The café economy: Structural transformation in Greece in the wake of austerity and "reforms"*

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Abstract

This paper investigates the structural transformation of the Greek economy over the past fifteen years, focusing on the increasing dominance of the Accommodation and Food Service Activities (AFSA) sector in the aftermath of austerity and structural reforms. Despite promises of productivity gains through labor market and product market reforms, the Greek economy has experienced a sharp decline in labor productivity and a significant reallocation of employment towards low-productivity sectors, especially AFSA, reminiscent of a Lewis-type dual sector economy. Using a simple Panel-VAR model we find that declining aggregate demand and real wages were key drivers of this productivity collapse. Our findings support theories of technological change that emphasize output growth and the cost of labor as fundamental determinants of productivity growth.

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1. Introduction

An impressive and distinctive feature of the Greek urban and semi-urban landscape is the sheer number of cafés. From major cities to small towns, and from quiet residential neighborhoods to bustling tourist areas, coffee shops are ubiquitous. Greece always had many cafés—as the result the important role coffee plays in the Greek culture—but it was not until the period during and after the Greek crisis which started in late 2009, that their number exploded.

This "café economy" is the most visible part of a wider transformation of the Greek economy over the same period towards "Accommodation and Food Service Activities," (henceforth AFSA) as it is the official name of the sector according to the European nomenclature, which also includes restaurants, bars, hotels and other, tourism-related activities. As we document in detail in section 4, using data from Eurostat's Industry Accounts, the post-2009 period saw a sharp increase in the share of this sector in value added and especially in employment.

This structural transformation is problematic because AFSA is a low productivity sector. In Greece its productivity was one of the lowest among the different sectors of the economy before the crisis, but has also decreased by around 40% since 2009, allowing the sector to absorb so much employment. At the same time wages decreased even more, by close to 60%, implying a redistribution of income against wage earners.

In turn, these developments are a central part of a wider decrease in productivity of the Greek economy over the last fifteen years. This decrease is an underappreciated aspect of the Greek crisis. Several studies have focused on the depth of the crisis and the very slow recovery that followed, but it is rarely discussed that productivity also decreased a lot during the crisis and despite the recovery of the last decade it has remained stagnant. As of 2024 labor productivity in Greece was 16% below its 2009 level—lower compared to its level at the depth of the crisis in 2015.

According to standard productivity-change decomposition techniques (presented in section 5), we calculate that around one third of this decrease is related to AFSA, an impressive figure for only one sector. The rest is accounted for by decreases in the productivity of the remaining sectors of the economy. Following Eurostat's classification of economic activities, as of 2023, sixteen out of the twenty "level-one" sectors of the Greek economy saw a decrease in their productivity levels relative to 2009—in fourteen the decrease was deeper than 10%. Finally, almost every sector saw large decreases in real wages. At the aggregate level, the 16% drop in productivity was accompanied by a 26% drop in the real wage if measured by the GDP deflator, or a 35% if measured with the CPI; also implying a redistribution of income against wage earners at the aggregate level.

Overall, as we argue in section 6, the trajectory of the Greek economy during the last fifteen years appears to reflect elements of a dualized growth model, where demand and growth is mainly generated in low-productivity sectors—especially the AFSA. These sectors also absorb excess labor through endogenously declining productivity and wages.

The reallocation of economic activity and employment toward the low-productivity "café economy," alongside a broader decline in productivity, stands in stark contrast to the stated objectives of the three economic adjustment programs implemented in Greece between 2010 and 2018—summarized in the next section. These programs were built on two central pillars: first, aggressive fiscal consolidation aimed at reducing the fiscal deficit and public debt; and second, an ambitious agenda of structural reforms—including labor and product market deregulation, privatizations, and tax system overhauls—designed to improve resource allocation, boost competitiveness, and support long-term productivity growth.

According to the macroeconomic forecasts underpinning these programs, austerity measures were expected to have only a modest short-term impact on economic activity, along the lines of the "expansionary austerity" theory (e.g., Alesina and Ardagna 2010), while structural reforms would rapidly trigger a strong recovery in output and growth. This optimistic view of structural reforms was grounded in a substantial body of theoretical and empirical literature (discussed in detail in section 3); it is difficult to identify any major reform advocated in this literature that was not implemented in Greece.

While it is now widely acknowledged that the initial forecasts underestimated the impact of the adjustment programs on output and employment (e.g., Blanchard and Leigh 2014), there has been comparatively little discussion about their long-run effects on the structure of the Greek economy and its productivity. Yet, the gap between optimistic projections—anticipating a more efficient allocation of resources and stronger productivity growth through structural reforms—and the reality of a "café economy" marked by a productivity collapse and stagnation is equally, if not more, striking.

It is also important to note that the structural transformation of the Greek economy toward the AFSA sector—particularly its part related to tourism—is accompanied by a range of challenges that extend beyond productivity concerns.[1] In recent years, the phenomenon of over-tourism has become increasingly pronounced, raising serious concerns about its adverse effects on the environment and local culture. Moreover, the widespread use of short-term rental platforms has significantly exacerbated housing affordability issues in many regions, making rents prohibitively expensive for local residents.

At the same time, the AFSA sector—especially tourism—remains of considerable macroeconomic importance. This is not only due to its substantial share of employment but also because of its critical role in improving Greece's current account balance. Addressing external imbalances has long been a central objective of economic policy in Greece, particularly in the aftermath of the crisis triggered by the sizeable "twin" fiscal and current account deficits. According to data from the Bank of Greece, the trade surplus in travel services improved by five percentage points between 2009 and 2023. This increase accounts for approximately half of the overall reduction in the current account deficit during the same period—an outsized contribution from a single sector.

[1] It is important to clarify that AFSA and tourism are not synonymous. Certain economic activities fall under AFSA without being part of tourism, and vice versa. Unfortunately, Greece has yet to establish comprehensive tourism satellite accounts, making it challenging to accurately determine tourism's exact contribution within the AFSA sector. Nevertheless, it is reasonable to assert that tourism-related activities represent the dominant share of AFSA.

Thus, as is explained in section 7, the structural transformation of the Greek economy over the past fifteen years has created a core dilemma. On the one hand, the economy has become increasingly dependent on AFSA and tourism as key sources of aggregate demand, employment, and foreign income. On the other hand, these sectors are characterized by low productivity and are associated with broader challenges such as environmental degradation, cultural erosion, and rising living costs.

Finally, the Greek experience is also an interesting case study on technological change. Contrary to theories that associate technical change with labor and product market liberalization—which, at least in Greece, have not yielded the expected productivity gains—two alternative theoretical frameworks appear more suitable for explaining the decline in labor productivity. First, drawing on an approach that dates back to Adam Smith and has been further developed by P.J. Verdoorn (1949), Nicholas Kaldor (1966) and Gunnar Myrdal (1957), among others (as reviewed in section 8), labor productivity growth is seen as a consequence of output growth. Second, the literature on induced technical change, also discussed in section 8, posits that productivity growth depends on the cost of labor: when labor is expensive, firms are incentivized to innovate and adopt labor-saving technologies; when labor is cheap, there is less pressure to do so.

In section 9, we test these theories using sectoral data for Greece over the period 1995–2024 within a Panel Vector Autoregression (Panel-VAR) framework. Our findings indicate that both demand shocks and real wage shocks have significant effects on labor productivity growth. From this perspective, the decline in labor productivity in Greece becomes more comprehensible: it reflects the contraction in output driven by austerity measures, as well as the collapse in real wages resulting from soaring unemployment and the deregulation of labor markets.

Greece is thus an interesting case study of how a blind horizontal application of structural reforms—without sufficient attention to institutional context, implementation capacity, and sectoral dynamics—can lead to counterproductive outcomes. We should stress, of course, that this does not imply all reforms, whether part of the adjustment programs or not, are inherently detrimental.

2. The Greek crisis and the Economic Adjustment Programs

The crisis started in the autumn of 2009, when after the elections on 4 October the newly elected government announced that the 2009 government deficit would exceed ten percent as opposed to 3.7 percent that the previous government was forecasting. These revelations led to a strong reaction of financial markets—already sensitive by the global financial crisis of the period—and a chain of events that led to the signing of the first adjustment program on May 3, 2010.

The high government deficit, which after successive revisions was estimated to be 15 percent of GDP in 2009, was accompanied by a high external deficit. As figure 1a shows the Greek economy saw a secular increase in its external deficit in the period after 1995 and until the crisis. The government deficit did not immediately increase at the same pace. However, the global crisis that started in 2007 led to a very rapid increase in the government deficit in the years 2008 and 2009. This “twin deficit” situation (the concurrence of high government and external deficits) was at the core of the structural problems that the Greek economy faced.

Figure 1 [twin deficits] around here

An important question related to the twin deficits is how causality runs between them. The usual neoclassical argument is that it is the increase in government deficit that leads to an increase in the foreign deficit (Volcker, 1984; Abell, 1990). However, it is also possible the causality goes the other way around (Darrat, 1988; Stiglitz, 2010: ch. 8).[2] In the case of Greece the adjustment programs—and some academic studies (Vamvoukas 1999; Alogoskoufis 2023)—adopted the conventional view. Nevertheless, one can also make the case that the monetary unification process post 1995 led to a reverse causality (Kalou and Paleologou 2012; Nikiforos, Carvalho, and Schoder 2015); a casual examination of figure 1 shows that (at least until the pandemic) external deficit Granger-causes government deficit.

The first Economic Adjustment Program that was agreed in 2010 between the Greek government and the so-called "troika" was followed by two more in 2012 and 2015 (European Commission 2010; 2012; 2015).[3]

The "twin deficits" and the presence of several structural rigidities were identified as the main culprits for the crisis. As a result, all three programs had two main dimensions. On the one hand, there would be a vigorous fiscal consolidation, which would decrease government deficit and thus also external deficit. On the other hand, there would be a series of structural reforms that would resolve the structural rigidities, improve the allocation of resources, increase competitiveness and promote output and productivity growth in the medium run. This reasoning is clear already in the first adjustment program (European Commission 2010), which after identifying the "twin deficits" and the structural rigidities as the problems to be solved (pages 1-8) proceeds and defines the main "Program Objectives" as (page 9, emphasis added):

> 9. The short-term programme objectives are to restore confidence and maintain financial stability: Sustainability-enhancing *fiscal consolidation is urgently needed*…
>
> 10. The medium-term programme objective is to improve competitiveness and alter the economy's structure towards a more investment- and export-led growth model. In parallel with short-term anti-crisis fiscal measures, *there is a need to prepare and implement an ambitious structural reform agenda to strengthen external competitiveness, accelerate reallocation of resources from the non-tradable to the tradable sector, and foster growth…The deep structural reforms foreseen in the programme, including reform of*

[2] The central idea of the neoclassical mechanism is that an increase in government spending leads to a rise in demand, which subsequently results in an increase in the price level and/or the interest rate. The latter often causes currency appreciation. Both effects contribute to the deterioration of the trade and current account balance. Conversely, the reverse causality emphasizes structural factors as the primary determinants of the trade balance, with government balance adjusting to stabilize the domestic economy. A more detailed discussion is provided in Nikiforos, Carvalho, and Schoder (2015, p. 305-307).

[3] For the uninitiated to the Greek crisis the term "troika" refers to the tripartite body consisting of the European Commission, the European Central Bank, and the International Monetary Fund (IMF). The IMF did not participate in the third program, as it had by that time reconsidered its position regarding the feasibility of the macroeconomic targets and therefore the sustainability of Greek public debt.

public management, will not only help address current challenges but will also boost growth prospects in the medium and long run.[4]

In particular, the first adjustment program targeted a reduction of the primary balance of the government budget by around 12 percentage points of GDP by 2013, while at the same time forecasted a shallow crisis and a return to positive growth rates in 2012. From a theoretical point of view, this optimism was justified on the basis that fiscal multipliers are relatively low and that structural reforms—as the quotes suggests—would lead to a better allocation of resources, boost productivity growth and cushion whatever impact restrictive fiscal policy might have, by promoting investment and especially net exports. We come back to the theoretical and empirical literature on structural reforms in the next section.

Figure 2 [fiscal] around here

Figure 2 shows the extent of austerity in Greece in the years after the crisis. In panel A we can see that real government expenditure decreased by around 30 percent between 2009 and 2017. At the same time, total revenue increased by around 10 percentage points of GDP. Interestingly, the majority of this increase—around 6 percent—came through an increase in indirect taxes; a policy choice that is consistent with the theory of structural reforms which prioritizes indirect as opposed to direct taxes which are considered distortionary.[5]

The two objectives of fiscal consolidation and structural reforms were achieved. However, the macroeconomic forecasts were far from accurate. As figure 3a shows the Greek economy lost around one quarter of its output within a very short period of time (until 2013), after some years of stagnation an anemic recovery started in 2016 (which was temporarily interrupted by the pandemic). Nevertheless, as of 2023, seven years into this recovery, real GDP is still around 20 percent below its pre-crisis level.

Figure 3 [output/employment] around here

Not surprisingly, and as we can see in figure 3b, the drop in output led to a sharp decrease in employment. The number of people employed decreased by around 10 percent and started recovering together with output. However, unlike output it is—as of 2023—around its precrisis level. Total hours worked followed a similar path, but they have not recovered as quickly as employment. This is due to the flexible forms of employment that were promoted through the reforms in the labor market (we are coming back to this in the following sections).[6]

These economic developments have led to a relative consensus that austerity was excessive and was one of the main reasons for the collapse of output and employment. This consensus

[4] The word "reform" (in various versions, e.g. reforming) appears 195 times in the document of the first adjustment program; 261 in the one of the second program, and around 93 times in the documents associated with the third.
[5] This choice was also dictated by the fact that indirect taxes are more easily implemented and earned.
[6] It is also not surprising that this freefall in economic activity and employment had very severe implications for the living conditions of the Greek population, with a significant increase in poverty (when measured against a fixed pre-crisis poverty line) and the number of people in material deprivation and economic strain (Papatheothodorou and Missos 2013; Matsaganis 2013; Perez and Matsaganis 2018; Andriopoulou, Karakitsios, and Tsakloglou 2018; INE-GSEE 2023).

transcends theoretical or political views, and disagreements on the specific issues related to the sources of the crisis (e.g., the causality between the "twin deficits" or the role of the Euro and the Eurozone) or the solutions to it (e.g., if expansionary austerity à la Alesina and Ardagna [2013] is possible or the importance of structural reforms [and what reforms]). Krugman (2010) was an early critique of the programs, as was De Grauwe (2020). In 2012 and after the two adjustment programs had been signed the International Monetary Fund accepted that the fiscal multiplier assumed for the estimation of the effects of the austerity had been underestimated (IMF 2012; Olivier J. Blanchard and Leigh 2013; Olivier J Blanchard and Leigh 2014).[7] Ardagna and Caselli (2014) suggested that although the agreement of May 2010 was individually rational for the various participants in the negotiations (Eurozone authorities, the Greek government etc.) a more generous program might have made everyone better off. Ioannides and Pissarides (2015) after reviewing the various supply-side factors and policy mismanagement that led to the crisis also suggest that demand contraction due to fiscal austerity was excessive. Finally, Orphanides (2015) discusses another aspect of the May 2010 program, namely that it was designed mainly to protect the banking sector in Northern European countries that held Greek bonds, and shifted all the losses and the burden of adjustment to Greece via austerity.[8]

Other contributions emphasized the interdependencies between the real and the financial sector of the economy. At the beginning of the crisis the Greek banking sector increased—its already high—holdings of Greek public-sector bonds. When the debt was restructured in 2012 the balance sheets of the banks were severely impacted. In parallel, the crisis led to the collapse of the income of the private sector, which in turn impacted its balance sheets: consumption was maintained through dissaving and many loans that had been assumed were stopped being serviced. This increase in the non-performing loans was another source of distress for the balance sheets of the banks, and resulted in three rounds of recapitalization with an additional fiscal cost of €65 bn which led to a further increase in public debt (Nikiforos, Papadimitriou, and Zezza 2015). Moreover, the weak balance sheets of the banking sector fed back into the real economy. Gourinchas, Philippon, and Vayanos (2016) estimated that the GDP loss would have been 9% smaller in 2013 if banks did not have solvency and liquidity problems, while investment would have been 33% higher. Fakos, Sakellaris, and Tavares (2022) find that the reduction in the supply of credit had very significant effects on real investment. Similar conclusions are reached by Hardouvelis and Vayanos (2023).

Finally, several macroeconomic models of different approaches also agree that the adjustment programs and the austerity were at the root of the drop in output and employment. For example, Gourinchas et al. (2016), using a DSGE model, estimate that 50% of the output decline was due to fiscal contraction, another 40% was due to the increase in the cost of financing for the private sector and the government, while the remaining 10% was due to the increase in product market

[7] Blanchard and Leigh (2013) using data for several European economies concluded that "fiscal multipliers were, on average, underestimated for both sides of the fiscal balance, with a slightly larger degree of underestimation associated with changes in government spending" (p. 5).

[8] A similar idea was later asserted by the former President of the USA, saying: "I noticed that they [German chancellor Angela Merkel and French former President Nicolas Sarkozy] rarely mentioned that German and French banks were some of Greece's biggest lenders, or that much of Greeks' accumulated debt had been racked up buying German and French exports" (Obama 2020).

mark-ups and the rise in nonperforming loans. Chodorow-Reich et al. (2023) examine the reasons for the boom and bust of the Greek economy. They reject the nominal rigidities explanation, arguing that wages and prices fell substantially during the crisis (we will talk more about this in section 4). Instead, they attribute both the boom and the bust to demand factors and suggest that the policy mix also played a role.

Another recent attempt to examine the decline in GDP during the crisis is Lenoël et al. (2023), who use NIGEM, a macroeconometric model from the UK's National Institute of Economic and Social Research (Hantzsche, Lopresto, and Young 2018). The model is structural (non-microfounded), where demand plays a role in the short and medium run, but the supply side dominates in the long run. They find that the decline was the result of spending cuts and a loss of confidence among households and firms.

Another structural model for Greece developed during the crisis was the model of the Levy Economics Institute (Papadimitriou, Zezza, and Nikiforos 2013a). The model is Keynesian in both the short and long run and follows the principles of Stock-Flow Consistent macroeconomic modeling, which aims to make explicit the interactions between the real and financial sides of the economy (Tobin 1982; Godley and Lavoie 2012; Nikiforos and Zezza 2017). Various reports produced with the model (Papadimitriou, Nikiforos, and Zezza 2013b; 2015) also suggested that austerity measures and their impact on private sector balance sheets were the main factors leading to the economic contraction. A similar model was later developed by Pierros (2021), who argued that the deregulation of the labor market and the fall in real wages also contributed to the contraction in demand and output.

An issue to which not enough attention has been paid within this literature that has analyzed the effect of the adjustment programs is that of productivity. A careful reader should have already noticed when we discussed figure 3 that output fell much more relative to employment during the crisis, while employment has recovered much quicker than output after 2016. As illustrated in Figure 4, this divergence has led to a substantial decline in labor productivity during the crisis—approximately 20 percent below pre-crisis levels. Unlike output, which has experienced some, albeit slow, recovery in recent years, productivity has remained stagnant. As of 2023, labor productivity remains at the same level it was seven years earlier, at the start of the recovery.

Figure 4 [productivity] around here

Productivity growth is the cornerstone of long-run growth of every economy, and for that reason, as was mentioned above, it was the main goal of the ambitious reform agenda that was adopted in the three adjustment programs. Given this central position as an objective of the programs and their reforms, the collapse in productivity during the crisis and its stagnation over the last years is arguably an even bigger contradiction compared to the output loss and poses a significant challenge for the long run growth of the Greek economy.

As we will discuss in section 4, a better understanding of the fall in productivity requires going beyond the aggregate level and examine the sectoral structure of the Greek economy and its transformation over the last fifteen years in the wake of the crisis. Before going there, in the next section we examine in detail the literature that justifies structural reforms as a cause of long-run

productivity growth as well as the reforms that were implemented in Greece over the last fifteen years.

3. Structural reforms

3.1 Theoretical and empirical justification

The term "structural reform" is vague and can include several and oftentimes contradictory policies. On the one hand, one can argue that the establishment of national-pension, public-health and education systems are important reforms. On the other, the reduction of the scope or the complete elimination of these systems can also be called structural reform. When it comes to adjustment programs in Greece, or other similar programs in other countries, structural reforms are defined as reforms that would remove rigidities and distortions and will allow an economy to move towards a complete market/perfect competition ideal state. This is the definition of reforms that we will use in this paper. Under this definition the economic literature and several policy reports have examined several types of policy initiatives:

i) reforms in the labor market such as the reduction or elimination of unemployment benefits, job protection, pension rights and administrative extensions of bargaining agreements, as well as active labor market policies that facilitate the matching of labor demand and supply.
ii) product market reforms that enhance competition.
iii) privatization of government owned firms.
iv) tax reforms, such as revenue-neutral tax switching, which would increase indirect taxes to offset income tax cuts (which are considered distortionary).
v) trade and capital account liberalization, with the reduction of tariffs and the elimination of other barriers to trade and movement of capital.
vi) domestic finance reforms associated with the liberalization of the banking sector.

From a theoretical point of view, this type of reforms will lead to:

1) A more efficient allocation of resources. In the baseline neoclassical model markets, if left unhindered, lead to an efficient allocation of resources. Several types of distortions and rigidities, however, prevent such outcomes. Therefore, removing these rigidities through structural reforms improves the efficiency of overall allocation.

2) An increase in investment. Regulatory barriers and other inefficiencies hinder investment. Again, structural reforms remove these barriers and inefficiencies and contribute to an increase in investment. Part of this argument is related to barriers and rigidities related to foreign firms (foreign-ownership restrictions, discriminatory procedures etc.), which if removed through reforms will lead to an increase in Foreign Direct Investment (Nicoletti and Scarpetta 2003).[9]

[9] One of the main justifications in favor of the monetary integration of Europe was on this basis, i.e. that the common currency and the associated reforms in the Eurozone economies would lead to an increase in foreign direct investment to the less developed economies and contribute to the convergence of the Eurozone economies as envisaged by the Maastricht treaty. The influential work of Blanchard and Giavazzi (2002) on Greece and Portugal is a case in point. It is clear now that this did not happen (Eichengreen 2010).

3) More innovation and faster technical change. Higher competition among firms, facilitated by related product market reforms, induces firms to innovate in order to acquire a competitive advantage over their rivals (Aghion and Howitt 1998; Aghion et al. 2001; Acemoglu, Aghion, and Zilibotti 2006).

All of these factors, the argument continues, will then lead to higher output and productivity growth.

These theoretical perspective has led to a rich empirical literature that has found statistical evidence in favor of the positive effects of structural reforms on the allocation of resources, as well as output and productivity growth (e.g., IMF 2003; Nicoletti and Scarpetta 2003; Bouis et al. 2012; Bourlès et al. 2013; Christiansen, Schindler, and Tressel 2013; Prati, Onorato, and Papageorgiou 2013; OECD 2014). Some other studies have reached similar conclusions on the benefits of reforms by simulating their effects with the use of DSGE models (Varga and Veld 2013; Anderson et al. 2014; Canton et al. 2014).

However, a careful reading of parts of this literature suggests some caution. To begin with, even if one starts from the neoclassical Schumpeterian model à la Aghion and Howitt, an increase in product market competition will lead to more innovation only in markets that are already competitive, in the sense that the current technology level is similar among firms (firms are "neck-and-neck"). However, increased competition will lead to a *decrease* in innovation in sectors or economies which are "unleveled," where there are some firms with technological advantage and some laggard firms. Finally, an increase in competition tends to decrease the fraction of "neck-and-neck" sectors in the economy (Aghion et al. 2018).

In a related argument, Acemoglu, Aghion, and Zilibotti (2006) emphasize the importance of the distance of an economy from the technological frontier. The growth of an economy which is far from the frontier depends on the adoption of existing technologies through large scale investment. If firms in such an economy are credit constrained, then profits and retained earnings are important for investment, and therefore more competition tends to *decrease* investment and growth. It is only in economies at the technological frontier that more competition is beneficial. Prati, Onorato, and Papageorgiou (2013) provide empirical evidence showing that the effectiveness of reforms is related to the distance from the technology frontier. In the case of Greece these nuances (product market characteristics, distance from the frontier—Greece was clearly not at the technological frontier) were ignored.

Another dimension that is examined in the theoretical and empirical literature is the relationship between the effects of structural reforms and the state of the economy or macroeconomic policy. Eggertsson, Ferrero, and Raffo (2014) suggest that when an economy is at the so-called "Zero Lower Bound" structural reforms are contractionary, because they lead to deflation, which raises real interest rate, and depresses demand. Bordon, Ebeke, and Shirono (2018) also argue that the effects of labor market reforms can be negative if they are introduced during a recession. They also point to that the effect of reforms is conditioned by the macroeconomic policy framework within which they are adopted; expansionary macroeconomic policies contribute to a positive effect in the medium run. Anderson et al. (2014) also point that weak demand can have a negative influence on the positive effects of reforms. Finally, Decressin et al. (2015) also argue

that reforms that aim at wage moderation need combined with expansionary monetary policy. These arguments were also ignored in the case of Greece where structural reforms were implemented in the mid of a very deep recession, and as was explained above (section 2), were accompanied by a significant fiscal consolidation.

Finally, another dimension of the theoretical and empirical literature on structural reforms is whether they are complements or substitutes. Several works have pointed towards complementarity, meaning that simultaneous implementation of reforms in different areas (labor market, product market, taxation etc.) yield more positive effects than the sum of the effects if reforms were implemented in each area separately (Nickell 1999; Varga and Veld 2013; Anderson et al. 2014). In a similar fashion the IMF in its 2003 World Economic Outlook (IMF 2003) suggests that reforms need to be comprehensive as partial reforms can hinder the positive impact of reforms in specific areas, especially if the labor market is regulated. Contrary to this view some works argue that the effectiveness of product market reforms is higher when the regulation of the labor market and the worker bargaining power is high (Griffith, Harrison, and Macartney 2007; Amable, Demmou, and Gatti 2011; Fiori et al. 2012). As previously mentioned and further analyzed in the next section, the adjustment programs implemented in Greece were based on the "complementarity" approach, whereby deep structural reforms in many different areas were adopted simultaneously.

It is also worth noting that, as was mentioned in the previous section, in the case of Greece an additional goal of structural reforms—especially those in the labor market—was the so-called internal devaluation. The idea was that since the country could not devalue its currency, it had to decrease its real effective exchange rate and therefore become more competitive by decreasing the cost of labor and therefore the price level (e.g. European Commission 2010). A standard theoretical exposition of how reforms in the labor market can achieve simultaneously a better allocation of resources (transition of labor to high-productivity sectors) and a fall in the overall price level and thus better competitiveness is provided by Obstfeld and Rogoff (1996, ch. 4).

3.2 Structural reforms in Greece

The three economic adjustment programs in Greece included, as part of their conditionalities, the implementation of deep structural reforms in almost all the aforementioned areas: labor and product markets, taxes and public expenditures, and privatizations.

Table 1 provides a summary of the reforms included in each of the three programs. When it comes to the labor market, the changes that were adopted included the introduction of sub-minimum wage—and the subsequent reduction of both the minimum and sub-minimum wage—the easing of hiring and firing with the promotion of temporary contracts, and the weakening of collective bargaining. Product market reforms were focused on the rapid deregulation of several markets and related professional activities (energy market, railways, air transports, pharmaceutical sector, and professional, scientific and technical activities). These changes were accompanied by significant privatization of public enterprises and property, reforms related to public administration efficiency and increases in indirect and property taxes.

Table 1 [reforms] around here

In parallel the Greek government asked from the OECD for a competition assessment toolkit, an evaluation of the state of competition in various sectors and proposals on how to make these sectors more competitive (OECD 2014b; 2017). In total three toolkits were provided in 2012, 2014, and 2016. The first one assessed and proposed changes in retail trade, food manufacturing, building materials, and tourism; the second one in beverage manufacturing, coke and refined petroleum products, textile production, clothing, leather and leather goods, as well as machinery and equipment manufacturing; the third one in e-commerce, construction, media, wholesale trade, and selected areas of manufacturing, including chemicals and rubber, pharmaceuticals, electrical equipment, and paper and printing. According to a report by the Hellenic Federation of Enterprises, the three toolkits made 775 recommendations on how these markets could become more competitive. As of the end of July 2019, 708 had been implemented; a rate above 90% (SEV 2020).

Before moving on, it is worth noting that the macroeconomic policies and the reforms that were adopted contained several serious contradictions. For example, the significant increase in indirect taxes reduced the effect of the reforms in labor and product markets on prices and competitiveness (Petroulakis 2017). Similarly, despite the efforts to liberalize product markets some important sectors experienced an increase in their concentration. A case in point is the banking sector, that after three rounds of recapitalization with public funds of around €60bn ended up much more concentrated than before. According to the World Bank's Global Financial Development Database, the assets of the three largest commercial banks as a share of total commercial banking assets—a commonly used measure of banking sector concentration—increased from 66% in 2010 to 98% in 2015. As of 2021, the concentration remains elevated at 93% (World Bank 2024).[10]

Another crucial sector that is highly concentrated is the energy sector, despite the entry of private firms and the privatization of the Public Electricity Enterprise. According to Eurostat data, in 2021 95% of the country's electricity production was produced by three firms, registering Greece at the lower end among the EU member states (along with Malta and Slovenia).[11] Arguably this is one of the main reasons why the firms in the Greek energy market maintained the second highest mark-ups across the EU (ACER-CEER 2022). Other oligopolies include the meat and dairy industry (Bragoudakis 2018), the tobacco industry and the air transports (Petrakis 2020).

4. Sectoral changes: the emergence of the café economy

In order to better understand the developments discussed in section 2—particularly the collapse and subsequent stagnation of labor productivity, as well as the structural transformation of the Greek economy over recent decades—it is necessary to go beyond the macroeconomic level and examine the evolution of different sectors of the economy during this period. As we will discuss in this section, a major conclusion of such an analysis is that, over the past fifteen years, the Greek

[10] The data is easily accessible in the Federal Reserve Economic Data (FRED) of St. Louis FED; Code: DDOI01GRA156NWDB.

[11] At the other extreme, in Denmark, the number of electricity producing enterprises exceeded 1000.

economy has experienced a reallocation of economic activity, particularly employment, towards the "Accommodation and Food Service Activities" (henceforth AFSA) sector, while at the same time the productivity of most sectors has decreased.

4.1 Value added, employment, productivity and real wages

As a first step toward a sectoral analysis of the Greek economy we used data from the Industry Accounts of Eurostat.[12] The results of our analysis are presented in Table 2 as well as figures 5-7. Column (C) of Table 2 shows that only three sectors of the Greek economy experienced a positive growth rate of the real value added over the period 2009-2023: AFSA (~11%), Real estate activities (~24%) and Other service activities (~2%).

Table 2 [sectors] around here

Figure 5 [Total/AFSA] around here

As figure 5a shows, output in AFSA decreased in the period 2007-2011 (during the global financial crisis and the first years of the Greek crisis) but then quickly rebounded and surpassed its pre-crisis levels. It was also severely affected by the pandemic in 2020 but has bounced back in the following years.

Even more striking is the trajectory of employment. Figures 1b and 1c, along with columns [D] and [E] of Table 2, reveal that both employment and total hours worked in the AFSA sector increased sharply after 2009—at a markedly faster pace than in the preceding years. As of 2023, total employment is around 87% above its 2009 level, while total hours worked have increased by around 70%. Seen differently out of the roughly 740 thousand jobs that have been created since 2013 (when the employment level reached its trough during the crisis), around 320 thousand (or 43%) have been jobs in AFSA. Compared to 2009 total employment has increase by around 200 thousand, while employment in AFSA by 324 thousand.

Naturally, these changes in output and employment in AFSA relative to the total economy have led to an increase in its share in overall economic activity. Figure 6 and columns (J) and (K) of Table 2 show that the share of output of AFSA in total output has increased by around 2%, while that of employment by 6% (almost double compared to its pre-crisis level).

Figure 6 [shares] around here

The changes in the level of real output and employment imply a decrease in labor productivity. Indeed, as figures 1d and 1e (as well as columns [F] and [G] of Table 2) show, productivity in AFSA decreased at a much faster pace compared to the total economy. In 2023 labor productivity—measured as real value added over total employment—was around 41% below its 2009 level. The

[12] More precisely we used data from the databases "National accounts aggregates by industry" (nama_10_a64) and "National accounts employment data by industry" (nama_10_a64_e) which are available at an annual frequency for the period 1995-2023. The data were accessed on 20 May 2025. The data are classified according to the second revision of the NACE system of classifications of economic activities and products (Eurostat 2008). The analysis here is conducted at the "section" level (e.g., Section A: Agriculture, forestry and fishing, Section B: Mining and quarrying etc.). Accommodation and Food Service Activities is section [I] of the classification. A detailed discussion of the data sources for this and the following sections is provided in the Appendix.

decrease is 35% if we calculate productivity based on the hours worked. The rate of the decrease in productivity over this period in AFSA is smaller only compared to the "real estate activities" and "the administrative and support service activities" sectors.

This is a significant development, as even prior to the crisis, AFSA was—both in Greece and, as is typical across countries—among the sectors with the lowest levels of productivity.[13] Therefore, not only there was a reallocation of economic activity and employment toward a low-productivity sector such as AFSA, but on top of that the productivity of this sector collapsed. As we will discuss below this aligns with models of economic duality, where a traditional/low-productivity sector acts as an absorber of excess employment with its productivity adjusting endogenously (Lewis 1954).

Finally, figure 1f and columns (H) and (I) of the table show that the crisis and the deregulation of the labor market led to significant decreases in real wages. When using the Consumer Price Index (CPI) to deflate nominal wages, every single sector experienced a decline in real wages between 2009 and 2023, with most sectors seeing decreases of over 20%. The average real wage across the total economy fell by 34%.

When nominal wages are deflated using the implicit value-added deflator of each sector, we still observe significant declines in real wages. However, in most sectors, the value-added deflators increased less than the CPI, resulting in smaller decreases—or even slight increases—in real wages when these deflators are used. For example, in the total economy, the real wage calculated using the value-added deflator decreased by approximately 26%. Exceptions to this trend include the Agriculture, Mining, Electricity, Transportation, and Finance sectors, where the decrease in real wages was greater when using the value-added deflators.

The largest decline in real wages among all sectors was recorded in AFSA, which experienced a decrease of nearly 60% between 2009 and 2023. In this sector, the decrease was the same regardless of which deflator was used. This suggests that the reallocation of economic activity and employment toward AFSA, along with declining productivity in the sector, was accompanied by a sharp reduction in real wages. However, as in the case of the total economy, the decline in real wages significantly exceeded the decline in productivity, implying a redistribution of income away from wages.

Finally, as was mentioned above, the other sector that saw an increase in real value added was "Real estate activities." This increase has been the combined effect of three factors: i) an increase in nominal imputed rents; ii) a decrease in the price level of the sector—at least at the national level as reflected in the national accounts and iii) a real estate sector boom over the last years related to a recovery in real estate prices in Athens and other major touristic destinations, which in turn is also related to the emergence of online rental platforms (such as Airbnb) as well as policies to attract foreign capital into the country.[14] Thus, although a detailed analysis of the recent developments of the real estate sector in Greece is beyond the scope of this paper, it is

[13]In 2009, AFSA ranked fourth from the bottom, ahead of only agriculture, other service activities, and activities of households as employers. By 2023, it had fallen to second from the bottom.

[14] For example, the so-called Golden Visa program gives a permanent residence permit in Greece (and thus the European Union) in exchange for a €250,000 investment in Greek real estate.

safe to say that to a large extent the increase in the value added of the sector is related to the increasing importance of AFSA.[15]

4.2 Characteristics of the labor force

We can draw further insights about the structural transformation of the Greek economic in the period after 2009 by having a closer look at the evolution of labor force characteristics at the sectoral level. Our analysis here is based on data from the Labor Force Survey published by the Greek statistical authority (ELSTAT); the results are presented in Table 3 and figure 7.[16]

Table 3 [LFS] around here

Figure 7 [LFS Total/AFSA] around here

As we can see in column (C) of the table and figure 7a, the period after 2009 was marked by an increase in part-time employment in almost every sector of the economy. At the aggregate level, the increase in part-time employment relative to 2009 reached 32% in 2017; it was 12% in 2023. The proliferation of part-time employment became possible because of the deregulation in the labor market. This proliferation explains a large part of the difference between the trajectory in employment and the hours worked presented in figure 3b. Hours worked fell more than employment during the crisis because on top of the decrease in the latter there was an increase in part-time employment. Similarly in 2023 hours worked have not returned to their 2009 level, despite employment being above it (see Table 2) for the same reason. One of the sectors with the highest increase in part-time employment is AFSA. Figure 7a shows that this increase reached 140% in 2009 and was 82% as of 2023.[17]

The lion's share of the increase in part-time employment was involuntary: employees who could not find a full-time job had to work part time (column (D) of Table 3 and figure 7b). As we can see in the figure, involuntary part-time employment increased fast during the crisis (faster than part-time employment itself) but has also decreased fast over the last years and it is now 4% below its 2009 level. In the case of AFSA involuntary part time employment increased much faster than total economy: in 2016 it was 210% above its 2009 level. As opposed to the total economy, involuntary part-time employment is still elevated in AFSA, close to 80% above its 2009 level.

Figures 7c and 7d and columns (E) and (F) of Table 3 present the changes in the skill level of the existing jobs (thus the skill level refers to the characteristics of the job itself, not the qualifications of the person who holds it).[18] In this respect, high skilled jobs in total dropped by 18%, while low

[15] Also note that, as in every country, the real estate sector has a disproportionately large share in value added vis à vis employment largely due to imputed rents. As of 2023, and despite the increase mentioned in Table 2 real estate accounted for only 0.5% of total employment (as opposed to around 17% in value added).
[16] The data were retrieved on November 30, 2024, from ELSTAT's website: https://www.statistics.gr/en/statistics/-/publication/SJO03/-
[17] Some numbers of the table that seem bizarre are due to the small number of employees who belong in this category in this sector. For example, the 100% decrease in part-time employment in Mining from 400 employees in 2009 to 0 in 2023.
[18] The skill level refers to both manual and non-manual labor.

skilled or unskilled employment went up by 4.7%. These numbers indicate the transition to a lower productivity economy.

The change is even bigger in AFSA. Specifically, the sector experienced one of the largest falls in high-skilled jobs (close to 60% in 2016 and 30% in 2023) and one of the largest increases in low-skilled or unskilled occupations (around 50% in 2019 and 42% in 2023).

These changes in the levels of these types of employment are also reflected in their shares in total employment. In columns (G)-(J) of the table we can see that as of 2023 the share of part-time employment in total employment is higher than in 2009 (by 1.33%) and the share of high-skilled jobs has decreased by 6% with a commensurate increase in low-skilled jobs.[19] AFSA stands out as the sector with the highest increase in the share part-time employment and the second highest decrease in skilled jobs: as of 2023 the share of part-time employment in total employment has increased by 4.2%, half of which is involuntary; the share of skilled labor has decreased by 13%.[20]

Table 4 [education] around here

As mentioned above, the skill level in Table 3 and figure 7 refers to the type of occupation and not the person employed in it. At the same time, these changes are combined with an increasingly educated workforce. Table 4 presents the shares of employees in total economy and AFSA by educational attainment level for the period 1993-2023. We can see that the workforce of AFSA has always been less educated than in the total economy, a reflection of the productivity differentials between them. At the same time, both at the level of the total economy as well AFSA the workforce has been becoming increasingly educated, even in the period of the crisis. If anything, the crisis sees an acceleration of university graduates working in AFSA, as employment opportunities in other sectors decreased. The result is a widening skills mismatch, with employment positions becoming less skill-intensive—both because there is a reallocation of economic activity to low productivity sectors and because productivity within sectors decreased—while the employees filling them are increasingly more educated.

5. Productivity (de)growth decomposition

From an accounting point of view aggregate productivity can decrease for two reasons—*ceteris paribus*. First, because of productivity decreasing in some sectors, even if productivity in the remaining sectors does not change and the allocation of employment remains the same. Second, because of employment reallocation to low-productivity sectors, even sectoral productivities do not change.

The discussion in the previous section (especially around Table 2 and figures 5 and 6) suggests that during the period 2009-2023 the decrease in aggregate productivity has been the result of both the decrease in the productivity of most sectors (with AFSA experiencing one of the largest

[19] Given our definitions the labor force is divided into high-skilled and low-skilled labor. As a result, for each sector—apart from rounding errors—the sum of columns (I) and (J) is equal to zero.
[20] Other sectors that experienced large decreases in skilled labor were the trade sector and manufacturing.

decreases), but also a reallocation of economic activity and employment towards low-productivity sectors (AFSA was to begin with a low-productivity sector).

The literature on economic development and structural transformation proposes a simple way to decompose the importance of each sector's productivity changes and reallocation effects to the aggregate change in productivity (see for example Ocampo, Rada, and Taylor 2009, ch. 3). If we denote real output as X, employment as L, then productivity is $\xi = X/L$. If we further denote the growth rate between two periods 0 and 1 with a hat (so that, for example, the growth rate of output is $\hat{X} = (X_1 - X_0)/X_0$, with the subscript referring to the period), then it is easy to show that the growth rate of aggregate productivity is

$$\hat{\xi} = \left(1 + \hat{L}\right)^{-1}\left(\hat{X} - \hat{L}\right) \qquad (1)$$

Thus, the growth rate of productivity ($\hat{\xi}$) is equal to the difference between the growth rate of output ($\hat{X}$) and employment ($\hat{\mathrm{L}}$), adjusted for the interaction term $\left(1 + \hat{L}\right)^{-1}$.

If output and labor for each sector of the economy i is X_i and L_i respectively (with $i = 1,2\ldots,n$), then $\sum_i X_i = X$ and $\sum_i L_i = L$. We can then rewrite equation (1) as

$$\hat{\xi} = \left(1 + \hat{L}\right)^{-1} \sum_i [\underbrace{\theta_{\mathrm{i},0}\left(\hat{X}_i - \hat{L}_i\right)}_{\substack{Productivity \\ change}} + \underbrace{(\theta_{\mathrm{i},0} - \epsilon_{\mathrm{i},0})\hat{L}_i}_{\substack{Reallocation \\ effect}}] \qquad (2)$$

where $\theta_{\mathrm{i},0} = X_{i,0}/X_0$ and $\epsilon_{\mathrm{i},0} = L_{i,0}/L_0$ are the shares of the ith sector's output and employment in total output and employment in period 0.

Equation (2) shows that, aside from the interaction term, aggregate productivity growth can be decomposed into two parts. First, the weighted sum of sectoral productivity growth; the term $\theta_{\mathrm{i},0}\left(\hat{X}_i - \hat{L}_i\right)$ shows the productivity growth of sector i, weighted by its share in total output in period 0. Second, the sum of sectoral reallocation effects. If the term $\theta_{\mathrm{i},0} - \epsilon_{\mathrm{i},0}$ is positive, the productivity of sector i is above the average productivity, and therefore an increase in employment in that sector will lead to an increase in total productivity. The opposite happens when $\theta_{\mathrm{i},0} - \epsilon_{\mathrm{i},0} < 0$; in this case a reallocation of employment toward this sector will lead to a decrease in overall productivity.

The results of applying equation (2) on the data of the previous section for the period 2009-2023 are presented in figure 8.[21] The figure does not contain "Real Estate" for reasons explained below.

Figure 8 [productivity decomposition] around here

The figure shows that, in line with the results of Table 2, most sectors experienced productivity losses. AFSA experienced the largest productivity losses among the sectors presented in the figure. However, the structural transformation of the Greek economy and the steep rise in employment in this sector—a low productivity sector to begin with—implies that there were also

[21] A difference of the decomposition presented in figure 8 compared to the figures and the tables of the previous section is that we are now using the GDP deflator as a common deflator for the value added of all sectors to guarantee that equation (2), which is an accounting identity, holds. The results do not change in a significant way if we use sectoral deflators instead.

significant reallocation losses. The combined productivity and reallocation losses associated with AFSA amount to -5.2%, almost one third of the overall decline in the productivity of the Greek economy over this period (which was -16.13%). This is by far the biggest contribution by any sector to the aggregate decline in productivity, an impressive number for a sector that accounted for only 5% of value added and 7.7% of employment in 2009.[22]

As was mentioned above, figure 8 does not include the real estate sector. The reason for that is that the productivity and reallocation effects of that sector are so big, that if the sector was included in the graph they would dwarf and make unintelligible the behavior of the remaining sectors. More precisely, the real estate sector saw productivity losses of -24.79% and reallocation gains of 23.38% leading to an overall loss of -1.41%.

6. A dual growth model

Overall, the discussion of the two previous sections suggests the last fifteen years have seen a "de-development" and dualization of the Greek economy along the lines of a conventional dual-economy model. In his seminal article, Lewis (1954) suggested that in developing economies there is a traditional low-productivity sector (usually agriculture) and a modern high-productivity (capitalist) sector. When the economy grows the modern capitalist sector grows and draws on the labor reserves of the traditional sector. When the economy contracts the capitalist sector contracts and excess labor is absorbed by the traditional sector. Importantly the output of the traditional sector is quasi-fixed, meaning that changes in employment are accommodated mainly through changes in productivity.

Lewis analysis focused on developing economies and his work has been instrumental in the field of development economics that developed afterwards (Tignor 2006; Gollin 2014). However, some recent literature has used his model to analyze the dualization of developed economies. For example, Temin (2018), Storm (2017) and Taylor and Ömer (2019) analyze the structural and socioeconomic transformation of the US economy of the last five decades through these lenses, while the chapters in Emmenegger et al. (2012) provide an analysis of the dualization experience of several industrialized countries from a comparative political economy point of view.

The parallels with the Greek experience are clear. The crisis led to a sharp decline in economic activity and employment. AFSA acted as the traditional sector in a dual-economy model, absorbing a large share of excess labor through significant productivity adjustments. This process has also been accompanied by declining wages, rising part-time employment, and increased job precarity.

Compared to other developed economies, the process of dualization in Greece occurred much more rapidly. Moreover, in most developed countries, dualization typically entails a divergence between dynamic sectors with rising productivity and stagnant sectors that absorb surplus labor.

[22] The relative contribution of AFSA is even higher when we measure productivity in terms of hours worked. In this case the combined productivity and reallocation losses associated with AFSA amount to -4.5%out of an overall decline of -11.87%.

In Greece, however, productivity declined across almost all sectors—especially in low-productivity sectors like AFSA, which absorbed the surplus labor.

This type of dual economy is a type of what Baccaro and Pontusson (2016) call a "growth model." They suggest that in order to understand the political economic arrangements of an economy and the related society we need to examine how this economy grows, and more specifically, along the lines of Post Keynesian economics, what are the sources of demand that drive the growth of an economy. In their original contribution they distinguish between consumption- and export-led economies, a taxonomy that has been extended along several dimensions within the literature that has subsequently emerged.[23]

As discussed in section 2, prior to the crisis, the Greek economy grew primarily through the expansion of private expenditure—mainly consumption, but also residential investment—as well as government spending. This growth was largely debt-financed, while net exports were on a declining trajectory. From a sectoral perspective, economic expansion was driven predominantly by services and construction, with the AFSA sector growing slightly more slowly than the overall economy. After 2010, the onset of the crisis and the implementation of austerity measures under the adjustment programs exerted significant downward pressure on both private and public expenditure. Although net exports improved during this period, this was driven mainly by a sharp contraction in imports due to the domestic downturn, with export growth playing a more modest role.

AFSA was one of the few sectors that largely escaped the broad-based collapse in demand during the crisis period. This resilience can be attributed to structural features of both the Greek and global economies. Greece remained a major international tourist destination, benefiting from the continued global expansion of the tourism sector. Moreover, domestic demand for services such as coffee remained relatively inelastic, reflecting its deep cultural significance—indeed, for many unemployed individuals, visiting a café served as a form of low-cost social activity. Against this backdrop, it is not surprising that the Greek economy increasingly pivoted toward an AFSA-led growth model.

7. The role of accommodation and food service activities: a (Greek) dilemma

The previous sections highlighted the process of structural transformation of the Greek economy over the last fifteen years. As we explained, the role of AFSA has become increasingly important over this period both in terms of its share in total value added and especially its share in total employment.

As this discussion makes clear, an economy that centers its growth model around the AFSA sector is likely to encounter outcomes similar to those observed in Greece, for the straightforward reason that AFSA is a prototypical low-productivity sector. Across all European Union countries—and in nearly every other country for which data is available—AFSA consistently ranks among the lowest in terms of sectoral productivity. Furthermore, as we have seen, the dualization of the

[23] A more recent review of this literature together with several extensions of this GM approach is contained in Baccaro, Blyth, and Pontusson (2022).

Greek economy not only reinforced the pre-existing productivity limitations of AFSA but also contributed to a further deterioration: productivity in the sector has collapsed over the past one and a half decades.

Although Greece still does not have well-developed tourism satellite accounts (Eurostat 2023) and therefore it is difficult to identify with precision the role of tourism in wider AFSA sector, it is safe to say that tourism-related activities hold the lion's share within the sector. Tourism has its own additional limitation as a source of long-run growth of an economy, that have become visible in Greece and other popular touristic destinations over the last years. To begin with, an expansion of tourism is bound to encounter sooner or later significant decreasing returns to scale. In most cases the natural and cultural "capital" upon which tourism is based is almost fixed and cannot be expanded: there are that many beaches, monuments and picturesque old villages and city centers to visit.

Related to that, overtourism can have a negative impact on local culture and the environment. The experience of many places around the world over the last decades shows that a disproportionate increase in tourists distorts the local cultural landscape as these places become increasingly focused on catering for the needs of tourists. At the same time, the sharp increase in the number of visitors leads to a permanent damage to the natural landscapes. The environment is also negatively affected by the transportation of tourists. It is well established that airplanes and cruise ships are very polluting for the air and the water.[24]

Finally, the increasing importance of tourism has also been one of the main reasons behind the real estate boom in touristic areas, also facilitated by the appearance of short-term rental platforms. This boom has led to a sharp increase in ordinary rental prices—as many apartments are being used for short-term rentals—and has exacerbated the pressure that the recent increase in consumer price inflation has put on household budgets.[25]

However, at the same time one should not disregard the importance and the positive contribution of AFSA in general and tourism in particular. Figure 8 presents the components of the current account balance of the Greek economy. The figure illustrates one of the main structural characteristics of the Greek economy, namely that there is a deficit in the trade of goods and a surplus in the trade of services. We can see that the deterioration of the current account balance before the crisis was due to an increase in the trade deficit of goods as well as the worsening of the income deficit. Over the same period the trade balance of services remained stable, while the

[24] The risks of saturation of touristic destinations have been known for a while. These risks are discussed in a report by the United Nations World Tourism Organization four decades ago (UNWTO 1983). More recently the same agency has produced a comprehensive report on the dangers of overtourism with case studies from around the world and strategies to deal with it (UNWTO 2018). Other recent academic surveys of overtourism include Milano, Novelli, and Cheer (2019) and Mihalic (2020). The growing significance of the issue has led to a recent surge in the number of articles published in the public press. A simple web search of the term overtourism with one's favorite newspaper will return several recent results.

[25] Barron, Kung, and Proserpio (2021) and Franco and Santos (2021) offer empirical studies examining the effects of short-term rental platforms on local real estate markets.

travel balance (a sub-component of the services balance) slightly decreased as the economy grew faster than international tourism.

Figure 8 [current account] around here

After the crisis the improvement in the current account balance that we have already encountered in figure 1 is due to an improvement in all its subcomponents. The goods deficit decreased by 8% between 2008 and 2016 (from 18.4% to 10.3%). Half of this improvement came from the decrease in demand for imports due to the contraction of the economy; the other half due to an increase in exports as a share of GDP. The income deficit decreased and has been fluctuating around zero over the last decade. Finally, the services surplus increased significantly. The entirety of this improvement, around 5% of GDP, is due to the improvement in the travel surplus, which increased from 3.4% in 2009 to 8.3% in 2023 (out of an overall services surplus of 9.9% in the latter year). This accounts for half of the improvement in the current account balance over the same period. Thus, tourism has played a central role in the decrease in the twin deficits discussed above in section 2 (figure 1). Moreover, and related to that, tourism is one of the very few sectors where economic activity did not collapse and was therefore able to support the overall aggregate demand and employment (see e.g., figure 5). These numbers highlight the central role of AFSA and tourism in the Greek macroeconomy.

Thus, the Greek economy (and other economies that overly rely on AFSA and tourism) face this basic dilemma. On the one hand, these activities are characterized by low (and decreasing) productivity and cannot act as a long-run engine of growth, while at the same time they entail a series of other problems (cultural and environmental degradation, exacerbation of the cost-of-living crisis etc.). On the other hand, though, the economy is very much dependent on them as a source of aggregate demand generation and of foreign income.

8. Induced technical change

As discussed in section 2 one of the three main pillars of the adjustment programs was the structural reforms intended to allow productivity to grow, which would then allow the economy itself to grow in the medium and long run. However, the evidence presented in the previous sections suggests that the opposite happened. Despite the aggressive adoption of reforms, productivity plummeted as a result of the reallocation of economic activity to low-productivity sectors, such as “Accommodation and food service activities,” but also the severe productivity losses that most sectors experienced.

This severe loss of productivity makes the Greek economy an interesting case study on how to think about technical and structural change. One approach to technical change which goes back to the very first pages of *The Wealth of Nations* by Adam Smith (1776 [1999]) is that labor productivity growth is due to the division of labor and in turn the division of labor is constrained by total output as defined by the extent of the market. Thus, the growth of the extent of the market and output allows for deeper division of labor and higher labor productivity. Smith describes a virtuous cycle in which higher output growth enables greater division of labor, thereby enhancing productivity. This increase in productivity, in turn, facilitates further market expansion and output growth, perpetuating the cycle.

This idea of increasing returns which suggests that higher output growth leads to higher productivity growth has been subsequently emphasized by several seminal contributions including Marshall (1898) and Young (1928).This positive relationship was further formalized by Verdoorn (1949) and Kaldor (1966), whose work led to it being widely referred to as the Kaldor-Verdoorn (KV) law.

There have been several contributions that have found empirical evidence in favor of the KV using different methodologies for different time periods and economies. Michl (1985) using data for several advanced economies for the period 1950-80, was one of the first of these contributions. More recently, Magacho and McCombie (2018) estimate the KV coefficient for 70 developed and developing countries for the period 1963-2009 and find that it depends on the level of development of a country with less-developed economies exhibiting higher coefficients in low-tech-manufacturing and developed economies benefitting more from high-tech manufacturing. Other related studies that find empirical support for KV law include Dosi and Yu (2019) and Iasco Pereira, Romero, and Medeiros (2021) who focus on the economies of China and Brazil respectively; Deleidi, Paternesi Meloni, and Stirati (2020) who employ an Autoregressive Distributed Lag (ARDL) model for several European countries for the period 1970-2015; and, more recently, Fazzari and González (2025) who estimate a Keynesian model using a minimum distance estimator and find significant effects of aggregate demand growth on productivity.

In a similar vein to Smith, Kaldor, and Verdoorn, Myrdal (1957) puts forward what he called the "principle of circular and cumulative causation" to explain the persistent differences in economic development among different countries. In addition to the purely economic aspects, Myrdal emphasizes the political and institutional elements in the process of development. As an economy grows, productivity grows, but institutions also improve and become more conducive to further growth. Finally, Myrdal emphasizes that circular and cumulative causation can work both ways, as a virtuous cycle but also as a vicious one. An economy that finds itself in a deep economic crisis might enter a cycle of lower productivity growth, political instability, and institutional deterioration, which in turn lead to further decrease in output—a description reminiscent of the situation in Greece over the last one and a half decades.

In neoclassical economics, the standard assumption is what Blanchard (2018) calls the "independence" hypothesis, namely that the long run state of the economy is independent of aggregate demand and the business cycle. The forecasts of the troika that austerity in Greece would have a mild macroeconomic impact were based on this assumption. In turn, the structural reforms are supposed to improve the (independent-to-demand) long-run state of the economy.

However, even within neoclassical economics there have been contributions that emphasize that the long run is endogenous to short-run state of the economy, what is sometimes called "hysteresis." Early contributions along these lines include Blanchard and Summers (1986) who emphasize the effect of demand and unemployment on labor force participation and the labor supply and Stadler (1990) who shows that demand shocks and the business cycle have an effect on knowledge accumulation and thus productivity—along the lines of Smith, Kaldor, Verdoorn, and Myrdal (but without any reference to it!). These ideas went into hibernation in the next two decades during the period of the so-called "Great Moderation" but have become again popular over the last years due to the unexpectedly slow recovery of output and productivity after the

financial crisis of 2007-9, which was hard to be explained with the standard model.[26] As a result several recent contributions provide theoretical and empirical evidence in favor of how investment in innovation and diffusion of new technologies depend on demand (e.g., Benigno and Fornaro 2018 and Anzoategui et al. 2019). Cerra, Fatás, and Saxena (2023) provide a comprehensive review of this literature.

Another approach to technical change, which goes back to David Ricardo (1817 [1971]) and Karl Marx (1867 [1976]) and was first formalized by Hicks (1932) suggests that labor productivity is a positive function of the cost of labor. The intuition is straightforward: when a factor of production becomes relatively expensive, firms are incentivized to adopt production techniques that economize on its use—that is, techniques with higher factor productivity. Conversely, when the factor becomes relatively cheap, the incentive to improve its productivity diminishes.

In the case of labor productivity, when the real wage increases firms—all else being equal—have an incentive to engage in labor-saving innovation, while when real wages stagnate (or decrease) this incentive wanes. This basic intuition has been used in several important works within a neoclassical or classical framework. Samuelson (1965), Drandakis and Phelps (1966), Von Weizsäcker (1966), Nordhaus (1967), Funk (2002) and Acemoglu (2002) are important works within the first (neoclassical) category; Kennedy (1964), Foley (2003), Julius (2005), Tavani (2012), and Zamparelli (2015) follow the latter (classical).

This negative relationship between productivity and the cost of a factor of production can be established without reference to innovation and technical change. Assuming that several techniques of production are available, profit maximization suggests that as the cost of a factor of production increases firms will tend to substitute this factor of production with others (and vice versa). Consider, for example, a standard neoclassical production function. The profit-maximization condition that the real wage is equal to the marginal product of labor implies that as the real wage increases firms use less labor (due to the decreasing returns to each factor of production less labor is associated with a higher marginal product).[27]

Finally, there have been contributions that combine the role of demand and the cost of labor as basic determinants of productivity growth (Sylos-Labini 1983; Taylor, Foley, and Rezai 2019). Tridico and Pariboni (2018), using data for the period 1990-2013 for 26 OECD countries, and Carnevali et al. (2020), who focus on some Euro-area economies for the period 1996-2016 find empirical evidence in favor of both demand growth and labor cost as important joint determinants of productivity growth.

In light of this conceptual framework of productivity growth, the trajectory of productivity in Greece following the crisis is not surprising. As discussed in Section 3, it is now widely accepted that the fiscal consolidation of the 2010s was responsible for the collapse in demand and output

[26] The failure of the forecasts of the Greek adjustment programs were an extreme case of a more general failure of standard models to forecast the trajectory of output in the period after the financial crisis of 2007-9.

[27] An interesting question is whether the observed patterns of wage and productivity growth are due to technical change or just substitution between already-existing techniques of production (Foley et al 2019, ch. 8). However, this question goes beyond the scope of this paper. For our purposes it suffices that both approaches suggest that a decrease in the cost of labor will tend to lead to a decrease in labor productivity.

during that period. At the same time, the structural reforms implemented—combined with the rise in unemployment—led to a sharp decline in labor costs. According to the theories of labor productivity growth presented in this section, both of these developments (the collapse in output and the sharp decline in labor costs) would be expected to result in a significant decrease in labor productivity. Therefore, despite the stated objectives of the adjustment programs—namely, that reforms would unlock the productive potential of the Greek economy and raise labor productivity in the medium term—the outcomes observed are not unexpected and are well explained by established economic theory.

9. Estimating a technical progress function for Greece

In the previous section, we suggested that the decline in productivity in Greece is consistent with theories of technological change that emphasize output growth and labor costs as the main determinants of labor productivity. In this penutlimate section, we examine whether there is statistical support for this alternative explanation of technological change.

To that end, we employ seasonally and calendar-adjusted quarterly data from Eurostat's Industry Account, covering the period from 1995q1 to 2024q4. At a quarterly frequency, Eurostat aggregates certain sectors and provides data for only eleven sectors, compared to the twenty sectors available in the annual accounts. Unfortunately, in this more aggregated classification, AFSA is grouped together with Wholesale and Retail Trade and Transport, which prevents us from testing our hypothesis specifically for this sector.[28]

Overall, our sample contains 1,320 observations. Real value added is calculated as the ratio of value added at current prices to the (sectoral) implicit price deflator (2015 = 100). Labor productivity is computed as the ratio of real value added to total hours worked. Finally, the real wage is calculated as the deflated total compensation of employees divided by the number of employees.

We estimated a simple Panel Vector Autoregression (P-VAR) model using the growth rates of the three variables. The lag length (h = 6) was selected based on the Akaike Information Criterion. At this lag length, we fail to reject the null hypothesis of no serial correlation according to the LM test. As expected—given that the variables are expressed in growth rates—the model is stable, and the characteristic roots lie within the unit circle.

Figure 9 [IRFs] around here

Figure 9 presents the accumulated impulse response functions (IRFs) of productivity growth to generalized one-standard-deviation shocks to the growth rate of real wages and real value added. The results confirm that both real wage and output growth have a positive effect on productivity

[28] More specifically these sectors are [A] Agriculture, forestry and fishing; [B-E] Industry (except construction); [C] Manufacturing; [F] Construction; [G-I] Wholesale and retail trade, transport, accommodation and food service activities; [J] Information and communication; [K] Financial and insurance activities; [L] Real estate activities; [M,N] Professional, scientific and technical activities; administrative and support service activities; [O-Q] Public administration, defence, education, human health and social work activities; [R-U] Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies. For our exercise, and to avoid double counting, we removed manufacturing from [B-E].

growth—or inversely that negative shocks to real wages and output growth have a negative effect on productivity growth.

Seen differently, our results suggest that a 1% increase in real wage growth leads to a 0.15% increase in productivity growth, while a 1% increase in output growth leads to a 0.55% increase in productivity growth. The latter Kaldor-Verdoorn coefficient is close to the consensus value of the related literature suggests.

The results are robust to different specifications. For instance, we get very similar IRFs if we use a standard Cholesky decomposition with an ordering: real wage growth, output growth, productivity growth. Similar outcomes are also observed when restricting the sample to the post-2009 period.[29]

The similarity of the full-sample results to those from the post-2009 period is particularly valuable, as it allows us to identify the shocks responsible for the observed decline in productivity. As is well known, a key limitation of VAR models is the difficulty to identify the structural shocks that drive changes in the variables. For instance, output shocks may originate from either the demand or supply side. In turn, this requires further identification assumptions, which are questionable. For example, in their well-known paper, Blanchard and Quah (1989) assume that demand shocks have no long-run effect on output; only supply shocks do. Or, more recently, Furlanetto et al. (2025) make the identification assumption that that demand shocks have a positive effect on both output and prices, while supply shocks have a positive effect on output but negative on prices.

As discussed in section 2, in the case of Greece, it is widely acknowledged that the post-2009 output trajectory was primarily influenced by the negative demand effects of austerity measures (or by the relaxation of fiscal constraints during the pandemic). Meanwhile, the decline in real wages was largely driven by labor market reforms and the surge in unemployment—itself a consequence of reduced demand. As a result, we can reasonably identify austerity policies and labor market deregulation as the principal shocks contributing to the observed declines in output, employment, and, ultimately, productivity.[30]

Overall, our findings lend support to the theories of technical change outlined in the previous section. In the Greek context this is an important result. The collapse in demand and output growth due to austerity, along with a sharp decline in labor costs due to the deregulation of the labor markets have been the main factors behind the decrease and the stagnation in productivity.

10. Concluding remarks

This paper has examined the structural transformation of the Greek economy in the period during and after the crisis that started in 2009, highlighting the increasing dominance of what we term the "café economy"—the Accommodation and Food Service Activities (AFSA) sector. Contrary to the promises of the adjustment programs implemented between 2010 and 2018, the Greek

[29] If we run the model for the period before 2009, the estimates are also similar, but the effect of real wages is not statistically significant at the 95% level.

[30] This also suggests that a Cholesky ordering of wage>output>productivity is plausible as well.

economy did not experience a more efficient allocation of resources or productivity growth. Instead, it underwent a substantial reallocation of economic activity and employment toward AFSA, accompanied by a decline in productivity across the majority of sectors. This pattern reflects a dual growth model, where surplus labor is absorbed by low-productivity sectors through falling wages and diminishing productivity.

The structural shift of the Greek economy toward the AFSA sector—particularly tourism—has created a fundamental dilemma. While tourism has become a vital source of employment and foreign income, significantly contributing to the improvement of Greece's current account balance, this growing dependence comes with mounting challenges. The sector's low productivity limits its capacity to drive long-term growth, and its expansion has intensified issues such as over-tourism, environmental degradation, cultural commodification, and housing unaffordability due to short-term rentals. As a result, Greece finds itself increasingly reliant on a sector that, despite its short-term macroeconomic benefits, poses significant structural and social risks over the long term.

The Greek experience of the last decade and a half is also an interesting case study for technical change. In an empirical exercise with the use of a Panel-VAR model, we find that declining aggregate demand and falling real wages were key drivers of the productivity collapse. These results are consistent with theories of technological change that emphasize the role of output growth and labor costs in driving productivity dynamics. From this perspective, the stagnation of productivity in post-crisis Greece appears less as an unintended side effect and more as an endogenous consequence of the policy framework imposed during the adjustment period.

Ultimately, Greece's predicament raises fundamental questions about the adequacy of standard policy prescriptions and the theory that underlies them. Structural reforms must be carefully reconsidered in light of the real-world economic and institutional conditions. A successful path forward for Greece will require policies that not only restore demand but also strategically foster high-productivity sectors, support technological upgrading, and ensure inclusive growth. Without such a pivot, the café economy risks becoming not a temporary adjustment, but a long-term equilibrium of stagnation.

More broadly, the Greek experience holds important lessons for Europe as a whole. While Greece represents a particularly acute case, many of the underlying dynamics—stagnant productivity, increasing reliance on low-value-added services, economic dualization, and the uneven regional impacts of adjustment policies—are evident across much of the European Union. These outcomes are, in large part, the result of a shared policy framework that has prioritized fiscal consolidation and horizontal structural reforms without adequately supporting demand, investment, or productive upgrading. As the recent Draghi report also acknowledges (Draghi 2024), persistent productivity stagnation poses a significant threat to the long-term growth prospects and global competitiveness of European economies. Without a fundamental rethinking of the policy architecture Europe risks entrenching a model of uneven and low-growth trajectories across its member states.

References

Abell, John D. 1990. "Twin Deficits during the 1980s: An Empirical Investigation." *Journal of Macroeconomics* 12 (1): 81–96.

Acemoglu, Daron. 2002. "Directed Technical Change." *The Review of Economic Studies* 69 (4): 781–809.

Acemoglu, Daron, Philippe Aghion, and Fabrizio Zilibotti. 2006. "Distance to Frontier, Selection, and Economic Growth." *Journal of the European Economic Association* 4 (1): 37–74.

ACER-CEER. 2022. "Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2021. Energy Retail and Consumer Protection Volume." Brussels: European Union Agency for the Cooperation of Energy Regulators and Council of European Energy Regulators.

Aghion, Philippe, Stefan Bechtold, Lea Cassar, and Holger Herz. 2018. "The Causal Effects of Competition on Innovation: Experimental Evidence." *The Journal of Law, Economics, and Organization* 34 (2): 162–95.

Aghion, Philippe, Christopher Harris, Peter Howitt, and John Vickers. 2001. "Competition, Imitation and Growth with Step-by-Step Innovation." *The Review of Economic Studies* 68 (3): 467–92.

Aghion, Philippe, and Peter Howitt. 1998. *Endogenous Growth Theory*. MIT Press.

Alesina, Alberto, and Silvia Ardagna. 2010. "Large Changes in Fiscal Policy: Taxes versus Spending." *Tax Policy and the Economy* 24 (1): 35–68.

———. 2013. "The Design of Fiscal Adjustments." *Tax Policy and the Economy* 27 (1): 19–68.

Alogoskoufis, George. 2023. "The Twin Deficits, Monetary Instability and Debt Crises in the History of Modern Greece," Department of Economics Athens University of Economics and Business Working Papers 07-2023.

Amable, Bruno, Lilas Demmou, and Donatella Gatti. 2011. "The Effect of Employment Protection and Product Market Regulation on Labour Market Performance: Substitution or Complementarity?" *Applied Economics* 43 (4): 449–64. https://doi.org/10.1080/00036840903317367.

Anderson, Derek, Bergljot Barkbu, Lusine Lusinyan, and Dirk Muir. 2014. "Macroeconomic Impact of Structural Reforms in the Euro Area." *Jobs and Growth: Supporting the European Recovery*.

Andriopoulou, Eirini, Alexandros Karakitsios, and Panos Tsakloglou. 2018. "Inequality and Poverty in Greece: Changes in Times of Crisis." In *Socioeconomic Fragmentation and Exclusion in Greece under the Crisis*, edited by Dimitris Katsikas, Dimitri A. Sotiropoulos, and Maria Zafiropoulou, 23–54. New Perspectives on South-East Europe. Cham: Springer International Publishing.

Anzoategui, Diego, Diego Comin, Mark Gertler, and Joseba Martinez. 2019. "Endogenous Technology Adoption and R&D as Sources of Business Cycle Persistence." *American Economic Journal: Macroeconomics* 11 (3): 67–110.

Ardagna, Silvia, and Francesco Caselli. 2014. "The Political Economy of the Greek Debt Crisis: A Tale of Two Bailouts." *American Economic Journal: Macroeconomics* 6 (4): 291–323.

Baccaro, Lucio, Mark Blyth, and Jonas Pontusson, eds. 2022. *Diminishing Returns: The New Politics of Growth and Stagnation*. Oxford, New York: Oxford University Press.

Baccaro, Lucio, and Jonas Pontusson. 2016. "Rethinking Comparative Political Economy: The Growth Model Perspective." *Politics & Society* 44 (2): 175–207.

Barron, Kyle, Edward Kung, and Davide Proserpio. 2021. "The Effect of Home-Sharing on House Prices and Rents: Evidence from Airbnb." *Marketing Science* 40 (1): 23–47.

Benigno, Gianluca, and Luca Fornaro. 2018. "Stagnation Traps." *The Review of Economic Studies* 85 (3): 1425–70.

Blanchard, Olivier. 2018. “Should We Reject the Natural Rate Hypothesis?” *Journal of Economic Perspectives* 32 (1): 97–120.
Blanchard, Olivier J., and Daniel Leigh. 2013. “Growth Forecast Errors and Fiscal Multipliers.” *American Economic Review* 103 (3): 117–20. https://doi.org/10.1257/aer.103.3.117.
Blanchard, Olivier J, and Daniel Leigh. 2014. “Learning about Fiscal Multipliers from Growth Forecast Errors.” *IMF Economic Review* 62 (2): 179–212.
Blanchard, Olivier J., and Lawrence H. Summers. 1986. “Hysteresis and the European Unemployment Problem.” *NBER Macroeconomics Annual* 1 (January):15–78. https://doi.org/10.1086/654013.
Blanchard, Olivier Jean, and Danny Quah. 1989. “The Dynamic Effects of Aggregate Demand and Supply Disturbances.” *The American Economic Review* 79 (4): 655–73.
Bordon, Anna Rose, Christian Ebeke, and Kazuko Shirono. 2018. “When Do Structural Reforms Work? On the Role of the Business Cycle and Macroeconomic Policies.” In *Structural Reforms: Moving the Economy Forward*, edited by Jakob de Haan and Jante Parlevliet, 147–71. Cham: Springer International Publishing.
Bouis, Romain, Orsetta Causa, Lilas Demmou, Romain Duval, and Aleksandra Zdzienicka. 2012. “The Short-Term Effects of Structural Reforms: An Empirical Analysis.” https://www.oecd-ilibrary.org/content/paper/5k9csvk4d56d-en.
Bourlès, Renaud, Gilbert Cette, Jimmy Lopez, Jacques Mairesse, and Giuseppe Nicoletti. 2013. “Do Product Market Regulations in Upstream Sectors Curb Productivity Growth? Panel Data Evidence for OECD Countries.” *Review of Economics and Statistics* 95 (5): 1750–68.
Bragoudakis, Zacharias. 2018. “Are Price Adjustments Asymmetric in Basic Food Categories? The Case of Greek Food Market.” *Bank of Greece Economic Bulletin*, no. 47.
Canton, E., I. Grilo, J. Monteagudo, F. Pierini, and A. Turrini. 2014. “The Role of Structural Reform for Adjustment and Growth, ECFIN Economic Briefs No. 34.” *Brussels, Belgium, European Commission*.
Carnevali, Emilio, Antoine Godin, Stefano Lucarelli, and Marco Veronese Passarella. 2020. “Productivity Growth, Smith Effects and Ricardo Effects in Euro Area’s Manufacturing Industries.” *Metroeconomica* 71 (1): 129–55.
Cerra, Valerie, Antonio Fatás, and Sweta C. Saxena. 2023. “Hysteresis and Business Cycles.” *Journal of Economic Literature* 61 (1): 181–225.
Christiansen, Lone, Martin Schindler, and Thierry Tressel. 2013. “Growth and Structural Reforms: A New Assessment.” *Journal of International Economics* 89 (2): 347–56.
Darrat, Ali F. 1988. “Have Large Budget Deficits Caused Rising Trade Deficits?” *Southern Economic Journal* 54 (4): 879–87.
De Grauwe, Paul. 2020. *Economics of the Monetary Union*. Oxford, UK: Oxford University Press.
Decressin, Jörg, Raphael A. Espinoza, Ioannis Halikias, Michael Kumhof, Daniel Leigh, Prakash Loungani, Paulo A. Medas, Susanna Mursula, Antonio Spilimbergo, and TengTeng Xu. 2015. “Wage Moderation in Crises: Policy Considerations and Applications to the Euro Area.” *IMF Staff Discussion Notes*, IMF Staff Discussion Notes, November. https://ideas.repec.org//p/imf/imfsdn/2015-022.html.
Deleidi, Matteo, Walter Paternesi Meloni, and Antonella Stirati. 2020. “Tertiarization, Productivity and Aggregate Demand: Evidence-Based Policies for European Countries.” *Journal of Evolutionary Economics* 30 (5): 1429–65.
Dosi, Giovanni, and Xiaodan Yu. 2019. “Technological Catching-up, Sales Dynamics, and Employment Growth: Evidence from China’s Manufacturing.” *Industrial and Corporate Change* 28 (1): 79–107.

Draghi, Mario. 2024. “The Future of European Competitiveness.” European Commission. https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en#paragraph_47059.
Drandakis, E. M., and E. S. Phelps. 1966. “A Model of Induced Invention, Growth and Distribution.” *The Economic Journal* 76 (304): 823–40.
Eggertsson, Gauti, Andrea Ferrero, and Andrea Raffo. 2014. “Can Structural Reforms Help Europe?” *Journal of Monetary Economics*, Carnegie-Rochester-NYU Conference Series on “Fiscal Policy in the Presence of Debt Crises” held at the Stern School of Business, New York University on April 19-20, 2013, 61 (January):2–22.
Eichengreen, Barry. 2010. “Imbalances in the Euro Area.” University of California Berkeley.
Emmenegger, Patrick, Silja Hausermann, Bruno Palier, and Martin Seeleib-Kaiser, eds. 2012. *The Age of Dualization: The Changing Face of Inequality in Deindustrializing Societies*. Oxford, UK: Oxford University Press.
European Commission. 2010. *The Economic Adjustment Programme for Greece*. LU: Publications Office of the European Union. https://data.europa.eu/doi/10.2765/46750.
———. 2012. “The Second Economic Adjustment Programme for Greece.” *European Commission Directorate-General for Economic and Financial Affairs. Occasional Papers* 94.
———. 2015. “The Third Economic Adjustment Programme for Greece.” *European Commission Directorate-General for Economic and Financial Affairs. Occasional Papers* 94.
Eurostat. 2008. “NACE Rev. 2, Statistical Classification of Economic Activities in the European Community.” *General and Regional Statistics*.
———. 2023. “Tourism Satellite Accounts in Europe.” Luxemburg: Publications Office of the European Union.
Fakos, Alexandros, Plutarchos Sakellaris, and Tiago Tavares. 2022. “Investment Slumps during Financial Crises: The Real Effects of Credit Supply.” *Journal of Financial Economics* 145 (1): 29–44.
Fazzari, Steven M., and Alejandro González. 2025. “How Large Are Hysteresis Effects? Estimates from a Keynesian Growth Model.” *Journal of Economic Dynamics and Control*, 105058.
Fiori, Giuseppe, Giuseppe Nicoletti, Stefano Scarpetta, and Fabio Schiantarelli. 2012. “Employment Effects of Product and Labour Market Reforms: Are There Synergies?*.” *The Economic Journal* 122 (558): F79–104.
Foley, Duncan K. 2003. “Endogenous Technical Change with Externalities in a Classical Growth Model.” *Journal of Economic Behavior & Organization* 52 (2): 167–89.
Franco, Sofia F., and Carlos Daniel Santos. 2021. “The Impact of Airbnb on Residential Property Values and Rents: Evidence from Portugal.” *Regional Science and Urban Economics* 88 (May):103667.
Funk, Peter. 2002. “Induced Innovation Revisited.” *Economica* 69 (273): 155–71.
Furlanetto, Francesco, Antoine Lepetit, Ørjan Robstad, Juan Rubio-Ramírez, and Pål Ulvedal. 2025. “Estimating Hysteresis Effects.” *American Economic Journal: Macroeconomics* 17 (1): 35–70.
Gollin, Douglas. 2014. “The Lewis Model: A 60-Year Retrospective.” *Journal of Economic Perspectives* 28 (3): 71–88.
Gourinchas, Pierre-Olivier, Thomas Philippon, and Dimitri Vayanos. 2016. “The Analytics of the Greek Crisis.” *NBER Chapters*, 1–81.
Griffith, Rachel, Rupert Harrison, and Gareth Macartney. 2007. “Product Market Reforms, Labour Market Institutions and Unemployment.” *The Economic Journal* 117 (519): C142–66.
Hantzsche, Arno, Marta Lopresto, and Garry Young. 2018. “Using NiGEM in Uncertain Times: Introduction and Overview of NiGEM.” *National Institute Economic Review* 244 (May):R1–14.

Hardouvelis, Gikas A., and Dimitri Vayanos. 2023. “The Greek Economic Crisis and the Banks.” Monograph. London, UK: Hellenic Observatory, London School of Economics and Political Science. January 2023. https://www.lse.ac.uk/hellenic-observatory/publications/greese-papers.

Hicks, John R. 1932. *The Theory of Wages*. London: McMillan and Co.

Iasco Pereira, Hugo Carcanholo, João P. Romero, and Victor Medeiros. 2021. “Kaldor–Verdoorn’s Law and Institutions: Evidence from Brazilian Municipalities.” *Cambridge Journal of Economics* 45 (3): 511–36.

IMF. 2012. “World Economic Outlook, October 2012: Coping with High Debt and Sluggish Growth.”

INE-GSEE. 2023. “Annual Report for the Greek Economy and Employment.” Labor Institute of GSEE.

International Monetary Fund. 2003. “World Economic Outlook (WEO): Growth and Institutions.”

Ioannides, Yannis M., and Christopher A. Pissarides. 2015. “Is the Greek Crisis One of Supply or Demand?” *Brookings Papers on Economic Activity*, 349–83.

Julius, A. J. 2005. “Steady-State Growth and Distribution with an Endogenous Direction of Technical Change.” *Metroeconomica* 56 (1): 101–25.

Kaldor, Nicholas. 1966. *Causes of the Slow Rate of Economic Growth of the United Kingdom: An Inaugural Lecture*. Cambridge, UK: Cambridge University Press.

Kalou, Sofia, and Suzanna-Maria Paleologou. 2012. “The Twin Deficits Hypothesis: Revisiting an EMU Country.” *Journal of Policy Modeling* 34 (2): 230–41.

Kennedy, Charles. 1964. “Induced Bias in Innovation and the Theory of Distribution.” *The Economic Journal* 74 (295): 541–47.

Krugman, Paul. 2010. “Opinion | The Euro Trap.” *The New York Times*, April 30, 2010, sec. Opinion. https://www.nytimes.com/2010/04/30/opinion/30krugman.html.

Lewis, W. Arthur. 1954. “Economic Development with Unlimited Supplies of Labour.” *The Manchester School* 22 (2): 139–91.

Magacho, Guilherme R., and John SL McCombie. 2018. “A Sectoral Explanation of per Capita Income Convergence and Divergence: Estimating Verdoorn’s Law for Countries at Different Stages of Development.” *Cambridge Journal of Economics* 42 (4): 917–34.

Marshall, Alfred. 1898. *Principles of Economics*. 4th ed. McMilland and Co.

Marx, Karl. 1867 [1976]. *Capital: A Critique of Political Economy, Vol. I*. London, England: Penguin Books.

Matsaganis, Manos. 2013. “The Greek Crisis: Social Impact and Policy Responses.” Friedrich-Ebert-Stiftung, Department of Western Europe/North America.

Michl, Thomas R. 1985. “International Comparisons of Productivity Growth: Verdoorn’s Law Revisited.” *Journal of Post Keynesian Economics* 7 (4): 474–92.

Mihalic, Tanja. 2020. “Conceptualising Overtourism: A Sustainability Approach.” *Annals of Tourism Research* 84 (September):103025.

Milano, Claudio, Marina Novelli, and Joseph M. Cheer. 2019. “Overtourism and Tourismphobia: A Journey Through Four Decades of Tourism Development, Planning and Local Concerns.” *Tourism Planning & Development* 16 (4): 353–57.

Myrdal, Gunnar. 1957. *Economic Theory and Under-Developed Regions*. London: G. Duckworth.

Nickell, Stephen. 1999. “Product Markets and Labour Markets1.” *Labour Economics* 6 (1): 1–20.

Nicoletti, Giuseppe, and Stefano Scarpetta. 2003. “Regulation, Productivity and Growth: OECD Evidence.” *Economic Policy* 18 (36): 9–72.

Nikiforos, Michalis, Laura Carvalho, and Christian Schoder. 2015. “‘Twin Deficits’ in Greece: In Search of Causality.” *Journal of Post Keynesian Economics* 38:302–30.

Nikiforos, Michalis, Dimitri B. Papadimitriou, and Gennaro Zezza. 2015. “The Greek Public Debt Problem.” *Nova Economia*.

Nordhaus, William D. 1967. “The Optimal Rate and Direction of Technical Change.” In *Essays on the Theory of Optimal Economic Growth*, edited by K. Shell. MIT Press, Cambridge, Mass.
Obama, Barack. 2020. *A Promised Land: The Powerful Political Memoir from the Former US President*. Penguin UK.
Obstfeld, Maurice, and Kenneth S Rogoff. 1996. *Foundations of International Macroeconomics*. Cambridge, MA: MIT press.
Ocampo, Jose Antonio, Codrina Rada, and Lance Taylor. 2009. *Growth and Policy in Developing Countries: A Structuralist Approach*. New York: Columbia University Press.
OECD. 2014a. “Going for Growth.”
———. 2014b. *OECD Competition Assessment Reviews: Greece*. Paris: Organisation for Economic Co-operation and Development. https://www.oecd-ilibrary.org/finance-and-investment/oecd-competition-assessment-reviews-greece_9789264206090-en.
———. 2017. *OECD Competition Assessment Reviews: Greece 2017*. Paris: Organisation for Economic Co-operation and Development. https://www.oecd-ilibrary.org/finance-and-investment/oecd-competition-assessment-reviews-greece-2017_9789264088276-en.
Orphanides, Athanasios. 2015. “The Euro Area Crisis Five Years after the Original Sin.” *Credit and Capital Markets–Kredit Und Kapital*, no. 4, 535–65.
Papatheothodorou, Christos, and Vlassis Missos. 2013. “Inequality, Poverty and Economic Crisis in Greece and EU.” Scientific Report 9. Labor Institute of GSEE.
Perez, Sofia A., and Manos Matsaganis. 2018. “The Political Economy of Austerity in Southern Europe.” *New Political Economy* 23 (2): 192–207.
Petrakis, Panagiotis E. 2020. *The New Political Economy of Greece up to 2030*. Switzerland: Springer Nature.
Petroulakis, Filippos. 2017. “Internal Devaluation in Currency Unions: The Role of Trade Costs and Taxes.”
Pierros, Christos. 2021. “Assessing the Internal Devaluation Policy Implemented in Greece in an Empirical Stock-Flow Consistent Model.” *Metroeconomica* 72 (4): 905–43.
Prati, Alessandro, Massimiliano Gaetano Onorato, and Chris Papageorgiou. 2013. “Which Reforms Work and under What Institutional Environment? Evidence from a New Data Set on Structural Reforms.” *Review of Economics and Statistics* 95 (3): 946–68.
Ricardo, David. 1817 [1971]. *On the Principles of Political Economy and Taxation*. UK: Penguin.
Samuelson, Paul A. 1965. “A Theory of Induced Innovation along Kennedy-Weisäcker Lines.” *The Review of Economics and Statistics* 47 (4): 343–56.
SEV. 2020. “Healthy competition, stronger economy: Leveraging the legacy of the OECD toolbox.” Special Report: Competition 51. Athens, Greece.
Smith, Adam. 1776 [1999]. *The Wealth of Nations*. London, UK: Penguin Books.
Stadler, George W. 1990. “Business Cycle Models with Endogenous Technology.” *The American Economic Review*, 763–78.
Stiglitz, J.E. 2010. *Freefall: America, Free Markets, and the Sinking of the World Economy*. New York: W. W. Norton.
Storm, Servaas. 2017. “The New Normal: Demand, Secular Stagnation, and the Vanishing Middle Class.” *International Journal of Political Economy* 46 (4): 169–210.
Sylos-Labini, Paolo. 1983. “Factors Affecting Changes in Productivity.” *Journal of Post Keynesian Economics* 6 (2): 161–79.
Tavani, Daniele. 2012. “Wage Bargaining and Induced Technical Change in a Linear Economy: Model and Application to the US (1963--2003).” *Structural Change and Economic Dynamics* 23 (2): 117–26.

Taylor, Lance, Duncan K Foley, and Armon Rezai. 2019. “Demand Drives Growth All the Way: Goodwin, Kaldor, Pasinetti and the Steady State.” *Cambridge Journal of Economics* 43 (5): 1333–52. https://doi.org/10.1093/cje/bey045.

Taylor, Lance, and Özlem Ömer. 2019. “Race to the Bottom: Low Productivity, Market Power, and Lagging Wages.” *International Journal of Political Economy* 48 (1): 1–20.

Temin, Peter. 2018. *The Vanishing Middle Class: Prejudice and Power in a Dual Economy*. Cambridge, MA: MIT Press.

Tignor, Robert L. 2006. *W. Arthur Lewis and the Birth of Development Economics*. Princeton University Press.

Tridico, Pasquale, and Riccardo Pariboni. 2018. “Inequality, Financialization, and Economic Decline.” *Journal of Post Keynesian Economics* 41 (2): 236–59.

UNWTO. 1983. “Risks of Saturation of Tourist Carrying Capacity Overload in Holiday Destinations.” Madrid, Spain: United Nations World Tourism Organization.

———. 2018. “‘Overtourism’? – Understanding and Managing Urban Tourism Growth beyond Perceptions.” Madrid, Spain: United Nations World Tourism Organization.

Vamvoukas, George A. 1999. “The Twin Deficits Phenomenon: Evidence from Greece.” *Applied Economics* 31:1093–1100.

Varga, Janos, and Jan in ’t Veld. 2013. “The Growth Impact of Structural Reforms.” *Quarterly Report on the Euro Area (QREA)* 12 (4): 17–27.

Verdoorn, P.J. 1949. “Fattori Che Regolano Lo Sviluppo Della Produttivita Del Lavoro.” *L’ Industria* 1:3–10.

Volcker, Paul A. 1984. “Facing up to the Twin Deficits.” Challenge.

Von Weizsäcker, Carl-Christian. 1966. “Tentative Notes on a Two Sector Model with Induced Technical Progress.” *The Review of Economic Studies* 33 (3): 245–51.

World Bank. 2024. “Global Financial Development | Data Catalog.” https://datacatalog.worldbank.org/search/dataset/0038648.

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

Zamparelli, Luca. 2015. “Induced Innovation, Endogenous Technical Change and Income Distribution in a Labor-Constrained Model of Classical Growth.” *Metroeconomica* 66 (2): 243–62.

Appendix

In this appendix we provide details on the sources of the data used in sections 4, 5 and 9

Sections 4.1 and 5 (Table 2; Figures 5,6, 8)

Data from the databases "National accounts aggregates by industry" (nama_10_a64) and "National accounts employment data by industry" (nama_10_a64_e) at an annual frequency for the period 1995-2023. The data were accessed on 20 May 2025. The data are classified according to the second revision of the NACE system of classifications of economic activities and products (Eurostat 2008). The analysis is conducted at the "section" level (e.g., Section A: Agriculture, forestry and fishing, Section B: Mining and quarrying etc.). Accommodation and Food Service Activities is section [I] of the classification.

A difference of the decomposition presented in section 5 (figure 8) compared to section 4.2 is that in the former we used the GDP deflator as a common deflator for the value added of all sectors to guarantee that equation (2), which is an accounting identity, holds. The results do not change in a significant way if we use sectoral deflators instead.

Section 4.2 (Table 3; Figure 7)

Labor Force Survey published by the Greek statistical authority (ELSTAT). The data were retrieved on November 30, 2024.

Some numbers of Table 3 that seem bizarre are due to the small number of employees who belong in specific categories in some sectors. For example, the 100% decrease in part-time employment in Mining reflects a decrease from 400 employees in 2009 to 0 in 2023.

The skill level—presented in figures 7c and 7d and columns (E) and (F) of Table 3—refers to both manual and non-manual labor.

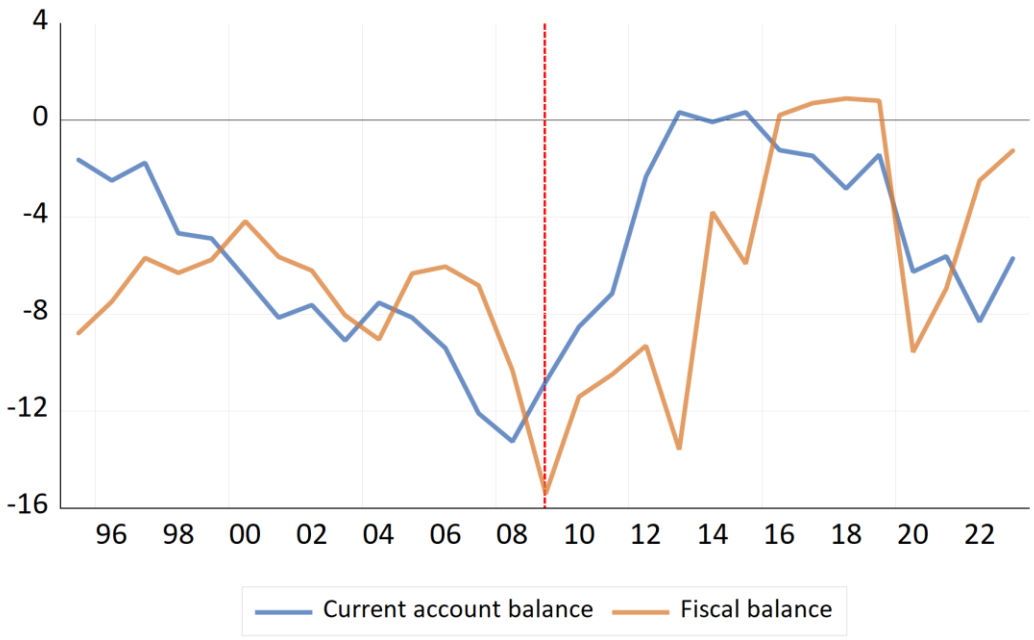
Section 9

Data from the databases "National accounts aggregates by industry" (namq_a10) and "National accounts employment data by industry" (namq_a10_e) at a quarterly frequency for the period 1995-2024. The data were accessed on 29 May 2025.

At a quarterly frequency, Eurostat aggregates certain sectors and provides data for only eleven sectors, compared to the twenty sectors available in the annual accounts. More specifically these sectors are [A] Agriculture, forestry and fishing; [B-E] Industry (except construction); [C] Manufacturing; [F] Construction; [G-I] Wholesale and retail trade, transport, accommodation and food service activities; [J] Information and communication; [K] Financial and insurance activities; [L] Real estate activities; [M,N] Professional, scientific and technical activities; administrative and support service activities; [O-Q] Public administration, defence, education, human health and social work activities; [R-U] Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies. For our exercise, and to avoid double counting, we removed manufacturing from [B-E].

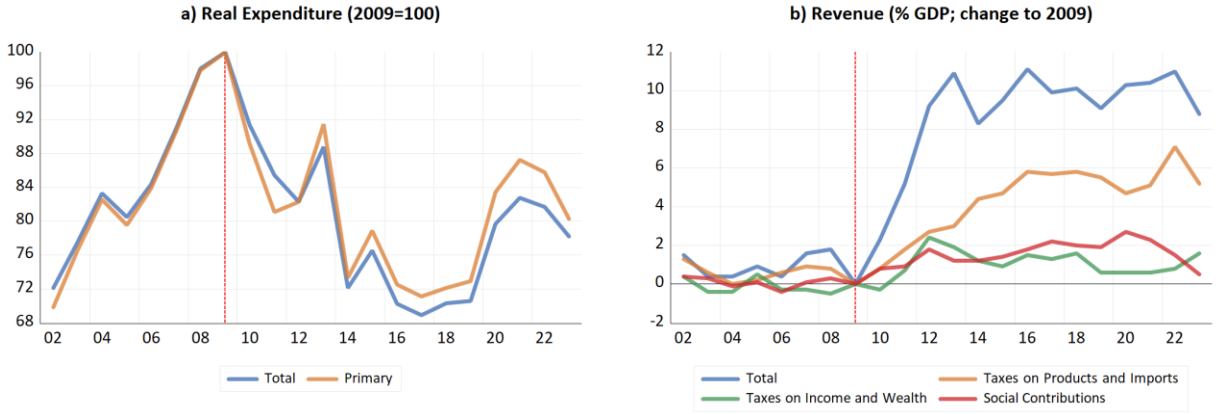
Figures

Figure 1: Current account balance and Fiscal balance, 1995-2003 (percent of GDP)



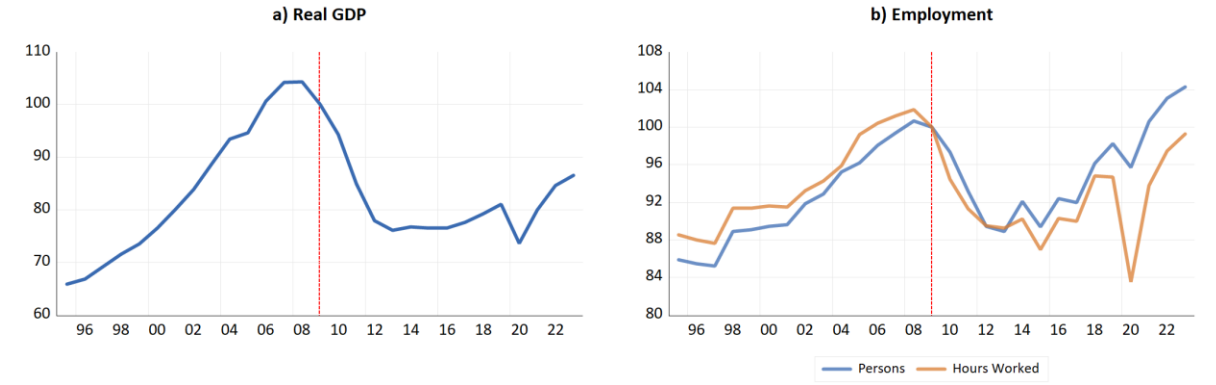
Source: Eurostat

Figure 2: Government Statistics, 2002-23



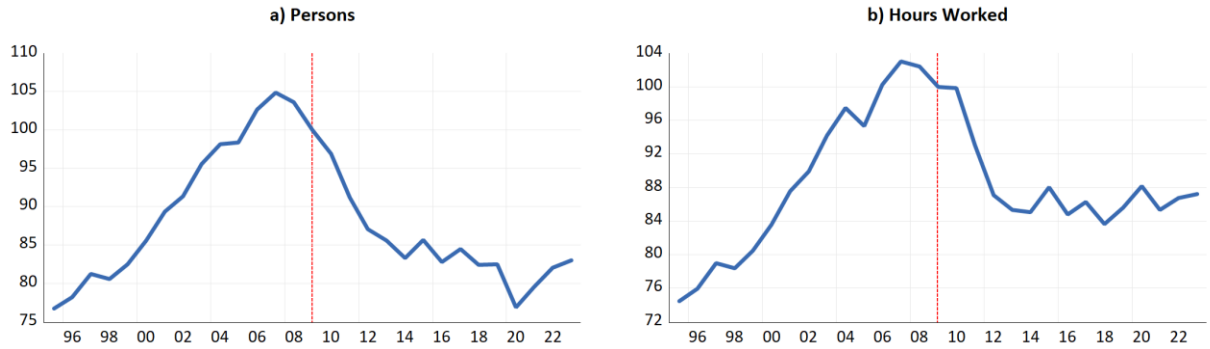
Note: Panel (b) presents the change in government revenue as percentage of GDP relative to 2009. It shows, for example, that total government revenue in 2023 was ten percentage points of GDP above its 2009 level. For reference the 2009 levels as a percentage of GDP were: i) Total Revenue 38.9%; ii) Taxes on Products and Imports 11.7%; iii) Taxes on Income and Wealth 8.5%; iv) Social Contributions 12.4%.
Source: Eurostat

Figure 3: Real GDP and Employment,1995-2023 (2009=100)



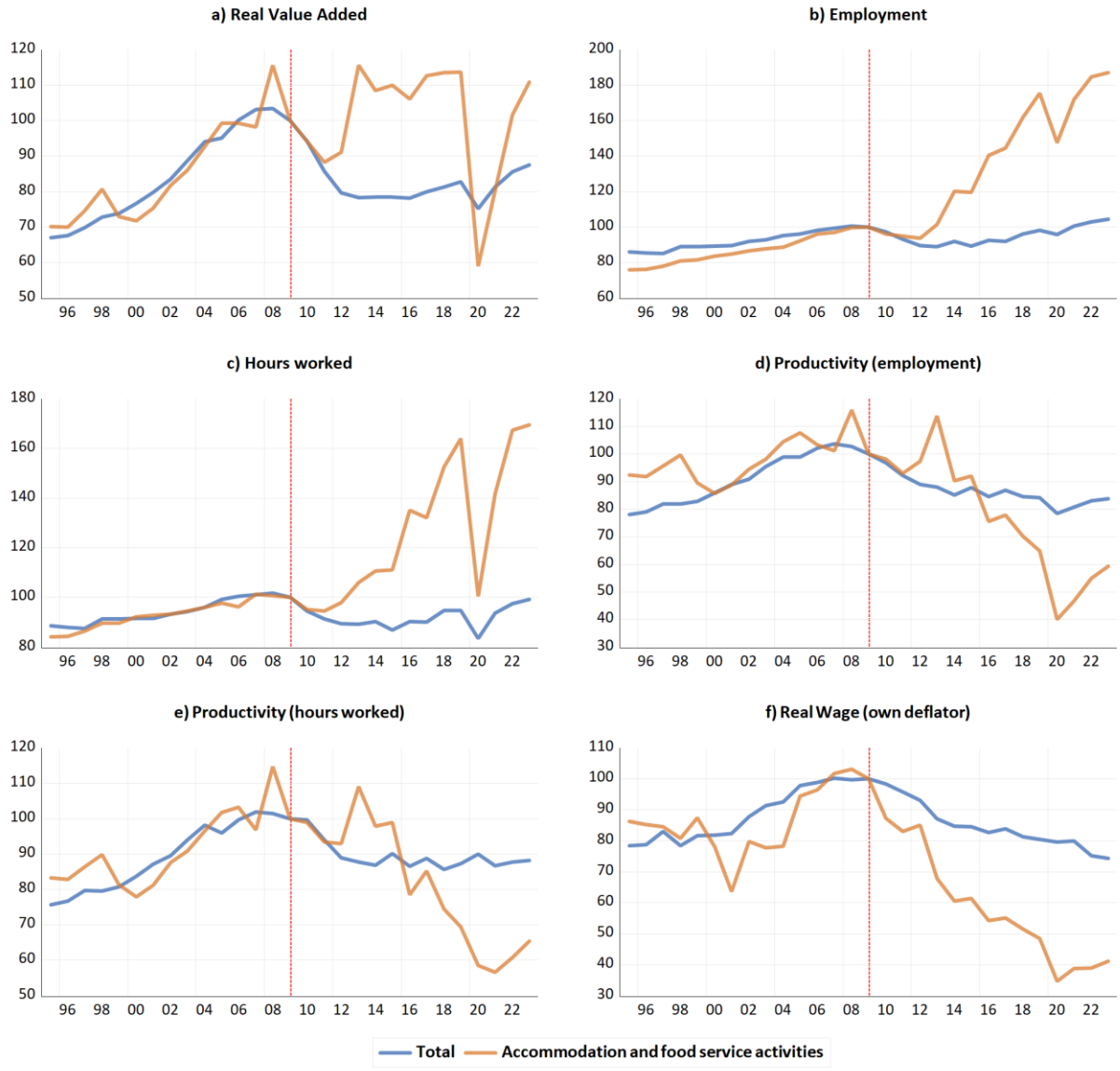
Source: Eurostat

Figure 4: Labor Productivity, 1995-2003 (2009=100)



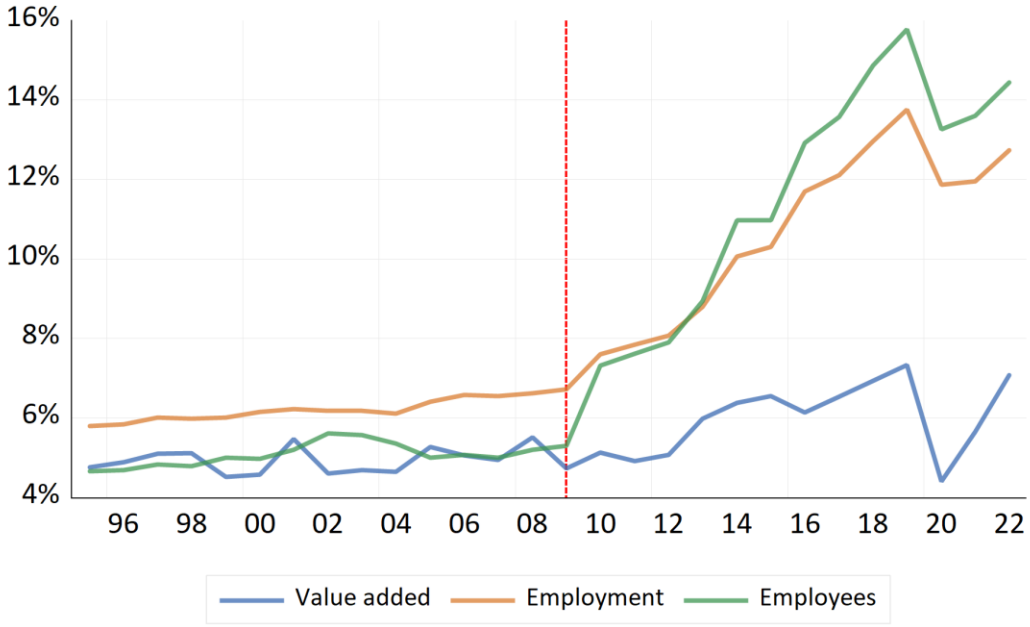
Source: Eurostat

Figure 5: Indices of relevant economic variables in Accommodation and Food Service Activities and Total economy (2009=100)



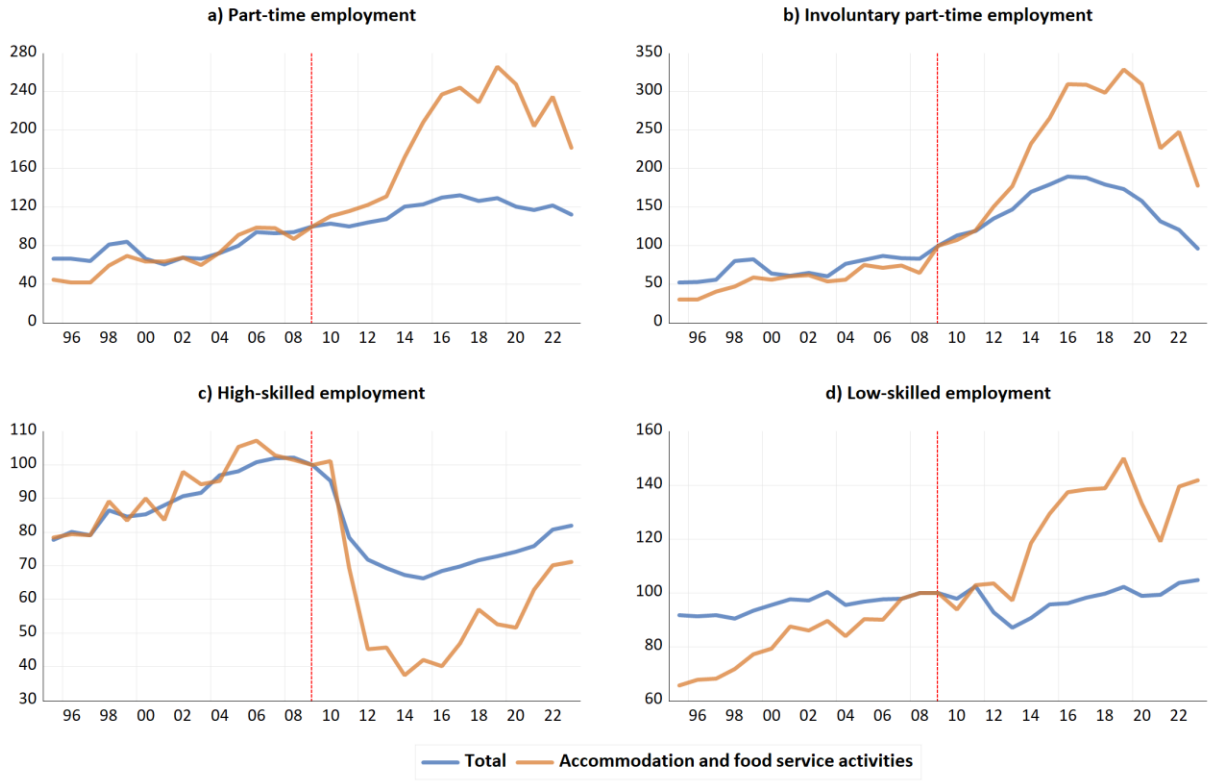
Note: The real wages of total economy and AFSA have been deflated with the respective gross value added deflators.
Sources: Eurostat: Industry Accounts, authors' calculations

Figure 6: Shares of Accommodation and Food Service Activities in value added, employment, and employees



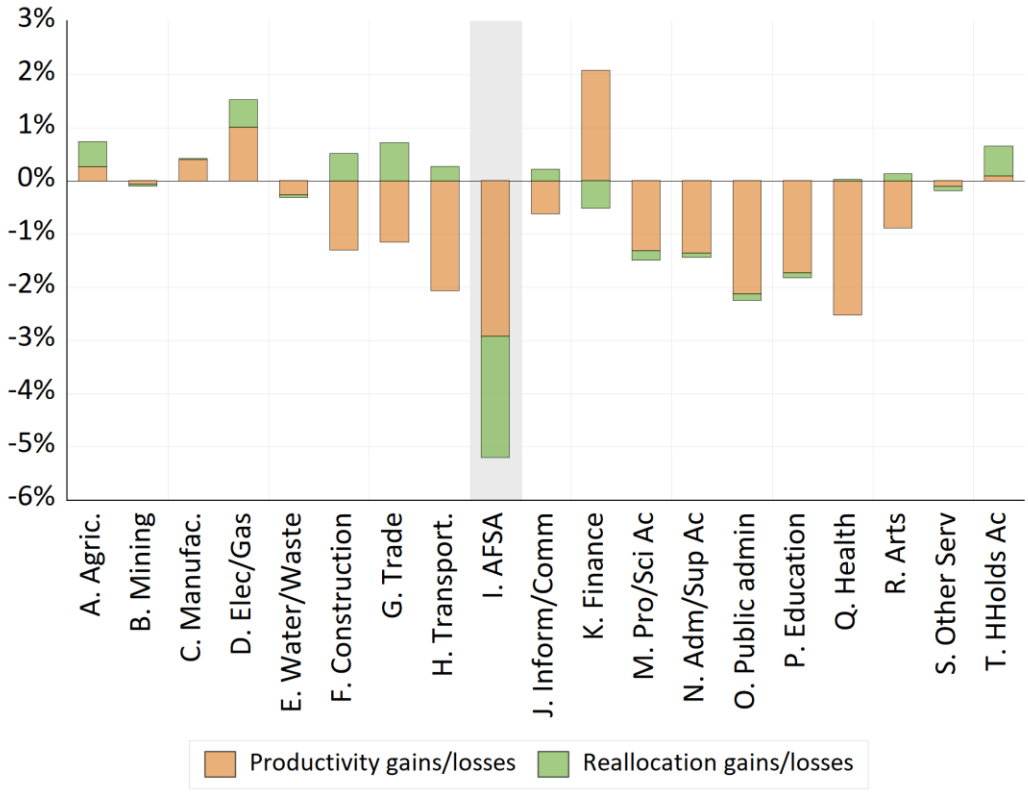
Sources: Eurostat: Industry Accounts, authors' calculations

Figure 7: Labor Market Indicators (2009=100)



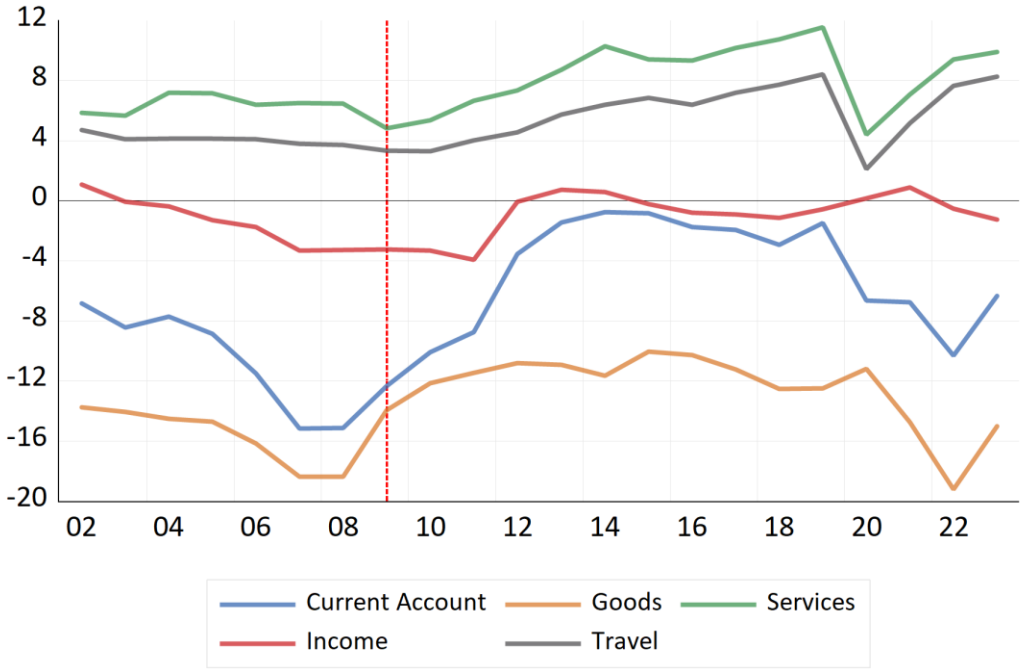
Note: For the period before 2007 we use data for "Hotels and restaurants," which was the name of the related industry according to the first version/revision of the Statistical classification of economic activities in the European Community (NACE Rev. 1). "Accommodation and food service activities" is the name of the sector in the second version (NACE Rev. 2).
Sources: Eurostat: Labour Force Surveys, authors' calculations

Figure 8: Productivity growth decomposition (productivity and reallocation gains/losses per sector 2009-2023)



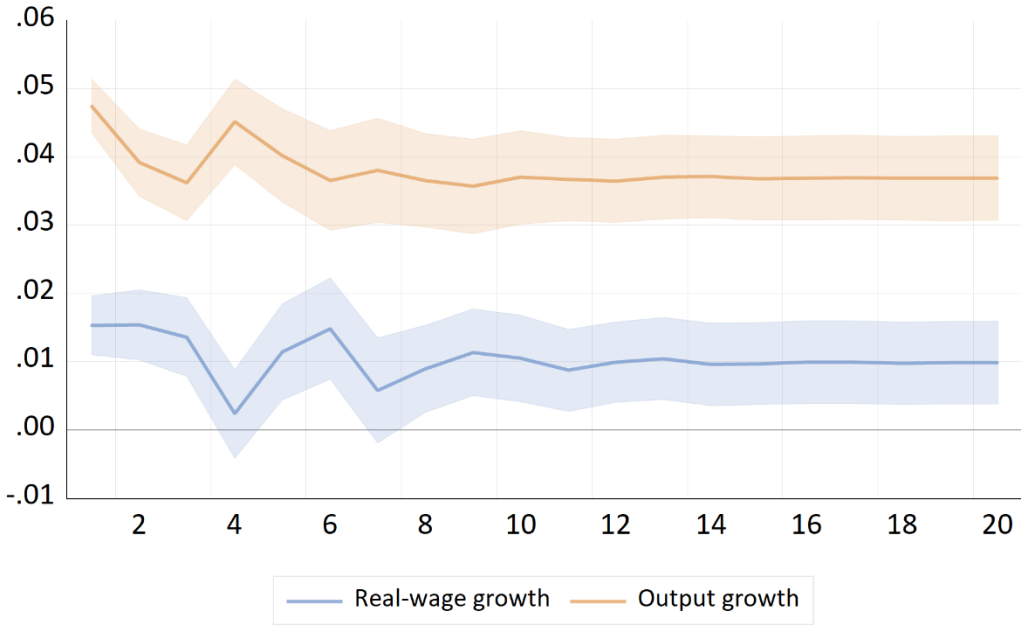
Notes: The name of each sector includes its code and an abbreviated name for its label. The complete label can be found in Table 2. The figure does not contain data for sector "L. Real estate." In this sector there were productivity losses of -24.79% and reallocation gains of 23.38% leading to an overall loss of -1.41%.
Sources: Eurostat: Industry Accounts, authors' calculations

Figure 9: Current account and its components (percent of GDP)



Sources: Bank of Greece, Eurostat, authors' calculations

Figure 10. Impulse response functions of the labor productivity growth rate



Note: Accumulated response of labor productivity growth rate to generalized one standard deviation innovations in real wage growth rate and real gross valued added growth rate. Colored areas around the responses reflect the 95% confidence intervals using analytic asymptotic S.E.s. The horizontal axis measures quarters after the introduction of the shock.

Source: Authors' estimations.

Tables

Table 1: Key reforms of the three Economic Adjustment Programs implemented between 2010-2018 in Greece.

Year	2010	2012	2015
Labor market reforms	1. Introduction of sub-minimum wage 2. Ease off hiring/firing (promotion of temporary contracts) 3. Prioritization of firm-level agreements	1. Reduction of minimum (-22%) and sub-minimum (-32%) wage 2. Threshold on the maximum duration of collective agreements 3. Withdrawal of extension of collective agreements to non-unionized firms 4. Arbitration only if both bargaining parties agree	Freeze collective agreements between 2017 and 2018
Product market reforms	1. Ease off the birth of start-ups 2. Deregulation of the: - energy market - railways - professional, scientific and technical activities	Deregulation of the air transports	Deregulation of the pharmaceutical sector
Other reforms	1. Reductions in public sector wages, pensions and general government expenditures 2. Increase in VAT, excise taxes, and implementation of new taxes (property tax) 3. Hiring freeze, cap on government wages 4. Enhancement of budgetary control and management systems 5. Privatizations	1. Deeper cuts in public sector wages (13th and 14th salary), reduction of health and defense expenditures 2. Introduction of the new property tax, restructuring tax rates and reforming tax collective mechanism 3. Continued efficiency enhancements and cost reductions in public administration	1. Reductions in pension expenditures through recalculations of pension benefits and eligibility criteria 2. Streamlining of VAT rates, increases in VAT for high-demand goods and services. 3. Acceleration of privatizations to raise funds 4. Reforms aimed at improving public spending efficiency and resource management 5. Tax compliance measures: Enhanced measures to combat tax evasion using electronic tracking

Sources: Authors' elaboration based on the Economic Adjustment Programs for Greece (European Commission 2010; 2012; 2015)

Table 2: Sectoral changes in real gross value added, employment hours worked, productivity and the real mean wage, 2009-2023 (percent)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
NACER2 sector		**Levels**							**Shares**	
Code	Labels	Real Value Added	Employment	Hours Worked	Productivity (empl/ment)	Productivity (Hrs worked)	Real Wage (own defl.)	Real Wage (CPI)	Value Added	Employment
TOTAL	**Total - all NACE activities**	**-12.52**	**4.30**	**-0.74**	**-16.13**	**-11.87**	**-25.67**	**-34.02**	**0.00**	**0.00**
A	Agriculture, forestry and fishing	-22.54	-6.04	-3.61	-17.56	-19.63	-17.72	-3.58	0.55	-1.13
B	Mining and quarrying	-50.66	-25.40	-29.27	-33.86	-30.24	-50.54	-48.37	-0.14	-0.07
C	Manufacturing	-7.02	-8.99	-10.69	2.17	4.11	-17.50	-24.70	0.85	-1.18
D	Electricity, gas, steam and air conditioning supply	-12.71	40.93	22.68	-38.06	-28.85	-54.38	-7.68	2.29	0.17
E	Water supply; sewerage, waste management and remediation activities	-2.33	-7.59	-12.33	5.69	11.40	35.65	-13.46	-0.25	-0.07
F	Construction	-51.58	-40.25	-44.93	-18.96	-12.07	15.44	-27.11	-3.27	-2.86
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	-30.77	-9.88	-16.23	-23.18	-17.36	-33.48	-31.28	-0.99	-2.73
H	Transportation and storage	-42.75	13.43	7.19	-49.53	-46.59	-29.37	-9.92	-0.41	0.43
I	**Accommodation and food service activities**	**10.93**	**86.96**	**69.47**	**-40.67**	**-34.55**	**-58.84**	**-58.62**	**2.17**	**6.11**
J	Information and communication	-9.23	21.36	12.32	-25.21	-19.18	-15.80	-17.81	0.43	0.33
K	Financial and insurance activities	-14.72	-23.07	-25.14	10.85	13.92	-47.48	-31.97	1.92	-0.58
L	Real estate activities	24.08	159.26	142.09	-52.14	-48.74	-29.16	-52.97	0.95	0.33
M	Professional, scientific and technical activities	-17.44	13.97	9.27	-27.56	-24.44	9.04	-3.61	-0.26	0.52
N	Administrative and support service activities	-20.70	50.74	30.56	-47.39	-39.26	-24.40	-29.73	-0.11	1.00
O	Public administration and defence; compulsory social security	-9.22	-6.63	-7.34	-2.77	-2.03	-7.53	-34.89	-1.85	-0.91
P	Education	-13.56	5.44	7.47	-18.02	-19.57	-8.51	-31.19	-0.91	0.08
Q	Human health and social work activities	-8.51	31.24	16.84	-30.29	-21.69	-6.38	-29.80	-0.57	1.25
R	Arts, entertainment and recreation	-18.97	30.33	22.97	-37.82	-34.10	-22.14	-35.97	-0.24	0.31
S	Other service activities	1.96	6.14	2.93	-3.93	-0.94	-22.22	-34.20	0.15	0.05
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	-49.31	-65.22	-68.59	45.73	61.36	-18.18	-29.79	-0.30	-1.05

Note: The "levels" columns refer to the percentage change in the level of the related variable, while the "shares" columns refer to the change in the share/percentage of the related variable in total.
Sources: Eurostat: Industry Accounts, authors' calculations

Table 3: Sectoral changes in occupational characteristics, 2009-2023 (percent)

(A)	(B)	(C)	(D)	(E)	(F)		(G)	(H)	(I)	(J)
NACER2 sector		**Levels**					**Shares**			
Code	Labels	Part time	Involuntary Part time	High skilled	Low/ unskilled		Part time	Involuntary Part time	High skilled	Low/ unskilled
TOTAL	**Total - all NACE activities**	**12.10**	**-4.05**	**-17.97**	**4.68**		**1.33**	**0.12**	**-6.08**	**6.06**
A	Agriculture, forestry and fishing	-10.46	-10.26	20.72	-10.11		-0.09	-0.01	0.4	-0.39
B	Mining and quarrying	-100.00	-100.00	-16.16	-40.23		-2.68	-1.38	4.05	-3.95
C	Manufacturing	8.38	-3.67	-28.07	20.58		0.87	0.2	-8.68	8.69
D	Electricity, gas, steam and air conditioning supply	552.66	288.59	41.38	23.10		1.09	0.53	3.16	-3.18
E	Water supply; sewerage, waste management and remediation activities	48.48	80.63	12.03	21.05		1	1.37	-1.81	1.71
F	Construction	-38.18	-41.03	-54.36	-62.12		1.37	0.85	1.8	-1.79
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	32.27	44.34	-58.72	25.28		2.98	1.68	-25.03	25.03
H	Transportation and storage	41.51	40.33	4.58	0.66		0.56	0.26	0.77	-0.76
I	**Accommodation and food service activities**	**81.74**	**78.18**	**-28.87**	**41.77**		**4.2**	**2.2**	**-12.88**	**12.88**
J	Information and communication	9.34	-28.97	17.31	32.17		-0.31	-0.46	-2.11	2.14
K	Financial and insurance activities	42.35	-31.14	-15.31	-43.32		1.79	-0.03	9.28	-9.23
L	Real estate activities	157.99	---	31.16	453.36		1.17	0.12	-18.57	18.51
M	Professional, scientific and technical activities	-30.63	-25.51	15.12	-6.90		-1.79	-0.61	2.53	-2.55
N	Administrative and support service activities	30.49	44.55	44.37	20.60		0.28	0.69	3.43	-3.42
O	Public administration and defence; compulsory social security	-31.52	-59.10	-9.02	4.63		-0.41	-0.63	-3.49	3.49
P	Education	26.08	-38.85	-2.62	29.04		3.04	-3.22	-2.61	2.61
Q	Human health and social work activities	148.59	101.74	44.00	5.65		2.78	0.85	6.15	-6.16
R	Arts, entertainment and recreation	10.87	-11.43	-5.56	-15.33		3.79	-0.11	2.73	-2.72
S	Other service activities	13.08	-10.70	11.54	2.56		0.54	-0.64	2.01	-2.03
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	-55.13	-63.74	792.68	-73.52		14.36	---	9.91	-9.85

Note: The "levels" columns refer to the percentage change in the level of the related variable, while the "shares" columns refer to the change in the share/percentage of the related variable in the total of each sector.
Sources: Eurostat: Labour Force Surveys, authors' calculations

Table 4: Allocation of employees according to the level of education completed (percent of total, period average)

	Primary		Secondary		Tertiary		Master or PhD	
	Total Economy	AFSA	Total Economy	AFSA	Total Economy	AFSA	Total Economy	AFSA
1993-2000	35.39	40.94	32.19	32.07	17.72	5.31	0.41	0.06
2001-2009	22.83	24.66	40.25	41.85	23.01	8.50	1.45	0.13
2010-2020	12.73	13.19	43.28	47.82	29.41	13.05	4.44	0.59
2021-2023	7.91	7.72	44.94	51.17	31.00	14.99	7.84	1.23

Note: AFSA refers to Accommodation and food service activities
Sources: Eurostat: Labour Force Surveys, authors' calculations