INTERNATIONAL MONETARY FUND

Improve Resource Allocation to Boost Growth in Greece

Ritong Qu

SIP/2025/58

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on March 11, 2025. This paper is also published separately as IMF Country Report No 25/49.

2025 MAY



© 2025 International Monetary Fund

SIP/2025/58

IMF Selected Issues Paper European Department

Improve Resource Allocation to Boost Growth in Greece Prepared by by Ritong Qu

Authorized for distribution by Joong Shik Kang April 2025

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on March 11, 2025. This paper is also published separately as IMF Country Report No 25/49.

ABSTRACT: The productivity growth of the Greek economy has stagnated since the 2010 European Debt Crisis. Despite reforms in product market regulations, their impact on productivity has been mixed. Firm-level data shows that resource misallocation worsened from 2009 to 2020, especially in non-tradable services and smaller firms. Although many firms have become more productive and new high-potential firms have emerged, their growth hasn't been sufficient to boost overall productivity. Accelerating regulatory reforms could enhance competition and improve business dynamism.

RECOMMENDED CITATION: Ritong Qu. Improve Resource Allocation to Boost Growth in Greece. IMF Selected Issues Paper (SIP 2025/58). Washington DC. International Monetary Fund.

JEL Classification Numbers:	D24, E22, F41, O16, O47
Keywords:	Productivity, resource allocation, firm size
Author's E-Mail Address:	rqu@imf.org

SELECTED ISSUES PAPERS

Improve Resource Allocation to Boost Growth in Greece

Greece

Prepared by Ritong Qu¹

¹ The author would like to thank the Greece authorities including the Bank of Greece, the Ministry of Finance, Bingjie Hu, Joong Shik Kang, Tomohide Mineyama, Larry Cui Qiang and Wei Shi for helpful comments.

IMPROVE RESOURCE ALLOCATION TO BOOST GROWTH IN GREECE¹

The productivity growth of the Greek economy has been stagnant since the European Debt Crisis in 2010, partly due to low investment amid large deleveraging. During this period, despite significant reforms in product market regulation aimed at improving the legislation with EU practices, the real impact of these reforms on productivity has been mixed. This paper examines firm-level data and finds resource misallocation within the market economy sector deteriorated from 2009 to 2020, particularly in the non-tradable service sectors and among smaller firms. While a substantial number of firms have become more productive and many young firms with high potential have entered the market, they have not expanded fast enough to lift the productivity of the whole economy. Accelerating regularity reforms to foster competition would help improve business dynamism and thereby enhance productivity.

A. Background

1. Since the European Deb Crisis, amid large deleveraging and low investment, total

factor productivity (TFP) in Greece has continued to decline until recently. In comparison, TFP in the

euro area has grown by 9.7 percent during this period. Broadly speaking, productivity measures the efficiency of producing outputs from a given set of resources such as capital, labor, and materials. At the firm level, productivity growth reflects the advancement of the technology employed by a firm. In aggregate, reallocating resources to more productive firms can increase total output, even when firm-level productivity remains the same. The allocative efficiency factor is particularly relevant to Greece's experience. Given that productive



technology should have remained constant, if not advancing over time, resource misallocation is likely the main culprit behind the lackluster productivity growth in Greece.

2. A series of reforms have been implemented over the last decade to improve the efficiency of the Greek economy. Early reforms (2009–10) focused on addressing the bloated public sector wage bill and implementing modest policies to increase flexibility by allowing symmetric access to arbitration and sectoral agreement opt-outs. Reforms in product markets since 2011 included legislative changes in macro-critical sectors to enhance competition, reducing red tape, opening "closed professions" and amending investment licensing laws to remove approval requirements. Since 2019, a series of reforms have been launched to reduce administrative burdens,

¹ Prepared by Ritong Qu.

including codifying all major business regulation frameworks, implementing an online one-stop shop for company registration, introducing a risk-proportionality requirement for all new licenses and permits. Some of these reforms seem to have borne fruit: for example, new firm entry in 2023 has increased by 33 percent compared to pre-pandemic levels², though the firm entry rate remains below the median of the euro area.

3. While the overall legislation of the product market has aligned with EU practices, the real impact of such reforms on overall productivity has been mixed. Survey results indicate that Greece ranks among the highest in the share of firms citing business regulation as a major investment obstacle (EIB 2023). Empirical evidence (IMF 2019) shows that product price declines were not commensurate with wage declines, indicating incomplete reforms in the goods market. More importantly, the overall TFP has remained stagnant in Greece, with its level being estimated to be still about 10 percent lower than in 2009, prior to the Greek sovereign debt crisis.



4. This paper aims to estimate the degree of resource misallocation using firm-level data. By directly observing firms' resource allocation, the analysis serves as a reality check on the costs of economic rigidities and complements the studies on regulatory legislation and survey data, which

² OECD DynEmp dataset

can overlook how regulation is implemented on the ground. The granular data enable us to quantify the economic costs of resource misallocation, examine its progress over time, and identify sectors where the issue is more acute. We find the degree of resource misallocation worsened after the Greek sovereign debt crisis in 2009 and has remained elevated prior to the pandemic. The results reinforce the view that product market rigidities are costly to the Greek economy and highlight the potential benefit of more comprehensive reforms.

B. Examine Resource Misallocation with Firm-level Data

5. The firm-level data cover a stable sample of Greek firms from 2009 to 2020, but the sample is tilted towards larger firms. The data are sourced from Orbis. We focus on the resource allocation of market economy sectors under NACE Rev. 2 economic classification and exclude the financial sector. The sectors under analysis account for 56 percent of GDP. After data cleaning, as instructed in Kalemli-Özcan et al. (2024), the sample includes 58,000 unique firms. When compared with national aggregate statistics, the sample covers about one-third of total employment and around 80 percent of total firm revenue. The coverage is consistent over time. The literature indicates that the Orbis dataset tends to omit smaller firms. The issue is magnified in the case of Greece, where more than half of employment is provided by micro firms with less than ten employees. Comparing with national aggregates by firm sizes, at the vintage of 2020, the sample covers most medium and large firms (those with more than 49 employees) in terms of both employment and revenue. The sample coverage of small firms (those with between 10 and 49 employees) is substantial but has significant omissions, covering about one-third of small-firm employment and three-fourths of small-firm revenue. In contrast, the coverage of micro firms is minimal. Therefore, a caveat is that our analysis omits micro firms almost entirely. However, the omission is likely to underestimate the degree of resource misallocation, which, as discussed below, is more concentrated in smaller firms.





6. Dispersion in the marginal productivity across firms is increasing due to rigidities of product and factor markets. In a world without transaction costs, market forces would equalize marginal revenue product across firms. Product market rigidities lead to different output prices among firms producing the same products. Similarly, labor market and capital market rigidities result in varying costs of capital and wages across firms. Firms' resource allocation responds to these cost distortions, leading to deviations from optimal resource allocation.

7. The dispersion of Greek firms' marginal product of revenue has increased since the start of Greek sovereign debt crisis and remains elevated. We examine the dispersion of marginal revenue product of capital (MRPK) and marginal revenue product of labor (MRPL) within each sector. Both measures expanded quickly between 2009 and 2012 and have not recovered since. In contrast, IMF (2024) shows that firm productivity dispersion in most economies declined during the same period. Among different sectors, the construction sector experienced the largest MPRK dispersion before the pandemic, while the food and accommodation sector experienced the largest MPRL dispersion. For both MPRK and MPRL, the expansion in dispersion is much more pronounced among smaller firms, which has deteriorated persistently during the sample period. In contrast, the dispersion of larger firms' MPRK and MPRL has peaked in 2013. The result is likely due to size-dependent borrowing frictions and regulations. More productive smaller firms are unable to expand due to borrowing constraints and may choose to remain small, as growing larger invites more scrutiny from regulators, who find it cheaper to enforce regulations on larger firms.



8. The declining efficiency of resource allocation within sectors has contributed to the expansion in the dispersion of marginal revenue product. Gopinath et al. (2017) show that MRP dispersion can be decomposed into dispersion in TFP, dispersion in productive factors, and the correlation between TFP and productive factors. In the case of Greece, the latter has shown secular declines since 2009, indicating that resources are not flowing to more productive firms. The issue is more prominent among non-tradable service sectors, namely, construction, professional services, and food and accommodation services. The correlation between TFP and capital is around zero among non-tradable sectors. For the professional services sector, the correlation is negative, while for the construction and food and accommodation sectors, the correlation started in positive territory at the beginning of the sample and then declined to negative values. In contrast, the correlation between firm-level TFP and labor. The correlation declines across all sectors, although tradable sectors generally exhibit more efficient resource allocations than non-tradable sectors, as evidenced by higher correlations between TFP and labor.



9. Resource misallocation has been costly for the Greek economy, amounting to about 3 percent market-economy-sector GDP per year between 2009 and 2020. These costs represent missed opportunities in a scenario where the degree of resource misallocation remained constant during the sample period. To construct such a scenario, we adopt the framework originated by Klenow and Hsieh (2009). The technical details are elaborated in Appendix I. The framework has been applied by Gopinath et al. (2017) to analyze resource misallocation in Spain and by IMF (2024) to examine 20 economies. We start from a counterfactual scenario with optimal resource allocation, where marginal revenue products are equal across firms within each sector. The analysis shows that the TFP gap between the efficient scenario and the actual outcome has expanded significantly for Greece. While actual TFP growth has been close to zero from 2009 to 2020, the log of efficient TFP would have grown by 30 percent during the period. The main source of the divergence is non-tradable service sectors, namely, construction, professional services, and food and accommodation services.



10. Young firms have not expanded fast enough to lift the productivity of the whole

economy. The increasing efficient TFP since 2009 indicates that a significant share of Greek firms has experienced productivity growth, with many more productive younger firms entering the market during this period. We compare the efficiency gap observed among permanent firm sample with the efficiency gap across the entire sample of firms and find that the entry of young firms accounts for about two-thirds of cumulative resource misallocation before the pandemic. Young firms are generally more productive than older firms. In most sectors, the median TFP of firms under five years of age is 10 to 20 percent higher than that of firms older than 15 years. The slow growth of young firms is partly due to the scarcity of bank credit. But a reversal of banks' deleveraging trend does not necessarily imply more efficient resource allocation. For example, Spain experienced a significant increase in productivity losses from capital misallocation during periods of credit expansion beginning in the 1990s (Gopinath et al., 2017).



C. Policy Advice

11. Business dynamism and productivity remain low in Greece, posing a drag on growth. Despite the bold reforms implemented since the Greek sovereign debt crisis, regulatory burdens continue to weigh heavily on firms' decisions to invest, and productivity growth has stagnated over the past 15 years. Between 1980 and 2010, Greece generated more than five thousand new regulations each year (OECD, 2011). The number of new laws in Greece ranked the highest among OECD countries during the period from 1997 to 2009 (Pissarides et al., 2023). This overregulation undermines competitiveness and inhibits efficient resource allocation, leading to the largest small business employment among EU countries and a sizable informal economy (Cui and Yao, 2024). On a positive note, a fair number of Greek firms have increased their productivity, and many young firms with high potential have entered the market. Significant productivity gains can be achieved by reducing obstacles and disincentives for firms' entry and growth.

12. Accelerating regulatory reforms is key to improving resource allocation, particularly in

the non-tradable service sector. Given the large number of legacy regulations, a systemic ex-post evaluation is needed. Resources should prioritize sectors with the most significant regulatory distortions, such as the non-tradable service sector. To expedite the process, opt-out provisions can be included for certain laws to provide clarity. Firm size-based tax and regulatory incentives should be avoided, while tax incentives should be narrowly targeted at firms' research and development (R&D) investments to support young, innovative firms. Additionally, remaining barriers to entry in service sectors should be further reduced.

13. The scope of regulatory impact assessment should be broadened to emphasize

the impact on efficiency. A regulation can give rise to unnecessary costs or other unintended impacts on innovation and competition, which may sometimes overweigh its intended purpose. The Quality Evaluation Committee for the Drafting of Legislation (EAPND) was established in 2012 to examine laws proposed for voting in parliament. The current process focuses more on effectiveness but pays less attention on efficiency (Petrakis, 2024). Assessments should be required to consider alternatives to regulations, such as a 'do-nothing' option.





Additionally, the assessment should cover potential competition effects from subordinate regulations as well as primary laws (OECD 2024).

14. Labor market and capital market reforms can facilitate the growth of small and young

firms. Labor force participation remains low, particularly among youth, women and the elderly. Targeted support for childcare and elderly care can enable woman to work outside the home. Reducing the high tax wedge and phasing out the unemployment benefits within the eligibility period can incentivizing job search.³ On the capital market side, sustained efforts to reduce non-performing loans will lower the costs of bank lending to small firms. With unresolved bad assets locking in valuable resources, further judicial system reforms will facilitate resource allocation by channeling funding from distressed firms to more productive ones⁴.

15. On the European level, removing barriers within the single market and investing in infrastructure will further strengthen economic integration and efficiency.

³ See special issue paper Capell et al. (2025) "Unlocking the Work Force Potential: Empowering Women to Boost Economic Growth and Greek Prosperity"

⁴ See special issue paper Dai et al. (2025) "Enhancing Judicial System Efficiency in Greece. Drivers and Economic Impact"

Appendix I. Technical Appendix

1. The current framework is adapted from Klenow and Hsieh (2009), by assuming a monopolistic competition market in each sector. The output of sector *s* is the aggregated of each differentiated product with a CES function:

$$Y_{st} = \left(\sum_{i=1}^{I_{st}} Y_{sit}^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}},\tag{1}$$

Where Y_{st} is output of sector *s*; Y_{st} is output of good *i* in sector *s*; and $\sigma > 0$. In this exercise, we assume $\sigma = 3$, consistent with Klenow and Hsieh (2009), Gopinath et al. (2017) and IMF (2024). Each differentiated product is produced from capital and other variable costs using a Cobb-Douglas function:

$$Y_{sit} = A_{sit} K_{sit}^{\alpha_s} COG_{sit}^{1-\alpha_s},$$
⁽²⁾

Where K_{sit} is capital used; COG_{sit} is variable costs of goods including material costs and labor costs; A_{sit} captures the productivity of the firm producing product *i*; and $\alpha_s \in (0,1)$ which is calibrated using one minus sectoral medians of cost of goods sold divided by total revenue. Note here, due to data limitations, we use a production function based on capital and other variable costs, rather than capital and labor.

2. There is an output distortion (τ_{Ysit}), a capital distortion (τ_{Ksit}), and a cost-of-goods distortion (τ_{COGsit}), and firms maximize their profits under monopolistic competition, leading to the following optimality conditions:

$$MRPK_{sit} \equiv \alpha_s \frac{\sigma_c - 1}{\sigma_c} \frac{P_{sit} Y_{sit}}{K_{sit}} = r_{cst} \frac{1 + \tau_{Ksit}}{1 - \tau_{Ysit}},$$
(3)

$$MRPCOG_{sit} \equiv (1 - \alpha_s) \frac{\sigma_c - 1}{\sigma_c} \frac{P_{sit} Y_{sit}}{COG_{sit}} = \frac{1 + \tau_{COGsit}}{1 - \tau_{Ysit}}.$$
(4)

Note that everything that does not vary at the firm level cancels out in this expression, so the only information we require is:

$$MRPCOG_{sit} \propto \frac{P_{sit}Y_{sit}}{COG_{sit}}, \qquad MRPK_{sit} \propto \frac{P_{sit}Y_{sit}}{K_{sit}}, \qquad MRPL_{sit} \propto \frac{P_{csit}Y_{csit}}{L_{csit}}.$$
 (5)

The last term is a simple extension, if we assume COG_{sit} is a Dogg-Coublas function of personnel expenditure and other variable costs. With the absence of wage data, we use number of employees as L_{csit} . Following the terminology of Hiesh and Klenow (2009), we define the revenue-based total factor productivity (TFPR) at the firm level as:

$$TFPR_{sit} \equiv \frac{P_{sit}Y_{sit}}{K_{sit}^{\alpha_s}COG_{sit}^{1-\alpha_s'}}$$
(6)

And industry level TFPR as:

$$\overline{TFPR}_{st} \equiv \frac{P_{st}Y_{st}}{K_{st}^{\alpha_s}COG_{st}^{1-\alpha_s'}}$$
(7)

Where K_{st} and COG_{st} is sectoral total fixed assets and total costs of goods, and P_{st} is sectoral level price index. The firm level productivity A_{sit} can be measured as:

$$A_{sit} = \frac{Y_{sit}}{K_{sit}^{\alpha_s} L_{sit}^{1-\alpha_s}} = d_{st} \frac{(P_{sit}Y_{sit})^{\frac{\sigma}{\sigma-1}}}{K_{sit}^{\alpha_s} L_{sit}^{1-\alpha_s}},$$
(8)

Where $d_{cst} \equiv P_{st}^{-\frac{\sigma}{\sigma-1}} Y_{st}^{-\frac{1}{\sigma-1}}$. We can write sectoral TFP as:

$$TFP_{st} = \frac{TFPR_{st}}{P_{st}} = \left[\sum_{i=1}^{I_{st}} A_{sit}^{\sigma-1} \left(\frac{TFPR_{sit}}{\overline{TFPR}_{st}}\right)^{1-\sigma}\right]^{\frac{1}{\sigma-1}}.$$
(9)

3. Absence of distortion leads to $TFPR_{sit} = \overline{TFPR}_{st}$, and we see that the efficient level of TFP is given by:

$$TFP_{st}^{e} = \left[\sum_{i=1}^{I_{st}} A_{sit}^{\sigma-1}\right]^{\frac{1}{\sigma-1}}.$$
 (10)

As in Hsieh and Klenow (2009), assume aggregate output is Cobb-Douglas:

$$Y_t = \prod_{s=1}^{S} Y_{st}^{\theta_{st}} , \qquad (11)$$

where $\theta_{st} > 0$, $\sum_{s} \theta_{st} = 1$. Let Y_t^e denotes the efficient level of output if marginal products were equalized within each sector, we can express the aggregate ratio of actual output over efficient output:

$$\frac{Y_t}{Y_t^e} = \prod_{s=1}^{S} \left(\frac{TFP_{st}}{TFP_{st}^e} \right)^{\theta_{cst}} .$$
(12)

The ratio and its log serve as a measure of allocation efficiency overtime.

References

- Capell, Júlia Cots, Larry Qiang Cui, Diego Gomes, Duncan MacDonald, Céline Thévenot, and Katherine Dai, "Unlocking the Work Force Potential: Empowering Women to Boost Economic Growth and Greek Prosperity" (2025). Washington, D.C.: International Monetary Fund.
- Cui, Larry Qiang, and Jiaxiong Yao. Recent Trends of Informality in Greece Evidence from Subnational Data. IMF Selected Issues Paper (SIP/2024/009). Washington, D.C.: International Monetary Fund.
- Dai, Katherine, Mariusz Jarmuzek, Ritong Qu, and Amira Rasekh. "Reforming Judicial System Efficiency in Greece. Drivers and Economic Impact" (2025). Washington, D.C.: International Monetary Fund.
- Gopinath, Gita, Şebnem Kalemli-Özcan, Loukas Karabarbounis, and Carolina Villegas-Sanchez. "Capital allocation and productivity in South Europe." The Quarterly Journal of Economics 132, no. 4 (2017): 1915-1967.
- International Monetary Fund. 2024. World Economic Outlook— Steady but Slow: Resilience amid Divergence. Washington, DC.
- Kalemli-Özcan, Şebnem, Bent E. Sørensen, Carolina Villegas-Sanchez, Vadym Volosovych, and Sevcan Yeşiltaş. "How to Construct Nationally Representative Firm-Level Data from the Orbis Global Database: New Facts on SMEs and Aggregate Implications for Industry Concentration." American Economic Journal: Macroeconomics 16, no. 2 (2024): 353-374.
- Kalimeri, Maria, Maria Mendez and Sebastian Weber. Reforms, Labor Market Dynamics and Competitiveness. IMF Selected Issues Paper (2019). Washington, D.C.: International Monetary Fund.
- Hsieh, Chang-Tai, and Peter J. Klenow. "Misallocation and manufacturing TFP in China and India." The Quarterly Journal of Economics 124.4 (2009): 1403-1448.
- Petrakis, Panagiotis E. "The legislative process and regulatory interventions in the Greek democracy: Deep-rooted weaknesses and recommendations for improvement." Statute Law Review 45, no. 1 (2024).
- Pissarides, C, C Meghir, D Vayanos and N Vettas (2023), "A Growth Strategy for the Greek Economy", CEPR Press, Paris & London.
- OECD (2011), Greece: Review of the Central Administration, OECD Publishing.
- OECD (2024), OECD Economic Surveys: Greece 2024, OECD Publishing, Paris.