ОРГАНИЗАЦИЈА
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ENHANCING BUSINESS PRODUCTIVITY:

A COMPREHENSIVE ANALYSIS OF PRODUCTIVITY AND ITS DRIVERS IN FIRMS IN NORTH MACEDONIA

International Labour Organization

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ENHANCING BUSINESS PRODUCTIVITY: A COMPREHENSIVE ANALYSIS OF PRODUCTIVITY AND ITS DRIVERS IN FIRMS IN NORTH MACEDONIA[1]

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Executive Summary

This study analyzes the level and drivers of firm productivity in North Macedonia, focusing on total factor productivity (TFP) as a more comprehensive measure compared to labor productivity. The data originates from the World Bank Enterprise Surveys conducted in 2009, 2013, and 2019, covering 214 firms for which data is available in each of the observed periods. The analysis also includes qualitative insights from a focus group with representatives of 10 firms, providing additional depth and context to the quantitative findings.

The results show that total factor productivity has declined over the analyzed period. From 2013 to 2019, the TFP of the average firm decreased by 8.4%, indicating that firms are becoming increasingly less efficient in utilizing the basic factors of production – labor and capital. This trend is particularly pronounced after 2013, which may be linked to institutional and economic factors such as stagnation in investments, weakened capacity of public institutions, and reduced export competitiveness.

At the same time, there is pronounced heterogeneity in firm productivity. The most productive firms are up to 14 times more efficient than the least productive ones, and such disparities are present both across and within industrial sectors. This points to an inefficient allocation of resources, where capital and labor are not reallocated to more efficient firms but remain trapped in less productive ones. The causes of this situation are likely a mix of institutional barriers, access to finance, technological disparities, and limited access to markets.

Firms with foreign ownership exhibit significantly higher TFP — up to four times largerthan that of domestic firms. Export-oriented firms are also more efficient than those serving only the domestic market, highlighting the role of exposure to international competition and the demand of foreign markets as a stimulus for productivity improvement. In contrast, no strong links were found between productivity and a firm's age or size, suggesting that structural characteristics alone are not decisive factors for efficiency.

When examining the determinants of productivity growth through an econometric model, the results show that the business climate is of essential importance. Corruption has the strongest and most consistent impact on productivity growth. The index measuring corruption explains the variation in TFP over 500 times more compared to the infrastructure index. Financial constraints are the second most important factor, with a similar magnitude of influence. This indicates that a weak institutional framework and corrupt practices directly hinder firm development, distort competition, and create unpredictability that discourages investment and innovation.

Competition and regulation also emerge as relevant factors, but with a moderate effect. The data suggest that bureaucratic procedures, unfair competition, and burdensome regulations can discourage firms from growing and innovating. On the other hand, infrastructure has a consistently positive, though not dominant impact. The quality of transport, the stability of electricity supply, and logistical support are important prerequisites for efficient business operations, especially for manufacturing firms.

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List of abbreviations

PCA	Principal Components Analysis
WBES	World Bank Enterprise Survey
TFP	Total Factor Productivity
PC	Principal Components
DUP	Detailed Urbanization Plan
ENER	Electronic National Register of Regulations of North Macedonia
CD	Cobb-Douglas Specification
TIDZ	Technological Industrial Development Zones
TL	Translog Specification

1. Introduction

Productivity growth is a '*conditio sine qua non*' for economic growth and prosperity. Most often, when thinking about productivity, reference is made to labor productivity, that is, how much output per worker or per hour worked is produced in a country. According to this metric, productivity in North Macedonia is, to say the least, stagnant. Over a two-decade period (2001–2022), labor productivity[1] grew at an average annual rate of 1.2%, or cumulatively 28.2% over the entire period. This is the lowest productivity growth among developing countries in Europe and Central Asia. For example, during the same period, productivity[2] increased fourfold in Armenia, more than threefold in Turkmenistan, and doubled in Albania, Bosnia and Herzegovina, Moldova, Serbia, and Turkey. Thus, although most of these countries had lower output per worker than North Macedonia in 2000, by 2022 they either significantly closed the gap or had already surpassed it. The situation is somewhat better, though not significantly, when looking only at the private sector. Here, productivity growth in North Macedonia during the same time frame was about 40%, with an annual average of 1.6%.

However, analyses and discussions of productivity using this measure, especially in the context of the private sector, may not be sufficiently informative. Of course, economic growth is influenced by the accumulation of labor (considered both in quantity and quality), as well as of capital. While the latter is not directly captured by labor productivity, even the accumulation of production factors alone often cannot fully explain growth (Bastos and Nasir, 2004). Economic research indicates that improving the efficiency with which a country uses its production factors—so-called total factor productivity (TFP)—is a more important indicator of economic growth. No country has achieved continuously high rates of economic growth without a significant increase in productivity. Therefore, it is important for policymakers to understand what determines a country's productivity, i.e., what allows its producers to be more efficient than those in competing countries.

Total factor productivity is not an indicator calculated by official statistics. However, several studies have derived it from official data, including the more recent one by the World Bank (2020), presented in Figure 1. North Macedonia's productivity performance between 2001–2018 has been erratic and vulnerable to both domestic and global shocks. While early 2000s reforms generated momentum, the lack of sustained structural transformation—particularly in institutions, innovation, and human capital—limited long-term TFP growth. TFP growth has been, on average, negative, and so has been the contribution of TFP to North Macedonia's GDP growth: -0.8 percentage points (p.p.) for the period 2009–2013, and -1.4 p.p. for the period 2014–2017. This indicates that even when labor and capital increased, the way they were used became less efficient over time. These macroeconomic figures are consistent with firm-level data: between 2013 and 2019, average TFP across all firms declined by 4.9%, while value added per worker dropped by 0.7%.[3]

This prolonged deterioration in productivity suggests that North Macedonia's growth model has been increasingly reliant on input accumulation rather than improvements in efficiency. Several structural and external factors likely contributed to this trend. On the domestic front, persistent weaknesses in institutional quality, legal predictability, and regulatory coherence have constrained firms' ability to innovate and scale efficiently. The education system has not evolved in line with labor market needs, leading to skills mismatches and an underutilized workforce. Technology adoption remains slow, particularly among smaller firms, due to both financing constraints and limited digital infrastructure. At the same time, foreign direct investment, while sizable, has generated limited productivity spillovers to the broader economy, as many investments operate in enclaves with weak linkages to local suppliers. Exogenous shocks have further amplified these weaknesses: domestic political instability—most notably

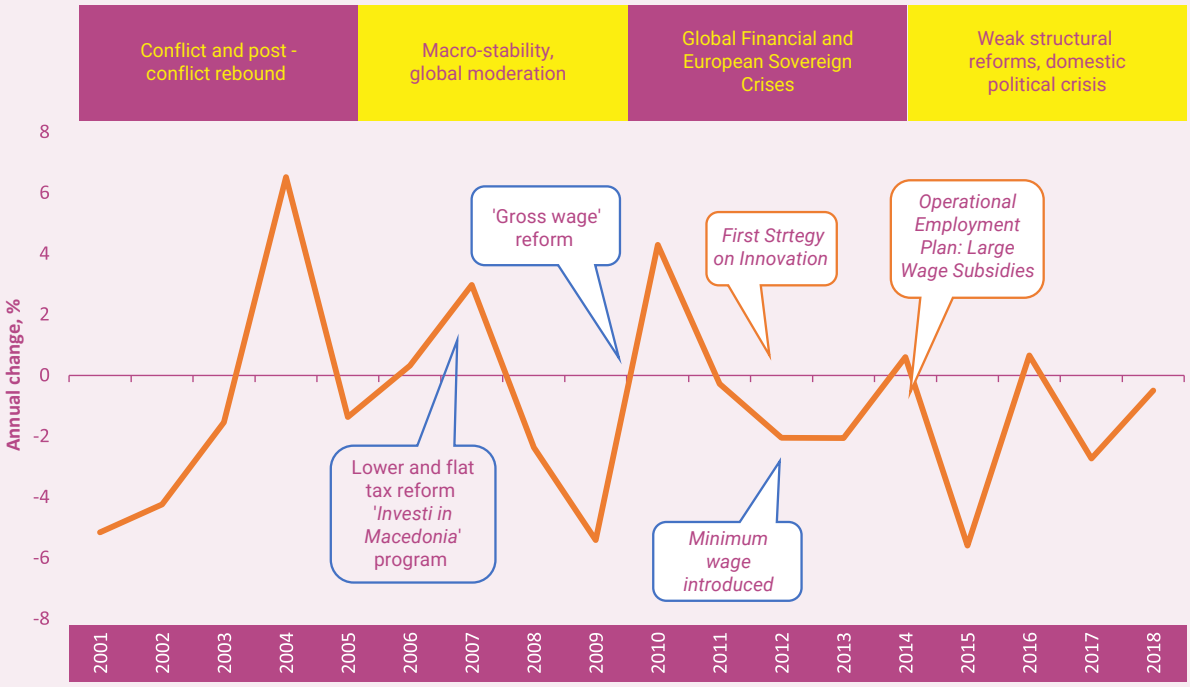
1 Estimated as the gross added value per employee.Authors' calculation based on data from the State Statistical Office.
2 Estimated as the gross added valuer per employee.
3 Authors' calculation based on the methodology and the data sources presented in this study.

during the 2015–2017 crisis—disrupted confidence and investment planning, while international crises such as the 2008–2009 global financial crisis and the Eurozone turmoil slowed export demand, tightened capital flows, and delayed reform momentum. These combined factors help explain why, even during periods of GDP growth, productivity systematically declined.

Over the past three decades, North Macedonia has implemented a series of economic reforms aimed at transitioning to a market economy, improving the business environment, and attracting foreign investment. In the first decade after independence, the focus was on macroeconomic stabilization, privatization, and trade liberalization. During the 2000s, significant structural reforms were introduced, particularly in the late 2000s, such as the introduction of a flat tax, simplification of procedures for starting a business, regulatory reform (the so-called "regulatory guillotine"), and attracting foreign investment into export-oriented zones known as TIDZs (Technological-Industrial Development Zones) (see Figure 1).

However, despite progress on paper, implementation was often uneven and accompanied by institutional weaknesses, insufficient transparency, and low efficiency in public administration. In the last decade, the country has undertaken initiatives to enhance innovation, digitalization, and the alignment of education with labor market needs, but with limited impact on productivity.[4] This suggests that continuous efforts to reform the economy are not sufficient unless complemented by improvements in institutions, rule of law, and a long-term vision for economic transformation.

Figure 1 – TFP growth and timeline of major reforms



Source: World Bank and compilation by the authors.

The large disparity in productivity among firms in North Macedonia further indicates an inefficient allocation of capital and labor. As said, the causes may include weak governance, low levels of innovation, institutional weaknesses, or other structural problems, as well as differences in technology, management, skills, and quality. While in developed economies the most productive firms are about twice as efficient as the least productive, in North Macedonia they are as much as 7.6 times more efficient—and in sectors such as trade and telecommunications, even more than 10 times (World Bank, 2020). In this context, the literature is rich with research on productivity constraints in firms in developing countries: macroeconomic instability that negatively affects private investment (Krugman, 1988); strict regulations on labor markets and firm entry (Dabla-Norris et al., 2016; Klapper et al., 2006); serious disruptions in the financial sector, infrastructure, and markets (Kouamé and Goyette, 2018; Bah and Fang, 2015; Giannetti and Ongena, 2009), among others.

4 Of course, the crisis events that the world and North Macedonia have gone through have also had an impact on the results in recent years.

In a global economy where technology spreads rapidly and capital is mobile, differences in productivity can be attributed to the business or investment climate—that is, the environment shaped by policies, institutions, and regulations in which businesses operate (Bastos and Nasir, 2004). Firms in countries with access to solid infrastructure, efficient and non-partisan public administration, respect for property rights, and rule of law, and where they can compete with each other in a healthy and market-driven manner, operate within a favorable business and investment climate. Such a climate reduces the cost of doing business and yields higher returns on investment.

The goal of this study is to portray productivity in North Macedonia and to understand its determinants. Beyond simply observing value per worker, the study looks at productivity in a more nuanced way—namely, how improving the efficiency of using the two key resources, labor and capital, can lead to benefits for firms and citizens in the medium term. Accordingly, the study also aims to propose a reform focus that could influence productivity and, consequently, the competitiveness of the economy.

The study is organized as follows. Section 2 further elaborates on the importance of productivity and its determinants, approached from the perspective of the global literature. Section 3 discusses the data used in this study and the calculation of the productivity indicator through TFP. Section 4 provides a description of productivity across several characteristics of firms in North Macedonia. Section 5 examines the determinants of productivity, briefly elaborating on the economic model used for that purpose. The section concludes with a quantitative assessment of the importance of business climate factors for the total factor productivity of firms in the country. Section 6 offers conclusions and recommendations for policymakers.

2. Productivity and Its Determinants – Conceptual Discussion

2.1. Business Climate

Firm productivity is the result of the interaction between external (exogenous) conditions in which firms operate and the internal (endogenous) capacities they mobilize. Research shows that both the institutional context and the capabilities within firms are critical for their efficiency, adaptability, and growth. Firms operate within a framework that is heavily shaped by infrastructure, regulation, access to finance, and institutional integrity. These factors are not directly under firms' control, yet they fundamentally determine their potential for growth and productivity.

Modern productivity depends not only on human and physical capital but also on the quality of public infrastructure, especially digital infrastructure. Bartelsman et al. (2013) emphasize that the lack of adequate infrastructure slows down technological diffusion, particularly for small and medium-sized enterprises. Without efficient logistics and communication infrastructure, firms cannot compete on equal footing nor optimize their production processes. The influential work of Aschauer (1989) documents the causal relationship between infrastructure capital and aggregate TFP. The review studies by Straub (2008, 2011) summarize a large body of literature comparing the elasticities of infrastructure and private capital. Meanwhile, several recent papers document the relationship between infrastructure, in a broader sense, and TFP. For example, Khanna and Sharma (2021) find a positive effect of public infrastructure on manufacturing productivity in India, with marked differences in impact depending on whether it involves road, rail, energy, port, or telecommunications infrastructure. Arif et al. (2021) reach similar findings, with a particularly strong link for telecommunications and energy infrastructure across 19 Asian countries. Furthermore, Rehman and Islam (2023) find that energy infrastructure significantly and positively increases TFP in both the short and long term in upper-middle- and middle-income countries. The impact is found to be stronger in higher-income countries. Tang and Zhao (2023) identify a strong positive effect of digital infrastructure on TFP in China, with the channels of influence being technological innovation, optimization of the allocation of production factors, and achievement of economies of scale. The effect is more pronounced at higher levels of economic development. At the firm level, small firms are more affected by infrastructure deficiencies (Lee and Anas, 1992; Aterido et al., 2011).

Competitive pressure and well-designed regulations stimulate firms to be more efficient, innovative, and results-oriented (Aghion and Griffith, 2005). According to Melitz (2003), exposure to international trade intensifies the process of creative destruction, whereby less productive firms exit the market, and the remaining ones are forced to undergo technological and organizational adaptation. On the other hand, rather than facilitating entrepreneurship, regulation often becomes a source of burden. Djankov et al. (2002) point out that bureaucratic procedures, complex permits, and administrative barriers slow down firm's dynamics. Namely, a positive effect of competition on firm's performance is expected, and a negative effect from excessive regulation. For example, Carlin et al. (2006) document that anti-competitive practices are significant constraints for business everywhere and that encouraging competition positively affects productivity (Bastos and Nasir, 2004; Escribano and Guasch, 2005; Commander and Svenjar, 2007). Kong et al. (2022) find that TFP in China increased after the adoption of antitrust legislation, likely because the increased competitive pressure pushed firms to improve their investment efficiency and innovation output. On the other hand, the negative effect of regulation is not consistently documented; on the contrary, if implemented consistently, regulation can have a positive effect (Beck et al., 2005; Aterido and Hallward-Driemeier, 2007), especially for small firms.

Access to finance is a crucial determinant for productive investments, especially for innovation, expansion, and the adoption of new technologies. Therefore, firms facing higher financial constraints are more sensitive to TFP growth (Bağır and Seven, 2022). Bartelsman et al. (2013) note that limited access to capital is a key reason why smaller firms lag behind larger ones. These constraints not only slow down growth but also limit technological transformation, especially in enterprises with high potential but low liquidity. These findings are widely documented in the literature. For example, Beck et al. (2005) examine a range of financial constraints on firm sales growth and find that six out of eleven specific financial constraints have a negative and significant impact. However, other studies (such as Commander and Svenjar, 2007) do not find a significant effect of financing costs on firm revenue in Eastern Europe and Central Asia, nor of access to finance on productivity (Dollar et al., 2005; 2006; Hallward-Driemeier et al., 2006). In more recent empirical studies, Piao et al. (2023) find that financial constraints of Chinese firms not only directly negatively affect TFP but also indirectly through unfavorable capital allocation; this effect is estimated to be stronger for small and medium-sized firms. Additionally, Kim (2021) shows that small and young domestic firms facing financial constraints invested less in research and development, which negatively impacted productivity.

Institutional integrity—primarily the rule of law and the level of corruption—has both direct and indirect effects on productivity. Djankov et al. (2002) and other researchers emphasize that in environments with high levels of administrative discretion and weak legal certainty, firms have less motivation for long-term investments and formalizing their operations. Corruption creates unfair competition where productivity is not rewarded but suppressed. Carlin et al. (2006) find that crime is an obstacle to productivity growth in one-quarter of about 60 countries, mostly developing, and corruption in as many as 70% of them. In fact, these relationships are widely documented in the global literature. Pande and Udry (2005) and Dollar et al. (2005) find strong evidence that long-term growth is faster in countries with high-quality legal institutions, better law enforcement, strong protection of property rights, improved central government services, greater democracy, and high levels of trust. Moreover, studies based on microdata document similar conclusions; for example, there is a "strong, stable, and negative correlation between bribery and short-term growth rates of firms in Uganda, and [...] the effect is much greater than the suppressive effect of taxes" (Fishman and Svensson, 2007). Demir et al. (2022) find that corruption has a significant negative effect on TFP in manufacturing firms, while Shi (2024) finds this relationship conditional on other influences such as taxes. Escribano and Guasch (2005) assess that corruption and crime are the most important determinants of firm productivity.

Firm productivity is shaped by the dynamic interplay between the environment in which firms operate and their internal capabilities. While capital and labor remain essential, productivity today depends increasingly on the quality of public infrastructure—especially digital—and on institutions that ensure fair competition, efficient regulation, and reliable access to finance. Inadequate infrastructure hinders technological diffusion, disproportionately affecting small firms. Likewise, when regulation becomes burdensome or legal institutions are weak, firms shift focus away from innovation and efficiency. Financial constraints, particularly for smaller and younger firms, suppress investments in R&D and limit potential productivity gains. Across all these dimensions, the evidence points to a common conclusion: inclusive, efficient, and transparent institutions are as vital to productivity as the firms' own capacities.

2.2. Internal potentials

According to classical economic theory and the Solow-Swan model (Solow, 1956), productivity arises from the efficient combination of labor and capital. Firms with greater investments in physical capital and a more qualified workforce tend to achieve higher productivity. However, research by Hsieh and Klenow (2009) shows that productivity depends not only on the quantity of factors but also on their proper allocation. In many developing countries, inefficient allocation of labor and capital, often driven by dysfunctional markets, leads to significant productivity losses.

Lagakos and Waugh (2013) point out that structural barriers in the labor market — such as informality, inadequate education, and talent migration — limit the effective utilization of human capital within the firm itself. Firms frequently face a shortage of qualified personnel, while mismatches exist between the skills offered and the actual market needs.

Technological progress is recognized as a key driver of long-term productivity growth (Aghion & Howitt, 1992). Enterprises that successfully implement innovative solutions — such as automation, digital tools, or artificial intelligence-based solutions — significantly improve their performance (Bloom et al., 2019). The benefits are visible through faster decision-making, improved resource management, and greater market flexibility. However, technology adoption is uneven. Smaller firms, especially in countries with limited access to financing and support, lag behind larger competitors (Bartelsman et al., 2013). This manifests as a digital divide among firms and a low degree of automation, which limits productivity across entire sectors.

Contemporary literature increasingly highlights the quality of management as a fundamental determinant of productivity. Bloom and Van Reenen (2007) demonstrate that firms with better management practices — transparent goals, performance monitoring, employee incentives — achieve significantly higher efficiency. In post-socialist economies, many firms still operate with managerial structures inherited from the era of state planning (Djankov& Murrell, 2002). The lack of modern corporate governance, insufficient access to training, and limited incentives for managerial evolution constrain firms' ability to adapt and advance.

Productivity is not only a function of inputs, but of how effectively those inputs are combined and managed. While classical models link productivity to capital accumulation and human capital, more recent research emphasizes the importance of factor allocation, technology adoption, and management quality. In many developing economies, structural labor market barriers and capital misallocation undermine potential efficiency gains. At the same time, technological progress and innovation can boost firm performance, but adoption remains uneven, especially among smaller firms. Crucially, managerial capability plays a central role — firms with stronger leadership, performance systems, and governance practices consistently outperform those lacking such capacities. Together, these findings underscore that raising productivity requires more than investment — it demands systemic improvements in how firms are organized, equipped, and led.

2.3. Critical Review of the Literature

Although the literature investigating productivity — especially total factor productivity (TFP) — has significantly advanced and expanded over the past decade and beyond, it has not remained immune to some relatively standard critiques. First, studies differ in the scope of variables they use to explain productivity, which results in heterogeneity in the magnitude of effects. Furthermore, earlier literature in particular relied on so-called cross-sectional data, i.e., data for one year across multiple countries. This mainly brings to the table the problem of an inability to adequately control for time-invariant effects (at the country or firm level), as well as difficulties in finding appropriate instruments when specifications are subject to endogeneity problems. This leads us to the third problem — the presence of endogeneity (Romp and de Haan, 2007). This implies that, for example, when examining the relationship between infrastructure and productivity, the former is expected to influence the latter, but it is also possible that more productive countries invest more in infrastructure; or that a third factor simultaneously affects both infrastructure and productivity, thereby obscuring their true relationship.

All these, as well as some less important critiques, emphasize the need to examine the relationship between productivity and its determinants at a disaggregated level, ideally at the firm or industry level. This should lead to more stable results and, consequently, more precise policy recommendations, as noted by the World Bank (2004), Pande and Udry (2005), and Durlauf et al. (2008). Indeed, Banerjee and Duflo (2005) argue that firm-level analysis can account for the individual behavior of firms in a world where market and government failures exist, or where people face psychological difficulties in grasping the opportunities available to them.

3. Data and Productivity Measures

3.1. Data

Our analysis takes the firm as the unit of interest. This study relies on firm-level data obtained from the World Bank Enterprise Surveys (WBES, available at https://www.enterprisesurveys.org). WBES is based on a representative sample (stratified random sampling), mainly from the private sector. The survey collects data on firm characteristics and performance, as well as a wide range of topics related to the business environment, including access to finance, corruption, infrastructure, regulations, and competition. The dataset covers three periods 2009-2013-2019, provided in a panel structure by the World Bank. This means the dataset is organized so that firms appearing in at least two of these years are identified, enabling us to control for some time-invariant effects, such as the influence of a firm characteristic that has not changed or is generally considered fixed over time.

The firm dataset covers all formally registered private firms from the manufacturing and service sectors, with a large part of the sample coming from manufacturing activities. The sample is designed based on stratification by size and sector (World Bank, 2009) and includes only firms with at least five employees. Firms with 100% state ownership, as well as unregistered firms, where registration is defined through tax registration, are excluded.

3.2. Qualitative Information Collected through a Focus Group

The quantitative analysis based on the World Bank Enterprise Surveys (WBES) is complemented with qualitative information gathered through the focus group method. The focus group was composed of representatives from 10 firms from the country, from different sectors and sizes, to ensure heterogeneity. The group of companies is composed of all sizes; sector-wise, manufacturing dominates, especially textiles and apparel, food processing, engineering, and industrial production. The presence of industry associations, such as the textile cluster, highlights sectoral coordination and collaboration. Overall, the group reflects a mix of large-scale export-oriented manufacturers, medium-sized industrial producers, and small niche businesses.

Companies were selected through the Employers Organization, with an email invitation sent to all members. Additionally, some firms with prior experience in productivity improvements were directly invited to diversify operational perspectives. Sectors with historically low productivity, such as textiles, were approached directly to ensure representation. Particular attention was given to including export-oriented companies, given their relevance for competitiveness and policy discussions. The final sample achieved diversity in company size (large, medium, small), sector (textile and apparel, food industry, industrial production, engineering, automotive, agro-industry, metal processing), and ownership structure (domestic, foreign, and joint ventures). The focus group discussions were guided by a structured questionnaire, organized into four main thematic blocks:

Introduction and general perceptions: factors influencing productivity, relative importance of internal vs. external drivers.

1. Differences across firms and sectors: sectoral disparities, firm size effects, export orientation.
2. Deep dive into specific factors: technology and innovation, access to finance, regulatory environment, competition, infrastructure, and management practices.

3. Closing recommendations: priority external support needed to improve sectoral productivity.
4. Qualitative data was analyzed using thematic coding aligned with the questionnaire topics. The mapping of questions to coding themes is provided in Annex 1.

The information from the focus group serves as a complement to the findings of the quantitative analysis, that is, it acts as a form of validation, explanation, description, and deeper understanding. Accordingly, the thematic scope of the discussion in the focus group was defined after the completion of the quantitative analysis, and the findings from the focus group are also presented through quotes to better illustrate our findings and the points of the respondents.

3.3. Labor Productivity

In this analysis, we construct three different measures of firm productivity. The first is labor productivity, defined as the ratio of total sales to the number of employees. This measure is calculated for the current year and the previous value (current year minus 2), and from these we derive a productivity growth measure as the difference of the natural logarithms, divided by the average value of the initial and final labor productivity (Haltiwanger and Davis, 1999; World Bank, 2016), to approximate the average annual growth free from the influence of extreme values.

However, labor productivity has several limitations as a measure of firm productivity. First, this indicator does not account for differences in capital or other productivity factors, such as technology or work organization (Kouamé and Tapsoba, 2019). Labor productivity may be low due to increased employment of less productive workers, despite the firm possessing strong capital or innovations. Second, this measure assumes that all workers have the same skills and effectiveness, which is not always the case. For these reasons, labor productivity is not a sufficiently good measure of the overall productivity of firms.

3.4. Construction of Total Factor Productivity

Therefore, our primary interest lies in observing and measuring firm productivity beyond labor productivity, through total factor productivity (TFP). It represents a measure of technological efficiency and organizational capability, i.e., the "residual" that cannot be explained solely by the quantity of production factors. In estimating TFP, we follow Francis et al. (2020). We use a production function estimation, which is an econometric model that links value added to the use of labor and capital, applying two specifications: a simplified Cobb-Douglas function and a more flexible translog function. Both are based on the value-added approach.

The Cobb-Douglas production function is specified as follows:

$$va_{it} = \beta_k k_{it} + \beta_l l_{it} + \epsilon_{it}$$

where va_{it} is the logarithm of the value added of firm i in the year t, estimated as the difference between total sales and the costs of intermediate goods; k_{it} and l_{it} are the logarithms of capital and labor, respectively. TFP at the firm level is obtained as the residual from the regression:

$$\widehat{TFP_{it}^{CD}} = \widehat{\epsilon_{it}} + \hat{c}_s + \widehat{FE_t}$$

where $\hat{c}_s$ is a constant specific to the industry, and $\widehat{FE_t}$ are time fixed effects. This specification assumes that the production elasticities (β_k, β_l) are the same for all firms and do not depend on how much labor or capital a firm uses.This is a strong restriction since it corresponds to situations with constant returns and no interaction between factors.

To allow variation in the elasticities and interaction between factors, we also estimate a translog production function which permits elasticities to depend on the factor levels themselves and their interaction. The function is specified as follows:

$$va_{it} = \beta_k k_{it} + \beta_l l_{it} + \beta_{kk} k_{it}^2 + \beta_{ll} l_{it}^2 + \beta_{kl} k_{it} \cdot l_{it} + c + FE_i + \epsilon_{it}$$

This specification adds quadratic and interaction terms, which in practice means that: 1) The effect of labor or capital can change depending on their magnitude (e.g., more labor does not necessarily imply higher marginal productivity); and 2) There is the possibility of substitution between labor and capital, which does not have to be the same across all firms.

TFP is again extracted as the residual, analogous to the previous function:

$$\widehat{TFP_{it}^{TL}} = \widehat{\epsilon_{it}} + \hat{c}_s + \widehat{FE_t}$$

Thus, unlike the Cobb-Douglas specification, the translog specification allows elasticities to vary between firms, depending on the level of use of each factor. For example, the elasticity of value added with respect to labor is calculated as:

$$\frac{\partial va_{it}}{dl_{it}} = \beta_l + 2\beta_{ll} l_{it} + \beta_{kl} k_{it}$$

This means that the increase in value added from a one-percent increase in labor depends on how much labor and capital the firm uses. For example, a firm with little capital will experience a different effect than one with a lot of capital. In other words, this specification allows us to capture real economic situations where firms differ in structure and production methods.

The Cobb-Douglas specification offers simplicity and easier interpretation but imposes strong restrictions of constant elasticities and factor independence. The translog specification relaxes these assumptions and better captures heterogeneity in production technology across firms. As shown by Francis et al. (2020), statistical tests mostly support the translog specification, so we follow that approach but present results from both for robustness.

After calculating TFP, we compute its growth relative to the previous period's value, divided by the number of years between two WBES waves to approximate average annual growth.

For the calculation of TFP, we use the following input data from WBES:

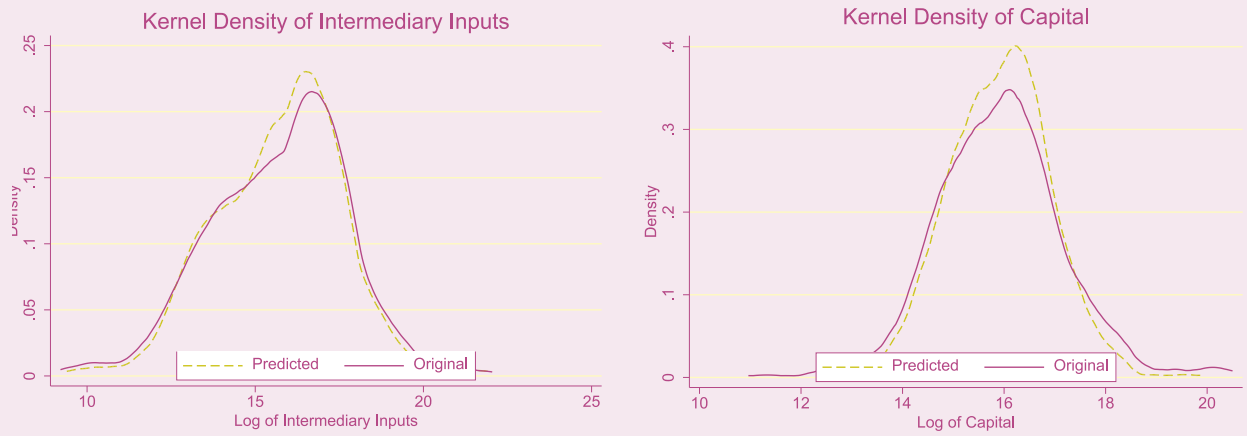
- Total annual sales of the firm,
- Annual labor costs (wages, contributions, bonuses, etc.) as an approximation of human capital,
- Hypothetical value for replacement of machinery, equipment, and vehicles as an approximation of the value of physical capital,
- Annual costs of raw materials and intermediate goods (used to subtract from total sales to obtain value added).

One significant limitation of WBES is that some of the financial data were collected on a voluntary basis; that is, the responding firm had the option not to provide information on certain more detailed financial variables. This applies to the last two variables in the previous list, where about two-thirds of firms did not provide data. This complicates the calculation of TFP. We take a simple but active deterministic approach for imputing the missing data. Specifically, we use simple regression models to predict the missing values. For intermediate costs (materials), we use information on sales, export orientation, and the number of employees. For capital, we use the number of employees, legal form, certification indicator, industry sector, as well as the firm's age and size.

These specifications are intuitive and based on the assumption that there is a structural relationship between these variables.We acknowledge that imputing financial data with such a high missingness rate introduces potential validity concerns. However, we view this approach as a pragmatic compromise to preserve sample size and analytical power. Nonetheless, results involving imputed data should be

interpreted with appropriate caution. **Figure 2** shows a similar pattern between the original and the predicted variables, with a slightly higher concentration of values around the mean, which is common in predictions. At the bottom of **Figure 2**, estimates of the Wilcoxon matched-pairs signed-rank test are reported; at conventional significance level, the test fails to reject the null that the distributions of the original and predicted values are identical. This approach allows us to use the full sample of firms available in the analysis, which is especially important when working with survey data.

Figure 2 – Original and Predicted Values for Intermediary Inputs and Capital



Wilcoxon matched-pairs signed-rank test

Ho: Both distributions are the same

p = 0.1970 **p = 0.9648**

Source: Authors' calculations.

4. Stylized Facts about Firm Productivity in North Macedonia

Total factor productivity in North Macedonia is estimated at close to 19 thousand dollars (current prices) for the average firm, which is comparable to the World Bank's estimate of around 25 thousand dollars (based on purchasing power parity).[5] shows that TFP decreases over the years, with a decline of 3% between 2009 and 2013, while from 2013 to 2019 the decline deepens to 8.4%. This indicates that the efficiency in the use of production factors — labor and capital — worsens over time, which may be a result of structural problems in the economy, limited innovation activity, low levels of technological progress, or institutional barriers to productivity. The accelerated decline after 2013 further suggests that political or economic shocks, such as an investment slowdown, weakened institutional capacity, or reduced export competitiveness, likely contributed to this deterioration.

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Table 1 – Total Factor Productivity, Average Firm

	Total	2009	2013	2019
TFP (mil. MKD)	1.02	1.06	1.03	0,94
TFP (change)			-3,0%	-8,4%

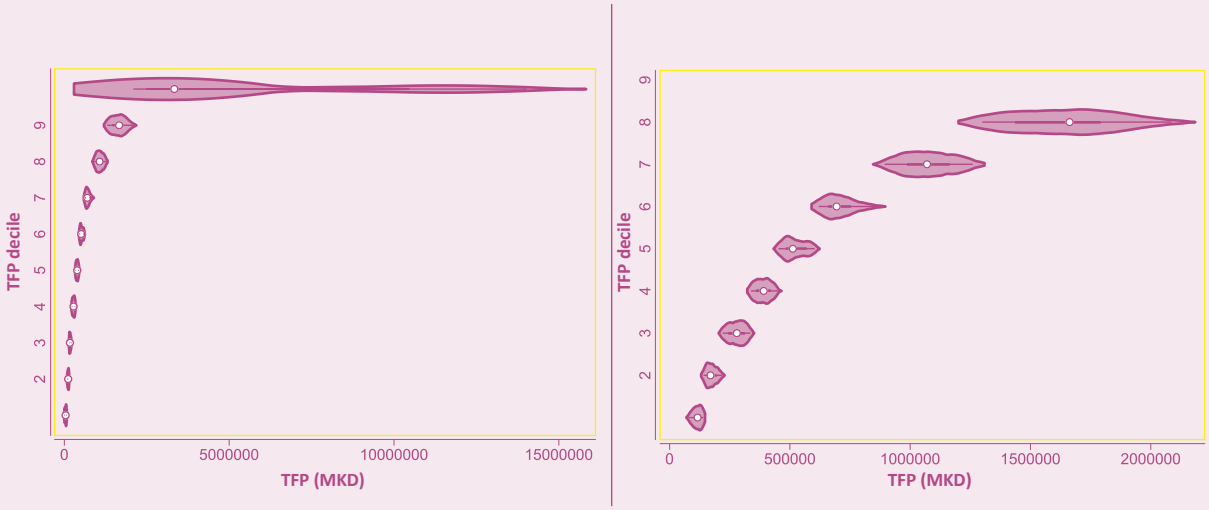
Source: Authors' calculation

There is significant heterogeneity among firms regarding their total factor productivity. **Figure 3** presents the distribution of TFP across TFP deciles. First, it is evident that there are a small number of firms with very high TFP (positioned in the 10th decile). Therefore, the first and last deciles are omitted from the visualization to better highlight the distribution within each decile.

Not all businesses in North Macedonia are equally productive. Some firms are up to 14 times more productive than others-even within the same economy, using similar inputs like labor and machinery. This means that for every unit of value created by a low productivity firm, a high productivity firm is generating 14 units with the same or even fewer resources. In Figure 2, the firms in the second decile cluster tightly near the bottom indicating very low productivity. Moving upward (toward decile 9) not only does the average productivity increase, but the range expands significantly. This shows that not only are some firms more productive, but the best among them are pulling far ahead of the rest.

5 Available on Figure 1 from the following opinion on the following link: https://www.worldbank.org/en/news/opinion/2024/03/26/a-tale-about-productivity-and-jobs-in-north-macedonia. Note: Specifications for estimation may differ.

Figure 3 – Distribution of TFP across Deciles

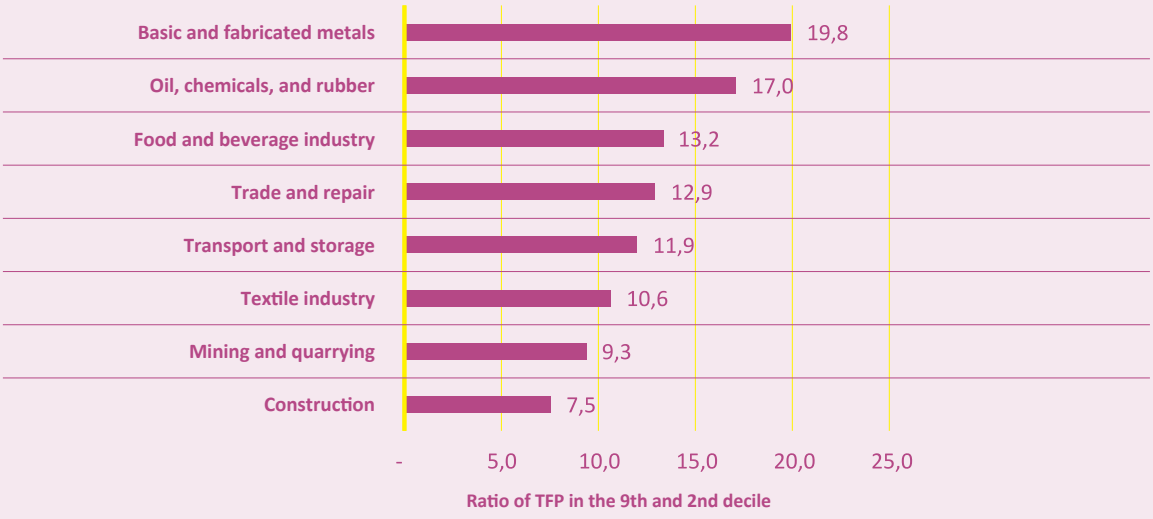


Source: Authors' calculations.

From a sectoral perspective (for sectors with sufficient observations in our data), the difference between the most productive and least productive firms is greatest in the basic and processed metals sector, nearly 20 times, and lowest in construction, 7.5 times. The high productivity gap between firms operating within the same industrial branch indicates the presence of market distortions and inefficient resource allocation. This means that instead of labor, capital, or technology being directed toward more efficient firms, they remain trapped in less productive firms, limiting the overall economic potential of the sector.

Large differences within the same sector were also explained by firms in discussions through variations in technology and automation of their processes. It is important to emphasize that our sample is heterogeneous in terms of firms' turnover volume, so the average firm by this indicator is likely structurally different from a micro firm, which may contribute to explaining such differences. From a business environment perspective, these inefficiencies may arise from barriers to entry, sectoral access to financing, unequal treatment, and potential institutional weaknesses.

Figure 4 – Most productive versus least productive firms, by sector



Source: Authors' calculations.

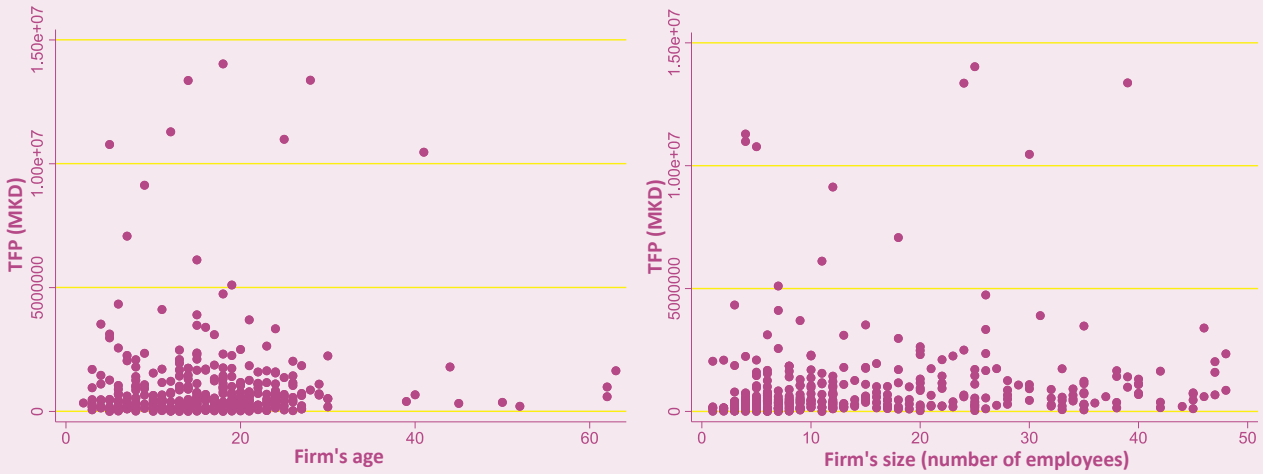
However, when productivity is cross-analyzed with firm age and size (**Figure 5**), no clear relationship emerges. There is likely a slight negative relationship between productivity and age, indicating that newer firms (including startups) tend to be more efficient than older firms. Focus group participants noted that productivity drivers differ depending on a firm's stage of growth. Younger and smaller firms often struggle with financing new equipment or technology, which can limit efficiency. In contrast larger and older firms may be more stable, but face challenges with innovation, agility or accessing new markets.

"Large companies are less flexible. They have greater access to financial resources and institutions, but adapting to change takes longer."

Still, the relationship is not clear enough and is influenced by extreme values, despite the fact that the series was winsorized (i.e., 2% of values on both sides were excluded). Meanwhile, productivity and firm size show no clear relationship. The focus group concluded that different factors affect productivity depending on firm size and age.

"The resources needed for investments in equipment and technology are a challenge both at the start and when you are small. That affected employees' productivity at the time. Now, we have stabilized in that regard, but we face other challenges related to scaling and expanding."

Figure 5 – Productivity and Firm Age (left) and Size (right)



Source: Authors' calculations.

Viewed by some observed characteristics, firms in North Macedonia do not experience significant differences **Figure6**). For example, firms managed by women have a slightly higher TFP than those managed by men, but this difference does not appear to be statistically significant. On the other hand, firms with foreign ownership have about four times higher average efficiency compared to domestically owned firms. This finding suggests that foreign investors likely bring higher standards of efficiency, innovation, process optimization, and management practices to the country. Similarly, there is a notable but much smaller difference between exporting firms and those selling only on the domestic market; the former are more efficient than the latter. This confirms that exporting can provide access to broader markets, offering more growth opportunities and increased competition, which motivates firms to improve and become more efficient. And, vice versa: the motive to export and hence grow, likely makes firms increase their efficiency. These findings indicate that not only structural factors but also strategic decisions, such as exporting or foreign ownership, play an important role in determining the productivity of firms in North Macedonia. Focus group results show that mainly export-oriented firms are exposed to greater competition, which requires continuous innovation, introduction of new technologies, and compliance with standards. This is the key channel through which they become more productive.

"We have to constantly stay up to date due to high competition. This encourages the introduction of innovations and new products. Greater competition can stimulate higher productivity."

Additionally, foreign market demands also influence process optimization, which is crucial for higher productivity.

"Standardization requires a high level of quality, and that positively affects process optimization. Through process optimization, company productivity increases."

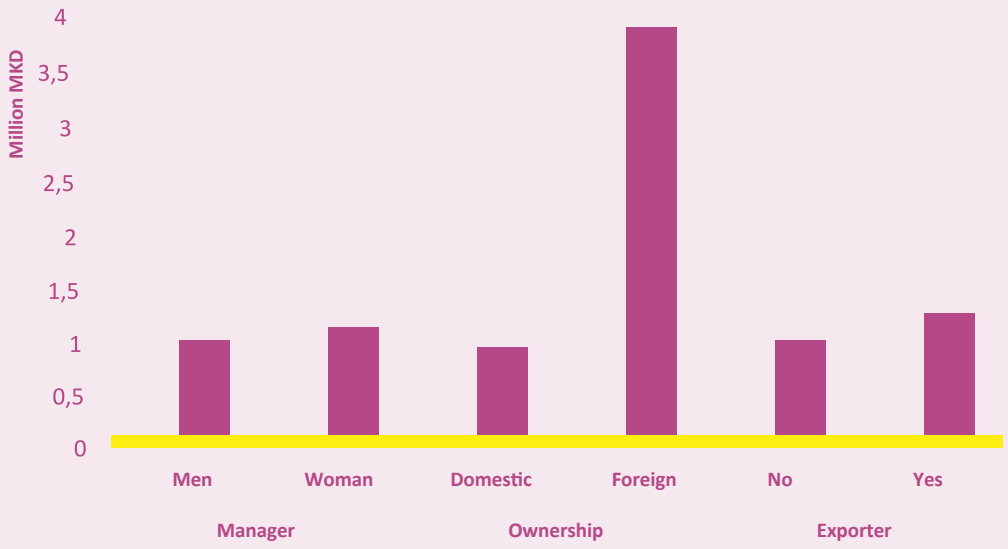
"On the other hand, to meet standards, your processes must be maximally optimized."

However, the conclusion from the focus group is that the "domestic" and "foreign" markets are structurally different. The overall business climate and certainty of cooperation indirectly affect productivity.

"The domestic market is limited. We rarely have new companies on the market where we would sell our products. Even if you are more productive, the size of the market and the overall business climate limit the type and volume of production."

These findings indicate that not only structural factors but also strategic decisions, such as exporting or foreign ownership, play an important role in determining the productivity of firms in North Macedonia.

Figure 6 – Productivity According to Other Firm Characteristics



Source: Authors' calculations.

5. Determinants of Firm Productivity in North Macedonia

5.1. Model and Estimator

To be able to assess how certain factors and phenomena relate to firm productivity in North Macedonia, it is necessary to consider what kind of determinants we are discussing. The discussion from Section 2 provides guidance for our line of thinking: business climate and internal drivers of productivity, from the perspective of the individual firm, are possible important determinants of productivity dynamics. Indeed, the general perceptions of managers regarding the business climate provide some indication of the limiting factors within the business environment.

However, to understand the impact of the business climate and internal potential on productivity, we need concrete indicators. WBES is collected based on a wide range of quantitative and qualitative, or perception-based, indicators. While perception-based indicators are useful, we must complement them with quantitative indicators to obtain a more accurate picture of the phenomenon we want to portray.

In Section 2, we identified four aspects of the business climate: 1) infrastructure, 2) competition and regulation, 3) financial opportunities/constraints, and 4) corruption; as well as two dimensions of internal productivity determinants: 5) innovation and technology capacity, and 6) managerial practices related to skills and labor.

In the analysis, business climate indicators are treated as exogenous determinants of productivity. However, this assumption may be strict because reverse causality is possible — for example, more productive firms may proactively act to improve their business environment (through influence on public administration, facilitation of infrastructure access, etc.), which could lead to simultaneity bias in the estimates. The ideal approach to overcome this would be to use industry-level average values of the business climate to reduce the possibility that individual firms influence these conditions. However, due to the limited number of observations, this is not feasible in our analysis.

- Therefore, the model includes industry fixed effects (10 grouped related industrial branches/sectors, due to sample limitations), which absorb all time-invariant unobserved characteristics of the industrial branches that may influence both productivity and the business climate. This reduces the risk of simultaneity stemming from structural factors specific to the industry branch. Additionally, we use relevant controls to further understand the relationships. The results, in any case, are interpreted as statistical associations rather than necessarily direct causal links, emphasizing the theoretical basis for the identified mechanisms.

Another issue is the selection of indicators representing a certain phenomenon. For example, in the WBES, infrastructure may be covered by multiple questions, each important, but which is more important than the other is subjective. Additionally, these indicators may be correlated. To address this, we apply dimensionality reduction using Principal Component Analysis (PCA). This approach first identifies the four main aspects of the business climate, collects several data series related to each, and then extracts the "main variation" for each aspect by using the first principal component. Intuitively, the goal is to construct an artificial variable that can summarize the behavior of a group of basic variables describing similar aspects of the business climate or the firm's internal potentials. Thus, all individual indicators of the business climate are treated as indirect measures (proxies) for four broader dimensions of the business climate: infrastructure, competition and regulation, financial constraints, and corruption.

- Infrastructure is assessed through several indicators: firms' perception of transport as an obstacle, reported losses of goods during transport, and presence of electricity supply interruptions. These variables reflect a spectrum ranging from poor to well-functioning infrastructure, where lower perceived obstacles, minimal losses, and stable electricity signal higher infrastructure quality, and higher obstacles or disruptions indicate weaker infrastructure conditions.
- Competition and regulatory environment are captured through the number of competitors, the presence of informal competition, and the amount of managerial time spent on regulatory compliance. The resulting component ranges from a low-pressure environment with fewer regulatory burdens and less informal competition to a high-pressure environment characterized by intense competition—both formal and informal—and significant regulatory demands.
- Financial constraints are measured through variables such as the difficulty in accessing finance, proportion of reliance on banks for financing working capital, and counting the firm's need for a loan, use of authorized overdraft, and holding of active loans. This component reflects the degree of access to and reliance on external finance, ranging from constrained to readily available. By combining these dimensions, the component highlights not only the equality of financial accessibility across firms but also the extent to which firms depend on external financial resources for their operations as opposed to internally-generated funds.
- Corruption is constructed based on the perceived severity of corruption and bribery, corruption within the judiciary, and the share of informal payments in sales. The corresponding component represents a range from low to high exposure to corruption-related obstacles, where higher scores reflect greater interference of corruption in business operations.

The adequacy of the components is assessed through Bartlett's test of sphericity, which in its null hypothesis assumes that the variables are not correlated. The results in **Table 2** indicate that the proposed variables for the factors can be further grouped, except for managerial practices related to skills, although for this variable the probability is close to the 10% level of statistical significance.

Table 2 – Barlett's Test of Sphericity

Component	p-value
Infrastructure	0,020
Competition and regulation	0,00 0
Financial constraints	0.000
Corruption	0.000

Source: Authors' calculations.

Accordingly, we extract the first principal component from PCA, standardize it (mean of zero and standard deviation of one), and include it in the following model:

$$\Delta productivity_{it} = \sum \beta_j Business\_climate_{it} + \sum \gamma_j Internal\_factors_{it} + \sum \delta_j Firm\_Controls_{it} + \alpha_i + \alpha_k + \alpha_t + \epsilon_{it}$$

Wherere $\Delta productivity_{it}$ presents the productivity growth of firm i at time t, and comes in three variants explained in Section 3; $Business\_climate_{it}$ is a vector of the generated principal components related to the investment/business climate; $Internal\_factors_{it}$ includes whether the firm introduced a new products, whether it provided training to its employees; [7]$Firm\_Controls_{it}$ includes controls for observable firm characteristics, with only two basic ones used: firm size and age, due to the sample size.

Additionally, some firm characteristics are nearly time-invariant (for example, whether a firm is an exporter or not), so they will be captured by the fixed effects, thereby avoiding significant loss of degrees of freedom. α_i is the fixed effect for the firm i (controlling for all time-invariant firm-level characteristics), α_k is the fixed effect for the industry k (controlling for all time-invariant industry-level characteristics and aiming to alleviate endogeneity concerns), α_t are time fixed effects, which control for all characteristics constant at time t (e.g., regulations that were in effect in one year but not in another), ϵ_{it} is the idiosyncratic

error term of the model. This model is estimated using a fixed effects regression, i.e., the least squares method, and most of the fixed effects in the model aim to reduce the influence of potential endogeneity. Due to the limited sample size, we are not in a position to use instrumental variable estimators or other estimators that explicitly address endogeneity issues. For more on the problem of endogeneity and related methodological challenges in studies like this one, a detailed elaboration is provided in Dethier et al. (2011), and we refer readers to that discussion for greater caution when using the results. We appropriately use the weights provided in the WBES to ensure that our conclusions are representative at the population level of firms.

5.2. Results and Discussion

The results presented in **Table 3** reveal that certain aspects of the business climate and internal potential of firms have a consistent and statistically significant impact on productivity growth, primarily on that of total factor productivity. When labor productivity is observed from such a firm-level perspective, robust conclusions cannot be drawn that the business climate or internal firm potentials are especially significant for labor productivity. This can be explained by the fact that labor productivity, as a simple measure (ratio of sales to number of employees), mostly reflects the value of human capital and the individual efficiency of workers. However, productivity in a broader sense also depends on how that human capital—in its quantity and quality—is combined with other production factors—such as technology, management, and infrastructure—which becomes evident only through measures like TFP. From the discussions with firms, we identified that indeed, the same combination of labor and technology, but with different structure and quality of the workforce, will affect total productivity differently. Therefore, only through assessments of total efficiency can the true effects of the business climate and organizational capacities of firms be captured.

Infrastructure has a consistently positive effect on productivity growth when controls are added (**Table 3**), indicating that better availability and quality of infrastructure increase firms' capacity for efficient production. Noticeable in the coefficients for infrastructure is that their magnitude slightly increases when industry fixed effects are added, which may suggest that a simultaneous relationship (more productive firms may find ways for the existing infrastructure to work better for them) is likely present. This finding can also be explained through firms' perceptions of internal infrastructure (within capacities) and external infrastructure (roads, energy supply, water supply). Bureaucratic obstructions and slow processes with construction permits and zoning agricultural land converted into construction land is an obstacle to better internal infrastructure, which negatively affects total productivity.

"We are scattered across the entire city with warehouses because obtaining construction permits takes years, the urban planning sector in the Municipality hardly functions, and that is an additional cost reducing productivity."

"We cannot improve our infrastructure because we have not had a Detailed Urbanization Plan for years."

External road infrastructure is felt more strongly as a problem by firms located outside the capital (outside Skopje). Firms perceive that poor road infrastructure negatively affects productivity mainly through:

"...Higher depreciation, slower processes, higher transportation costs."

Meanwhile, water supply infrastructure, and especially reduced efficiency in the water supply system, is significant for firms in agriculture.

"Fifty years ago, we irrigated larger areas than nowadays... all the electric pumps used back then have been destroyed, and half of the water is lost before it reaches the final point."

"Infrastructure depends on Municipalities and institutions; we have no power there."

Energy infrastructure, although not as intensely problematic as urban planning and construction aspects, was mentioned by firms as a factor affecting productivity, inter alia, through poor governance.

"In our area, electricity outages happen at least 10 times a year during working hours, unannounced. And nobody reacts, while if it happens on a Saturday, nobody comes. And who do we complain to? That is also infrastructure. It affects productivity."

However, bureaucratic aspects were also emphasized in energy infrastructure, including obtaining permits and strategic planning for investments in energy capacities (including for own production).

The tightening of competition and regulation appears to have no statistically significant impact on productivity growth in the analyzed models (**Table 3**). This suggests that, contrary to expectations, the increased administrative burden, unpredictability, or market conditions associated with tighter competition and regulation do not have a clear measurable effect on firm productivity growth in this sample. Even after accounting for industry-specific effects and firm heterogeneities such as size, age, or sector of operation, the coefficient remains insignificant. This lack of significance implies that the potential negative impacts of competition and regulation may be heterogeneous across firms or context-dependent, and that any such effects might be too subtle or offset by other factors to be captured in the aggregate analysis. Therefore, these results should be interpreted cautiously, recognizing that the role of competition and regulation in shaping productivity may require further investigation with more granular data or alternative methodological approaches.

Firms perceive regulation and competition as separate factors, which may be also a factor driving our results. Moreover, the impact of competition on productivity largely depends on whether it is fair or unfair. Legal competition is perceived as healthy and has a stimulating effect on productivity, while informal competition has the opposite effect.

"Unfair competition discourages development, which slows productivity."

"We cannot cope with unfair competition; no action is taken, and the state has continuously allowed it for all these years. This negatively affects us."

Regarding regulation, firms indicate that bureaucratic processes and administrative inefficiency negatively impact productivity. Slow communication with institutions (both inter-institutional communication and between firms and public institutions), uncertainty related to frequent regulatory changes, short deadlines for compliance, regulation not adapted to business needs, lack of digitalization in procedures, and insufficient inter-institutional coordination are cited as examples of negative influences on firm productivity.

"The deadlines for complying with new regulations are short. The business voice is not heard. Sometimes even comments from the ENER remain there with no further discussion or open debate."

"Laws are not passed in a comprehensive way. One ministry passes one law, another ministry passes another, and coordination is missing. Thus, laws often remain ambiguous, and inspections interpret them arbitrarily."

The problem of digitalization remains a burden for firms:

"Institutions do not use new technologies."

"Institutions do not communicate among themselves. They ask us for documentation repeatedly; nothing is digitized. And even where they say it is, it does not work."

The coefficient for financial constraints (**Table 3**) is negative and indicates that reliance on external finance over own-generated funds for firms constrains their productivity growth, and that this effect

would remain subdued if not controlling for firm heterogeneities, especially size and age. It indicates that reliance on external finance does not affect all firms equally, but its negative impact is particularly manifested in certain segments – such as smaller, younger, or faster-growing firms – which are more sensitive to financing constraints.

Corruption, on the other hand, has a strong negative and statistically significant effect on productivity growth across all models. The presence of corruption creates inefficiencies, increases transaction costs, and reduces the motivation to invest in productivity. This result is especially pronounced in models with controls and industry fixed effects, indicating that the impact of corruption is stable even when controlling for differences across firms and industries. Firms perceive the problem of corruption mainly through the lens of a bureaucratic and inefficient system.

"If you take the urban planning cases managed in our Municipalities, you will see how slow the processes are. It takes years. One government leaves, another comes, and maybe only 10% of the cases are resolved."

"Companies are even willing to pay to finance the process of adopting municipal urban plans, just to speed up these processes. But that doesn't fit [for the authorities]."

However, system inefficiency is not only at the municipal level; the conclusion from the focus group with firms is that inefficiency of institutions is the same at both central and local levels.

"It's the same, there are no differences!"

We turn to analyzing the coefficients on control variables.

Innovators experienced higher productivity growth, as evidenced through the positive and significant coefficient on the indicator of innovation (**Table 3**). This finding confirms the importance of technological upgrading and modernization as key drivers of productivity in firms. Firms confirm that investing in technology and digitalization also increases productivity growth by speeding up processes, which illustrates an increase in TFP. They emphasize that digitalization improves overall performance. However, they point out that depending on the structure of employees (young, older, quality), the same technology can produce different total productivity.

"Younger employees themselves demand new technology. In plants with an older workforce structure, it is harder to accept and implement new technology."

However, the type and scope of new technology is largely dictated by access to financial resources, which is a bigger challenge for smaller and younger firms.

On the other hand, investment in skills through training has been found insignificant.Likewise, there is no statistically meaningful relationship between firms' size and productivity growth. Larger firms are found with higher productivity growth, with sufficient evidence showing that such growth is accelerated particularly among the large firms employing over 50 employees.

Overall, the results confirm that TFP-based measures are more sensitive and accurate for measuring the real productivity of firms, as they also take into account the role of capital and other production factors. This is especially important when the goal is to understand the deeper determinants of firm efficiency, rather than just measuring output per employee.

Table 3 – Results

		Specification only with PC			Specification with PC and characteristics			Specification with PC, characteristics and industry fixed effects		
		Dependent variable: Productivity growth								
		Labor	TFP (CD)	TFP (TL)	Labor	TFP (CD)	TFP (TL)	Labor	TFP (CD)	TFP (TL)
Infrastructure		0,00734***	0,0178	0,0121	0,00997***	0,0717***	0,0670***	0,00847***	0,0774*	0,0764**
		(0,002)	(0,018)	(0,018)	(0,002)	(0,024)	(0,022)	(0,002)	(0,043)	(0,038)
Competition and regulation		-0,0045	-0,0394	-0,0515	-0,0016	0,0997	0,094	-0,00569	0,091	0,0946
		(0,005)	(0,060)	(0,056)	(0,006)	(0,071)	(0,064)	(0,006)	(0,152)	(0,138)
Financial conditions		0,00505	-0,109*	-0,0921*	-0,000211	-0,199***	-0,183***	0,00352	-0,192*	-0,179*
		(0,007)	(0,055)	(0,051)	(0,007)	(0,069)	(0,061)	(0,008)	(0,111)	(0,100)
Corruption		0,00967	-0,142*	-0,131*	0,0102	-0,181**	-0,168**	0,00611	-0,188*	-0,175**
		(0,007)	(0,074)	(0,069)	(0,007)	(0,090)	(0,083)	(0,008)	(0,096)	(0,088)
The firm introduced a new product in the last year					0,00986	0,338***	0,326***	0,00681	0,350*	0,351**
					(0,014)	(0,083)	(0,075)	(0,016)	(0,195)	(0,170)
Workers received training in the last year					-0,00589	0,0508	0,0845	-0,00476	0,0845	0,141
					(0,010)	(0,078)	(0,075)	(0,011)	(0,148)	(0,132)
Firm Age (ref. < 10 years)	10-29				-0,0168	0,115	0,0822	-0,0171	0,129	0,113
					(0,013)	(0,102)	(0,087)	(0,014)	(0,228)	(0,191)
	30-49				-0,0386	-0,0867	-0,0847	-0,0451*	-0,11	-0,091
					(0,025)	(0,162)	(0,137)	(0,027)	(0,355)	(0,309)
	Over 49				0,0754**	0,0394	0,088	0,163**	0,00889	0,0768
					(0,033)	(0,171)	(0,143)	(0,082)	(0,290)	(0,210)
Firm Size (ref. < 10 employees)	10-19				0,00754	-0,0176	-0,0449	0,00515	-0,0186	-0,0468
					(0,011)	(0,062)	(0,053)	(0,011)	(0,367)	(0,318)
	20-49				0,0439**	0,471**	0,478***	0,0341*	0,484	0,515
					(0,020)	(0,185)	(0,169)	(0,020)	(0,455)	(0,408)
	Over 49				0,0185	0,808***	0,805***	0,0258	0,854**	0,856**
					(0,022)	(0,229)	(0,220)	(0,025)	(0,371)	(0,341)
Constant		0,0155***	-0,0374***	-0,0380***	0,0178*	-0,416***	-0,395***	0,0481	-0,424	-0,426
		(0,001)	(0,012)	(0,012)	(0,011)	(0,078)	(0,069)	(0,043)	(0,367)	(0,323)
Observations		272	210	210	272	210	210	269	209	209
R-squared		0,104	0,364	0,366	0,23	0,68	0,715	0,3	0,695	0,736
Number of firms		209	184	184	209	184	184	206	183	183

*Source: Authors' calculations. *, ** and *** indicate statistical significance at the 10%, 5% and 1% confidence levels. Standard errors are given in parentheses. Standard errors are robust to heteroscedasticity. Population weights were used.*

Table 4 presents a robustness check of our main results by introducing the principal components into the regression one at a time. Since principal components capture abstract variance and may be correlated, collinearity could influence the estimates. Nevertheless, the key findings remain largely consistent in terms of significance and magnitude. One notable exception is the component related to competition and regulation, which—when considered in isolation—is found to have a statistically significant and negative effect on firm productivity growth. This may suggest that tighter competition and regulatory environments, rather than fostering innovation and efficiency, instead impose administrative burdens, create unpredictability, and foster perceptions of unfair market conditions. As a result, firms may divert resources toward compliance and navigating bureaucracy, rather than toward productive investment.

Table 4 – Robustness check

	Labor	TFP (CD)	TFP (TL)
Infrastructure	-0,00113	0,0484*	0,0479*
	(0,009)	(0,026)	(0,026)
Competition and regulation	-0,0216	-0,208***	-0,179***
	(0,023)	(0,051)	(0,055)
Financial conditions	-0,00292	-0,156***	-0,145***
	(0,007)	(0,046)	(0,047)
Corruption	0,0130*	-0,164**	-0,164**
	(0,007)	(0,063)	(0,063)

Source: Authors' calculations. *, ** and *** indicate statistical significance at the 10%, 5% and 1% confidence levels. Standard errors are given in parentheses. Standard errors are robust to heteroscedasticity. Population weights were used.

5.3. Which factor has the greatest impact?

The analysis in the previous section establishes the significance of four aspects of the business climate and two internal drivers of productivity growth in firms. However, one more step is needed – the identification of the relative importance of these dimensions and, hence, the space for reforms that will yield the greatest benefit for the business sector and society as a whole. Given that the dimensions of the business climate are principal components, their coefficients do not have a measurement scale that can be easily interpreted (Greene, 2000, p. 258). Additionally, since most of the indicators constitutingthe business climate are qualitative and perceptual, it is unclear how changes can be constructed from them.

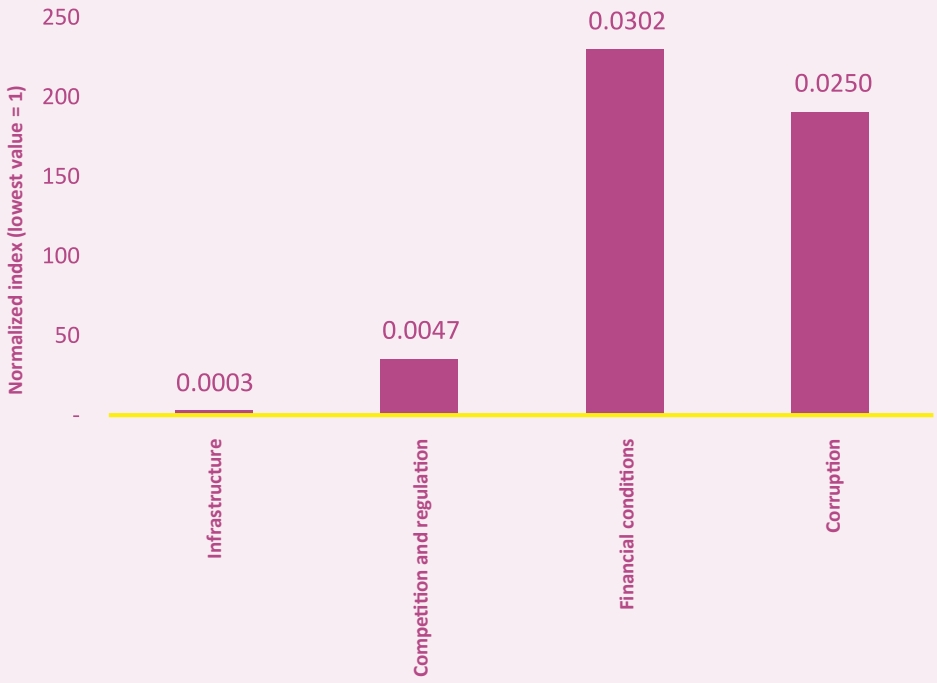
For policies, it is necessary to rank the relative importance of each of the dimensions of the business climate in explaining the variation in productivity growth across firms. However, there is no simple way to assess the relative contribution of regressors in the context of multiple regression, since they are not completely independent. One way to do this is to apply Kruskal's (1987) methodology. Explanation and elaboration of this methodology can be found in Johnston and DiNardo (1997), as well as Bastos and Nasir (2004), and this study will not devote space to its explanation in mathematical or syntactical terms.

Kruskal's approach is based on the simple concept of partial correlation coefficients, which are used when it is necessary to measure the association between two variables while accounting for the joint influence of other factors. By calculating different orders of considering these factors, an index is obtained which shows how much each factor (regressor) influences the explanation of the business climate.

The normalized index results show that productivity growth is mostly explained by corruption, followed by financial constraints (**Figure 7**). The measure for corruption explains about 500 times more variation than the measure for infrastructure (the lowest index), while financial constraints explain about 400 times,

making these two factors key in explaining the productivity growth of firms in North Macedonia. Next in importance is the factor of competition and regulation, which explains 48 times more variation than infrastructure, but still about or less than a tenth of what financial constraints and corruption explain. The analysis places an important focus on the significance of corruption and financial constraints in the economic processes of firms.

Figure 7 – Normalized Index with Infrastructure as the Base



Source: Authors' calculations.

Note: The numbers above the bars represent the unnormalized Kruskal index.

6. Conclusions and Recommendations

The aim of this study is to portray the productivity of firms in North Macedonia and to identify its determinants. Instead of using a simplified approach based on labor productivity, the study uses total factor productivity (TFP) as a more comprehensive measure that integrates how labor and capital are combined in the production process. The data originates from the World Bank Enterprise Surveys (2009, 2013, and 2019), structured as a panel dataset, which enabled analysis of the dynamics of firm productivity over time and control for time-invariant firm characteristics. Methodologically, the determinants were examined using a model that incorporated principal components of business climate and internal firm capacities, extracted through principal component analysis. The context and depth of the findings were further verified and understood through the perspectives of 10 firms from various sectors, who participated in a focus group discussion.

Key Findings from the Analysis

- Productivity is declining. Total factor productivity (TFP)—a measure of how efficiently firms combine labor and capital—declined by 8.4% between 2013 and 2019, signaling worsening efficiency despite apparent economic stability.
- There are wide disparities in firm productivity. The most productive firms are up to 14 times more efficient than the least productive ones. This is a sign of misallocated resources: labor and capital remain stuck in inefficient firms rather than flowing to better-performing ones.
- Exporting and foreign ownership are associated with higher productivity. Export-oriented and foreign-owned firms consistently perform better, suggesting that international exposure drives competitive pressure, innovation, and better management.
- Financial constraints and corruption are the biggest productivity inhibitors. According to the normalized Kruskal index, corruption explains 500 times more of the variation in TFP than infrastructure, and financial constraints explains 400 times more. These are the most urgent priorities for reform.
- Infrastructure supports productivity growth—especially for smaller and rural firms. Transport, energy reliability, and local permit systems have measurable, though moderate, effects. Focus group responses strongly corroborate this.
- Regulatory burden and unfair competition hinder growth, but the result needs to be analyzed further. Firms especially struggle with inconsistent enforcement, informal competitors, and burdensome procedures. These factors have a negative but more modest impact on productivity than financial constraints or corruption—unless left unchecked.

Key recommendations

Based on these conclusions, the following list of recommendations is proposed for policymakers, ranked by importance, starting with the most critical.

1. **Fight against corruption:**
   - To reduce the negative effects of corruption, it is necessary to strengthen mechanisms for transparency in the public sector and improve accountability mechanisms. These measures will reduce transaction costs and increase the efficiency of firms.
   - Improving judicial independence and the effectiveness of court proceedings is crucial to combat corruption. Faster and more efficient procedures for resolving legal disputes should be ensured, along with promoting mechanisms for complaints against corrupt practices.

- Increasing education about firms' rights and providing training on identifying and reporting corrupt practices will enable firms to resist these negative practices while also promoting greater transparency in the economy.

2. **Financial support, especially for small and new firms**

   - Small and new firms often face financial and regulatory constraints that limit their ability to grow productively. While easing access to finance remains important, policies should also aim to strengthen firms' internal financial capacity—for example, by facilitating equity injections, retained earnings, or strategic partnerships—thereby reducing excessive reliance on external borrowing.
   - To encourage innovation and modernization, targeted subsidies and performance-based grants should be prioritized over debt instruments. These measures are especially important for firms operating below their productivity potential or in early stages of development where self-financing is not yet feasible.
   - Support for research and development (R&D) should be structured in a way that minimizes the financial risk for firms. This includes providing fiscal incentives (e.g., tax credits or deductions for innovation expenditures), but also encouraging co-financing models that blend public and private funding while limiting firms' exposure to debt.
   - To sustain technological upgrading and innovation, complementary support should be provided in the form of capacity-building initiatives. Training programs should aim to develop not only digital and innovation-related skills, but also financial and managerial competencies that help firms better allocate internal resources and reduce inefficient dependence on external finance.

3. **Take measures against unfair competition and the shadow economy:**

   - Strengthening inspection oversight and coordination among institutions (tax administration, labor inspection, customs) for detecting and sanctioning informal activities.
   - Digitalization of services, especially those relevant to firms, as well as efficient and consistent implementation of ongoing reforms in this domain, such as the introduction of e-invoicing.
   - Intensifying campaigns to legalize and formalize informal businesses, with concrete incentives for transitioning to the formal sector (reduced taxes/contributions during the initial period).
   - Eliminating regulatory barriers that excessively burden formalization, especially for small and newly established firms, through one-stop-shop systems, digitalization, and simplified procedures.

4. **Improving competition policy and control of state aid:**

   - Strengthening the independence and capacities of competition protection authorities:
     - The Commission for Protection of Competition should have full institutional autonomy, sufficient resources, and political support to investigate cartels, abuse of dominant position, and prohibited concentrations.
     - Encouraging a proactive monitoring policy, especially in sectors dominated by a few large players or where the state has a stake (public enterprises, public procurement, etc.).
   - Strict control and transparency of state aid:
     - State aid for firms must be targeted, time-limited, and transparently allocated, especially in situations where there is a risk of favoritism toward politically connected firms or market distortion.

- State aid should be tied to clear conditions for productivity and innovation (e.g., technological modernization, creation of new jobs, digitalization), rather than sustaining inefficient firms.
- A publicly accessible database of all forms of state support – subsidies, tax relief, state guarantees – should be established to allow public scrutiny and analysis of the effects.

- Eliminating hidden forms of market discrimination:
  - Favoritism toward specific firms through exclusive public procurement, administrative licenses, or preferential terms must be prevented.
  - There should be encouragement of equal application of regulation for all market participants, which is especially important for improving private sector trust.

5. **Regulatory reform**

- Reforms should aim to reduce administrative burden and increase the predictability of market conditions. It is important to revise existing laws and regulations to eliminate unproductive or excessive restrictions that slow down business development (e.g., parafiscal charges), while also avoiding excessive "regulatory guillotines" that could leave grey areas that can be a source of corruption.
- The public consultation mechanism in the process of drafting new laws needs to be improved to ensure that new measures align with the needs of the business sector.
- Competitiveness enhancement programs should also include small businesses, which suffer the most from administrative burdens. Encouraging firms to apply for funding calls that support strengthening productive capacity and efficiency will motivate them to improve quality and innovation.

6. **Infrastructure improvement:**

- Although transport infrastructure is already at a relatively good level, further investment is needed in the modernization of digital and energy infrastructure, which are key for advancing technology and productivity.
  - Particular attention should be given to local infrastructure, where it is crucial to efficiently overcome administrative barriers, especially when obtaining construction and other relevant permits. These processes are essential for companies planning to expand or modernize their capacities and facilitating them is an important precondition for supporting business development.
- Policies should focus on regional balance, by investing in infrastructure in less developed areas, in order to enable competition and access to resources across all regions.
- It is necessary to encourage public and private investment in infrastructure through public-private partnership (PPP) models, which will enable more efficient use of resources and faster development of key infrastructure projects.

7. References

Aghion, P. and Griffith, R., 2008. *Competition and growth: reconciling theory and evidence.* MIT press.

Aghion, P., and P. Howitt 1992. A Model of Growth through Creative Destruction, *Econometrica*, 60, 323-351.

Arif, U., Javid, M. and Khan, F.N., 2021. Productivity impacts of infrastructure development in Asia. *Economic Systems*, 45(1), p.100851.

Aschauer, D.A., 1989. Is public expenditure productive?. *Journal of monetary economics*, 23(2), pp.177-200.

Aterido, R. and Hallward-Driemeier, M., 2007. Impact of Access to Finance, Corruption and Infrastructure on Employment Growth: Does Sub-Saharan Africa Mirror Other Low-Income Regions. *Policy Research Working Paper*, 5218.

Aterido, R., Hallward-Driemeier, M. and Pagés, C., 2011. Big constraints to small firms' growth? Business environment and employment growth across firms. *Economic Development and Cultural Change*, 59(3), pp.609-647.

Bağır, Y.K. and Seven, Ü., 2022. Access to finance and productivity growth: The role of own and suppliers' financial constraints. *Empirical Economics,* 63(6), pp.3095-3119.

Bah, E.-H., & Fang, L. 2015. Impact of Business environment on output and productivity in Africa. *Journal of Development Economics*, 114, 159–171.

Banerjee, A.V. and Duflo, E., 2005. Growth theory through the lens of development economics. *Handbook of economic growth*, 1, pp.473-552.

Bartelsman, E., Haltiwanger, J. and Scarpetta, S., 2009. Measuring and analyzing cross-country differences in firm dynamics. *Producer dynamics: New evidence from micro data*, 68, pp.15-76.

Bartelsman, E., Haltiwanger, J. and Scarpetta, S., 2013. Cross-country differences in productivity: The role of allocation and selection. *American Economic Review*, 103(1), pp.305-334.

Bastos, F., and J. Nasir. 2004. Productivity and the Business climate: What Matters Most? Policy Research Working Paper 3335. World Bank, Washington.

Beck, T., Demirgüç-Kunt, A.S.L.I. and Maksimovic, V., 2005. Financial and legal constraints to growth: does firm size matter?. *The journal of finance*, 60(1), pp.137-177.

Bloom, N. and Van Reenen, J., 2007. Measuring and explaining management practices across firms and countries. *The Quarterly Journal of Economics*, 122(4), pp.1351-1408.

Bloom, N., Brynjolfsson, E., Foster, L., Jarmin, R., Patnaik, M., Saporta-Eksten, I. and Van Reenen, J., 2019. What drives differences in management practices?. *American Economic Review*, 109(5), pp.1648-1683.

Carlin, W., M.E. Schaffer, and P. Seabright. 2006. Where are the Real Bottlenecks? A Lagrangian Approach to Identifying Constraints on Growth from Subjective Survey Data. Discussion Paper 2006/04. Centre for Economic Reform and Transformation, Edinburgh.

Dabla-Norris, M.E., Ho, G. and Kyobe, M.A., 2016. Structural reforms and productivity growth in emerging market and developing economies. International Monetary Fund.

Demir, F., Hu, C., Liu, J. and Shen, H., 2022. Local corruption, total factor productivity and firm heterogeneity: empirical evidence from Chinese manufacturing firms. *World Development,* 151, p.105770.

Dethier, J.J., Hirn, M. and Straub, S., 2011. Explaining enterprise performance in developing countries with business climate survey data. *The World Bank Research Observer,* 26(2), pp.258-309.

Djankov, S. and Murrell, P., 2002. Enterprise restructuring in transition: A quantitative survey. *Journal of Economic Literature*, 40(3), pp.739-792.

Djankov, S., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A., 2002. The regulation of entry. *The Quarterly Journal of Economics*, 117(1), pp.1-37.

Dollar, D., Hallward-Driemeier, M. and Mengistae, T., 2005. Investment climate and firm performance in developing economies. *Economic Development and Cultural Change*, 54(1), pp.1-31.

Dollar, D., Hallward-Driemeier, M. and Mengistae, T., 2006. Investment climate and international integration. *World development*, 34(9), pp.1498-1516.

Durlauf, S.N., Kourtellos, A. and Tan, C.M., 2008. Are any growth theories robust?. *The Economic Journal,* 118(527), pp.329-346.

Escribano, A. and Guasch, J.L., 2005. *Assessing the impact of the investment climate on productivity using firm-level data: methodology and the cases of Guatemala, Honduras, and Nicaragua* (Vol. 3621). World Bank Publications.

Fisman, R. and Svensson, J., 2007. Are corruption and taxation really harmful to growth? Firm level evidence. *Journal of Development Economics*, 83(1), pp.63-75.

Giannetti, M., & Ongena, S. 2009. Financial integration and firm performance: Evidence from foreign bank entry in emerging markets. *Review of Finance*, 13(2), 181–223.

Greene, William H. 2000. Econometric Analysis. 4th ed. Upper Saddle River, N.J.: Prentice Hall.

Hallward-Driemeier, M., Wallsten, S. and Xu, L.C., 2006. Ownership, investment climate and firm performance: Evidence from Chinese firms 1. *Economics of Transition*, 14(4), pp.629-647.

Haltiwanger, J., & Davis, S. 1999. On the driving force between cyclical movements in employment and job reallocation. *The American Economic Review*, 89(2), 1234–1258.

Hsieh, Chang-Tai and Peter J. Klenow, 2009. Misallocation and Manufacturing TFP in China and India, *The Quarterly Journal of Economics,* 124(4), 14031448.

Johnston, Jack, and John DiNardo. 1997. *Econometric Methods.* 4th ed. New York: McGraw-Hill.

Khanna, R. and Sharma, C., 2021. Does infrastructure stimulate total factor productivity? A dynamic heterogeneous panel analysis for Indian manufacturing industries. *The Quarterly Review of Economics and Finance*, 79, pp.59-73.

Kim, M., 2021. Financial constraints, productivity, and the global financial crisis. *Applied Economics*, 53(57), pp.6570-6581.

Klapper, L., Laeven, L., & Rajan, R. 2006. Entry regulation as a barrier to entrepreneurship. *Journal of Financial Economics,* 82, 591–629.

Kong, X., Xu, J. and Zhang, Y., 2022. Industry competition and firm productivity: Evidence from the antitrust policy in China. *Finance Research Letters*, 47, p.103001.

Kouamé, W. A. & Goyette, J. 2018. Tax Evasion in Africa and Latin America: The Role of Distortionary Infrastructures and Policies. Policy Research Working Paper, no WPS 8522. Washington, DC: World Bank.

Kouamé, W.A. and Tapsoba, S.J.A., 2019. Structural reforms and firms' productivity: Evidence from developing countries. *World Development,* 113, pp.157-171.

Krugman, P. 1988. Financing vs. forgiving a debt overhang. *Journal of Development Economics*, 29(3), 253–268.

Kruskal, William. 1987. Relative Importance by Averaging over Orderings. *American Statistician*,41(1), pp.6–10.

Lagakos, D. and Waugh, M.E., 2013. Selection, agriculture, and cross-country productivity differences. *American Economic Review*, 103(2), pp.948-980.

Lee, K.S. and Anas, A., 1992. Impacts of infrastructure deficiencies on Nigerian manufacturing. In I*nfrastructure Department Discussion Paper* No. INU 98. The World Bank Washington, DC.

Melitz, M.J., 2003. The impact of trade on intra-industry reallocations and aggregate industry productivit y. *Econometrica*, 71(6), pp.1695-1725.

Pande, R. and Udry, C., 2005. Institutions and development: *A view from below* (No. 928). Center discussion paper.

Piao, Z., Wu, C., Su, N., Lin, Y. and Zheng, Z., 2023. Financial constraints, capital misallocation and firm's total factor productivity (TFP) loss–empirical evidence from listed manufacturing companies in China. *Applied Economics,* 55(39), pp.4572-4585.

Rehman, F.U. and Islam, M.M., 2023. Does energy infrastructure spur total factor productivity (TFP) in middle-income economies? An application of a novel energy infrastructure index. *Applied Energy,* 336, p.120836.

Romp, W. and Haan, J.D., 2007. Public capital and economic growth: A critical survey. *Perspektiven der wi rtschaftspolitik*, 8(Supplement), pp.6-52.

Shi, Y., 2024. Corruption, technical efficiency and total factor productivity growth: empirical evidence from China. *Economic Change and Restructuring*, 57(6), p.251.

Solow, R.M., 1956. A contribution to the theory of economic growth. *The Quarterly Journal of Economics,* 70(1), pp.65-94.

Straub, S., 2008. *Infrastructure and growth in developing countries* (Vol. 4460). World Bank Publications.

Straub, S., 2011. Infrastructure and development: A critical appraisal of the macro-level literature. *The Journal of Development Studies*, 47(5), pp.683-708.

Svejnar, J. and Commander, S.J., 2007. Do institutions, ownership, exporting and competition explain firm performance? Evidence from 26 transition countries. *Ross School of Business Paper*, (1067).

Tang, J. and Zhao, X., 2023. Does the new digital infrastructure improve total factor productivity? *Bulletin of Economic Research*, 75(4), pp.895-916.

World Bank. 2004. World Development Report 2005: A Better Business Climate for Everyone. World Bank, Washington.

World Bank. 2016. An assessment of the investment climate in Nigeria: The challenge of Nigeria. Private Sector. World Bank, Washington.

World Bank. 2020. Republic of North Macedonia: Action Plan for Recovery of Growth and Jobs. World Bank, Washington.

8. Annex 1: Focus group questionnaire

INTRODUCTION AND GENERAL PERCEPTIONS

1. In your opinion, what is the key factor for productivity in a company?
   (Multiple answers possible – technology, human capital, management, etc.)
2. Do you think productivity depends more on internal or external factors? Why?
   (External / business climate: 1) infrastructure, 2) competition and regulation, 3) financial opportunities/constraints, and 4) corruption;
   Internal: 5) capacity for innovation and technology, and 6) managerial practices related to skills and labor.)

DIFFERENCES BETWEEN FIRMS AND SECTORS

3. Based on your experience, are there major productivity differences between firms in your sector? What explains them?
4. Do you see differences in productivity between sectors? Which sectors do you consider more advanced and why? What are these differences due to (if any)?
5. How does company size (small, medium, large) affect productivity? Do smaller firms face different challenges than larger ones, and vice versa? What are these different factors?
6. Some results show that export-oriented companies are more productive than those serving only the domestic market. What explains these differences? What are the key work aspects or processes applied by export-oriented firms that domestic-oriented firms do not, or are unable to?

FACTORS – FOCUS ONE BY ONE

7. How do technology, innovation, and automation affect productivity in your sector? Do all firms have similar access to new technology? Are there differences in the priority given to new technologies depending on company size or maturity, or does access become easier at a certain stage?
   (To confirm the finding on factor prioritization.)
8. Does access to skilled workers influence efficiency? To what extent does the quality of workers explain productivity differences between sectors?
9. How does access to finance influence opportunities for improving productivity? Does access to finance differ depending on company size or sector?
10. How do regulations and the time required for compliance affect productivity? Which specific aspects are the main bottlenecks? What are the biggest institutional barriers affecting productivity?
11. How do you view competition as a factor for productivity?
    (Clarification: whether they refer to fair or unfair competition, and any differences.)

12. Infrastructure is also a factor. To what extent is company productivity reduced due to infrastructure conditions? Can location influence differences in productivity? (Transport, energy network, etc.)

13. How important are management practices and work organization? The analysis does not find statistical significance—are these often neglected?

FINAL QUESTIONS

14. What would you recommend as the most important external support to improve productivity in your sector?

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