following their integration into the EMU. The EMU resulted in new Euro Area-wide economic governance rules, particularly fiscal rules (e.g., the Stability and Growth Pact of 1997, the Fiscal Compact of 2012, and complementary fiscal rules). However, these rules did not prevent the implementation of procyclical fiscal policies for purely electoral reasons (Efthyvoulou, 2012). Furthermore, between 1995 and 2009, the fall in real interest rates in peripheral member-states resulted in an increase in fiscal space, which, in turn, resulted in significant increases in primary public spending (Lane, 2006).[67]

The SCM results provide empirical evidence that EMU membership amplifies the macroeconomic imbalances of the peripheral member-states, namely, a large deterioration of these countries' net external wealth.

4.4 Conclusions

The OCA literature and the 1977 MacDougall Report prepared by independent experts at the behest of the European Commission outlined the need for a much larger federal government budget and fiscal stabilizers. These policy instruments, absent in the EMU, would have resulted in large fiscal transfers from wealthier and more productive Euro Area member-states, known as core member-states, to poorer and less productive Euro Area member-states, known as peripheral member-states. In a monetary union without such fiscal transfers, poorer member-states would need to borrow from and/or to sell assets to non-residents, resulting in the deterioration of those member-states financial position vis-à-vis the rest of the world. While this was well-known before the launch of the EMU, the lack of a counterfactual impeded the estimation of the EMU’s impact on

[67] The increase in public spending on non-tradable goods and services (such as health, education, and public sector wage spending) likely contributed to an increase in the relative prices of non-tradable goods and to the deterioration of the real exchange rate (Froot and Rogoff, 1991).

the EMU of peripheral member-states financial position.

To the best of our knowledge, our study is the first to address this issue by estimating the impact of the EMU on the net international investment position (NIIP) of the peripheral member-states (Portugal, Spain, Italy, Greece, and France) using the SCM, which is one of the most robust approaches for evaluating economic policies.

The results of our SCM analysis provide empirical evidence that the participation of peripheral member-states in the EMU resulted in significant deterioration in these countries' financial positions, thus intensifying their macroeconomic imbalances. We estimate that had the peripheral member-states opted not to participate in the EMU, then by 2010, they would be, on weighted average, 42% of 2010 GDP wealthier than they were, an effect that in combined terms represents 2.2 trillion 2010 euros.

Thus, our study contributes to the literature and the assessment and transparency of the economic policies underlying the EMU by estimating the costs of the incompleteness of the EMU to peripheral member-states. Our results constitute further evidence in support of the reform of the EMU architecture to heed well-known economic findings and experts' recommendations advocating for larger explicit fiscal transfers from wealthier to poorer Euro Area member-states.

5. Falling labor share and anaemic growth in Portugal: A Post-Keynesian econometric analysis

5.1 Introduction

The Portuguese economy, like that of the majority of developed economies, has exhibited timid and declining growth rates in the last decades (Barradas, 2020, 2022; Pariboni et al. 2020). This already represents a stylized fact of economic growth, and it has revived fears around a new "secular stagnation" (Krugman, 2013; Pariboni et al. 2020; Summers, 2014). Against this backdrop, the orthodox view claims that countries should pursue wage restraint policies and more deregulation and flexibilization of labor markets as necessary conditions to improve their macroeconomic performance in the near future (Naastepad and Storm, 2006). The argument invoked is that a decrease in wages will promote an increase in private investment through higher profits and an increase in net exports through lesser unit labor costs, and a corresponding rise in competitiveness that will more than compensate for the expected contraction of private consumption.

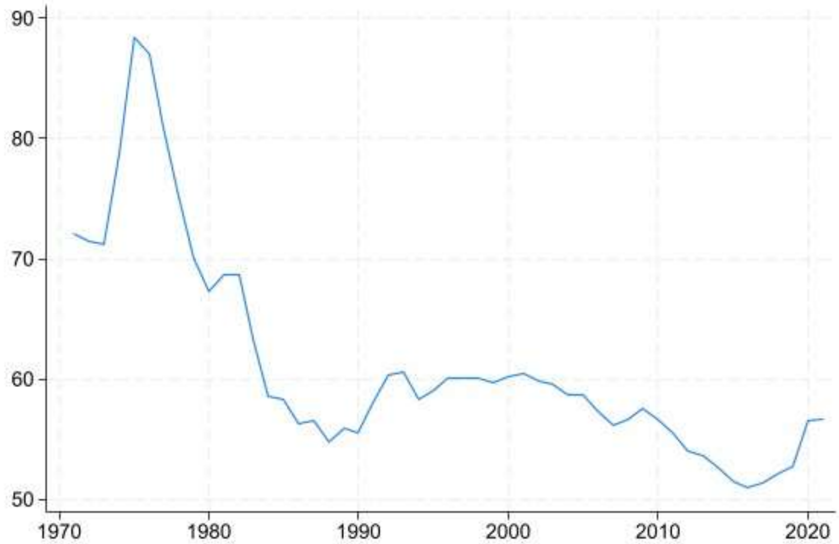
Nonetheless, the labor share has exhibited a decreasing trend in the majority of developed countries in the last decades (Barradas, 2019; Dünhaupt, 2011; Karabarbounis and Neiman, 2014; Kristal, 2010; Lin and Tomaskovic-Devey, 2013; Stockhammer, 2012, 2017; Stockhammer and Wildauer, 2016), including Portugal (Abreu, 2020; Barradas and Lagoa, 2017), which seems to contradict mainstream claims of the existence of a negative relationship between the labor share growth and economic growth.

According to a heterodox approach supported by post-Keynesian economics, the fall of the labor share effectively decreases aggregate demand and, thereat, depresses economic growth because the negative effect on private consumption more than supplants the positive effect on private investment and on net exports. This happens because most countries follow a wage-led growth regime (or a wage-led demand Model) instead of a profit-led growth regime (or a profit-led growth Model), despite the orthodox view tends to assume that all countries follow a profit-led growth regime (Naastepad and Storm, 2006). Several reasons could explain this positive relationship between labor share growth and economic growth. The first reason emphasizes that corporations operate with spare productive capacity, which makes it possible for them to rapidly increase production in response to relevant increases in aggregate demand (Kalecki, 1939). The second reason claims that profitability is less important in bank-based financial systems because non-financial corporations in these countries primarily fund their activities with retained earnings or with long-term bank loans, which suggests their willingness to make long-term investments and to accept lower returns on capital (Naastepad and Storm, 2006). The third reason stresses that countries that follow a profit-led growth regime are also penalized by policies around wage restraint measures because their performance depends on private investment and on net exports that are clearly influenced by the level of private consumption in countries that follow a wage-led growth regime (Naastepad and Storm, 2006). The fourth reason reinforces that wages are an additional source of demand, and investment decisions are also influenced by the level of aggregate demand (Lavoie, 2009). The fifth reason states that wage income is normally related to higher consumption propensities than are profit incomes (Stockhammer, 2012).

From the point of view of empirical studies, some have been developed to examine the relationship between labor share growth and economic growth. There are essentially two important types of empirical studies on this matter. The first is the so-called structural approach, according to which the labor share is considered to be exogenous, and the effect of changes in the labor share on private consumption, private investment, and net exports are separately assessed (Bowles and Boyer, 1995; Ederer and Stockhammer, 2007; Gordon, 1995; Naastepad, 2006; Naastepad and Storm, 2006; Onaran and Galanis, 2014; Onaran and Obst, 2016; Onaran and Stockhammer, 2005; Stockhammer and Onaran, 2004; Stockhammer et al. 2008). The second type of empirical study adopts an aggregative approach, according to which the direct effect on aggregate demand of changes in the labor share are evaluated (Barbosa-Filho and Taylor, 2006; Kiefer and Rada, 2015; Nikiforos and Foley, 2012; Rada and Kiefer, 2016; Stockhammer and Onaran, 2004; Teixeira et al. 2022).

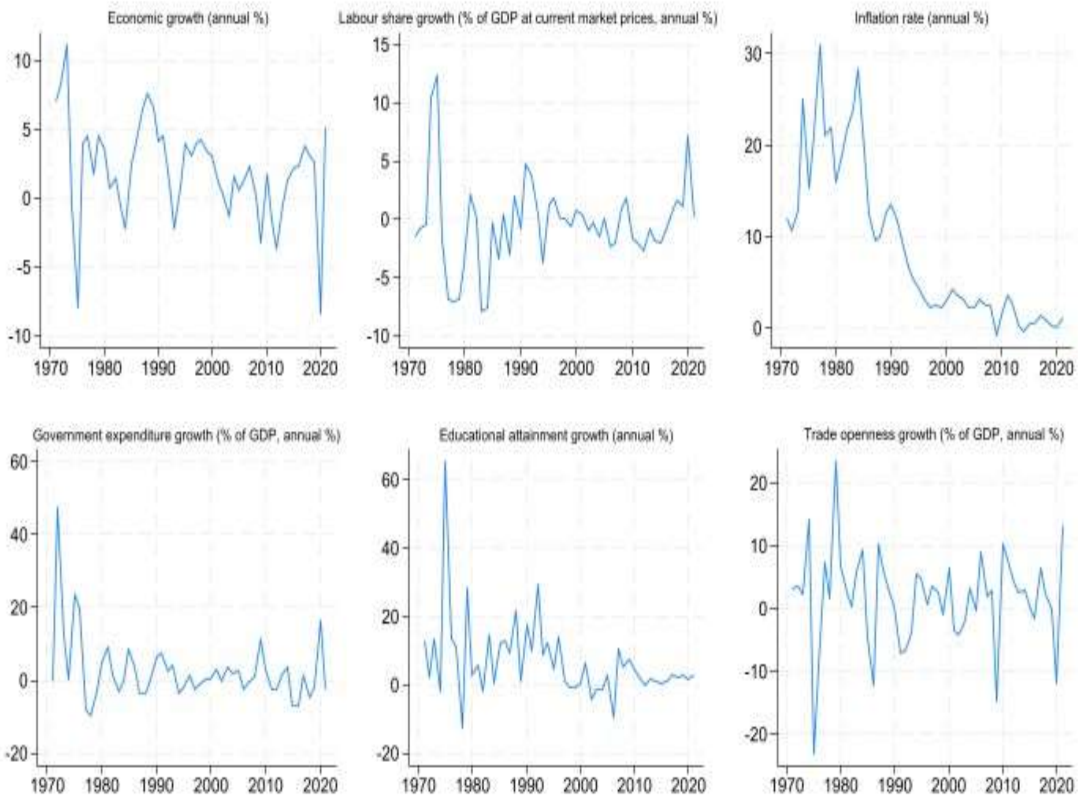
The research reported in this essay examines the impact of labor share growth on economic growth in Portugal from 1971 to 2021 through a time series econometric analysis that extends the existing literature in four different directions. First, this essay is centered on Portugal, for which the empirical evidence is almost non-existent (Onaran and Obst, 2016). Portugal offers a useful case study because labor share has exhibited a strong decline since the 1970s and the Portuguese economy has decelerated at the same time (Figures 5.1 and 5.2), which suggests that these two features could be interrelated. Secondly, this study employs a time series econometric analysis that allows a consideration of the historical, social, economic, and institutional forces behind the evolution of the labor share as well as its effects on growth. Thirdly, this study follows the so-called aggregative approach by directly estimating the effect of labor share growth on economic growth in Portugal. This approach has some advantages in comparison to the so-called structural approach. It captures some dynamic interactions that are potentially missed by the latter, by separately estimating the effect of the changes in labor share on the individual components of aggregate demand (Blecker and Setterfield, 2019). The majority of empirical studies that examine this issue follow the structural approach, and the few that follow the aggregative approach are centered on developed countries (Teixeira et al. 2022). To the best of our knowledge, this is the first study focused on Portugal that considers the aggregative approach. Fourthly, this study also determines economic effects (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004) to assess the role of labor share growth in explaining the trend of weaker and anaemic growth in Portugal since the 1970s.

Figure 5.1: Adjusted labor share (% of GDP at current market prices) in Portugal from 1971 to 2021



Source: AMECO.

Figure 5.2: Plots of our variables for Portugal from 1971 to 2021



The findings show that the labor share growth, the lagged growth rate of the real GDP per capita, educational attainment growth, and the growth of the degree of trade openness positively impact Portuguese economic growth, while the inflation rate and government expenditure growth exert a negative effect on Portuguese economic growth. The study thereby confirms that the Portuguese economy is following a wage-led growth regime, which suggests the urgent need to adopt public policies to support the growth of wages to avoid more decades of dismal growth in Portugal and a new "secular stagnation".

The remainder of the essay is structured as follows. The section, "Labor share and growth: Theoretical and empirical evidence" reviews the literature on the relationship between labor share and economic growth. "The growth Model and hypotheses" defines the growth Model that will be estimated and presents the corresponding hypotheses. The dataset is assessed in "The dataset", and the estimation methodology is explained in the section titled "The estimation methodology". "The estimation results and discussion" presents and discusses the main results. Finally, "Conclusions" contains conclusions, particularly relating to policy implications, and a proposal for investigating one unexpected finding, relating to public sector impacts.

5.2 Labor share and growth: Theoretical and empirical evidence

For Ricardo (1821), trying to understand the laws that regulated functional income distribution (among rents, profits, and wages) was the main problem of political economy. For Marx (1867), the main economic law of modern societies was based on the "class struggle" between labor and capital, which affected economic growth and technological changes. Nonetheless, the constancy over time of the labor share and of the profit share has typically been assumed by the traditional/classical theories (Barradas, 2019) and is considered as a stylized fact of economic growth in the long term (Kaldor, 1961) or even as a law (Bowley, 1937).

More recently, the constancy of the labor share and of the profit share over time has been questioned, particularly because of empirical evidence on the downward (upward) trend of the labor (profit) share since the 1970s. This phenomenon has been happening on a global scale (Barradas, 2019; Dünhaupt, 2011; Karabarbounis and Neiman, 2014; Kristal, 2010; Lin and Tomaskovic-Devey, 2013; Stockhammer, 2012, 2017; Stockhammer and Wildauer, 2016), including in Portugal (Abreu, 2020; Barradas and Lagoa, 2017). Smith (1776) had already concluded that the labor share is not constant over time by representing a balance of the bargaining power between workers and capitalists. This is the reason the constancy of the labor share and of the profit share over time was considered a mirage by Keynes (1939) or a bit of a miracle by Solow (1958).

There is substantial literature that addresses the impact of changes in functional income distribution on economic growth. In the most orthodox Models in macroeconomics, functional income distribution has no impact on economic growth in the long term because this is determined by supply-side factors (Aghion and Howitt, 1997; Romer, 1986; Solow, 1956). Public policies intended to promote technical progress or make prices and wages more flexible contribute to an acceleration of the potential growth of economies and also foster job creation. Due to these assumptions, most governments all over the world have adopted so-called pro-capital policies (Lavoie and Stockhammer, 2013). Examples of pro-capital policies are the flexibilization of labor legislation, a reduction in collective bargaining and union power, and a reduction in corporate taxation.

By contrast, in macroeconomic Models developed by post-Keynesians, changes in functional income distribution can influence economic growth in the long term. Against this backdrop, the Marxian economist, Kalecki (1939) noted that since the marginal propensity to save through profits is higher, the transfer of income from capital to labor could contribute to an increase in private consumption.[68] Regarding private investment, this author stated that there are two contradictory effects. On the one hand, wages constitute a relevant increase in corporate costs, which depresses private investment. On the other hand, wages are an additional source of demand, which boosts private investment. Note that investment decisions are influenced by the level of aggregate demand rather than dependent on the level of previously existing savings (Lavoie, 2009). Since the productive capacity of corporations is not fully utilized, corporations are able to immediately increase production to meet the relevant increases in aggregate demand.[69] Thus, for a given level of output, an increase in the labor share results in a lower profit margin for corporations (the so-called profitability effect), but it is possible that the level of capacity utilization of corporations may increase (the so-called acceleration effect). Thus, in situations in which the acceleration effect is greater than the profitability effect, private investment will increase. By contrast, when the profitability effect is more intense than the acceleration effect, private investment decreases. In general terms, when an increase in the labor share leads to an increase in private consumption that more than compensates for the decrease in private investment, aggregate demand increases and, therefore, economic growth accelerates. When an increase in the labor share leads to a

[68] In fact, Pasinetti (1962) emphasizes that the differences in the marginal propensity to consume that occur across social classes (workers or capitalists) in particular do not depend on the categories of income received (wages or profits, in general terms). According to this author, this happens because capitalists are in higher income brackets and save a larger share of their income.

[69] Steindl (1952) was one of the first economists to suggest that the level of capacity utilization is an important determinant of investment decisions. Consequently, a higher level of capacity utilization will encourage corporations to increase investment in order to expand production capacity.

decrease in private investment that is not compensated for by an increase in private consumption, aggregate demand decreases and, thereat, economic growth decelerates. According to these assumptions, two economic regimes are typically defined, namely a wage-led growth regime (or a wage-led demand Model) that corresponds to the first situation and a profit-led growth regime (or a profit-led growth Model)[70] that corresponds to the second situation.

Finally, the impact of an increase in the labor share on net exports tends to be negative. This happens because a reduction in the profit margin means that some exporters cease to be economically viable or lose external competitiveness, while there is a corresponding tendency to increase imports (due to the increase in the labor share).

The adoption of pro-capital policies accelerates economic growth in a profit-led growth regime but decelerates it in a wage-led growth regime. Pro-labor policies promote more economic growth in a wage-led growth regime, but they penalize economic growth in a profit-led growth regime. This should be taken into account because the adoption of economic policy measures that are contrary to the current regime would contribute to higher economic instability.

The first generation of post-Keynesian Models was developed by Kaldor (1955) and Robinson (1956, 1962). In Kaldor's growth Model (1955), the author did not attach great importance to the level of aggregate demand in the long term, considering that the share of profits and wages in aggregate income could fluctuate.[71] Thus, a transfer of income from the labor factor to the capital one would contribute to an increase in aggregate saving (due to a higher marginal propensity to save through profits), allowing for a greater capital accumulation.[72] One of the conclusions of this Model is that a more unequal functional

[70] A profit-led growth regime tends to be more likely if the difference between the marginal propensity to consume profits and to consume wages is small, the degree of openness of the economy is high, and the elasticity of productive capacity is less than 1.

[71] Kaldor (1955) suggests that the actual growth rate and the potential growth rate would eventually equalize, and the existence of price and wage flexibility would lead to the maintenance of full employment of the factors of production.

[72] The author argues that the level of aggregate investment depends on the previous accumulated savings.

income distribution (with a rising share of profits) could enable faster growth in the early stages of economic development.[73] On the other hand, in Robinson's growth Model (1956, 1962), the investment decisions depend on the expected future profit rate of entrepreneurs.[74] One of the conclusions of this Model is that an exogenous increase in the marginal propensity to save (owing to a transfer of income from labor to capital) would cause a decline in the level of effective savings, the aggregate corporate profit level, and the aggregate demand.[75]

Later on, Rowthorn (1981), Blecker (1989) and Bhaduri and Marglin (1990) have also developed post-Keynesian Models in order to address the relationship between functional income distribution and economic growth. In Rowthorn's initial Model,[76] although the capitalist's profit margin decreased, it was assumed that an increase in the level of capacity utilization of corporations was strong enough[77] so that aggregate profits would increase (a wage-led growth regime). Bhaduri and Marglin (1990) noted that occasionally, an increase in wages might have counterproductive effects on economic activity. They assumed that the economy could be in a wage-led growth regime or a profit-led growth regime. In their Model, an increase in labor share leading to an increase in aggregate demand (and in the level of capacity utilization) was defined as a stagnationist regime. The opposite situation was defined as an exhilarationist regime. The authors also claimed that occasionally, an increase in the labor share could result in an increase in the aggregate level of profits (despite a lower profit margin) by providing considerable increases in capacity utilization. In this situation, capitalists and workers can

[73] This is similar to the theoretical predictions of the so-called "Kuznets curve", according to which there is a non-linear relationship between economic growth and inequality as a concave quadratic function, which implies that economic growth has an inverted U-shaped effect on inequality (Kuznets, 1955).

[74] In contrast to the previous model, Robinson (1956, 1962) introduced an independent investment function, in which investment decisions do not depend on the previous level of accumulated savings.

[75] This has been popularized as the "paradox of thrift" (Keynes, 1936).

[76] The author considers that the economy is characterised by oligopolistic industries that operate with a given spare productive capacity (Kalecki, 1939). There is evidence of increasing business margins in recent decades (Boar and Midrigan, 2019; De Loecker and Eeckhout, 2017).

[77] This happens when the elasticity of productive capacity is greater than 1.

cooperate as both are in an advantageous situation. On the other hand, when an increase in the labor share has a minor impact on increasing capacity utilization by corporations, the aggregate profit level decreases, and a conflicting situation arises since workers are left in a better situation, but capitalists end up in a relatively worse situation.

Empirical studies that assess the relationship between the labor share and economic growth take two general approaches. The first is the so-called structural approach, in which the functional income distribution is considered to be exogenous, and the effect of changes in the labor share on private consumption, private investment and net exports is estimated separately (Bowles and Boyer, 1995; Ederer and Stockhammer, 2007; Gordon, 1995; Naastepad, 2006; Naastepad and Storm, 2006; Onaran and Galanis, 2014; Onaran and Obst, 2016; Onaran and Stockhammer, 2005; Stockhammer and Onaran, 2004; Stockhammer et al. 2008). The second approach is the so-called aggregative approach, according to which the direct effect of changes in the labor share on aggregate demand are evaluated (Barbosa-Filho and Taylor, 2006; Kiefer and Rada, 2015; Nikiforos and Foley, 2012; Rada and Kiefer 2016; Stockhammer and Onaran, 2004; Teixeira et al. 2022).

Most of these empirical studies have concluded that larger economies or those with a higher level of development tend to be in the wage-led growth regime, albeit with several exceptions. Naastepad and Storm (2006) focused on eight OECD countries (France, Germany, Italy, Japan, Netherlands, Spain, the UK, and the US) over the period 1960 to 2000, and only Japan and the US exhibited a profit-led growth regime. According to these authors, one of the reasons for the existence of a profit-led growth regime in Japan and especially in the US is that the profitability effect is less relevant in bank-based financial systems compared to countries that have market-based financial systems. Onaran and Galanis (2014) concluded that Argentina, China, India and Mexico can be categorized within a profit-led growth Model. Onaran and Obst (2016) concluded that the majority of European economies are classified by a wage-led growth regime except for Austria, Belgium, and Ireland due to their smaller dimensions but higher degree of openness. These authors reinforced that an increase in the labor share in all European countries would produce greater positive effects, even in the countries that have profit-led growth regimes.

To best of our knowledge, this is the first study focused on Portugal that analyses the relationship between labor share growth and economic growth by performing a time series econometric analysis from 1971 to 2021 and by considering the aggregative approach.

5.3 The growth model and hypotheses

Our growth Model is inspired by the growth regressions proposed by Barro (1991), with the inclusion of a variable to assess the labor share growth in Portugal. Our growth Model takes the following form:

$$\mathrm{Y}_t = \beta_0 + \beta_1 \mathrm{LS}_t + \beta_2 \mathrm{X}_t + \mathrm{u}_t \qquad (5.1)$$

where t is the time period (years), Y is the growth rate of the real GDP per capita, LS is the labor share growth, X is a set of control variables, and u is an independent and identically distributed (white noise) disturbance term with null average and constant variance (homoscedastic).

Our control variables encompass variables that are widely (theoretical and empirically) accepted as important determinants of economic growth, namely the lagged growth rate of the real GDP per capita, the inflation rate, government expenditure growth, educational attainment growth and the growth of the degree of trade openness (Barradas, 2020, 2022; Beck et al. 2014; Breintenlechner et al. 2015; Ehigiamusoe and Lean, 2018; Cecchetti and Kharroubi, 2012; Hassan et al. 2011; Rioja and Valev, 2004a 2004b; Rousseau and Wachtel, 2011). Therefore, our growth Model takes the following form

$$\mathrm{Y}_t = \beta_0 + \beta_1 \mathrm{Y}_{t-1} + \beta_2 \mathrm{LS}_t + \beta_3 \mathrm{IR}_t + \beta_4 \mathrm{GE}_t + \beta_5 \mathrm{EA}_t + \beta_6 \mathrm{TO}_t + \mathrm{u}_t \qquad (5.2)$$

where t is the time period (years), Y is the growth rate of the real GDP per capita, LS is the labor share growth, IR is the inflation rate, GE is government expenditure growth, EA is educational attainment growth, TO is the growth of the degree of trade openness and u is an independent and identically distributed (white noise) disturbance term with null average and constant variance (homoscedastic).

Our hypotheses assume that the lagged growth rate of the real GDP per capita, the labor share growth, government expenditure growth, educational attainment growth and the growth of the degree of trade openness exert a positive impact on economic growth, while the inflation rate exerts a negative impact on economic growth. The estimated coefficients should present the following signs:

$$\beta_1>0;\ \beta_2>0;\ \beta_3<0;\ \beta_4>0;\ \beta_5>0;\ \beta_6>0 \qquad (5.3)$$

The lagged growth rate of the real GDP per capita should positively impact the economic growth according to the steady-state predictions by the neoclassical theory (Alexiou et al. 2018; Hassan et al. 2011).

As described previously, the labor share growth should exert a positive influence on economic growth following the predictions of the post-Keynesian theory about the positive effects of the labor share on the rise of aggregate demand, particularly in the case of countries that have wage-led growth regimes.

Economic growth is negatively dependent on the inflation rate two reasons. First, an increase in the inflation rate is associated with more uncertainty, which implies a decrease in saving, investment and capital accumulation with harmful effects on economic growth (Barro, 2003; Fischer, 1993). Second, an increase in the inflation rate is related to the worst institutional development and less macroeconomic stability, which also represent a constraint on economic growth (Alexiou et al. 2018; Schnabl, 2009).

Government expenditure growth is expected to exert a positive influence on economic growth, translating the theoretical predictions of the Keynesian theory on the existence of a (short-term) positive effect of public expenditures on economic growth (Alexiou and Nellis, 2013; Alexiou et al. 2018; Arestis and Sawyer, 2005; Ehigiamusoe and Lean, 2018).

Educational attainment growth is also expected to positively influence economic growth due to the positive role played by human capital on economic growth (Ehigiamusoe and Lean, 2018; Rousseau and Wachtel, 2011).

Finally, economic growth is also positively dependent on the growth of the degree of trade openness (Ehigiamusoe and Lean, 2018; Rousseau and Wachtel, 2011). These authors maintained that higher levels of trade openness are commonly associated with more competition and technological progress, which are more growth enhancing.

5.4 The dataset

Our dataset is composed of a total of 51 observations due to the use of annual data for Portugal from 1971 to 2021. This represents the period and the periodicity for which all variables are available. Proxies to assess government expenditure growth and the degree of trade openness are effectively only available from 1970 onwards, proxies for the majority of our variables are not available yet for the year 2022, and the proxy to measure educational attainment is only available on a yearly basis. All data were collected in June 2023.

Our sample covers a relatively long period, during which we observed rather anaemic economic growth and a generally decreasing trend in the evolution of the labor share (Figures 5.1 and 5.2). This seems to suggest that these two features of the Portuguese economy could be interrelated.

Table 5.1 displays the variables, proxies, units, and sources. Table 5.2 provides the descriptive statistics for each variable, Table 5.3 represents the correlation matrix between the different variables, Table 5.4 contains the traditional augmented Dickey and Fuller (ADF) (1979) unit root test for each variable, Table 5.5 shows the conventional Phillips and Perron (PP) (1998) unit root test for each variable, and Figure 5.2 illustrates the respective plots of our variables.

Note that we treat all variables as being integrated of order zero, that is, stationary in levels, which will favor the analysis of our estimated coefficients. Three reasons support this decision. First, all of our variables are defined in annual growth rates (economic growth, labor share, inflation rate, government expenditure, educational attainment, and trade openness) (Table 5.1), which seems to exclude the hypothesis that they are not stationary in levels. Second, the plots of our variables (Figure 5.1) also reinforce the assumption that they are stationary in levels. Third, the conduction of unit root tests corroborates the assumption that all of our variables are indeed stationary in levels at the traditional significance levels (Table 5.4 and Table 5.5).

We confirm that the deceleration of economic growth since the 1970s represents a stylized fact in the evolution of the Portuguese economy (Figure 5.2). Note that the

Portuguese economy has exhibited an anaemic growth of 2.0% on average since the 1970s (Table 5.2). During that time, a deceleration in the inflation rate and an acceleration in government expenditure, educational attainment, and the degree of trade openness were not enough to support a higher economic dynamism in the evolution of the Portuguese economy (Table 5.2 and Figure 5.2). These trends have occurred simultaneously with a decline in the labor share, which seems to suggest that the fall of the labor share has represented one of the primary constraints on Portuguese economic growth in the past five decades (Figures 5.1 and 5.2). The negative correlation between the labor share growth and Portuguese economic growth sustains these beliefs (Table 5.3).

Table 5.1: Variables, proxies, units and sources

Variable	**Proxy (units)**	**Source**
Economic Growth	GDP per capita growth (annual %)	World Bank
Labor Share	Adjusted labor share growth (% of GDP at current market prices, annual %)	AMECO
Inflation Rate	Inflation, consumer prices (annual %)	World Bank
Government Expenditure	Government expenditure growth (% of GDP, annual %)	IMF
Educational Attainment	Actual schooling rate growth, upper-secondary education (annual %)	PORDATA
Trade Openness	Exports and imports of goods and services growth (% of GDP, annual %)	World Bank

Data from the World Bank database could be obtained directly through https://data.worldbank.org. Data from the AMECO database could be obtained directly through AMECO online. Data from the IMF database could be obtained directly through https://data.imf.org. Data from the PORDATA database could be obtained directly through https://www.pordata.pt/

Table 5.2: The descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Economic Growth	0.020	0.023	0.112	-0.084	0.036	-0.506	4.408
Labor Share	-0.004	-0.004	0.123	-0.079	0.038	0.866	5.571
Inflation Rate	0.087	0.042	0.310	-0.008	0.086	0.900	2.657
Government Expenditure	0.026	0.005	0.477	-0.095	0.091	2.745	13.283
Educational Attainment	0.068	0.031	0.653	-0.127	0.117	2.662	13.829
Trade Openness	0.017	0.025	0.233	-0.230	0.077	-0.497	4.884

5.5 The estimation methodology

Our growth Model was estimated based on the estimation methodology popularized by Hansen (1982), that is, the GMM estimator. Three reasons supported this choice. The first was related to the estimation of a dynamic growth Model due to the use of the lagged growth rate of the real GDP per capita among our independent variables. The second was associated with the need to overwhelm the potential problem of endogeneity that could be relevant in our growth Model due to the omission of other relevant variables to explain the Portuguese economic growth and/or the existence of simultaneity among our variables.[78] The third was linked to the consistent, asymptotically normally distributed and asymptotically efficient estimates produced by the GMM estimator under suitable

[78] As theoretically and empirically demonstrated by Barradas and Lagoa (2017) and Barradas (2019), a reverse causation between the labor share and economic growth could exist. These authors have also identified that government expenditure, educational attainment, and the degree of trade openness are also important determinants of the labor share.

regularity conditions (Greene, 2003; Hansen, 1982).

To produce our estimates using the GMM estimator, we needed to define a set of instruments, that is, the so-called instrumental variables. The number of instruments should be greater than or equal to the number of independent variables, and they should be chosen to guarantee that they are exogeneous in relation to the disturbance error and strongly correlated with the independent variables (Greene, 2003; Hansen, 1982). The traditional rule of thumb is to use lags of the independent variables and validate them according to the conventional J-statistic proposed by Hansen (1982). Our growth Models were estimated using five lags for each independent variable as instruments, that is, the lags from t-2 to t-6 for the growth rate of the real GDP per capita and the lags from t-1 to t-5 for the remaining independent variables. Note that we chose a relatively small set of instruments in order to avoid an increase in estimation bias (Ravenna and Walsh, 2006) and a reduction in the power of the J-statistic arising from the introduction of too many instruments (Mavroeidis, 2005).

Our growth Model was estimated using the EViews software (version 12). We employed the Newey-West option for the weighting matrix, which is a heteroskedasticity and autocorrelation consistent estimator, as well as the Bartlett kernel option procedure for the weighting matrix. We implemented the GMM continuous updating estimator proposed by Hansen et al. (1996), according to which the weighting matrix and the coefficients' vector are estimated simultaneously. This estimator produces reliable estimates even in the case of small samples because it has better finite-sample properties and performance in terms of consistency and efficiency in the presence of weak instruments (Hahn et al. 2004; Hansen et al. 1996), particularly when compared to the traditional GMM estimator created by Hansen (1982). Finally, we also performed the Hall and Sen (1999) O-statistic in order to confirm the stability and the absence of structural breaks in our instruments and the corresponding estimates.

Table 5.3: Correlation matrix between all the variables

	EG	**LS**	**IR**	**GE**	**EA**	**TO**
EG	1.000					
LS	-0.299***	1.000				
IR	0.116	-0.225	1.000			
GE	-0.044	0.372***	0.079	1.000		
EA	-0.098	0.293**	0.262*	0.300**	1.000	
TO	0.400***	-0.456***	0.148	-0.433***	-0.344**	1.000

Note: *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level. EG is the economic growth, LS is the labor share growth, IR is the inflation rate, GE is the government expenditure growth, EA is educational attainment growth, and TO is the growth of the degree of trade openness.

Table 5.4: P-values of the ADF unit root test

Variable	**Level**			**First Difference**		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None
Economic Growth	0.000*	0.000	0.000	0.000	0.000	0.000*
Labor Share	0.001	0.008	0.000*	0.000	0.000	0.000*
Inflation Rate	0.034	0.500	0.001*	0.266	0.349	0.094*
Government Expenditure	0.000	0.000	0.000*	0.000	0.000	0.000*
Educational Attainment	0.011	0.003*	0.009	0.000	0.000	0.000*

Trade Openness	0.000	0.000	0.000*	0.000	0.306*	0.000

Note: The lag lengths were selected automatically based on the Schwarz information criteria and * indicates the exogenous variables included in the test according to the Schwarz information criteria.

Table 5.5: P-values of the PP unit root test

Variable	Level			First Difference		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None
Economic Growth	0.000*	0.001	0.000	0.000	0.000	0.000*
Labor Share	0.004	0.024	0.000*	0.000	0.000	0.000*
Inflation Rate	0.571	0.075*	0.186	0.000	0.000	0.000*
Government Expenditure	0.000	0.000	0.000*	0.000	0.000	0.000*
Educational Attainment	0.000	0.000	0.000*	0.000	0.000	0.000*
Trade Openness	0.000	0.000	0.000*	0.000	0.000	0.000*

Note: * indicates the exogenous variables included in the test according to the Schwarz information criteria

Table 5.6: Estimation results for our growth Model

Variable	Coefficient	Standard Error	T-Statistic
β_0	0.014***	0.001	9.805
$Economic\ Growth_{t-1}$	0.134***	0.045	2.968
$Labour\ Share\ _t$	0.643***	0.054	11.875
$Inflation\ Rate_t$	-0.086***	0.018	-4.744

$Government\ Expenditure_t$	-0.229***	0.035	-6.545
$Educational\ Attainment_t$	0.182***	0.017	10.425
$Trade\ Openess_t$	0.322***	0.031	10.330
Observations	45	J-statistic (P-Value)	10.330 (0.993)
R-squared	0.387	Adjusted R-squared	0.290

Note: *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

5.6 The estimation results and discussion

The estimation results for our growth Model are presented in Table 5.6. The moderately high values for R-squared and for adjusted R-squared indicate that our growth Model describes Portuguese economic growth relatively well. Our growth Model effectively explains more than 38% of the evolution (variation) in Portuguese economic growth. We can also confirm the suitability of the estimation results for our growth Model and the validation of the chosen instruments because we cannot reject the null hypothesis of the J-statistic, which implies that our set of instruments satisfies the orthogonality conditions, that is, they are exogeneous in relation to the disturbance error and strongly correlated with the independent variables (Hansen, 1982). We can also exclude the existence of structural breaks because we reject the null hypothesis of the Hall and Sen (1999) O-statistic, which implies that our estimates (and instruments) are stable over time.

At the conventional significance levels, all variables are statistically significant and have the expected signs. The only exception was the variable of government expenditure growth that exerted unexpected negative effect on Portuguese economic growth.[79] The negative relationship between government expenditure growth and Portuguese economic growth does not support the theoretical predictions of the Keynesian theory, which could

[79] The negative relationship between government expenditure growth and Portuguese economic growth does not change if we use the growth of the general government final consumption instead of the government expenditure growth.

be related to higher wages of public servants, higher inflation pressures, inefficient state-owned corporations, corruption or other phenomenon that are not growth-inducing (Alexiou et al. 2018). The negative effect could also be explained by the higher levels of taxation to sustain the rise in government expenditure during that time (Figure 5.2). Rioja and Valev (2004a, 2004b), Hassan et al. (2011), Rousseau and Wachtel (2011), Cecchetti and Kharroubi (2012), Breintenlechner et al. (2015) and Barradas (2020, 2022) also found a detrimental effect from government expenditure on economic growth, including for the specific case of Portugal. Note that Portugal was one of the European countries hit by the sovereign debt crisis in the beginning of the last decade (Barradas et al. 2018). The remaining variables had the expected effects on Portuguese economic growth. Lagged economic growth was a positive determinant of economic growth in Portugal, which corroborates the steady-state predictions of the neoclassical theory (Alexiou et al. 2018; Hassan et al 2011). Hassan et al. (2011), Breitenlechner et al. (2015), Alexiou et al. (2018) and Barradas (2020, 2022) reported similar results. The inflation rate negatively impacted Portuguese economic growth, as was also found by Rioja and Valev (2004a, 2004b), Hassan et al. (2011), Breitenlechner et al. (2015), Ehigiamusoe and Lean (2018) and Barradas (2020, 2022).[80] The positive relationship between educational attainment growth and Portuguese economic growth also supports theoretical beliefs on the positive role played by human capital (Ehigiamusoe and Lean, 2018; Rousseau and Wachtel, 2011).[81] Portuguese economic growth was positively impacted by the growth of the degree of trade openness, which is in line with the theoretical claims that the degree of trade openness is growth enhancing due to its supportive role on competition and technological progress (Ehigiamusoe and Lean, 2018; Rousseau and Wachtel, 2011). Finally, labor share growth also positively impacted Portuguese economic growth, confirming the predictions of the post-Keynesian theory of the positive effects of labor share growth on the rise of aggregate demand.[82] This confirms that the Portuguese

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[80] The negative relationship between the inflation rate and Portuguese economic growth does not change if we use the annual growth rate of the GDP deflator instead of the annual growth rate of consumer prices.

[81] Please note that this positive impact of educational attainment growth on Portuguese economic growth does not change if we use the actual schooling rate of primary education or the actual schooling rate of lower secondary education instead of the actual schooling rate of upper-secondary education.

[82] This positive effect of labor share on Portuguese economic growth does not change if we use the adjusted labor share (% of GDP at current factor cost) instead of the adjusted labor share (% of GDP at current

economy is characterised by a wage-led growth regime, which is in accordance with the findings obtained by (Onaran and Obst, 2016).

Table 5.7: Economic effects of the labor share growth on Portuguese economic growth

Period	Short-term Coefficient	Long-term Coefficient	Actual Cumulative Change	Economic Effect	Economic Growth
1971-1973	0.643	0.742	-0.009	-0.007	0.088
1974-1975	0.643	0.742	0.114	0.085	-0.041
1976-1988	0.643	0.742	-0.036	-0.027	0.029
1989-2009	0.643	0.742	0.003	0.002	0.019
2010-2016	0.643	0.742	-0.017	-0.013	0.003
2017-2021	0.643	0.742	0.021	0.016	0.012
1971-2021	0.643	0.742	-0.004	-0.003	0.020

Note: The short-term coefficient corresponds to the estimated coefficient of the labor share growth. The long-term coefficient is obtained through the ratio between the short-term coefficient and one minus the coefficient of the autoregressive estimation (estimated lagged economic growth coefficient). Thus, the long-term impact of the labor share growth on Portuguese economic growth is 0.742, which means that a rise of 1 percentage point in labor share growth contributes to an increase in economic growth by around 0.742 percentage points. The actual cumulative change corresponds to the average of the annual growth rates of the labor share during that period. The economic effect is the multiplication of the long-term coefficient by

market prices). The short-term impact of the labor share on Portuguese economic growth is 0.643, which means that a rise of 1 percentage point in labor share growth contributes to an increase in economic growth of approximately 0.643%. This is relatively higher than the findings obtained by Onaran and Obst (2016), who identified an effect of approximately 0.399% on Portuguese economic growth for each surge of 1% point in labor share growth. This is because Onaran and Obst (2016) follow the so-called structural approach, which does not allow for capturing some dynamic interactions because the effects of changes in the labor share on the individual components of the aggregate demand are estimated separately (Blecker and Setterfield, 2019).

the actual cumulative change. Economic growth refers to the average of the annual growth rates of the real GDP per capita during that period.

We also re-estimated our growth Model by using different specifications to assess the robustness of results. First, our results are quite similar if we use the growth rate of the real GDP instead of the growth rate of the real GDP per capita as a proxy of economic growth. Second, our results do not radically change in terms of statistical significance and/or signs if we exclude the years 2020 and 2021, and/or we use a dummy variable for the years 2020 and 2021 in order to take into account the deleterious effects on the Portuguese economy of the COVID-19 pandemic (Figure 5.2). This is not too surprising because we had already excluded the existence of structural breaks in our estimates in accordance with the results of the Hall and Sen (1999) O-statistic. Third, our results did not considerably change if we excluded the years from 1971 to 1975 and/or if we used a dummy variable for the year of 1975 in order to take into account the negative consequences on the Portuguese economy caused by the strong turbulence related to the Carnation Revolution that instituted democracy in the country after 48 consecutive years of a conservative dictatorship (Figures 5.1 and 5.2).

Table 5.6 presents the economic effects of labor share growth on Portuguese economic growth (McCloskey and Ziliak 1996; Ziliak and McCloskey 2004). This allows us to identify the contribution of labor share growth in explaining the trend of weaker and anaemic growth in Portugal since the 1970s. This analysis was performed only for labor share growth and not for the remaining control variables given our interest in assessing the role of labor share growth on Portuguese economic growth in the last five decades.

We observed that since the 1970s, the evolution of the Portuguese labor share can be divided into six main subperiods (Figure 5.1). The first subperiod corresponds to the years from 1971 to 1973 in which the labor share exhibited a slight decrease of around 0.9% on average per year, probably due to the acceleration in inflation that occurred on an international scale and to the negative effects caused by the Colonial War that occurred from 1961 to 1974. During that time, Portuguese economic growth was relatively strong at around 8.8% on average per year, which is explained by the rapid industrialization after Portugal joined the European Free Trade Association in 1960. Nonetheless, Portuguese economic growth would have been even higher by about 0.7% on average per year if there had not been a decline in the labor share during these years.

The second subperiod is related to the revolutionary period of 1974 and 1975. In those two years, the Portuguese labor share rose sharply due to a corresponding rise in real wages caused by the social pressures to improve the general living conditions and the adoption of left-wing oriented economic policies (Lagoa et al. 2014). Abreu (2020) enumerated several public policies that contributed to this increasing trend in the Portuguese labor share and were adopted in these years; they were the creation of the minimum wage, the introduction of 14 months of wages, the definition of wage careers (some of them with automatic progression), the implementation of extraordinary and supplementary remuneration schemes, the nationalization of the majority of corporations and the participation of workers on the boards of directors. During those two years, the increase in the labor share favored an acceleration in Portuguese economic growth of around 8.5% on average per year, which was not enough to avoid an economic recession in Portugal of around 4.1% on average per year.

The third subperiod is linked to the post-revolutionary period from 1976 to 1988 in which the Portuguese labor share steeply declined by about 3.6% on average per year, preventing a higher economic growth in Portugal during that time. Portuguese economic growth would effectively have been greater by about 2.9% on average per year if there had not been a decline in the labor share during these years. This evolution can be attributable to a drop in wages caused by the emergence of several international economic crises, the existence of strong external imbalances and the adoption of two adjustment programmes and the corresponding austerity measures imposed by the International Monetary Fund in 1977 and 1983 (Barradas et al. 2018; Lagoa et al. 2014). High levels of inflation and the adoption of wage ceilings in several years by the Portuguese government also contributed to a decline in real wages and a corresponding fall in the labor share (Abreu, 2020).

The fourth subperiod corresponds to the years from 1989 to 2009 in which the Portuguese labor share remained relatively stable, albeit denoting a slight increase of around 0.3% on average per year. This happened in a context of low levels of inflation and moderate levels of economic growth along with a positive momentum in the international economy, lower levels of oil prices, favorable exchange rate developments (with the dollar appreciating against the European currencies) and the rise in social expenditures and public investment (Barradas et al. 2018). From 1989 to 2009, the rise in the labor share contributed to an acceleration of Portuguese economic growth by around 0.2% on average per year.

The fifth subperiod occurred in the years between 2010 and 2016, and it was characterized by the negative effects caused by the subprime crisis and the sovereign debt crisis in Portugal that culminated with the adoption of a new adjustment programme and a new wave of austerity measures imposed by the International Monetary Fund, the European Commission and the ECB (the so-called “Troika”). During that time, Portuguese economic growth would have even been higher by about 1.3% on average per year if there had not been a fall in the labor share by around 1.7% on average per year.

The sixth subperiod corresponds to the years from 2017 to 2021. During these years, the labor share increased by around 2.1% on average per year, which more than compensated for the decline observed in the previous subperiod. This happened due to the coalition between the left-parties in the elections for the Portuguese parliament that occurred at the end of 2015. This coalition adopted a set of measures to restore a recuperation in purchase power, which translated to a growth in real wages. During these years, the rise of the labor share favored an acceleration in Portuguese economic growth by around 1.6% on average per year.

Considering the entire period, we noted a general decreasing trend in the labor share in Portugal and an expected detrimental effect on economic growth. The Portuguese economic growth would effectively have been even greater by about 0.3% on average per year if there had not been a drop in the labor share by around 0.4% on average per year since the 1970s.

In summary, we confirm the existence of a positive relationship between labor share growth and Portuguese economic growth, which confirms that Portugal has been following a wage-led growth regime and suggests the need to adopt public policies to promote the growth of wages in the coming years in order to avoid more decades of dismal growth and a new “secular stagnation” in Portugal.

5.7 Conclusions

This essay analyzed the relationship between labor share and economic growth by performing a time series econometric analysis focused on Portugal from 1971 to 2021. During that period, the labor share exhibited a significant decline that coincided with a trend towards weaker and anaemic growth in Portugal. This seems to suggest that the fall in labor share represented an important constraint on Portuguese economic growth that is in accordance with heterodox claims and, particularly, with post-Keynesian economics on the beneficial effects played by the growth of wages on private consumption that tends to supplant the corresponding detrimental effects on private investment and net exports.

We estimated a growth Model by using the GMM continuous updating estimator proposed by Hansen et al. (1996), according to which Portuguese economic growth depends on the labor share growth and on five control variables (the lagged growth rate of the real GDP per capita, the inflation rate, government expenditure growth, educational attainment growth, and the growth of the degree of trade openness) that are typically used in empirical works on economic growth (Barradas, 2020, 2022; Beck et al. 2014; Breintenlechner et al. 2015; Cecchetti and Kharroubi, 2012; Ehigiamusoe and Lean, 2018; Hassan et al. 2011; Rioja and Valev, 2004a, 2004b; Rousseau and Wachtel, 2011).

Our results confirm that the labor share growth, the lagged growth rate of the real GDP per capita, educational attainment growth and the growth of degree of trade openness positively impact Portuguese economic growth, while the inflation rate and government expenditure growth exert a negative effect on Portuguese economic growth. The results confirming that Portugal follows a wage-led growth regime, also suggests the need to adopt public policies to promote the growth of wages in the coming years to avoid more decades of dismal growth and a new “secular stagnation” in Portugal.

To achieve this, Portuguese policymakers should prevent (and reverse) the progressive deregulation and flexibilization of the labor market at the level of unemployment benefits, employment protection, employment rights and minimum wage. In the same vein, Portuguese policymakers should promote the recovery of the general workers’ bargaining power by stimulating more collective bargaining at the national level, at least among public servants; reinforcing the role of trade unions and unionization levels; and encouraging the creation of workers' commissions and their respective participation on the board of directors of most corporations. Portuguese policymakers should also establish public policies for the purpose of reducing the greater importance placed on profit share. Some examples could be a rise in taxation on large corporations, on wealth, and on capital gains on stock market returns and/or other financial assets.

This essay employed a time series econometric analysis that allowed a consideration of the historical, social, economic and institutional forces behind the evolution of the labor share in the last decades, as well as its harmful effects on Portuguese economic growth. This seems to suggest that our results offer a limited capacity of generalization to other countries or regions because each one has its own idiosyncrasies. In order to overcome this limitation, further research about this subject could perform a panel data econometric analysis by assessing a large sample of countries over time, which tends to produce more generalizable results and more consistent and efficient estimates. Further research should also explore in more detail the reasons for the counterintuitive obtained result, according to Keynesian economics, pertaining the negative relationship between government expenditure growth and economic growth in Portugal.

6. Conclusion

The present thesis “Essays on macroeconomics and structural change in the Eurozone” investigates the impacts of the intensification of the economic integration process since the mid-1990s on the macroeconomic development of the so-called Euro Area peripheral member-states, with particular emphasis on the period of nominal convergence that led to and followed the launch of the EMU. The thesis is composed of four essays: i) The Dutch disease of the Euro Area peripheral member-states; ii) The promised land or a mirage? The puzzling divergence of the Euro Area’s periphery; iii) What could have been? A synthetic control evaluation of the effect of the Economic and Monetary Union on the net external wealth of peripheral member-states; and iv) Falling labor share and anaemic growth in Portugal: A Post-Keynesian econometric analysis.

Throughout these essays, I have attempted to argue that the establishment of the EMU was a significant factor impacting the economic performance of the peripheral member states, namely by enabling the continued availability of contingent capital inflows in theoretically unlimited volumes. These capital inflows were crucial in explaining the deterioration in productivity growth, key changes in the sophistication of the productive structure (with an increased importance of non-tradable sectors and the specialization in tradable sectors with low productivity growth potential), and a trend of growing external debt in the peripheral member states. In this regard, I found that if the Euro Area peripheral member states had not joined the EMU, they would have been, on average, 42 percent of GDP wealthier in 2010 compared to their actual situation.

The EMU resulted in the imposition of policy constraints on the main macroeconomic policy instruments — namely the inability to implement autonomous monetary and exchange rate policies, the creation of strict rules regarding the implementation of fiscal and industrial policies, and the absence of a significant federal budget and robust fiscal stabilizers within the EMU—. These arbitrary policy constraints left the peripheral member states increasingly vulnerable to the asymmetric shocks that affected these economies, such as rising external competition from countries like China or the Eastern European countries. Consequently, the peripheral member states were forced to impose internal devaluation policies, that is, austerity measures, which had negative impacts not only in the short term (in terms of economic growth and employment), but also contributed to a lower long-term productivity growth potential due to hysteresis effects.

The establishment of the EMU contributed to the emergence of macroeconomic imbalances that disproportionately affected the peripheral member-states.

lIn terms of policy implications, this thesis argues that in order to address the imbalances identified in this thesis the architecture of the EMU should be significantly changed to better promote economic convergence and mitigate macroeconomic imbalances among member-states, namely through larger fiscal transfers from wealthier to less developed member states. Additionally, since most developed economies (namely Portugal) are in a wage-led growth regime, meaning the negative impacts on private consumption are not offset by the benefits in private investment and net exports, policymakers should implement public policies aimed at increasing wage growth to avoid prolonged economic stagnation.

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8. Appendix

8.1 Tables

Table 8.1: Summary Table with Variables Description

Variable	**Data Source**	**Definition**
Exports	AMECO.	Real growth of exports of goods and services (national currency; yearly percentage change, base = 2015).
Foreign income	World Bank.	EU-28 average growth rate subtracted by the growth rate of domestic output (national currency; yearly percentage change).
GDP	AMECO.	Real growth rate of GDP - GDP, at constant price (national currency; yearly percentage change).
Gross fixed capital formation	AMECO.	Growth rate of Gross fixed capital formation (national currency; yearly percentage change, base = 2015).
Imports	AMECO.	Growth rate of real imports of goods and services (national currency; yearly percentage change, base = 2015).
Government Expenditure	AMECO.	Growth rate of Total General Government Expenditure (national currency; yearly percentage change, base = 2015).
Labor productivity	AMECO.	Growth rate of GDP per person employed (national currency; yearly percentage change, base = 2015).
Relative prices	AMECO.	Growth rate of Export prices subtracted by the

	growth rate of Import prices (national currency; yearly percentage change, base = 2015).

Table 8.2: Variable descriptions

Full variable name	**Simplified name**	**Data Source**
Logarithm GDP per capita (PPP, current international dollars)	GDP per capita (in logarithm)	Penn World Table (Feenstra et al., 2015).
Real GDP at constant 2017 national prices (annual % change)	GDP growth	Penn World Table (Feenstra et al., 2015).
Real domestic absorption at constant 2017 national prices (annual % change)	Domestic demand growth rate	Penn World Table (Feenstra et al., 2015).
Nominal Effective Exchange Rate (relative to the 65 most important trading partners)	Nominal effective Exchange rate	Bruegel (Darvas, 2012)
Real Effective Exchange Rate (relative to the 65 most important trading partners)	Real effective Exchange rate	Bruegel (Darvas, 2012)
Private debt, loans, and debt securities (as % of GDP)	Private debt	IMF (Mbaye et al., 2018)
Trade openness (%) = exports and imports as a share of GDP	Trade openness	World Bank
Government primary balance (as % of GDP)	Government primary Balance	IMF (Mauro et al., 2015)
Public debt (as % of GDP)	Public Debt	IMF (Abbas et al., 2010)
Net International Investment Position except gold (as % of GDP)	Net International Investment Position	Lane and Milesi-Ferretti (2018)
Current account balance (as % of GDP)	Current account balance	Lane and Milesi-Ferretti (2018)

Table 8.3: Predictor means in the pre-treatment period

Variable	Peripheral member-states	Synthetic control	Average of all donor pool countries
France			
Current account balance	0.8	0.6	-0.9
Nominal effective Exchange rate	86.6	86.0	882.2
Real effective Exchange rate	98.9	98.3	96.1
Public Debt	48.9	57.9	52.8
Government primary Balance	-1.0	1.5	1.6
Private Debt	131.2	155.8	118.1
Domestic demand growth rate	1.5	2.0	3.6
Trade openness	43.9	57.7	52.1
GDP growth	1.9	2.1	3.6
GDP per capita (in logarithm)	10.3	10.5	10.0
Greece			
Current account balance	-2.8	-1.5	-0.6
Nominal effective Exchange rate	103.5	2406.1	742.9
Real effective Exchange rate	86.3	90.6	96.4

Public Debt	93.4	49.2	52.5
Government primary Balance	1.7	0.4	2.0
Private Debt	39.8	66.8	118.4
Domestic demand growth rate	2.7	3.9	3.5
Trade openness	41.2	40.6	53.4
GDP growth	2.2	4.3	3.6
GDP per capita (in logarithm)	10.0	10.1	10.0
Italy			
Current account balance	0.6	-0.5	-0.9
Nominal effective Exchange rate	93.1	87.9	882.2
Real effective Exchange rate	95.4	98.3	96.1
Public Debt	115.8	69.1	52.8
Government primary Balance	2.9	1.0	1.6
Private Debt	64.7	134.6	118.1
Domestic demand growth rate	1.2	2.4	3.6
Trade openness	40.2	42.1	52.1
GDP growth	1.5	2.5	3.6
GDP per capita (in logarithm)	10.3	10.5	10.0
Portugal			
Current account balance	-2.2	-1.3	-0.9

Nominal effective Exchange rate	96.5	134.3	882.2
Real effective Exchange rate	89.5	102.3	96.1
Public Debt	57.8	57.6	52.8
Government primary Balance	0.7	1.2	1.6
Private Debt	95.1	105.5	118.1
Domestic demand growth rate	3.9	5.8	3.6
Trade openness	59.9	56.0	52.1
GDP growth	2.8	6.0	3.6
GDP per capita (in logarithm)	9.9	9.9	10.0
Spain			
Current account balance	-1.6	-0.5	-0.9
Nominal effective Exchange rate	98.9	3259.9	882.2
Real effective Exchange rate	92.8	93.1	96.1
Public Debt	56.3	55.4	52.8
Government primary Balance	-0.3	-0.2	1.6
Private Debt	79.7	97.1	118.1
Domestic demand growth rate	2.4	3.1	3.6
Trade openness	42.3	53.4	52.1
GDP growth	2.5	3.1	3.6

GDP per capita (in logarithm)	10.0	10.0	10.0

Table 8.4: Pre MSPE of Fake Unit/ Pre MSPE of Treated Unit

Donor countries	**Synthetic France**	**Synthetic Greece**	**Synthetic Italy**	**Synthetic Portugal**	**Synthetic Spain**
Treated	1.0	1.0	1.0	1.0	1.0
Australia	1.6	0.4	13.2	0.7	6.3
Canada	3.4	1.4	26.0	1.5	15.7
Chile	25.4	5.8	150.2	8.4	91.0
Colombia	2.8	0.7	16.4	1.0	9.9
Costa Rica	124.4	32.7	737.8	43.9	445.8
Denmark	2.5	0.5	12.7	0.3	6.8
Israel	42.7	9.5	251.5	14.2	165.6
Korea	9.8	2.7	55.6	1.4	29.6
Japan	1.6	1.0	3.5	0.1	4.1
Mexico	15.3	2.6	61.5	3.4	60.2
New Zealand	87.3	23.0	516.9	28.8	372.0
Norway	5.4	2.8	48.8	2.7	29.6
Sweden	3.8	0.9	33.0	1.4	11.3
Switzerland	529.5	141.5	3137.2	174.9	1896.9
Turkey	3.8	1.7	21.9	1.2	7.0
United Kingdom	4.8	2.2	32.3	1.6	17.5

United States	0.6	0.1	3.0	0.2	2.0
P-value	0.100*	0.077*	0.333	0.077*	0.333