

REM WORKING PAPER SERIES

**THE PROMISED LAND OR A MIRAGE? THE
PUZZLING DIVERGENCE OF THE EUROPEAN
UNION'S PERIPHERY**

João Alcobia

REM Working Paper 0273-2023

May 2023

REM – Research in Economics and Mathematics

Rua Miguel Lúpi 20,
1249-078 Lisboa,
Portugal

ISSN 2184-108X

Any opinions expressed are those of the authors and not those of REM. Short, up to two paragraphs can be cited provided that full credit is given to the authors.





REM – Research in Economics and Mathematics

Rua Miguel Lupi, 20
1249-078 LISBOA
Portugal

Telephone: +351 - 213 925 912

E-mail: rem@iseg.ulisboa.pt

<https://rem.rc.iseg.ulisboa.pt/>



<https://twitter.com/ResearchRem>

<https://www.linkedin.com/company/researchrem/>

<https://www.facebook.com/researchrem/>

THE PROMISED LAND OR A MIRAGE? THE PUZZLING DIVERGENCE OF THE EUROPEAN UNION'S PERIPHERY

João Alcobia[†]

May 2023

Abstract

Using a Balance-of-Payments Constrained Growth model and a Convergence Quadrants Diagram this paper finds evidence of economic divergence of most European Union (EU) peripheral member states and the EU average between 1996 and 2019. In only two cases – Spain and Cyprus – do we find a trend of economic convergence, but which was of an unsustainable nature since it was accompanied by growing external imbalances. Further, using a productivity convergence/divergence model this paper again finds evidence of productivity divergence between peripheral member states and the EU average between 1996 and 2019, though it finds evidence of productivity convergence between 1996 and 2008.

In the 2009-2019 period, productivity divergence was driven by a more pronounced reduction in the income elasticity of exports than in the income elasticity of imports and by a reduction in the importance of economies of scale.

JEL: C22, C23, E12, F15 and F45.

Keywords: Balance-of-Payments Constrained Growth, Convergence Quadrants Diagram, productivity convergence/divergence model, peripheral member states, economies of scale.

[†] ISEG, Universidade de Lisboa, Rua do Quelhas, n.º 6, 1200-791, Lisboa, Portugal, e-mail: l40859@aln.iseg.ulisboa.pt.

REM - Research in Economics and Mathematics, Rua Miguel Lupi, n.º 20, 1249-078, Lisboa, Portugal.

Acknowledgments: The author thanks Ana Figueiras, Diogo Martins, Eduardo Fortes, Ricardo Barradas, and Ricardo Cabral for helpful comments and suggestions. The author also gratefully acknowledges financial support from Fundação para a Ciência e Tecnologia under the doctoral grant number UI/BD/150768/2020. The usual disclaimer applies.

1. INTRODUCTION

The European Union (EU) – Germany's liberal empire in the words of Wolfgang Streeck (2019) – is a peaceful 66-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 member states could aspire to achieve the standards of living of the most advanced EU member state economies.

If successful on the second proposition, i.e., 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 (i.e., political and executive 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).¹ 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.

This paper focuses on the second proposition. The research question it investigates is whether the EU indeed promotes the more rapid economic and labour productivity growth of the nation-states 'distant' to the centers of power and of economic policy making. In other words, do the EU economic policies contribute to the economic and labour productivity convergence of the less economically developed and least internationally competitive peripheral member states 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).

¹ 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".

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 member states.

In the last decades, European countries have established a set of policies to increase economic integration, including labor and capital market liberalization, limitation of national industrial policies, and the establishment of the Economic and Monetary Union (EMU).

It is unclear whether these policies have had positive effects in most countries.² 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, Ginzburg, and Nocella, 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

² The marked divergence in real GDP growth between the peripheral economies and the EU average – see Figure 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.

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, i.e., the EU's core member states.³ Since these technologically-advanced sectors exhibit significant increasing returns to scale (Verdoorn, 1949) the concentration of these industries in the EU'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.⁴

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 paper focuses on the economic performance of the so-called EU peripheral member states⁵, analyzing the economic convergence of these countries compared to the EU

³ 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 crisis.

⁴ 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.

⁵ Hereinafter, peripheral Euro Area member states refer to Cyprus, France, Greece, Spain, Italy, Portugal following the literature (Gräbner et al., 2020).

weighted average, from 1996 to 2019.

The analysis of this period seems pertinent since it 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 EU (Caldentey and Ali 2011, 2007).

This research contributes to the literature as follows. To the best of our knowledge, this paper 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 paper is structured as follows: Section 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 Caldentey and Ali (2011, 2007). Section 3 presents the database used and an economic analysis of the Euro Area peripheral member states. Section 4 introduces the estimated empirical results. Section 5 summarizes the previous results and presents the conclusions of the paper.

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.

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.⁶ 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 analysing the possibility of β -convergence and σ -convergence among economies (Barro and Sala-i-Martin, 1991).⁷

Some studies demonstrate the existence of economic convergence processes within the EU (e.g., Borsi and Metiu, 2015; Bolea, Duarte, and Chóliz, 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) studied the possibility of absolute β -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 development stage following the collapse of the Soviet Union in 1991, and not as a consequence of economic convergence of the EU peripheral member states, which experienced growing economic divergence relative to that of the EU core member states and of the EU average.

The economic convergence process experienced for Eastern EU countries can be justified by the accession of these countries to the European Union since 2004. This fact allowed the integration of these economies into the value chains of the productive

⁶ 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.

⁷ 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.

structure of the EU's core economies (Gräbner and Hafele, 2020; Simonazzi, Ginzburg, and Nocella 2013; Celi et al., 2018)

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, 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, Romer, and Weil, 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.

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 scale⁸, Kaldorian inspired theories of economic growth initially developed by Myrdal (1957), among others, are based on the

⁸ The notable exception is the New Growth Theory (Romer, 1986; Aghion et al., 1998).

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.⁹

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, i.e., 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).¹⁰ There is extensive empirical support for Verdoorn's law hypothesis (Storm and Naastepad, 2012, 2017). The 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.

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).

⁹ Increased economic integration between countries accentuates these divergence-inducing effects (Krugman, 1991; Aglietta, 2012).

¹⁰ 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.

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).¹¹

In the simple version of Thirlwall's law, it is considered that there are no external capital flows, and for that reason, the balance of goods and services must remain balanced. Equation (1) specifies the balance of payments constraint without capital flows:

$$P_{d,t}X_t = E_tP_{f,t}M_t \quad (1)$$

By applying a logarithmic to both sides of the equation and deriving it, we obtain equation (2) specified in terms of growth rates:

$$p_{d,t} + x_t = e_t + p_{f,t} + m_t \quad (2)$$

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:

$$x_t = \eta_t (e_t - p_{d,t} - p_{f,t}) + \varepsilon_t z_t \quad \eta_t > 0, \varepsilon_t > 0 \quad (3)$$

$$m_t = \theta_t (e_t + p_{f,t} - p_{d,t}) + \pi_t y_t \quad \theta_t < 0, \pi_t > 0 \quad (4)$$

where η_t and θ_t represent the price elasticity of exports and imports, ε_t and

¹¹ The achievement of an external equilibrium may not allow for the fulfillment of the internal equilibrium, i.e. the level of aggregate demand lower than the level of potential output (Swan, 1956).

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) and (4) into (2), we obtain:

$$y_{BP,t} = \frac{(\eta_t + \theta_t - 1)(e_t + p_f - p_{d,t}) + \varepsilon_t z_t}{\pi_t} \quad (5)$$

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 household income, which must be reduced, mainly through an increase in unemployment, with negative 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, Cerqueira and Antunes, 2013; Carvalho and Lima, 2009).¹² 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).^{13, 14}

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), expression (5) becomes:

$$y_{BP,t} = \frac{\varepsilon_t z_t}{\pi_t} \quad (6) \quad \text{or} \quad y_{BP,t} = \frac{x_t}{\pi_t} \quad (7)$$

In Thirlwall's law, the ratio of elasticities of income to exports and of income to imports

¹² Bahmani et al (2013) empirically demonstrated that the Marshall-Lerner condition tends not to hold.

¹³ 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.

¹⁴ This situation is defined as the Kaldor Paradox (Kaldor 1978).

(hereinafter, for simplification, the ratio of elasticities) , i.e., $\frac{\varepsilon_t}{\pi_t}$, 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, Cerqueira and Antunes 2013; Soukiazis and Antunes, 2011), Spain (Alonso, 1999; Léon-Ledesma, 1999), Italy (Soukiazis, Cerqueira and Antunes 2014; Bagnai, 2016), Greece (Soukiazis, Antunes and Kostakis 2018), Cyprus (Pattichis 2004) and France (Charles, Dallery and Marie 2022).

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, i.e., 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, Caldentey and Ali (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 Caldentey and Ali's (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 can be described by the following expression:

$$GAP_t = \ln\left(\frac{P_{l,t}}{P_{f,t}}\right) \quad (8)$$

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

$$g_t = p_{l,t} - p_{f,t} \quad (9)$$

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

$$p_{l,t} = q_{l,t} + \lambda_{l,t} z_{l,t} \quad (10)$$

$$p_{f,t} = q_{f,t} + \lambda_{f,t} y_{f,t} \quad (11)$$

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 (i.e. $\lambda_{l,t} > \lambda_{f,t}$).

Thus, by substituting expression (5) into (11) and substituting expressions (11) and (10)

into expression (9), we can construct the productivity convergence model:¹⁵

$$g_t = (q_{l,t} - q_{f,t}) + z_t (\lambda_{l,t} - \lambda_{f,t} \frac{\varepsilon_t}{\pi_t}) \quad (12)$$

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 ($z_t \lambda_{l,t}$).¹⁶ For this reason, the leader country's output growth rate contributes to an 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 ($\lambda_{f,t}$).¹⁷

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 (i.e. $\lambda_{l,t} > \lambda_{f,t}$), 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).

¹⁵ Since these are constants without economic meaning, we will consider that $q_{l,t}$ and $q_{f,t} = 0$.

¹⁶ Also referred to as the Kaldor effect.

¹⁷ Also referred to as the Thirlwall effect.

3. DATABASE AND ANALYSIS OF PERIPHERAL MEMBER STATES

The empirical analysis developed here will test Thirlwall's law for the so-called Euro Area (and EU) peripheral member states. Additionally, it will estimate the coefficients of Ali and Caldentey's model (2007, 2011) to analyze the possibility of convergence against the GDP growth of the EU-28 (hereinafter, simply EU average) in two periods: between 1996 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 break in the long term trends of economic growth in the EU average and, particularly, in the Euro Area peripheral member states (see Figure 1). The test of economic convergence for the peripheral member states against the EU average seems appropriate since, the peripheral member states economies – here identified as Cyprus, France, Greece, Italy, Portugal and Spain, following other literature (Grabner 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.

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).

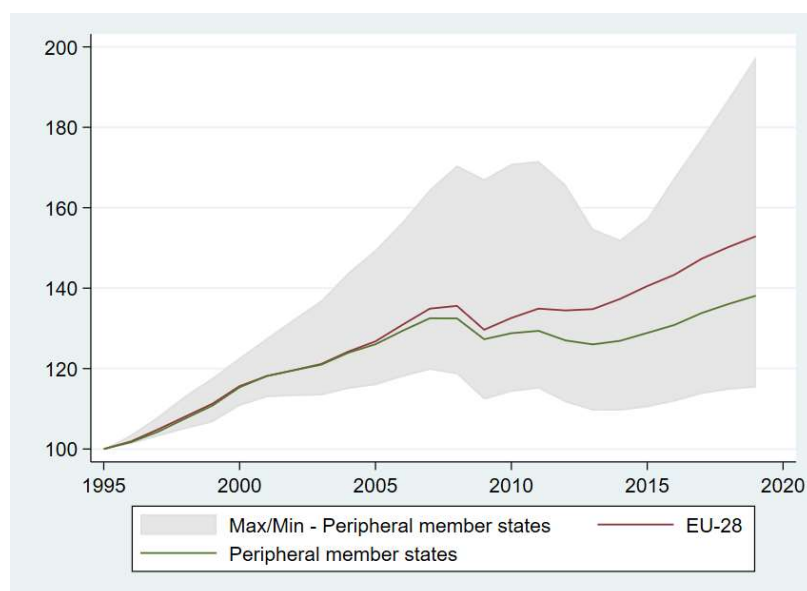
The data covers 1996-2019, and the primary source is AMECO, the European Commission's main macroeconomic database. Additionally, World Bank data have also been used. A summary table with the description of the variables can be found in the Appendix (Table 1).

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 against the EU average 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 external accounts.

Figure 1: Real GDP growth of the EU average and of the Peripheral member states, weighted average (1995 = 100)



Source: World Bank. author calculations.

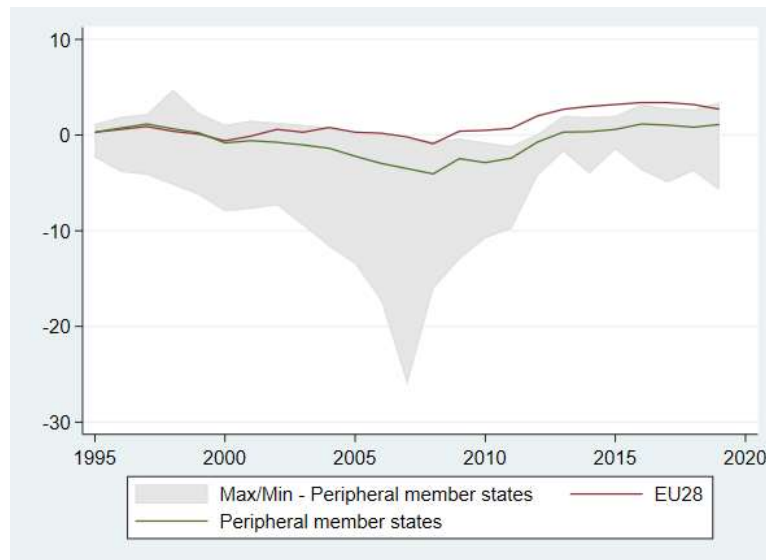
Figure 1 and Figure 2 compare the output growth and the current account balance of the peripheral member states with the EU average between 1996 and 2019. Figure 1 suggests that between 1996 and 2005, the peripheral economies' real GDP did not converge to the EU average, but at least it did not diverge, with both groups of economies presenting roughly identical growth rates.¹⁸ 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 divergence is beyond the scope of this article.¹⁹

¹⁸ 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, Kool, and Muysken, 2012; Botta, 2014).

¹⁹ 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-

Figure 2 presents current account data in percentage of GDP for the peripheral member states and the EU average for the same period. It finds that especially 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 1996-2008 period, the acceleration of economic growth in these countries ceased to be associated with an increase in current account deficits.

Figure 2: Current account balance in percentage of GDP, EU average versus peripheral member states (weighted averages²⁰)



Data: AMECO; author' calculations.

3.1 ESTIMATION OF THIRLWALL LAW FOR THE PERIPHERAL MEMBER STATES

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

Pereira, 2015).

²⁰ To calculate the respective weighted averages, real variables were used.

$$x_t = \alpha + \eta_t r p_t + \varepsilon_t z_t + \rho_t \quad (13)$$

$$m_t = \varphi + \theta_t r p_t + \pi_t y_t + \Omega_t \quad (14)$$

Thus, the growth of real exports will depend on the relative growth of foreign income z_t (EU-28 GDP²¹ growth rate subtracted by the GDP of the individual peripheral member state) and the growth rate of relative prices $r p_t$, 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 y_t and also the relative price growth $r p_t$. It is expected that $\theta_t > 0$ and that $\pi_t > 0$.

Table 1 – Estimations of the export function (equation 13)

	CYPRUS	FRANCE	GREECE	ITALY	PORTUGAL	SPAIN
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
η_t	0.0535 (0.750)	-0.697** (0.324)	-1.158** (0.475)	-0.753*** (0.241)	0.100 (0.269)	-0.143 (0.271)
ε_t	1.514*** (0.295)	2.013*** (0.283)	4.430*** (0.571)	2.468*** (0.344)	2.129*** (0.345)	2.425*** (0.275)
<i>Constant</i>	1.046 (0.815)	0.313 (0.568)	-1.871 (1.099)	-2.377** (0.936)	0.884 (0.915)	0.435 (0.589)
Observations	24	24	24	24	24	24
R-squared	0.329	0.717	0.797	0.816	0.636	0.701

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

In the case of the export function, relative prices and foreign income are assumed to be exogenous. Therefore, it was estimated through Ordinary Least Squares (OLS) robust of autocorrelation and heteroscedasticity.²² The results of the regression estimations for the

²¹ 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.

²² We use the “vce(robust)” option from Stata software.

peripheral member states can be viewed in Table 1. It is confirmed that foreign income is the most relevant explanatory variable of export growth, being significant at 1% in all regressions. That is, this estimate suggests that higher EU average real GDP growth results in a higher rate of growth of real exports of the peripheral member states.

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, Dallery, and Marie, 2022).

Therefore, we tested for endogeneity²³ to check if we can consider the variable y_t as exogenous. In cases that exhibit endogeneity, we used the Two-Stage Least Squares (2SLS) estimator in order to obtain consistent estimators.²⁴ In these cases we will consider as instrumental variables the growth rate of the GDP deflator, growth rate of real gross fixed capital formation, and the growth rate of private consumption.²⁵

In situations where the endogeneity hypothesis is rejected, we will again use the OLS estimator. The results are shown in Table 2.

Note that only in Cyprus and Spain, the variable y_t is endogenous. In these cases, we also performed Sargan's test²⁶ (Sargan, 1988), in which it was shown that the chosen instrumental variables were valid. Lastly, the fact that the Cragg-Donald F-statistic²⁷ is statistically significant at 1% suggests that the instrumental variables are not weak (Stock and Yogo, 2005).

Our analysis finds that domestic demand is the most relevant explanatory variable of import demand, which is also statistically significant at the 1% level in all specifications of our model. Price elasticity of imports is not statistically significant in any our model specifications. Only in the case of Greece does the Marshall-Lerner condition hold.

²³ We use the “estat endogenous” test from Stata software.

²⁴ We use the “ivregress 2sls” command from Stata software.

²⁵ In this paper we did not use lagged endogenous variables as instruments since it results in nonsensical coefficients estimates, statistical significance, and robustness. The chosen approach is quite common in the literature (e.g., Soukiazis and Antunes 2011; Dallery and Marie 2022; Leško and Muchová, 2020; León-Ledesma 1999).

²⁶ We use the “estat overid” test from Stata software.

²⁷ We use the “estat firststage” test from Stata software.

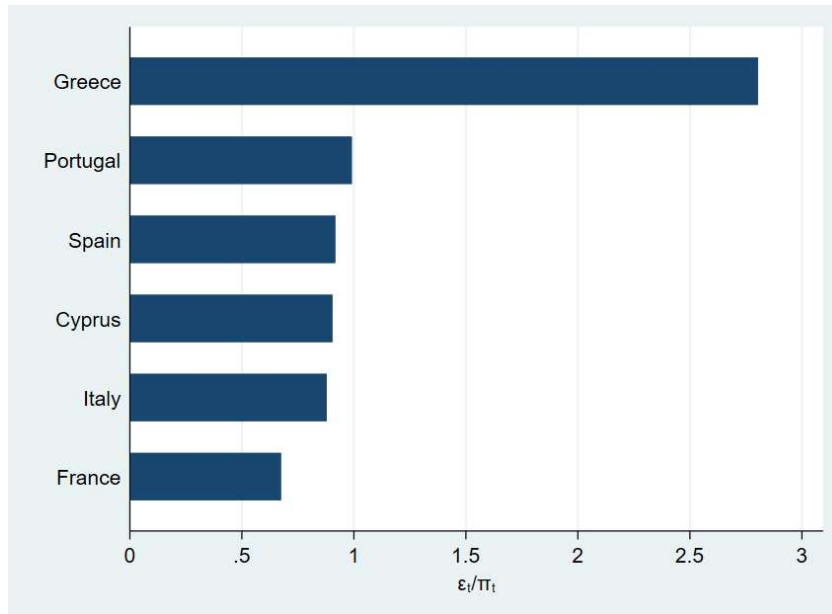
Table 2 – Estimations of the import function (equation 14)

	CYPRUS	FRANCE	GREECE	ITALY	PORTUGAL	SPAIN
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
π_t	1.668*** (0.469)	2.977*** (0.370)	1.579*** (0.328)	2.811*** (0.275)	2.147*** (0.260)	2.650*** (0.376)
θ_t	-0.151 (0.829)	-0.00790 (0.341)	-0.143 (0.727)	-0.0777 (0.273)	0.417 (0.389)	-0.537 (0.446)
Constant	-0.896 (2.102)	-0.464 (0.748)	2.989* (1.468)	1.045* (0.520)	0.945 (0.797)	-1.267 (1.232)
Observations	24	24	24	24	24	24
R-squared	0.277	0.799	0.503	0.798	0.747	0.723
Endogeneity test	$\chi^2=5.249$ (0.0220)	$\chi^2= 1.572$ (0.2099)	$\chi^2= 0.083$ (0.7734)	$\chi^2 = 0.186$ (0.6661)	$\chi^2 = 0.682$ (0.4091)	$\chi^2 = 4.143$ (0.0418)
Sargan test	$\chi^2= 0.849$ (0.6541)	-	-	-	-	$\chi^2 = 2.965$ (0.2270)
Weak instruments:	$F_{(3,19)} = 34.981$ (0.0000)	-	-	-	-	$F_{(3,19)} = 142.669$ (0.0000)

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

As we have concluded through expression (6), the possibility of economic convergence is affected by the ratio of elasticities in the different economies. Figure 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: Ratio of elasticities of the peripheral member states



Source: Author calculations based on econometric results from Tables 1 and 2.

Carrying out algebraic transformations, expression (6) becomes:

$$\frac{y_{BP,t}}{z_t} = \frac{\varepsilon_t}{\pi_t} \quad (15)$$

According to expression (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 ($\varepsilon_t > \pi_t$).²⁸

One of the most relevant models for assessing the possibility of economic convergence is the Convergence Quadrant Diagram developed by Cimoli, Porcile, and Rovira (2010).²⁹ According to the authors, the countries can be in the following four situations: sustainable convergence, unsustainable convergence, sustainable divergence, and unsustainable 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

²⁸ Known as the 45-degree rule (Krugman, 1989).

²⁹ Leško and Muchová (2020) also performed the convergence quadrants study for the Central and Eastern Europe Region.

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 ($\frac{\varepsilon_t}{\pi_t} < \frac{y_t}{Z_t} < 1$).

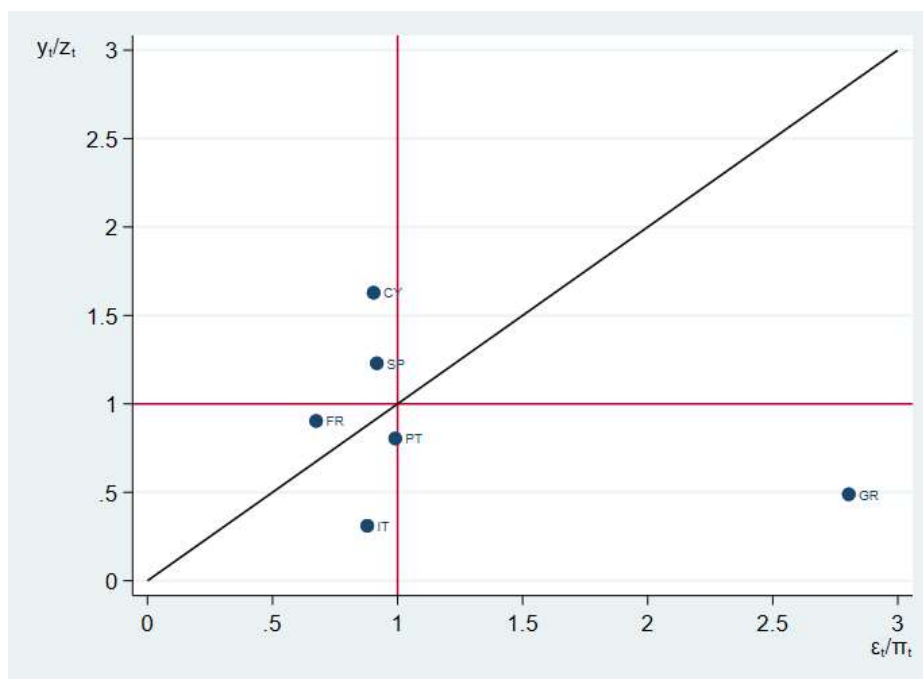
In Figure 4 is analyzed the relationship between the ratio of elasticities (y-axis) compared to the ratio between the domestic and EU average growth rates (x-axis). When the y-axis is greater than 1, we find economic convergence relative to the EU average, and when the x-axis is greater than 1, the ratio of elasticities is favorable.

The ratio of elasticities that are derived from our econometric results (see Tables 1 and 2) suggest that between 1996 and 2019 only Cyprus and Spain present a tendency of economic convergence to the EU average. Since the ratio of elasticities was unfavorable also for these two member states, it eventually revealed an unsustainable convergence regime, with the accumulation of external imbalances.

In opposition, France was in unsustainable divergence, and Portugal and Greece were in sustainable divergence scenarios during the entire period of 1996 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.³⁰

³⁰ 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).

Figure 4: Economic convergence quadrants diagram for peripheral member states relative to the EU, 1996-2019



Source: Author calculations based on econometric results from Tables 1 and 2.

3.2 BALANCE OF PAYMENT 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 1996-2019 period.

Table 3 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 7 displays the difference between the growth rate calculated using Thirlwall's law and the actual growth rate, and finally, column 8 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 and Cyprus 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 (8).

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, these 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.³¹

The Thirlwall equation estimated according to equation (7) is better at predicting the current growth rate since the average forecast error is lower³² (0.38) compared to expression (6) where the average forecast error is 0.62.

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 (Gouvêa and Lima, 2010; Araujo and Lima, 2007).³³

³¹ 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, Antunes, and Kostakis, 2018; Soukiazis, Cerqueira, and Antunes, 2013).

³² Difference between $y_{bp,t}$ and y_t .

³³ Several analyses find evidence that economic sectors with greater technology intensity tend to have higher income elasticities of exports (Jayme, Romero, and Silveira, 2011; da Silva Catela and Porcile, 2012; Cimoli, Porcile, and Rovira, 2014; Romero and McCombie, 2016).

Table 3 – Balance of payments equilibrium growth rates for peripheral member states, 1996-2019

	y_t	x_t	ε	π	$y_{bp,t}^* = \frac{x}{\pi}$	$y_{bp,t}^{**} = \frac{\varepsilon Z}{\pi}$	$y_{bp,t} - y_t$	nx_t
COUNTRY	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cyprus	2.93	3.77	1.51	1.67		1.62	-1.31	-6.46
					2.26		-0.67	
France	1.65	4.01	2.01	2.98		1.21	-0.44	0.28
					1.34		-0.31	
Greece	0.89	5.74	4.43	1.58		5.08	4.19	-7.20
					3.63		2.74	
Italy	0.61	2.46	2.47	2.81		1.73	1.12	0.28
					0.88		0.27	
Portugal	1.45	4.75	2.13	2.15		0.82	-0.63	-5.72
					2.21		0.76	
Spain	2.18	4.43	2.43	2.65		1.06	-1.12	-2.40
					1.67		-0.51	

Average error ($y_{bp,t}^* - y_t$) = 0.62; Average error ($y_{bp,t}^{**} - y_t$) = 0.38.

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 Breusch and Pagan Lagrangian multiplier test and Hausman (1978) test³⁴ to decide whether to use the Pooled Ordinary Least Squares, the Fixed-Effects (FE), or the Random-Effects (RE) model specifications. In this way we will check whether the effects are individual, fixed, or random. Again, all estimates are corrected for autocorrelation and heteroscedasticity.³⁵ The results of the regressions estimations for the Export Function for peripheral member states can be seen in Table 4.

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

³⁴ We will implement the commands "xttest0" and "hausman" from Stata software.

³⁵ We use the "vce(robust)" option from Stata software.

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 4 – Estimations of the export function for peripheral member states

	1996-2008	2009-2019	1996-2019
VARIABLES	(1)	(2)	(3)
η_t	-0.222 (0.166)	-0.385 (0.196)	-0.418* (0.169)
ε_t	4.070*** (1.024)	2.437*** (0.262)	2.469*** (0.404)
Constant	-4.828** (1.999)	0.332 (0.299)	-0.212 (0.738)
Observations	72	72	144
Number of countries	6	6	6
R-squared	0.3245	0.7363	0.548
LM test	$\chi^2= 9.08$	$\chi^2= 4.71$	$\chi^2= 0.00$
P-value	[0.0013]	[0.0150]	[1.0000]
Hausman test	$\chi^2 =2.28$	$\chi^2 =6.69$	$\chi^2 =10.62$
P-value	[0.3192]	[0.0353]	[0.0049]

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

In terms of the import demand function, we will again perform the endogeneity test³⁶ to examine whether we can consider the variable y_t exogenous.

Since the endogeneity hypothesis is not rejected in any of the specifications, we used Two-Stage Least Squares (2SLS) estimator to obtain consistent estimators.^{37, 38} The results can be seen in Table 5.

³⁶ We use the “endog” option from Stata software.

³⁷ We will use the same instrumental variables.

³⁸ We use the “xtivreg2” command from Stata software.

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 5 – Estimations of the import function for peripheral member states

	1996-2008	2009-2019	1996-2019
VARIABLES	(1)	(2)	(3)
π_t	2.828*** (0.336)	2.085*** (0.193)	1.953*** (0.151)
θ_t	-0.163 (0.249)	-0.245 (0.231)	-0.248 (0.206)
Constant	-2.155** (1.006)	1.268*** (0.038)	1.953*** (0.151)
Observations	72	72	72
Number of countries	6	6	6
R-squared	0.182	0.591	0.544
LM test	$\chi^2 = 7.39$	$\chi^2 = 0.00$	$\chi^2 = 0.00$
P-value	[0.0033]	[1.0000]	[1.0000]
Hausman test	$\chi^2 = 5.07$	$\chi^2 = 8.90$	$\chi^2 = 15,26$
P-value	[0.0792]	[0.0117]	[0.0005]
Endogeneity test	$\chi^2 = 8.906$	$\chi^2 = 8.047$	$\chi^2 = 9.426$
P-value	[0.0028]	[0.0046]	[0.0021]
Weak instruments	31.444	143.175	305.305
P-value	[0.0000]	[0.0000]	[0.0000]
Sargan- test	$\chi^2 = 1.672$	$\chi^2 = 3.620$	$\chi^2 = 5.224$
P-value	[0.4335]	[0.1636]	[0.0734]

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

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

As expected, the Verdoorn coefficient is much smaller in the peripheral member states, and these differences have widened in the 2009-2019 period.

Table 6 – Estimations of the labour productivity function for peripheral member states and EU average

VARIABLES	PERIPHERAL MEMBER STATES				EU AVERAGE	
	1996-2008	2009-2019	1996-2019	1996-2008	2009-2019	1996-2019
	(1)	(2)	(3)	(4)	(5)	(6)
λ_t	0.512*** (0.091)	0.253*** (0.054)	0.385*** (0.0397)	0.676*** (0.035)	0.538*** (0.026)	0.606*** (0.0198)
Constant	-0.273 (0.471)	-0.041 (0.151)	0.0203 (0.128)	0.179 (0.269)	0.099 (0.178)	0.222*** (0.0831)
Observations	72	72	144	336	336	672
Number of countries	6	6	6	28	28	28
R-squared	0.3150	0.2525	0.399	0.5272	0.5752	0.592
LM test	$\chi^2 = 53.27$	$\chi^2 = 10.54$	$\chi^2 = 0.01$	$\chi^2 = 240.72$	$\chi^2 = 63.12$	$\chi^2 = 330.11$
P-value	[0.0013]	[0.0006]	[0.4547]	[0.0000]	[0.0000]	[0.0000]
Hausman test	$\chi^2 = 0.04$	$\chi^2 = 7.19$	$\chi^2 = 0.01$	$\chi^2 = 2.19$	$\chi^2 = 0.63$	$\chi^2 = 4.76$
P-value	[0.3192]	[0.0073]	[0.9063]	[0.1390]	[0.4255]	[0.0292]

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

Table 7 presents data about the structural characteristics of the peripheral member states for the occurrence of convergence of the productivity of labour with the EU average. While between 1996 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 paper finds evidence of productivity divergence between the two groups of countries. Finally, for the entire period between 1996 and 2019, the paper results suggest that the productivity growth of the peripheral member states diverged from the EU average.

In the 2009-2019 period, for the occurrence of productivity convergence it would be necessary that the income elasticity of exports, $\epsilon_t > 4.434$ (higher than the estimated value of 2.437), that the income elasticity of imports, $\pi_t < 1.146$ (lower than the estimated value

of 2.085), that the Verdoorn coefficient had been $\lambda_{f,t} > 0.460$ (higher than the estimated value of 0.253), or finally some combination of the different parameters used in the model.

Table 7 – Parameters thresholds required for convergence in productivity according to productivity convergence/divergence model

	1996-2008	2009-2019	1996-2019
VARIABLES	(1)	(2)	(3)
<i>Econometric estimates of Verdoorn coefficients</i>			
$\lambda_{l,t}$	0.676***	0.538***	0.606***
$\lambda_{f,t}$	0.512***	0.253***	0.385***
<i>Econometric estimates of income elasticities of exports and imports</i>			
ε_t	4.070***	2.437***	2.469***
π_t	2.828***	2.085***	1.953***
<i>Elasticities thresholds for productivity convergence, according to the productivity convergence/divergence model</i>			
Minimum ε_t for convergence	3.734	4.434	3.074
Maximum π_t for convergence	3.083	1.146	1.569
Minimum $\lambda_{f,t}$ for convergence	0.470	0.460	0.479
<i>Productivity convergence/divergence model</i>			
Productivity convergence	No	Yes	Yes
g_t	-0.235	0.365	0.238

Source: Author calculations based on econometric results from Tables 4, 5 and 6.

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

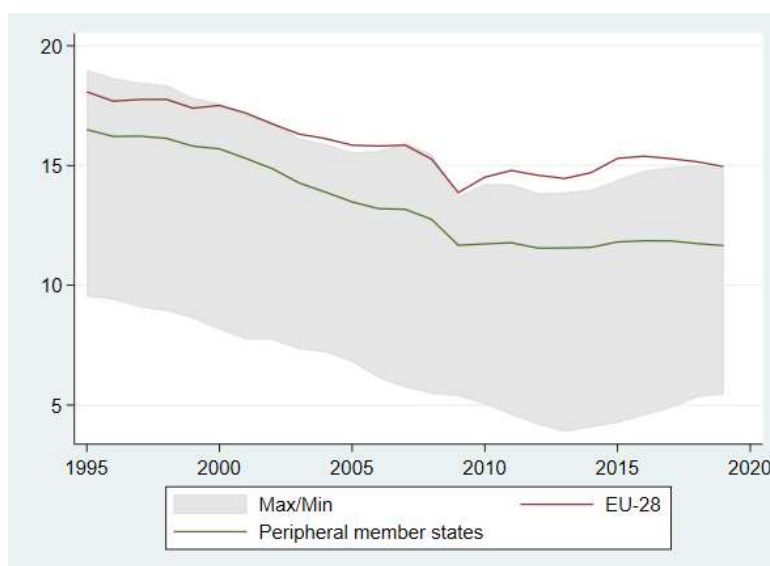
First, the fiscal austerity from the euro crisis was focused on this group of countries and may have contributed to the widening of the technology gap in these particular countries (Botta, Tippet, and Onaran, 2018). The increased unemployment has negatively impacted human capital, and the decline in 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 5 we observe that the de-industrialization trend in this group of countries was much more pronounced than in the EU average.

Figure 5: Industry share in percentage of GVA in the EU average and in the peripheral member states (weighted averages)



Source: Author calculations based on AMECO and World Bank data.

This poor performance of the industrial sector of the peripheral economies may negatively impact the intensity of the increasing returns to scale.³⁹ This happens because the industrial sector presents special characteristics, namely the possibilities of returns of scale, not only static, but also dynamic, i.e. 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

³⁹ 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).

reasons, the transfer of resources to the industrial sector constitutes a structural change conducive to economic growth and technological convergence (Tregenna, 2009).

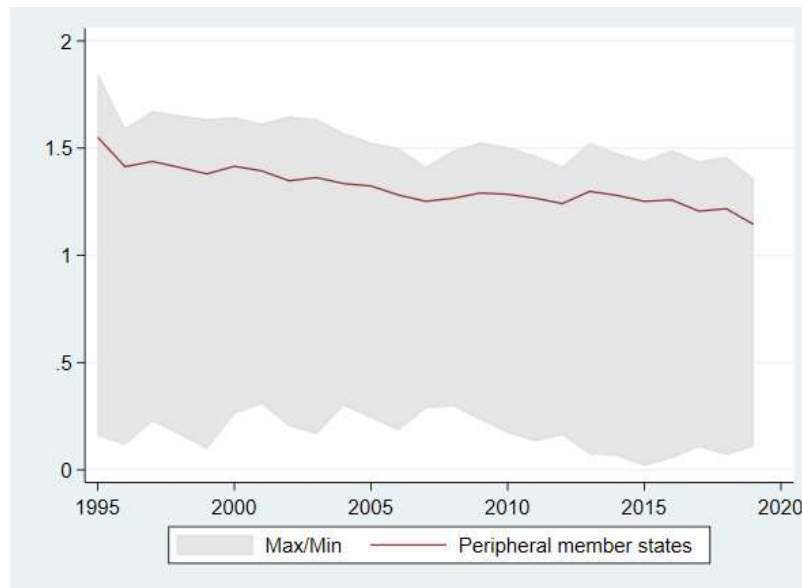
In addition, there are several reasons to assume that the technological sophistication of goods produced by the peripheral member states decreased significantly during this period. An important indicator that can be used as a proxy for non-price competitiveness is the Economic Complexity Index (ECI).⁴⁰ Finally, Figure 6 displays the deterioration of this indicator in this group of countries.⁴¹

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.

⁴⁰ This indicator was developed by Hidalgo and Hausmann (2009) and is relatively widely used in the literature (Gala, Rocha, and Magacho, 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.

⁴¹ The literature proposes several possible explanations for the observed trend (Alcobia and Cabral 2023; Gräbner and Hafele, 2020, Gräbner et al., 2020).

Figure 6: Peripheral member states Economic Complexity Index (weighted averages)



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

5. CONCLUSIONS

The paper analyzed the convergence/divergence process of the EU peripheral member states – Cyprus, France, Greece, Italy, Portugal, Spain – in the period from 1996 to 2019. During this period, there were significant events of macroeconomic nature, namely the launch of Euro Area, the Global Financial Crisis of 2007-2009, and the euro crisis of 2010-2012.

In this paper, 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 paper 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 for 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 EU average. We find that the effect of increasing returns to scale is weakest in the peripheral member states.

This paper finds that in the pre-2009 period, i.e., between 1996 and 2008, while there was no economic convergence trend between the peripheral member states and the EU-28 average, at least the peripheral economies were not diverging from the EU-28 average. After 2008, i.e., between 2009 and 2019, the peripheral member states diverged from the EU average, both in terms of economic growth and labour 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 1996 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 EU average. 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 paper, the finding of economic and productivity divergence of the peripheral member states is troubling as it suggests the EU is systematically failing to attain one of its key economic policy purposes

and is in fact attaining an opposite result. This result is surprising as the periphery is generously defined to include some key member states – in particular, France and Italy – close to the EU power centers and three member states – France, Italy, and Spain – with veto power on economic policy making.

The implication seems also clear. If EU policies fail to revert the current economic divergence trends found in this paper 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.

REFERENCES

- Acemoglu, D., and Robinson, J. A. 2017. *The economic impact of colonialism*. The Long Economic and Political Shadow of History Volume I. A Global View, 81.
- Aghion, P., Howitt, P., Howitt, P. W., Brant-Collett, M., and García-Peñalosa, C. 1998. *Endogenous growth theory*. Cambridge, MA: MIT press.
- Aglietta, M. 2012. *Zone euro: Éclatement ou Fédération*. Paris: Michalon
- Alcobia, J., and Cabral, R. 2023. “The Dutch Disease of the Euro Area Peripheral Member States”. *REM Working Paper*, 1-35. <https://doi.org/10.2139/ssrn.4344332>
- Alesina, A. and R. J. Barro R. 2002. Currency unions. *The Quarterly Journal of Economics* 117 (2): 409–436. <https://doi.org/10.1162/003355302753650283>
- Ali, A., and Pérez Caldentey, E. 2007. “La Ventaja Comparativa como Falacia y una Regla para la Convergência”. *Revista de la cepal*: 129-141. <https://doi.org/10.18356/aeabe814-es>
- Ali, A., and Pérez Caldentey, E. 2011. “Growth and Convergence/Divergence in Productivity under Balance-of-payments Constraint”. *Investigación económica* 70 (275): 15-38.
- Alonso, J. A. 1999. “Growth and the External Constraint: Lessons from the Spanish Case”. *Applied Economics* 31 (2): 245-253. <https://doi.org/10.1080/000368499324471>
- Amable, B. 1993. “Catch-up and Convergence: A Model of Cumulative Growth”. *International Review of Applied Economics* 7 (1): 1-25. <https://doi.org/10.1080/758528250>

Ameco (European Commission, accessed March 13, 2023).
https://economyfinance.ec.europa.eu/economic-research-and-databases/economic-databases/ameco-database_en

Araujo, R. A., and Lima, G. T. 2007. "A Structural Economic Dynamics Approach to Balance-of-payments-constrained Growth". *Cambridge Journal of Economics* 31 (5): 755-774. <https://doi.org/10.1093/cje/bem006>

Atesoglu, H. S. 1993. "Balance-of-payments-constrained Growth: Evidence from the United States". *Journal of Post Keynesian Economics* 15 (4): 507-514. <https://doi.org/10.1080/01603477.1993.11489957>

Atesoglu, H. S. 1994. "Balance of Payments Determined Growth in Germany". *Applied Economics Letters* 1 (6): 89-91. <https://doi.org/10.1080/135048594358122>

Bagnai, A. 2016. "Italy's Decline and the Balance-of-payments Constraint: A Multicountry Analysis". *International Review of Applied Economics* 30 (1): 1-26. doi: <https://doi.org/10.1080/02692171.2015.1065226>

Bahmani, M., Harvey, H., and Hegerty, S. W. 2013. "Empirical Tests of the Marshall-Lerner Condition: A Literature Review". *Journal of Economic Studies* 40 (3): 411-443. <https://doi.org/10.1108/01443581311283989>

Ban, C., and D. Adascalitei. 2020. "The FDI-led Growth Regimes of the East-Central and the South-East European Periphery." *CBDS Working Paper 2*: 1-45

Balassa, B. 1967 "Trade Creation and Trade Diversion in the European Common Market". *The Economic Journal* 77: 1-21. <https://doi.org/10.2307/2229344>

Barro, R. J., Sala-i-Martin, X., Blanchard, O. J., and Hall, R. E. 1991. "Convergence across States and Regions". *Brookings Papers on Economic Activity* 22 (1): 107-182, <https://doi.org/10.2307/2534639>

Becker, G. S. 1962. "Investment in Human Capital: A Theoretical Analysis". *Journal of Political Economy* 70 (5): 9-49. <https://doi.org/10.1086/258724>

Becker, J., Cetkovic, P., Weissenbacher, R., Cozzi, G., Newman, S., and Toporowski, J. 2016. "Financialization, Dependent Export Industrialization, and Deindustrialization in Eastern Europe". *Finance and Industrial Policy: Beyond Financial Regulation in Europe*: 41-64.

Bergh, A., Fink, G. 2018. "The French curse? On the puzzling economic consequences of French Colonization". *IFN Working paper No 1234*, Stockholm, Sweden. 17 p.

Bierut, B. K., and K. Kuziemska-Pawlak. 2017. "Competitiveness and Export Performance of CEE Countries." *Eastern European Economics* 55 (6): 522-542. <https://doi.org/10.1080/00128775.2017.1382378>

Bolea, L., Duarte, R., and Chóliz, J. S. 2018. "From Convergence to Divergence? Some New Insights Into the Evolution of the European Union." *Structural Change and Economic Dynamics* 47: 82-95. <https://doi.org/10.1016/j.strueco.2018.07.006>.

Borsi, M. T., and Metiu, N. 2015. "The Evolution of Economic Convergence in the European Union". *Empirical Economics* 48: 657-681. <https://doi.org/10.1007/s00181-014-0801-2>

Botta, A. 2014. "Structural Asymmetries at the Roots of the Eurozone Crisis: What's New for Industrial Policy in the EU?". *PSL Quarterly Review* 67 (269): 169-216. <https://dx.doi.org/10.2139/ssrn.2420168>

Botta, A., B. Tippet, and Ö. Onaran. 2018. "Divergence Between the Core and the Periphery and Secular Stagnation in the Eurozone." *Greenwich Papers in Political Economy* 20405: 1-23.

Bresser-Pereira, L. C., and Rossi, P. 2015. "Sovereignty, the Exchange Rate, Collective Deceit, and the Euro Crisis." *Journal of Post Keynesian Economics* 38 (3): 355-375.: <http://doi.org/10.1080/01603477.2015.1087807>

Britto, G., Romero, J. P., Freitas, E., and Coelho, C. 2019. "The Great Divide: Economic Complexity and Development Paths in Brazil and the Republic of Korea". *Cepal Review* 127: 191-213.

Buendía, L. 2020. "A perfect Storm in a Sunny Economy: A Political Economy Approach to the Crisis in Spain". *Socio-Economic Review* 18 (2): 419-438. <http://doi.org/10.1093/ser/mwy021>

Cárdenas, L., Villanueva, P., Álvarez, I., and Uxó, J. 2020. "Peripheral Europe Beyond the Troika: Assessing the 'Success' of Structural Reforms in Driving the Spanish Recovery." *Review of Keynesian Economics* 8 (4): 560-588. <http://doi.org/10.4337/roke.2020.04.06>

Carvalho, V. R. D. S., and Lima, G. T. 2009. “Estrutura Produtiva, Restrição Externa e Crescimento Econômico: A Experiência Brasileira”. *Economia e Sociedade* 18: 31-60.

Celi, G., A. Ginzburg, D. Guarascio, and A. Simonazzi. 2018. *Crisis in the European Monetary Union*. London: Routledge.

Charles, S., Dallery, T., and Marie, J. 2022. “The slowing of Growth in France: An Interpretation Based on Thirlwall’s law”. *Journal of Post Keynesian Economics* 45 (1): 100-129. <https://doi.org/10.1080/01603477.2020.1794903>

Cimoli, M., Porcile, G., and Rovira, S. (2010). “Structural Change and the BOP-Constraint: Why Did Latin America Fail to Converge?”. *Cambridge Journal of Economics* 34 (2): 389-411. <https://doi.org/10.1093/cje/ben060>

Cimoli, M., and Porcile, G. 2014. “Technology, Structural Change and BOP-constrained Growth: A Structuralist Toolbox.” *Cambridge Journal of Economics* 38 (1): 215-237. <https://doi.org/10.1093/cje/bet020>

Cooray A. 2009. “Does colonialism exert a long term economic impact on adult literacy?” *Working Paper No. 176*: Queen Elizabeth House, University of Oxford, Oxford, U.K.

Da Silva Catela, E. Y., and Porcile, G. 2012. “Keynesian and Schumpeterian Efficiency in a BOP-constrained Growth Model.” *Journal of Post Keynesian Economics* 34 (4): 777-802. <https://doi.org/10.2753/PKE0160-3477340408>

Dixon, R., and Thirlwall, A. P. 1975. “A Model of Regional Growth-rate Differences on Kaldorian lines”. *Oxford Economic Papers* 27 (2): 201-214. <https://doi.org/10.1093/oxfordjournals.oep.a041312>

European Commission 1987. *Single European Act, Treaties establishing European Communities*, Office for Official Publications of the European Communities, Luxembourg.

Ehmer, P. 2014. “The Impact of Diverging Economic Structure on Current Account Imbalances in the Euro Area” *Discussion Papers No. 27/2014*.

Ertan, A. S. Putterman, L. G. and Fiszbein, M.2012. “Determinants and Economic Consequences of Colonization: A Global Analysis” *SSRN Electronic Journal*. <http://dx.doi.org/10.2139/ssrn.2129786>

- Espiñosa, A. G. 2022. "Las Relaciones Centro-periferia en la Unión Europea Después de la Covid". *El Trimestre Económico* 89 (356): 1067-1102. <https://doi.org/10.20430/ete.v89i356.1591>
- Fagerberg, J., and Verspagen, B. 2002. "Technology-gaps, Innovation-diffusion and Transformation: An Evolutionary Interpretation". *Research policy* 31: 1291-1304. [https://doi.org/10.1016/S0048-7333\(02\)00064-1](https://doi.org/10.1016/S0048-7333(02)00064-1)
- Felipe, J., and Kumar, U. 2014. "Unit Labor Costs in the Eurozone: The Competitiveness Debate Again. *Review of Keynesian Economics* 2 (4): 490-507. <https://doi.org/10.4337/roke.2014.04.07>
- Flassbeck, H., and K. Lapabitsas. 2013. "The Systemic Crisis of the Euro-true Causes and Effective Therapies". In *Studien*. Berlin: Rosa-Luxemburg-Stiftung: (May 2013).
- Gala, P., Rocha, I., and Magacho, G. 2018. "The Structuralist Revenge: Economic Complexity as an Important Dimension to Evaluate Growth and Development." *Brazilian Journal of Political Economy* 38: 219-236. <https://doi.org/10.1590/0101-31572018v38n02a01>
- Gouvêa, R. R., and Lima, G. T. 2010. "Structural Change, Balance-of-payments Constraint, and Economic Growth: Evidence from the Multisectoral Thirlwall's law". *Journal of Post Keynesian Economics* 33 (1): 169-204. <https://doi.org/10.1590/0101-31572017v37n04a13>
- Gräbner, C., Heimberger, P., Kapeller, J., and Schütz, B. 2020. "Is the Eurozone Disintegrating? Macroeconomic Divergence, Structural Polarisation, Trade and Fragility." *Cambridge Journal of Economics* 44 (3): 647-669. <https://doi.org/10.1093/cje/bez059>
- Grabner C. and Hafele J. 2020 "The Emergence of Core-Periphery Structures in the European Union: A Complexity Perspective." *ZOE Discussion Papers* 6: 1–19.
- Greene, W. H. 2003. *Econometric Analysis*. 5 th Edition. Prentice-Hall: New York University.
- Harrod, R. 1933. *International Economics*. Cambridge University Press, Cambridge.
- Hartmann, D., Zagato, L., Gala, P., and Pinheiro, F. L. 2021. "Why did some Countries Catch-up, while others got Stuck in the Middle? Stages of Productive Sophistication and

Smart Industrial Policies.” *Structural Change and Economic Dynamics* 58: 1-13.
<https://doi.org/10.1016/j.strueco.2021.04.007>

Hausman, J. A. 1978. “Specification tests in econometrics.” *Econometrica* 46: 1251-1271.
<https://doi.org/10.2307/1913827>

Hein, E., Truger, A., and Treeck, T. V. 2012. *The European Financial and economic crisis: Alternative solutions from a (Post-) Keynesian perspective*. In *The Euro Crisis* (pp. 35-78). Palgrave MacMillan, London.

Hidalgo, C. A., and R. Hausmann. 2009. "The Building Blocks of Economic Complexity." *Proceedings of the National Academy of Sciences* 106 (26): 10570-10575.
<https://doi.org/10.1073/pnas.0900943106>

Holinski, N., Kool, C., and Muysken, J. 2012. “Persistent Macroeconomic Imbalances in the Euro Area: Causes and Consequences.” *Federal Reserve Bank of St. Louis Review* 94 (1): 1-20.

Jayme Jr, F. G., Romero, J. P., and Silveira, F. 2011. “Brazil: Structural Change and Balance-of-payments-constrained Growth”. *Cepal Review* (105): 173–195.
<https://doi.org/10.18356/e69bceca-en>

Kaldor, N. 1966. *Causes of the Slow Rate of Economic Growth in the UK*. Cambridge: Cambridge University Press.

Kaldor, N. 1970. “The Case for Regional Policies.” *Scottish Journal of Political Economy* 17 (3): 337-348. <https://doi.org/10.1111/j.1467-9485.1970.tb00712.x>

Kaldor, N. 1978. “The Effect of Devaluation on Trade in Manufacturers”. *Future Essays in Applied Economics*: 99–116. <https://doi.org/10.1016/b978-0-08-023768-8.50353-4>.

Krugman, P. 1989. “Differences in Income Elasticities and Trends in Real Exchange Rates.” *European Economic Review* 33 (5): 1031-1046. [https://doi.org/10.1016/0014-2921\(89\)90013-5](https://doi.org/10.1016/0014-2921(89)90013-5)

Krugman, P. 1991. “Increasing Returns and Economic Geography”. *Journal of Political Economy* 99 (3): 483-499. <http://doi.org/10.1086/261763>

Lall, S. 2000. “The technological structure and performance of developing country manufactured exports, 1985–1998”. *Oxford Development Studies* 28 (3): 337–69. <http://doi.org/10.1080/713688318>

Léon-Ledesma, M. A. 1999. “An application of Thirlwall’s law to the Spanish economy.” *Journal of Post Keynesian Economics*, 21(3): 431-439. <https://doi.org/10.1080/01603477.1999.11490206>

León-Ledesma, M. A. 2002. “Accumulation, Innovation and Catching-up: An Extended Cumulative Growth Model”. *Cambridge Journal of Economics* 26 (2): 201-216. <http://doi.org/10.1093/cje/26.2.201>

Leško, P., and Muchová, E. 2020. “Balance-of-Payments-Constrained Approach: Convergence Sustainability in the Region of Central and Eastern Europe.” *Emerging Markets Finance and Trade*, 56 (2): 472-483. <https://doi.org/10.1080/1540496X.2018.1543584>

Mankiw, N. G., Romer, D., and Weil, D. N. 1992. “A Contribution to the Empirics of Economic growth.” *The Quarterly Journal of Economics* 107 (2): 407-437. <https://doi.org/10.2307/2118477>

Martins, D., and Mamede, R. P. 2022. Alternative Views on Portuguese Stagnation: From the Euro’s Inception to the COVID-19 Pandemic. *International Journal of Political Economy* 51 (1): 49-64. <https://doi.org/10.1080/08911916.2022.2046345>

McCombie, J. S. L., and Thirlwall, A. P. 1994. *The balance-of-payments constraint as an explanation of international growth rate differences*. In *Economic Growth and the Balance-of-Payments Constraint*. Palgrave Macmillan: London. 232-261.

Myrdal, G. .1957. *Economic theory and under-developed regions*, London, Duckworth.

Musto, S. 1986. “European Economic Development—with Particular Reference to the European Periphery”. In: *World Futures: The Journal of New Paradigm Research* 22: 31–83. <https://doi.org/10.1080/02604027.1986.9972026>

Observatory of Economic Complexity (accessed march 13, 2023). <https://oec.world/>

Obstfeld, M., and Rogoff, K. 1996. *Foundations of international macroeconomics*. MIT press.

Pattichis, C. 2004. "Economic Growth and the Balance of Payments Constraint: Implications for Cyprus's Prospective EMU Membership". *The International Trade Journal* 18 (2): 85-100. <https://doi.org/10.1080/08853900490449160>

Rivera-Batiz, L. A., and Romer, P. M. 1991. "Economic integration and endogenous growth". *The Quarterly Journal of Economics*, 106(2): 531-555. <https://doi.org/10.2307/2937946>

Romer, P. M. 1986. "Increasing returns and long-run growth." *Journal of political economy* 94 (5): 1002-1037. <https://doi.org/10.1086/261420>

Romero, J. P., and McCombie, J. S. 2016. "The Multi-Sectoral Thirlwall's law: Evidence from 14 Developed European Countries using Product-level Data". *International Review of Applied Economics* 30 (3): 301-325. <https://doi.org/10.1080/02692171.2015.1102207>

Sargan J. 1988 *Testing for misspecification after estimation using instrumental variables*. In: Maasoumi E (ed) *Contributions to econometrics: John Denis Sargan*, vol 1. Cambridge University Press: Cambridge

Simonazzi, A., Ginzburg, A., and Nocella, G. 2013. "Economic Relations Between Germany and Southern Europe." *Cambridge Journal of Economics* 37(3): 653-675. <https://doi.org/10.1093/cje/bet010>

Solow, R.M. 1957. "Technical Change and the Aggregate Production Function." *The Review of Economics and Statistics* 39 (3): 312–320. <https://doi.org/10.2307/1926047>

Soukiazis, E., and Castro, V. 2005. "How the Maastricht Criteria and the Stability and Growth Pact Affected Real Convergence in the European Union: A Panel Data Analysis." *Journal of Policy Modeling* 27 (3): 385-399. <https://doi.org/10.1016/j.jpolmod.2005.01.002>

Soukiazis, E., Antunes, M., and Kostakis, I. 2018. "The Greek Economy Under the Twin-deficit Pressure: A Demand Orientated Growth Approach." *International Review of Applied Economics* 32 (2): 215-236. <https://doi.org/10.1080/02692171.2017.1338678>

Soukiazis, E., and Antunes, M. 2011. "Application of the Balance-of-payments-constrained Growth Model to Portugal, 1965-2008". *Journal of Post Keynesian Economics* 34 (2): 353-380.

Soukiazis, E. and Cerqueira, P.A. 2012. *Models of Balance of Payments Constrained Growth: History, Theory and Empirical Evidence*. Basingstoke: Palgrave MacMillan.

Soukiazis, E., Cerqueira, P. A., and Antunes, M. 2013. “Growth Rates Constrained by Internal and External Imbalances and the Role of Relative Prices: Empirical Evidence from Portugal.” *Journal of Post Keynesian Economics* 36 (2): 275-298.

Soukiazis, E., Cerqueira, P. A., and Antunes, M. 2014. “Explaining Italy's Economic Growth: A Balance-of-payments Approach with Internal and External Imbalances and Non-neutral Relative Prices”. *Economic Modelling* 40: 334-341.
<https://doi.org/10.1016/j.econmod.2014.04.014>

Stock, J. H., and Yogo M. 2005. *Testing for Weak Instruments in Linear IV Regression.*” *In Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* edited by Donald W. K. Andrews and James H. Stock. Cambridge University Press.

Storm, S., and Naastepad, C. M. 2012. *Macroeconomics beyond the NAIRU*. *In Macroeconomics Beyond the NAIRU*. Cambridge, MA: Harvard University Press.

Storm, S., and Naastepad, C. W. 2015. “Europe’s Hunger Games: Income Distribution, Cost Competitiveness and Crisis.” *Cambridge Journal of Economics* 39 (3): 959-986.
<https://doi.org/10.1093/cje/beu037>

Storm, S., and Naastepad, C. W. M. 2017. “Bhaduri–Marglin meet Kaldor–Marx: Wages, Productivity and Investment”. *Review of Keynesian Economics* 5 (1): 4-24.
<https://doi.org/10.4337/roke.2017.01.02>

Streeck, W. 2019. “The European Union is a liberal empire, and it is about to fall”. *LSE Blog*, March 6. (accessed May 9, 2023) <https://blogs.lse.ac.uk/brexit/2019/03/06/long-readthe-european-union-is-a-liberal-empire-and-it-is-about-to-fall/>

Tregenna, F. 2009. “Characterising Deindustrialisation: An Analysis of Changes in Manufacturing Employment and Output Internationally”. *Cambridge Journal of Economics* 33 (3): 433–66. <https://doi.org/10.1093/cje/ben032>

Verdoorn, J. P. 1949. On the factors determining the growth of labor productivity. *Italian economic papers* 2: 59-68.

Verspagen, B. 1991. "A new Empirical Approach to Catching up or Falling Behind." *Structural Change and Economic Dynamics* 2 (2): 359-380. [https://doi:10.1016/S0954-349X\(05\)80008-6](https://doi:10.1016/S0954-349X(05)80008-6)

Swan, T. 1956. "Economic growth and capital accumulation". *Economic Record* 32 (2): 334–361. <https://doi:10.1111/j.1475-4932.1956.tb00434.x>.

Thirlwall, A. P. 1979. “The Balance of Payments Constraint as an Explanation of International Growth Rate Differences.” *BNL Quarterly Review* 32 (128): 45-53.

Thirlwall, A. 2011. “The Balance of Payments Constraint as an Explanation of International Growth Rate Differences.” *PSL Quarterly Review* 64 (259): 429-438.

World Bank (accessed March 13 2023). <https://data.worldbank.org/>

Young, A. 1928. “Increasing Returns and Economic Progress”. *The Economic Journal* 38 (152): 527–42.

APPENDIX:

Table 8. 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).
Private	AMECO.	Growth rate of Private Final Consumption Expenditure

consumption		(national currency; yearly percentage change, base = 2015).
Labour productivity	AMECO.	Growth rate of Gross Domestic Product 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).