# QUALITY OF INSTITUTIONS AND STRUCTURAL TRANSFORMATION

Distortions and resource allocation in North Africa

United Nations
Economic Commission for Africa

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# Table of Contents

# List of Tables and Figures

# Acknowledgments

# Preface

Understanding why North African economies are not growing as dynamically as they possibly could to generate enough jobs is a central question. Since the 2008 financial crisis, the gap between employment growth and overall labour force growth has widened steadily. The lack of job creation against a growing number of people entering the job market has led to an increase in unemployment, which is a critical problem for the subregion.

Unemployment in North Africa remains at a relatively high level, 12.5 per cent in 2017. In particular, the subregion is characterized by a high unemployment rate for young people (29.5 per cent in 2017) and educated women (40 per cent in 2017), and low labour force participation (41.3 per cent in 2017, as compared to 59.3 per cent in the whole continent). The recent wave of instability in the region could partly be attributed to the lack of growth in jobs, which should give those trying to solve this problem a sense of urgency.

In the present report, it is argued that the growth process may be influenced by the allocation of resources between sectors. Growth through the reallocation of resources from less to more productive sectors is referred to as structural transformation (or structural change). Also pointed out in the report is that efficient allocation of resources within sectors is critical for growth and job creation in North Africa. By decomposing labour productivity growth into between sectors (structural change) and within sectors components, relatively low structural change and low within productivity growth are documented in the report. Based on a most recent knowledge, Governments in North Africa should focus on the optimal allocation of resources across firms within and between sectors.

In the report, it is argued that the misallocation of resources in the economy has a common origin. North African economies suffer from distortions that potentially have an extensive impact on pro-

ductivity. Indeed, countries in North Africa tend to have a high dispersion of productivities at the firm level, reflecting a misallocation issue.

In the report, distortions coming from various sources, among which capital and labour markets, political stability, State capacity, and their impact on productivity are studied. For example, on the effect of capital markets, it is shown that relaxing capital constraints could boost output by between 9 and 22 percentage points through a dramatic increase in labour productivity facilitated by a greater inflow of capital. Inefficient institutions may be largely responsible for the distortions. In the report, it is argued that the most important underlying distortion in the economies of North Africa is generated by politically connected and publicly owned firms. Large benefits to political connections imply that unconnected firms cannot compete nor enter the market. This endangers innovation, dynamism and, ultimately, the ability of these economies to export.

The report contains some recommendations to tackle the negative effect of inefficient institutions on misallocation of resources within the economies of North Africa. These recommendations encompass mainly governance issues, as the building of checks and balances through national and local institutions, the building of effective State capacity to reduce arbitrary behaviour from bureaucrats and increase transparency. They also englobe measures to reduce credit constraints and increase foreign direct investment competition.

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# Chapter 1: Introduction and background

Understanding why North African economies are not growing as dynamically as they possibly could to generate enough jobs is a central question. Unemployment in the subregion remains relatively high level at 11.5 per cent in 2018. Moreover, the subregion is characterized by a high unemployment rate for the young people (25.4 per cent in 2014) and women (17.1 per cent in 2013), and low labour force participation (47.5 per cent in 2015, as compared to 62.8 per cent in the rest of the world). Campante and Chor (2013) argue that the wave of instability that affected the region in 2011 could partly be attributed to the labour market situation.

The classical view of economic growth emphasizes capital (physical and human) and technological progress as major factors supporting long-term growth. However, this view does not take into consideration the economic structure on the path of accumulation through the economic development process. During earlier stages of development, economic growth is concentrated in a small number of low-productivity sectors, with limited technological improvement. Moreover, productivity gaps between traditional and modern sectors are very important (McMillan, Rodrik and Verduzco-Gallo, 2014), which explains the influence the structure of the economy has on productivity growth. The growth process may then be influenced by the allocation of resources between sectors. This growth through the reallocation of resources from less to more productive sectors is called structural transformation (or structural change).

Structural transformation in North Africa (comprised of the following countries: Algeria; Egypt; Libya; Mauritania; Morocco; Sudan; and Tunisia) has been adversely affected by a range of factors that are covered in the present report. Data from the three countries from which most data are reliably available (Morocco, Egypt and Tunisia) suggest that each of these countries has experienced significant productivity, employment and output growth. However, this growth in output, employment and productivity does not match the growth levels of other developing countries. Among other local economies, weaker growth was recorded in

Algeria, Libya and Mauritania. This suggests that rather than observing (conditional) convergence as postulated in the macroeconomic literature (Mankiw, Romer and Weil, 1992), there are mounting concerns that the economies in North Africa continue to diverge and may not be able to integrate their growing populations into their respective labour markets. If the situation does not change, the countries in North Africa will face significant challenges for stability in future.

Before shedding light on the potential reasons for the slow pace of structural transformation and lagging productivity growth in North Africa, some stylized facts and empirical evidence is introduced to cast light on the lack of economic dynamism in the subregion.

## Large pressure on the labour market in North Africa

As shown in figure I, the evolution of aggregate employment in North Africa is striking. The six North African economies for which data are available have generated more than 20 million jobs in 25 years. In addition, up until the financial crisis of 2008, growth in the labour force tracked employment growth. However, since then the gap between employment growth and overall growth in the labour force has widened. The lack of employment growth matching growth in the labour force has led to an increase in unemployment, which is a key problem for the subregion. In addition, the growing unemployment has had a greater effect on young people, suggesting that the failure for the economies to absorb young people into their labour markets bears significant potential for social conflict (Campante and Chor, 2012).

## Structural transformation – The classic view

Why has North Africa not managed to generate sufficient employment growth to keep up with its increasing labour force? This question is not only

**Figure I:** Labour force and employment in North Africa
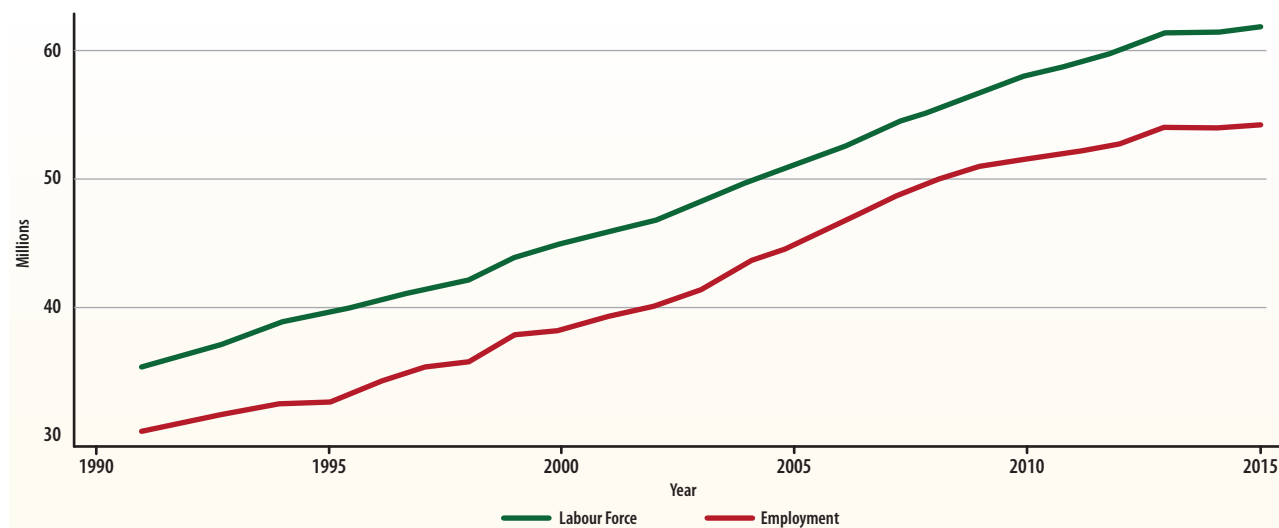


*Source:* International Labour Organization.

*Note:* The values displayed are the aggregation of national values from Algeria, Egypt, Libya, Mauritania, Morocco and Tunisia.

relevant for North Africa but it is also pertinent for other African economies, as many of them have a rapidly growing labour force and some of the highest birth rates in the world.

To facilitate structural transformation, research in economic development has long emphasized the important role played by markets in facilitating the reallocation of resources and factors of production from agriculture to manufacturing and services. The transformation from low degrees of specialization to increasingly modular value chains accompanies productivity growth, but it crucially relies on functioning markets. Throughout this process, known as structural transformation, factor productivities and overall total factor productivity (TFP) increase together with gross domestic product (GDP) per capita. This classic view of economic growth, developed after World War II, includes the transition from agriculture to an industrial and services economy as a key element in the process of capital accumulation and subsequent sustainable economic growth. A key contributor to this theory was Simon Kuznets, who defined economic development and growth as a process of sustainable GDP growth followed by "[…] changes in the industrial structure within which product was turned out and resources employed – away from agriculture toward non-agricultural activities" (Kuznets, 1966).[1]

# Structural transformation in the data

Indeed, the North Africa subregion has been undergoing a gradual process of structural transformation. Figure II displays the share of employment in North African countries in agriculture, manufacturing and service sectors across a subset of countries for which data are available from 1991 to 2013. Throughout the period, the share of employment in agriculture decreased, while the shares in services and manufacturing gradually increased. This suggests that the manufacturing and service sectors are mostly supporting the overall growth in employment, shown in figure I.

# Unpacking productivity growth

The recalibration of an economy, away from agriculture towards higher value-added manufacturing and services can be regarded as an important driver of economic growth, but in itself, it is not sufficient. A broader view is useful for policymakers.

This broader view is best understood if productivity growth is decomposed into two components: gains of productivity from the reallocation of resources across sectors; and gains in productivity within each sector. The former is referred to as "be-

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1    Syrquin (1988) provides an excellent review of patterns of structural transformation of countries in the 1980s.

**Figure II:** Average sector shares in North African economies
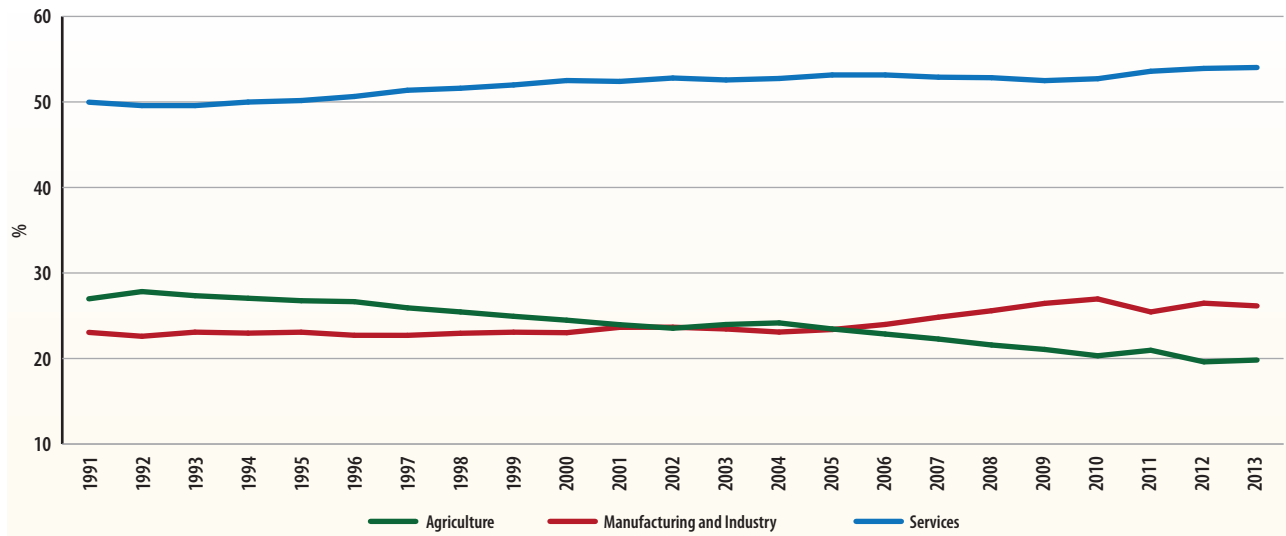


*Source:* International Labour Organization.

*Note:* The values displayed are the aggregation of sector labour shares in Algeria, Egypt, Libya, Morocco and Tunisia.

tween-sector growth", whereas the latter is referred to as "within-sector growth". The classic structural transformation view focuses on the reallocation of resources from less productive to more productive sectors in the economy, in particular, away from agriculture towards services and manufacturing. This between-sector reallocation increases growth, as long as productivity differences between sectors exist. On the other hand, within-sector growth is the result of improvements in productivity within a sector, for example when factors of production move from less productive to more productive firms within the same sector.

Empirically, these two components of productivity growth can be differentiated. McMillan and others (2014) have been using data from Asia and Latin America since the 1990s to decompose overall productivity growth. They show that there was significant growth within sectors and limited growth between sectors. In particular, they find that labour seems to have been reallocated between less productive sectors, mainly from agriculture to an informal service sector, which accordingly has not contributed to overall productivity growth. Timmer, de Vries and de Vries (2014) come to similar conclusions: Latin America and Africa have lagged more dynamic economies in terms of productivity

growth and economic development because of the transfer of labour into less technologically dynamic sectors.

## Structural transformation – Towards a broader view

Figure III displays sector labour productivities as a ratio of the overall economy's labour productivity, excluding the mining sector, from 1991 to 2013.[2] Interestingly, there is no evidence of changes in the relative labour productivity across sectors, on average, in the North African countries. This is a striking contrast to what is indicated in figure II. The explanation behind this is that, as the agricultural sector shedded labour, it also increased productivity so that its overall share in output remains constant. Nevertheless, linking to the changes in sector-specific labour shares showed in figure II, it appears that labour did flow from the least productive sector, agriculture, to a more productive sector, manufacturing. However, this did not have the effect of boosting the share of output produced in the manufacturing sector, which suggests that capturing changes in the economy through tracking the allocation of resources across sectors (between sector growth), has its limitations.

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2    The evidence above was obtained disregarding the mining sector. The reason for excluding that sector from the calculations is because of its extremely high productivity when compared to the other sectors – for the North African countries, on average, the mining sector is about 100 times more productive than other sectors. As such, small changes in productivity in that sector have a large impact on the overall economy and, accordingly, on relative productivity in other sectors. The appendix provides the equivalent plots with calculations including the mining sector.

**Figure III:** Output by sector in North Africa (per cent of all output)
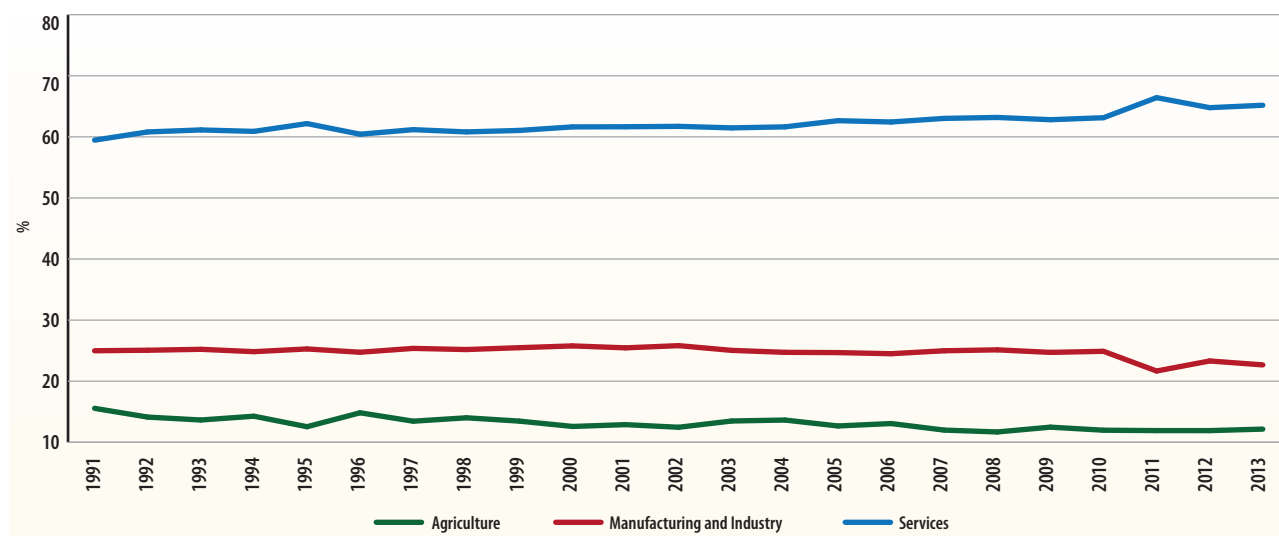


*Source:* International Labour Organization.

*Note:* The values displayed are the aggregation of relative sector labour production in Algeria, Egypt, Libya, Morocco and Tunisia with respect to the countries' overall production net of the mining sector. The reason for excluding mining is its extremely large relative productivity with respect to other sectors. Output shares were calculated by multiplying sector specific productivities with the labour share and dividing by the overall output.

Recent research in economics has changed the traditional view on economic development by focusing on within-sector productivity growth. Emerging from the macroeconomics and growth literature, this work has focused on the importance of the allocation of means of production across firms within the same sector for overall productivity.[3] This new view stresses that, within sectors, firms differ remarkably in their productivity, so that some firms that employ a significant share of workers and capital produce only a fraction of what other firms produce. This implies that enormous aggregate productivity gains are possible simply through reallocation of labour and capital across firms within the same sector. In their seminal paper, Hsieh and Klenow (2009) calibrate a model to data from China, India and the United States of America, and used it to show that if resources in China and India were to be reallocated to equalize marginal products to the extent observed in the United States, manufacturing TFP gains would be 30 to 50 per cent in China and 40 to 60 per cent in India.[4]

## Separating out within sector growth in the data

The importance of changes within sectors can also be analysed by reviewing at the within-sector productivity growth increases in sector productivities because of the reallocation of factors or growth in firms' sector productivities within sector. This can then be compared with the between-sector productivity growth the change in productivity that occurred because labour was reallocated from less to more productive sectors (between sectors). The practical decomposition of productivity growth into these two components can be done following McMillan and others (2014). Defining $\hat{Y}_t = Y_t/L_t$ as an economy's labour productivity, $y_t = Y_{it}/L_{it}$ as sector i's specific productivity and $\theta_{it} = L_{it}/L_t$ as sector i's labour share, the economy's labour productivity changes are decomposed from period t-k to t as

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3    For a review of this literature see Restuccia and Rogerson (2017)

4    The misallocation view is not without criticism. However, recent work by Bils, Klenow, and Ruane (2017) confirms that the magnitudes found in this paper are not the result of measurement error.

$$\Delta \hat{Y}_t = \underbrace{\sum_{i \in \mathcal{L}} \theta_{i,t-k} \Delta y_{i,t}}_{\text{within growth}} + \overbrace{\sum_{i \in \mathcal{L}} y_{i,t} \Delta \theta_{i,t}}^{\text{between growth}},$$

where $\Delta$ stands for the difference operator from period t-k to t (such as, $\Delta \hat{Y}_t = \hat{Y}_t - \hat{Y}_{t-k}$). A limitation of this decomposition is that it provides variations in levels, in the unit of measure of productivity, such as United States dollars. If the interest is, instead, in growth rates, the equation above needs to simply be divided by $\hat{Y}_{t-k}$. As such, the decomposition provides how much, in percentage points, the changes in productivity growth are the result of the within and the between component.

## The importance of within sector growth

Table 1 contains a summary of the average labour productivity growth for North African countries separately, together with the average within and between changes in components calculated using the above methodology with data from the Inter-national Labour Organization (ILO). The calculations were carried out including the mining sector (panel A) and excluding the mining sector (panel B).[5] Table 1 shows that overall, the within component has a much greater role in the growth of labour productivity than the between component. The interpretation of this is that gains in productivity within sectors are much more relevant for growth of labour productivity than the reshuffling of labour across sectors in those economies. Importantly, this pattern is prevalent elsewhere in the world and is not only specific to North Africa.

In addition, table 1 shows that countries in North Africa are attaining much lower productivity growth than other developing countries, such as India and Turkey. Even developed countries, such as Sweden, have attained greater productivity growth than even the most rapidly growing economy in North Africa. Interestingly, the more rapid productivity growth in India and Turkey is because of a combination of within and between growth. Most growth in these dynamic economies is coming from within growth, but they also appear to have managed to shift labour towards more productive sectors over the period 1991-2013. This lack of productivi-

**Table 1:** Labour productivity growth and its decomposition into within and between components in North African countries from 1991 to 2013

| | *Panel A: All Sectors* | | | | *Panel B: Excluding Mining Sector* | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | **(1)** GDP/Capita Growth | **(2)** Productivity Growth | **(3)** Within Growth | **(4)** Between Growth | **(5)** Productivity Growth | **(6)** Within Growth | **(7)** Between Growth |
| Algeria | 1.75% | 1.24% | 1.08% | -2.32% | 3.40% | 3.18% | 0.22% |
| Egypt | 2.49% | 6.23% | 11.08% | -4.84% | 6.93% | 6.78% | 0.14% |
| Libya | -2.37% | -9.05% | -12.45% | 3.39% | -3.10% | -2.85% | 0.24% |
| Morocco | 3.08% | 5.40% | 5.39% | 0.03% | 5.70% | 4.40% | 1.32% |
| Tunisia | 2.87% | 5.40% | 5.69% | -0.02% | 7.80% | 7.19% | 0.65% |
| **NA Countries\*** | **1.90%** | **1.35%** | **2.16%** | **-0.80%** | **4.16%** | **3.74%** | **0.42%** |
| Turkey | 2.97% | 7.90% | 7.30% | 0.60% | 7.70% | 4.30% | 3.40% |
| India | 5.20% | 16.80% | 15.60% | 1.20% | 16.80% | 13.70% | 3.10% |
| Sweden | 2.06% | 6.55% | 7.99% | -1.44% | 5.89% | 6.19% | -0.29% |

*Notes:* Values displayed stand for countries' averages from 1994 to 2013. GDP/capita growth stand for countries' average yearly GPD/capita growth rates. Productivity growths (columns 2 and 5) its decomposition (columns 3, 4, 6 and 7) are calculated following the methodology in the Appendix using 3 years lags. Panel B excludes mining sector given its intrinsic high productivity and low labour share. \*Sudan and Mauritania are not included due to lack of the data. Source of data: GDP/capita from WorldBank Data, others from International Labour Organisation (ILO).

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5    The high capital intensity (and accordingly, labour productivity) of that sector inflates the between component and has induced a lot of volatility into the series of both components.

ty growth between and within sectors should be a major concern for policymakers in North Africa and forms the backbone for this report.

Table 1 provides support for the view that it is useful to broaden the classic view of structural transformation as simple transitions from agriculture towards manufacturing and services. Based on this view, productivity growth can also be achieved by holding an economy's sector composition fixed and increasing a sector's productivity. Accordingly, whether resources within the sector are allocated efficiently and whether productivity within narrowly defined sectors is sufficiently high determines what makes economies more or less productive in relative terms.

Duarte and Restuccia (2010) investigate the role of sectoral labour productivity in explaining the process of structural transformation – the secular reallocation of labour across sectors – and the time path of aggregate productivity across countries, and present a good example of the resulting view. They measure sectoral labour productivity across countries and find that productivity differences across countries are large in agriculture and services and smaller in manufacturing. Over time, productivity gaps have been substantially reduced in agriculture and industry, but not nearly as much in services. As a result, productivity catch-up in manufacturing explains about 50 per cent of the gains in aggregate productivity across countries, whereas the low productivity in services and the lack of catch-up in this sector explain most of the experiences of a slowdown, stagnation, and decline observed across countries.

## The Importance of the State for within sector growth

In other words, the key to structural transformation lies in understanding the internal growth of the different sectors of the economy by analysing what ensures productivity growth within these sectors. In the present report, recent literature is used to argue that a significant part of this growth, or lack of it, is driven by how resources are allocated across firms within the same sector.

What is the role of the State in this scenario? The minimalist view of state intervention restricts its role to the provision of some public goods, such as defense, property rights, contract enforcement, and law and order. However, State intervention, following the impact of the two world wars and the Great Depression (with the emergence of the Keynesian theory), has evolved to include macroeconomic stabilization and the welfare state. In addition to these dimensions, State intervention, with the failure of the so-called "Washington consensus" to promote economic development in poor countries, and the "East Asian Miracle", has contributed to the emergence of the "Developmental State" and to a rapid extension of the domains of State intervention. This refers to the State adopting active development policies to foster economic development. State interventions range from poverty alleviation policies to active industrial policy. Active industrial policy is an example that highlights the complex nature of State intervention and its potential distorting effects on the economy. Although industrial policy may be justified by economic theory, because of market failures, the targeting of specific sectors, activities or even firms, may contribute to factor misallocation.

The present report is intended to take a functional view on the State in which the idea that markets rely on the State to function effectively is applied as a starting point. A strong State is, therefore, a pre-condition for well-functioning markets. Pursuing their role, Governments (a) provide public goods and services, (b) redistribute, (c) regulate by setting and enforcing laws, and (d) correct market failures. All these roles are important and fulfil a requirement of economic development. However, the focus of this report is on understanding the kind of distortions that are introduced if the State fails to fulfil functions (c) and (d).

## The political economy view on structural transformation

The focus on the State as an actor that provides the fundamentals for structural transformation raises many questions: What are the objectives of the Government? What shapes policy design and implementation? And what shapes the instruments used?

These are typical questions from the realm of political economy. This view assumes that the State consists of individuals whose actions are themselves determined by their competence and motivation and the incentives they encounter. This means that political institutions can shape a government's objectives: lack of accountability may leave room for the implementation of policies that favour the interests of a narrow group in society. This will then lead to inefficient allocation of resources. In addition, policy can be designed by a poorly qualified bureaucrat, which can lead to policy mistakes, or it can be designed by a central administration that does not consider local information. Consequently, State capacity may be a key determinant. Finally, the instruments used may depend on many factors, such as available information or government or bureaucrat objectives (Coate and Morris, 1995), and accordingly governance. All these may shape the extent to which a policy creates distortions, and thus affects within sector growth and, hence, productivity growth.

## Overview of the report

This report is structured as follows: In section 2, a canonical framework to tackle allocative efficiency, and document productivity dispersion in North Africa is presented. This section also includes a review of recent economics literature that sheds light on the economic cost of misallocation (because of distortions) of factors of production as a specific lens. Using this approach, the vast potential gains in output and productivity in North Africa if factor markets function more effectively are documented. In section 3, the impact of labour market distortions on the allocation of labour and skills in the economy and its effect on productivity are discussed. Section 4 includes a review of capital market distortions and estimates their effect on TFP. In section 5, the authors examine distortions on TFP, while looking at the effect of instability (political instability and uncertainty shocks) on productivity and investment and also consider expropriation risk, and political connections.

Section 6 contains a summary and highlights of some potential policies to reduce distortions and increase productivity in North Africa. In this section, there is a review of the entire report in a simple one-page data grid and a set of deep institutional reforms that would yield significant welfare gains.

# Chapter 2: Conceptual framework

In this section, a conceptual framework is presented. This framework is used to illustrate the various channels that impede structural transformation. In line with recent literature, the firm is a core unit of analysis. Economists model firms as production units that combine factors of production, typically labour and capital, to produce some output. An economy is populated by many of these firms. However, productivity of these firms vary and can change. It, therefore, matters which firm employs workers and capital.

## A standard model of the firm

Production models used in the literature on misallocation follow a very similar logic, but they use slightly more complicated functions of production, which are able to capture the role of capital, labour, firm-specific productivity, competition and various distortions in different sectors. In figure IV, the standard model of the firm that many economists use as an approximation of the firm is shown. In this model, firms combine two factors of production, capital $K_i$ and labour $L_i$ to produce output $Y_i$. If more capital or more labour is used, then output is assumed to increase.[6] At the same time, the model in figure IV is able to capture that every firm is different in the way it uses the inputs, capital and la-

bour, to produce output by the measure $A_i$, which is called total factor productivity. If $A_i$ is very high, a firm is very productive and can produce much more output with the same amount of inputs.

For this report, the current literature in modelling an economy with many firms is followed. This works on the same principle as displayed in figure IV. Total output of a country, $Y$, in such a model is simply the sum over all the output produced by the different firms $Y_i$.

## Characterization of structural transformation within this framework

Structural transformation has been characterized historically as the growth of an economy that is associated with a decrease in agricultural output and employment shares and increases in manufacturing and service sector output and employment shares. In the context of the stylized model economy, the notion of agriculture, manufacturing and service sector is not well defined. Structural transformation can mean three things:

**Figure IV:** The standard model of the firm



Output produced by the firm ← $Y_i = A_i * K_i^{\alpha_{s(i)}} L_i^{\beta_{s(i)}}$

capital intensity · labor intensity

total factor productivity · labor used in production · capital used in production

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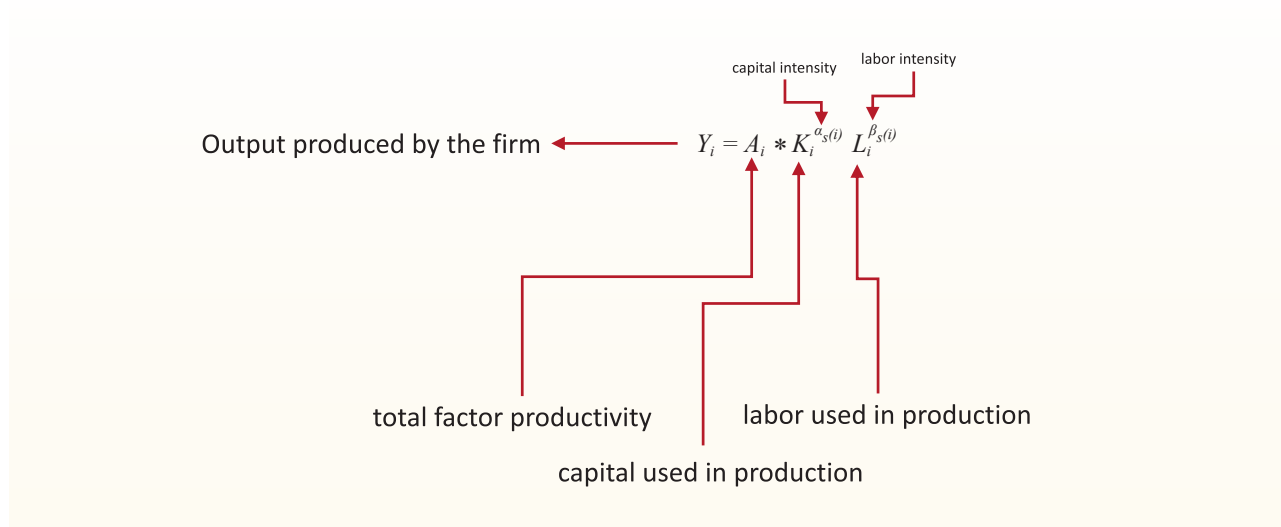
6    However, the rate at which this happens is typically assumed to be falling with more labour and capital usage, namely, *.e. α* and *β* are assumed to be smaller than 1. In addition, for this report, it is assumed that *α+β < 1*, which can be justified by a "span-of-control" argument where a firm cannot produce all goods in the economy because of organizational constraints.

a) Labour movements from some firms to other firms (including new firms);

b) Capital movements from some firms to other firms (including new firms);

c) Changes in the distribution of firm productivities.

The classic view of structural transformation has focused on the first element: the movement of labour, in particular from agriculture towards firms operating in other sectors of the economy, such as manufacturing or services.

However, why would such labour movements in the model above lead to an increase in total output $Y$? One factor behind structural transformation is a movement of labour from agriculture to firms that have higher capital intensity (higher values of $\alpha_i$) compared to agriculture. These capital-intensive firms, by using more capital $K_i$, augment the productivity of labour as capital and labour are complementary in the production process. The higher level of productivity allows these capital-intensive firms to pay higher wages, attracting workers, up until the point when diminishing returns set in and the productivities across firms are equalized. Consequently, one reason why movements of labour across firms may occur is because of inherently different production technologies. The mining sector, for example, is typically very capital intensive, requiring significant capital equipment. As a result, it has a higher value of $\alpha_i$ in its production function. As a result, a few hundred workers in mining can produce a lot of output.

Another reason for output gains from reallocation of labour in the economy is that some of the firms have a higher total factor productivity (higher $A_i$) compared to others. Then, if labour flows from firms with low productivity to firms with high productivity, output increases. However, nothing here requires that the movement of labour is across sectors. Labour could well move from less productive to more productive firms, even when these firms operate in the same industry or sector. This kind of change has been stressed by the literature on mis-

allocations. In this view, the misallocation of capital and labour is across firms that have different productivities. Distortions have a dual role: they make some firms more productive than others and prevent the movement of labour and capital to the more productive firms. A key aspect for misallocation to arise is, accordingly, differences in productivity across firms. The larger the dispersion of $A_i$ across the firms in the data, the larger the potential to gain output by redistributing labour and capital across firms.

# A two-firm example illustrating misallocation losses

A simple example of an economy with two firms illustrates this point. Assume that two firms in the economy distribute workers and capital equally between them. If both firms have the same productivity, then it is not possible to increase production by reallocating workers or capital differently. However, assume, instead, that one firm is more productive, having a higher value $A_i$ than the other firm. It is now efficient for labour (and capital) to get reallocated to the more productive firm.[7] If one firm becomes much more productive than the other firm, it can be efficient to allocate almost all labour and capital to this firm. This produces a link between dispersion of productivities $A_i$ and the gains from reallocation.

How large can the gains from reallocation be? Naturally, this depends on an understanding of the underlying constraints to movement of factors of production. The gains from reallocation that can be achieved in a model economy are simulated numerically for which it is assumed that capital can move freely across firms and also flow into a country from the outside. The output that can be achieved under two different scenarios regarding labour mobility across firms is compared. In the first scenario, labour is allocated equally across the two firms and only capital is adjusted, moving to firms with higher $A_i$ up to the level when marginal products of capital are equalized across firms. In the second scenario, labour and capital are allowed to move across firms.

7    In the appendix to the report, there is a simple simulation of this situation for very conservative parameter values and an open international capital market.

The output gains that can be achieved with full factor mobility can be compared to the output that can be produced when there is limited labour mobility (as firms each get an equal share of the labour endowment). Limiting labour mobility means that a misallocation arises if one firm is more productive than the other firm. The loss from misallocation is simulated as a function of different values of dispersion of the $A_i$ across firms in the economy in a simple plot as shown in figure V. The horizontal axis presents the different measures of dispersion of the $A_i$ across firms, while the vertical axis presents the relative output gain moving from restricted to full factor mobility. The dispersion measure is simulated such that a dispersion is the standard deviation of productivities, value of 1 then implies that one firm is three times as productive as the other firm in this economy.

If there is no difference in the $A_i$'s across firms, which is the case when dispersion of the $A_i$ is equal to zero (all firms share the same $A_i$), there are no output gains when moving from restricted to full labour mobility. In this case, the equal share of labour across firms is the efficient allocation. Yet, the more dispersion there is in the $A_i$ across firms, the larger the output losses because of restricted labour mobility. This is because labour is misallocated if it is distributed equally but one firm is much more productive. Figure VIII shows that when the dispersion across the $A_i$ equals 1, the output loss from misallocation reaches 35 persons. This kind of magnitude is similar in size to what has been found by Hsieh and Klenow (2009) for China and India

compared to the United States using a similar, but more sophisticated, method.

This suggests that institutional features that restrict the movement of factors of production, here labour, from less to more productive firms is associated with large output losses. This is the main idea of the misallocation literature.

# The role of international capital flows

An important observation in this simulation is the role that international capital flows can play. In the scenario with free mobility of labour, workers move from less to more productive firms. As a result, these firms also attract more capital (as capital and labour are complements in production), which has an added effect on output. However, in reality, it is not guaranteed that international capital markets will lead to capital inflows to more productive firms; this observation is a reminder that in a globalized economy, local productivity gains can be observed by outside capital markets and can lead to considerable inflows of capital, as has been experienced by Turkey.

This point is illustrated in figure VI which shows foreign investment inflows per capita into Egypt, Morocco and Tunisia (the most dynamic countries in the North African subregion) as a blue line and inflows per capita into Turkey as a red line. Both curves start at similar levels in the 1990s. As global capital markets deepened towards the end of the

**Figure V:** Simulated output loss from misallocation of labour
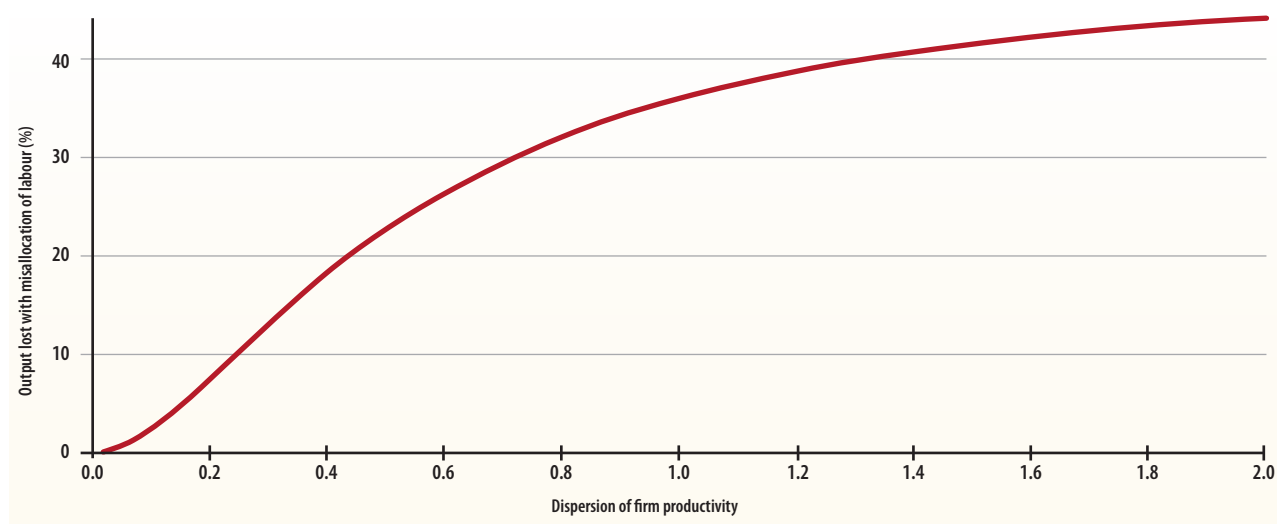
**Figure VI:** Foreign direct investment over time
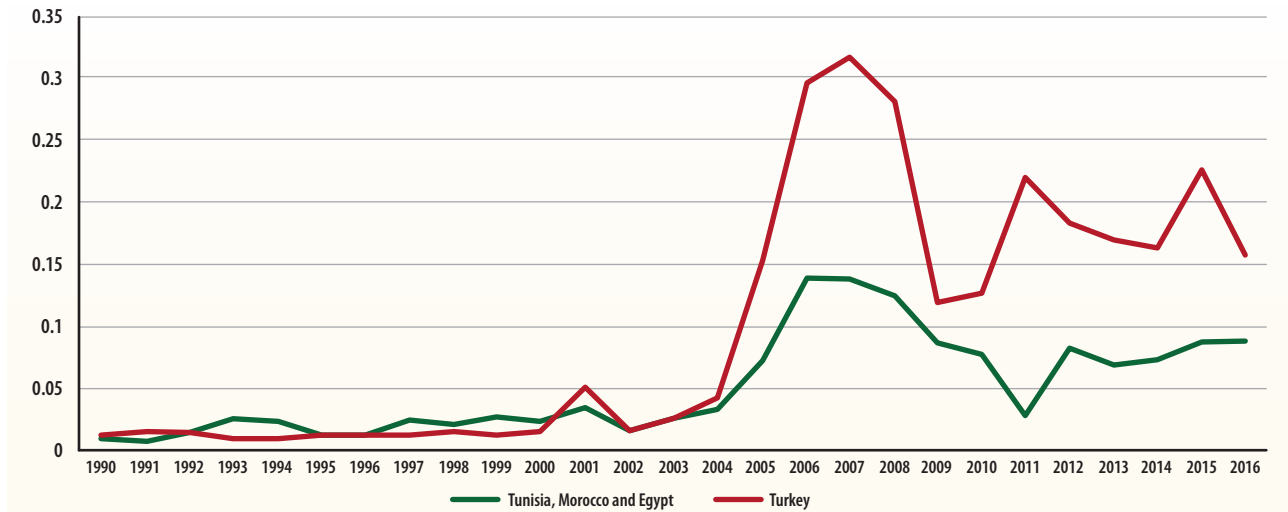


*Source:* Data from the United Nations Conference on Trade and Development (UNCTAD).

1990s, inflows into Turkey increased dramatically compared to inflows into Egypt, Morocco and Tunisia. After 2005, the two curves completely separate. Investment inflows into Turkey per capita stabilize at about the level of 30 cents per capita while they are below 10 cents per capita in North Africa. This is a clear sign that foreign investors did not see the same investment opportunities in North Africa as they saw in Turkey. Foreign direct investment (FDI) is an indicator and a cause of this.

## Estimating the total factor productivity distribution across firms

How can the model be used to give an estimate of the potential for welfare gains through the reallocation of factors of production across firms in North Africa? A simple way to use the model is to estimate regressions using the formula in figure IV, together with data on revenue of firms obtained from the enterprise surveys, and then use this to calculate proxies of $A_i$ (TFP) from the data.[8] The result from this exercise is one value $A_i$ per firm. The properties of the distribution of these estimates across the economy can be investigated.

The full distribution of the estimated log-transformed $A_i$ across the North African countries for

which data are available (Egypt, Morocco, Sudan and Tunisia) is plotted out in figure VII as a dashed line, while the distribution across the rest of the world is also plotted for reference. The distributions have a peak close to 0, which represents the normalized productivity level. However, it is evident that there is a lot of dispersion in firm productivities, in North Africa and elsewhere. Firms that are more productive than the average firm in the same sector and economy have positive values of $A_i$, while less productive firms have negative values. The dispersion of TFP is very large; a value of 5 in figure X indicates that a firm at this level is 150 times more productive than firms at 0. Even if some of this variation can be attributed to measurement error or other omitted factors, the striking observation is that the dispersion among North African firms is much wider compared to other countries, suggesting that welfare gains from reallocation may be particularly large in the subregion. The dashed line has a flatter bump and is more spread out. This shows that there are more firms that have lower productivity and more firms that have higher productivity.

In other words, countries in North Africa tend to have a high dispersion of productivities. Table 2 provides an estimate of the dispersion of productivities across North Africa and for a few other reference countries. The first thing to note is that dis-

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8    Regressions of in (sales) on (the ln of) measures of capital and labour expenditure plus sector and survey fixed effect are run and then the total factor productivity as the residuals of this regression are backed out.

**Figure VII:** Dispersion of estimated productivities across firms
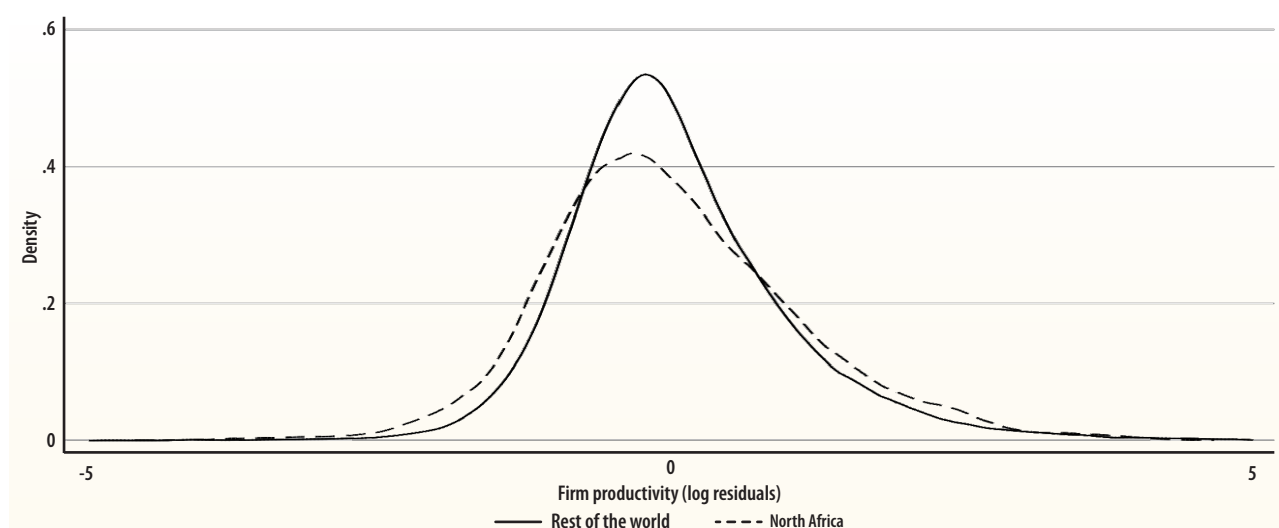


*Source:* Calculations by the authors from World Bank Enterprise Surveys.

persion (calculated as the standard deviation of the estimated $A_i$) is around 1. As for the calculations, the logarithmic transformation is used, which implies that a firm that is one standard deviation more productive than the average firm is almost four times as productive. Also, when compared to either developed or very dynamic economies in Asia, the North African economies appear to have relatively higher dispersion.[9] There is too little data on the North African economies, except on Egypt, to put a lot of weight on these results. However, together with the simulation results, the observations derived from the productivity growth data in the previous section and the FDI inflow data above the data strongly suggest that overall productivity is

**Table 2:** Dispersion of firm productivities in manufacturing

| Variable | Observations | Dispersion of Ai (standard deviation) |
|---|---|---|
| North Africa | 2 311 | 1.03 |
| Rest of the world | 51 971 | 0.95 |
| Egypt | 1 721 | 1.01 |
| Tunisia | 323 | 1.09 |
| Morocco | 169 | 1.09 |
| Sudan | 98 | 1.55 |
| China | 1 657 | 0.77 |
| India | 6 815 | 0.85 |
| Sweden | 311 | 0.89 |
| Turkey | 1 126 | 1.37 |

*Source:* Calculations by the authors from World Bank Enterprise Surveys.

held down significantly by misallocations between firms within the same sectors in North Africa.

Output increases by more than 30 per cent and a tripling of FDI inflows seem possible if North African Governments were to allow resources to flow to the most productive firms. An interesting note about these numbers is that economic theory indicates that, in equilibrium, firms that are much less productive than other firms will go out of business. This implies that, in the long run, persistent differences in productivities should be less apparent if firms are allowed to grow or exit the market. In this way, dispersion can then be seen as a measure of some fundamental distortion. Much of the present report is dedicated to understanding these fundamental distortions in North Africa and why they persist.

# Within- and between sector dispersion in productivity

Prior to setting out to explain the broader idea of structural transformation, it helps to come back to the classic view of structural transformation, the allocation of resources across sectors. Through the design of the dispersion measures, as shown in figure VII and table 2, these numbers capture within-sector differences in productivity. What about dispersion between sectors? One way to check this is to calculate the average productivity ($A_i$) for each sector in the enterprise survey and

9    The only exception is Turkey, which displays extremely high levels of dispersion.

**Figure VIII:** Within- and between sector dispersion in productivity in North Africa
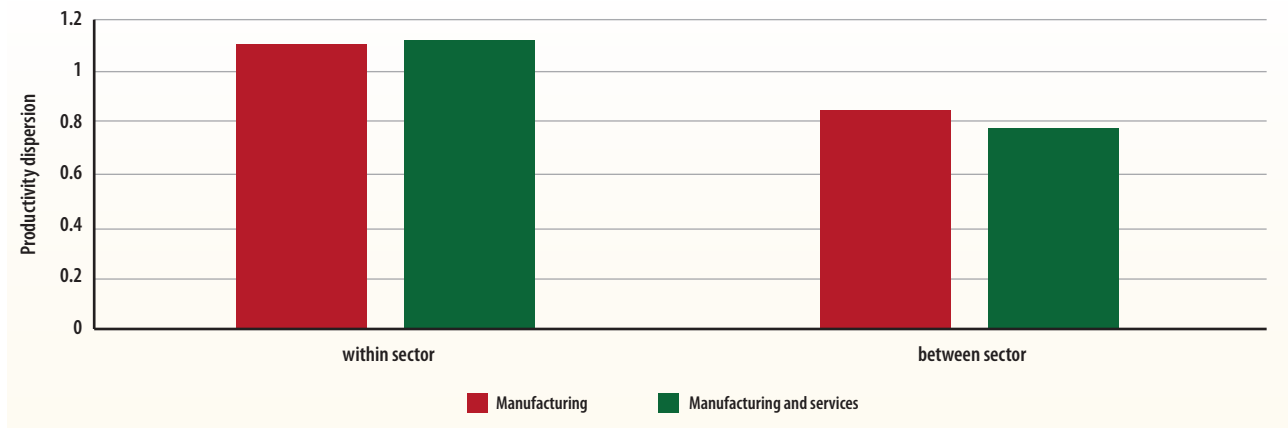


*Source:* Calculations by the authors from World Bank Enterprise Surveys.

look at the dispersion across the different sectors. Figure VIII displays the result for five countries in North Africa[10] using data from only manufacturing (blue bars) and from manufacturing and services (orange bars). Consistent with the most recent focus in the literature, the differences between sectors do not seem to be larger than within sectors. In other words, it is a good idea to focus on fixing distortions that prevent reallocations within sector instead of focusing on facilitation of the allocation of labour and capital between lower to higher productivity sectors.

## The role of the State in reducing dispersion

What does this mean for policymakers? How can the North African States reap the large benefits suggested by figure V and similar numbers in the literature? The underlying origins of misallocation can be broad. The present report covers a range of contributing factors that appear to be particularly relevant for the countries in the study region. In the report, specific emphasis is placed on the role of capital and labour markets and on distortions that can be conceptualized as TFP distortions. The neoclassical view is that most public interventions in markets can generate some distortions to the efficient allocation of labour; on the other hand, it is clear that government intervention is merited in certain markets to tackle market failures, such as in insurance or lending markets in the presence of incomplete information or information asymmetries.

The underlying source of distortions can be extremely broad. Some examples are the following:

1.  Statutory provisions, including features in the tax code and regulations
    *   Taxes varying with firm characteristics, such as age and size
    *   Tariffs for different goods
    *   Price control, price floors
    *   Labour market regulations
    *   Product market regulations that restrict size or limit entry
    *   Land regulations

2.  Discretionary provisions made by the Government or other entities, such as banks, which are referred to as "crony capitalism" or "government corruption"
    *   Subsidies, tax breaks, low loan interest rates to specific firms, preferential market access, unfair bidding practices, selective enforcement of taxes and regulations, among others

3.  Market imperfections
    *   Monopoly power
    *   Market frictions
    *   Enforcement of property rights
    *   Market failures due to information barriers (moral hazard and asymmetric information)

The third class of distortions can emerge in market places. In such cases, government intervention may

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10   Algeria, Egypt, Libya, Mauritania and Morocco.

be merited to ensure the smooth functioning of markets and, in particular, to deal with market failures or breakdowns. Accordingly, public interventions tackling these market imperfections can have significant positive effects and public intervention, such as to limit market power or reduce information barriers, can improve allocative efficiency. For the first two types of distortions, however, public policy, even when well-intended, may significantly exacerbate existing frictions and contribute to welfare losses. In addition, they may persist and induce even more complex interventions.

To understand which priorities should be taken, it is essential to understand why misallocation arises, and how it can be affected by government policies. To facilitate structural change, capital and labour need to move from less productive to more productive firms. The present report is, accordingly, structured to understand why the misallocation of labour (section 3) and capital (section 4) persists in North Africa and how this affects output. Section 5 covers why differences in firm productivity arise and persist.

# Chapter 3: Labour market distortions

This section entails a discussion on the effect of labour misallocation in preventing structural transformation. The discussion includes explanations as to why this misallocation arises, with special attention on the characteristic features of the North African economies.

## 3.1   Framework

Figure IX displays the role of labour in production. As the theoretical model makes clear, a firm that is very productive (high $A_i$) and has a lot of capital at its disposal (high $K_i$) will not reach its full potential if it cannot find workers. Low values of $L_i$ always mean that production is low, regardless of how high $K_i$ and $A_i$ are.

**Figure IX:** Role of labour in the theoretical framework

labour used in
production

output without
constraint

$$Y_i = A_i * K_i^{\alpha} L_i^{\beta}$$
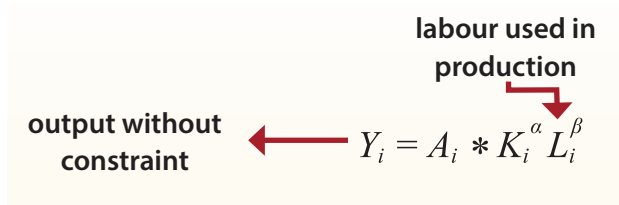
This makes the allocation of labour across firms a key factor for structural change. As already discussed, with the help of the simulation in the previous section, the allocation of labour to the most productive firms has the potential to boost productivity dramatically. Figure V shows that the efficient allocation of labour across firms increased output by approximately 35 per cent. This figure is at the lower bound of the magnitudes found in the misallocation literature. Given these extensive potential gains, the question arises as to why labour would not be allocated efficiently across firms.

*The potential importance of labour distortions*

Labour market outcomes can be subject to distortions coming from labour regulations and from other public policies, such as public employment.

Many studies on developing countries (see (Djankov and Ramalho, 2009) have provided empirical evidence that countries with rigid employment laws tend to have higher unemployment rates, and especially higher youth unemployment rates. Rigidities in the labour market have multiple implications for resource allocation. First, labour market regulation is a burden on the reallocation of labour towards new activities and productive or high-growth firms. This is particularly important as high-growth firms are very important contributors to net job creation. The State might, therefore, face a trade-off when considering job security and allocative efficiency. Poschke (2009) finds that costs associated with job dismissal costs discourage the practice in low-productivity firms. This disturbs the selection process and, consequently, has a negative impact on growth. Similarly, Haltiwanger, Scarpetta, and Schweiger (2014) argue that stringent hiring and firing regulations distort the allocation of jobs, which has a significant adverse impact on allocative efficiency, productivity levels and growth. Second, stringent labour market regulation can discourage firms from hiring formal employment, and even push them to stay in the informal sector. This has a negative impact on the creation of sustainable and skilled jobs. Loayza, Oviedo, and Servén (2004; 2005) present evidence that tight labour market regulations is associated with lower growth and an increase in informality. Dreher and Schneider (2006) show also that excessive labour regulation is positively correlated with the informal economy. They also find that better law enforcement reduces the informal sector.

The efficiency of labour allocation is not only quantitative; it is also qualitative. This means that in addition of distorting the allocation of workers between firms and sectors, the allocation of skills can also be distorted. This second point may be particularly relevant for North African countries, and can explain some patterns in the subregion in terms of productivity growth and unemployment. The allocation of talent can indeed have a very large impact on economic growth. For example, Pissarides and Véganzonès-Varoudakis (2006) argue that the weak contribution of human capital

accumulation to economic growth in the Middle East and North Africa is because of the misallocation of human capital in the economy. Hsieh and others (2018) estimate that for the United States economy, about 25 per cent of growth in aggregate output per person over the period 1960-2010 can be explained by the improved allocation of talent in the economy. The next point of discussion in the report is the main origins of distortions that have been documented in the literature pertaining to the labour markets in North Africa.

## 3.2 Labour Supply in North Africa

Over the past 30 years, educational attainment in North Africa has soared, suggesting that significant investment has been directed towards developing the human capital of a growing population. This trend is evident in table 3, which shows that Algeria, Egypt, Libya, and Tunisia ranked in the top 20 countries in the world in terms of the overall increase in educational attainment measured in years of schooling over the period 1980-2010.

This increase in education, however, has not been followed by better employment outcomes or opportunities. According to Jaramillo and Melonio (2011), the proportion of unemployed with a tertiary degree in Egypt, Morocco and Tunisia was almost seven times higher than in the Organization for Economic Cooperation and Development (OECD) countries in 2010, suggesting that even among the segment of the population with high degrees of educational attainment in those countries, job opportunities remain scarce.

Similarly, rather than improving the amount of education measured in years of education, there are significant concerns that the quality of the education remains poor. The 2015 Program for International Student Assessment study evaluated the quality of education in 72 countries. Within this evaluation, Algeria ranked sixty-ninth while Tunisia was ranked sixty-fifth. This suggests that the significant educational expansion since the 1980s has not been matched by an improvement in the quality of education delivered, implying that the de-facto increases in years of schooling are far less impressive.

**Table 3:** Increase in schooling

| Country | Years of schooling, 1980 | Years of schooling, 2010 | Increase in years of schooling |
|---|---|---|---|
| 1. Botswana | 3.12 | 9.56 | 6.44 |
| 2. Germany | 5.61 | 11.82 | 6.21 |
| 3. Iran | 3.34 | 8.59 | 5.25 |
| 4. Algeria | 3.06 | 8.30 | 5.24 |
| 5. United Arab Emirates | 3.88 | 9.12 | 5.23 |
| 6. Gabon | 3.33 | 8.35 | 5.02 |
| 7. Brazil | 2.77 | 7.54 | 4.77 |
| 8. Bahrain | 4.92 | 9.59 | 4.67 |
| 9. Jordan | 4.58 | 9.23 | 4.65 |
| 10. Libya | 3.26 | 7.85 | 4.59 |
| 11. France | 5.96 | 10.53 | 4.58 |
| 12. Malaysia | 5.69 | 10.14 | 4.46 |
| 13. Bolivia | 5.47 | 9.91 | 4.44 |
| 14. Egypt | 2.65 | 7.08 | 4.43 |
| 15. El Salvador | 3.58 | 7.97 | 4.39 |
| 16. Mexico | 4.89 | 9.11 | 4.22 |
| 17. Spain | 6.17 | 10.38 | 4.22 |
| 18. Saudi Arabia | 4.38 | 8.48 | 4.10 |
| 19. Tunisia | 3.25 | 7.32 | 4.07 |
| 20. Latvia | 6.69 | 10.60 | 3.91 |

*Source:* Campante and Chor (2012)

## Relatively low returns to secondary and tertiary schooling

Not surprisingly, the returns to secondary and tertiary schooling (compared to primary schooling) in the subregion are particularly low. Table 4 shows that in the Middle East and Africa, returns to tertiary education is among the lowest in the world. Psacharopoulos and Patrinos (2004) suggest that the returns are exceptionally low in some of the developing southern Mediterranean countries, in particular Egypt and Tunisia. This suggests that significant improvements need to be made in this subregion to improve the quality of education and to ensure that the educational sector produces degrees and qualifications that are sought after in the labour market.

Failure of the educational system to deliver a high-quality education in fields and skills sought after by the private sector implies that the burden of training and upskilling is shifting to the private sector, which needs to invest heavily to develop the skills needed. Encouraging the private sector to invest in training and developing of skills of employees is particularly problematic, as it fundamentally is providing a public good. Accordingly, government support or vocational training schemes may be important features to encourage private sector investment in human capital.

## Female labour force participation is lagging

North Africa is also a clear outlier when it comes to the labour force participation of women. Some summary statistics are provided in table 5. Female labour participation in North Africa was 22.75 per cent in 2015. This compares to 31.47 per cent in Turkey. Even India, which is much poorer, has a higher rate of female labour force participation compared to North Africa. Within the North African subregion, Algeria stands out as having a particularly low female participation rate, while Libya, Morocco and Tunisia are similar. Another striking observation is that female labour force participation has been growing in most of the rest of the world, while it has remained stagnant in North Africa over the last 25 years.

Low female labour participation implies that a pool of talent is prevented from entering the labour market, which could hold back firm productivity. Furthermore, low female labour force participation may have additional detrimental effects on economic development in particular, as women in the subregion tend to be more enrolled in higher education than men, as compared to OECD countries. This suggests that a significant pool of potentially skilled and motivated young women are shut out from the labour market. According to UNESCO data, in 2006-2007, the percentage of enrolment of men in tertiary education was 46.7 per cent in the Middle East and North Africa, as compared to 58.1 per cent in OECD countries.

## Is labour constraining private sector development?

To what extent do firms perceive labour to be a constraining factor in the subregion? As suggested, there may be a significant mismatch between the labour supply and the actual labour demand conditions. The poor quality of education that many children receive in the subregion implies that the private sector faces a significant burden,

**Table 4:** Average returns to schooling

| | Total | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| Region | Primary | Secondary | Tertiary | Primary | Secondary | Tertiary | Primary | Secondary | Tertiary |
| High Income | 4.9 | 6.6 | 11.11 | 3.3 | 7.5 | 10.7 | 7.2 | 5.2 | 12.3 |
| East Asia | 13.6 | 5.3 | 14.8 | 12.6 | 5.8 | 15.0 | 9.5 | 6.4 | 15.8 |
| Europe/Central Asia | 13.9 | 4.7 | 10.3 | 12.1 | 4.2 | 9.8 | 11.9 | 6.4 | 12.2 |
| Latin America | 7.8 | 5.4 | 15.9 | 7.9 | 5.3 | 15.7 | 8.7 | 6.5 | 17.4 |
| Middle East/N. Africa | 16.0 | 4.5 | 10.5 | 12.7 | 4.3 | 10.2 | 21.4 | 7.4 | 13.5 |
| South Asia | 6.0 | 5.0 | 17.3 | 4.7 | 3.9 | 16.6 | 4.8 | 6.2 | 23.3 |
| Sub-Saharan Africa | 14.4 | 10.6 | 21.0 | 12.5 | 10.1 | 21.0 | 17.5 | 12.7 | 21.3 |
| All economies | 11.5 | 6.8 | 14.6 | 10.1 | 6.7 | 14.4 | 13.2 | 8.2 | 16.1 |

*Source:* Patrinos and Montenegro (2014), based on latest period for each country.

**Table 5:** Labour force participation

| Country | | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 |
|---|---|---|---|---|---|---|---|
| **Algeria** | Female | 11.50 | 11.80 | 11.89 | 12.84 | 14.38 | 15.24 |
| | Male | 76.45 | 77.72 | 74.65 | 71.78 | 70.05 | 67.42 |
| | Total | 44.17 | 45.02 | 43.57 | 42.54 | 42.36 | 41.48 |
| **Egypt** | Female | 21.34 | 21.00 | 19.90 | 20.23 | 22.78 | 22.22 |
| | Male | 72.49 | 72.21 | 72.61 | 72.96 | 75.79 | 73.64 |
| | Total | 46.61 | 46.43 | 46.11 | 46.56 | 49.31 | 47.97 |
| **Libya** | Female | 20.01 | 21.95 | 24.41 | 27.44 | 29.33 | 25.76 |
| | Male | 73.02 | 73.34 | 74.13 | 75.47 | 77.35 | 78.84 |
| | Total | 48.59 | 49.25 | 50.40 | 52.26 | 53.80 | 52.40 |
| **Morocco** | Female | 24.08 | 24.48 | 25.25 | 26.67 | 25.60 | 25.02 |
| | Male | 79.07 | 79.49 | 78.05 | 76.35 | 75.60 | 74.33 |
| | Total | 51.11 | 51.42 | 50.98 | 50.80 | 49.85 | 49.08 |
| **Sudan** | Female | 23.45 | 27.61 | 26.60 | 24.48 | 22.96 | 23.62 |
| | Male | 76.60 | 75.37 | 74.56 | 74.00 | 72.75 | 70.36 |
| | Total | 49.90 | 51.39 | 50.46 | 49.10 | 47.48 | 46.69 |
| **Tunisia** | Female | 22.50 | 22.89 | 23.44 | 23.88 | 24.46 | 24.65 |
| | Male | 75.59 | 74.26 | 71.61 | 68.59 | 69.67 | 70.81 |
| | Total | 48.99 | 48.60 | 47.42 | 45.93 | 46.67 | 47.21 |
| **North Africa Countries** | Female | 20.48 | 21.62 | 21.92 | 22.59 | 23.25 | 22.75 |
| | Male | 75.54 | 75.40 | 74.27 | 73.19 | 73.53 | 72.57 |
| | Total | 48.23 | 48.68 | 48.16 | 47.87 | 48.24 | 47.47 |
| **Turkey** | Female | 34.03 | 30.75 | 26.28 | 23.31 | 27.03 | 31.47 |
| | Male | 80.79 | 77.46 | 72.62 | 70.12 | 69.64 | 71.71 |
| | Total | 56.82 | 53.47 | 48.79 | 46.03 | 47.70 | 51.01 |
| **Sweden** | Female | 63.14 | 59.08 | 58.35 | 59.58 | 58.90 | 60.62 |
| | Male | 72.09 | 68.51 | 66.54 | 67.99 | 67.40 | 67.31 |
| | Total | 67.52 | 63.70 | 62.36 | 63.72 | 63.11 | 63.94 |
| **India** | Female | 35.11 | 35.43 | 33.95 | 36.78 | 28.56 | 27.27 |
| | Male | 84.50 | 83.98 | 82.57 | 83.09 | 80.53 | 79.09 |
| | Total | 60.66 | 60.50 | 59.00 | 60.62 | 55.32 | 53.95 |
| **China** | Female | 73.20 | 72.52 | 71.01 | 66.77 | 63.78 | 62.44 |
| | Male | 84.79 | 84.59 | 83.18 | 79.73 | 77.88 | 76.73 |
| | Total | 79.13 | 78.69 | 77.22 | 73.38 | 70.97 | 69.73 |
| **ROW\*** | Female | 49.02 | 49.58 | 50.26 | 51.06 | 51.53 | 52.06 |
| | Male | 76.72 | 75.96 | 74.91 | 74.13 | 73.56 | 73.23 |
| | Total | 62.93 | 62.84 | 62.62 | 62.68 | 62.66 | 62.78 |

*Source:* ILO.
*Note:* \*ROW; rest of the world (all countries except those in North Africa).

having to invest resources to upskill young people as they enter the labour market, which may be an important impediment to expanding employment.

Figure X and XI shed some light on whether firms perceive labour to be constraining their development. The data are drawn from the enterprise survey conducted by the World Bank in which firms were asked whether labour is "the biggest" constraint or whether labour is a "severe/ major" constraint. The latter captures whether labour is one (of possibly many) constraints, while the former suggests that access to skilled labour may be the most pressing issue that firms face.

Figure X shows the share of firms indicating that an inadequately educated workforce is a major

or severe constraint for conducting business, as well as a comparison of the responses in countries in North Africa to other countries in other subregions. It is evident that access to skilled labour is a constraint in many countries. However, countries in North Africa does not stand out as sharply, as compared to, for example Turkey or Sweden. In addition, figure XI displays the relationship between the share of firms that report that access to skilled labour is *the biggest constraint* on the vertical axis plotted against the share of firms that report that access to skilled labour is a major or severe constraint, which was also shown in figure X. This can shed some light on the relationship between the share of firms reporting labour problems as the most pressing constraint versus access to labour being a significant constraint among many others.

**Figure X:** Share of firms indicating the workforce as a major or severe obstacle



*Source:* World Bank Enterprise Survey (http://www.enterprisesurveys.org/).
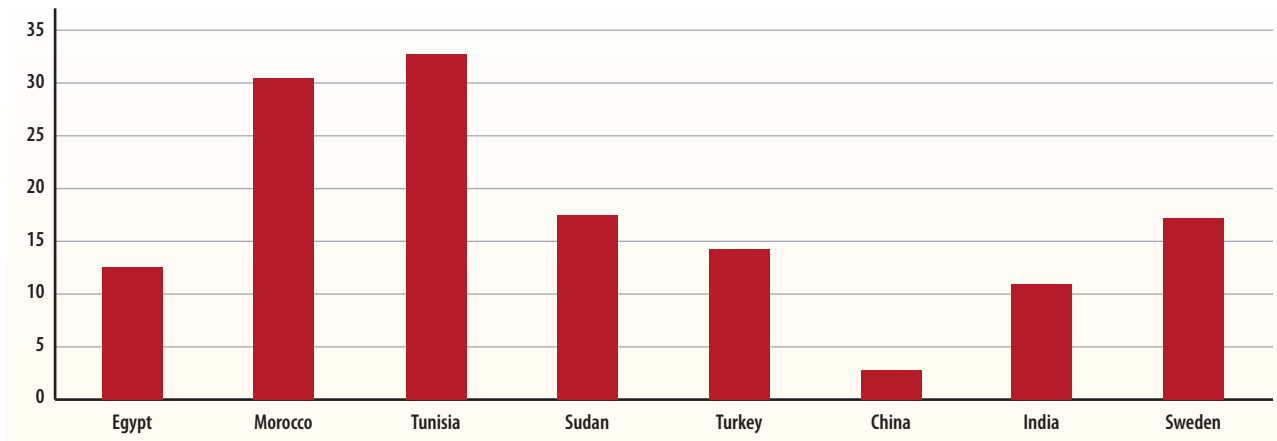
**Figure XI:** Educated workforce as a constraint



*Source:* World Bank Enterprise Survey (http://www.enterprisesurveys.org/).
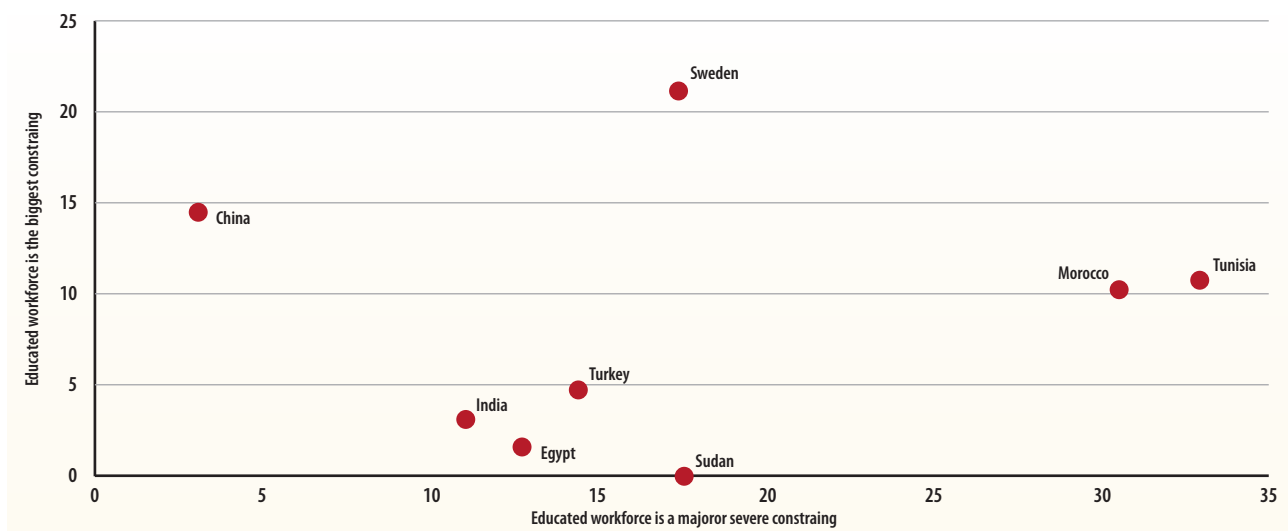
Figure XI suggests that, compared to other country groups, for more developed economies, overall labour scarcity is not regarded as the biggest constraint for firms in North Africa, which is especially the case for Egypt and the Sudan, where labour constraints seem to play almost no role. However, in Tunisia and Morocco, more than 30 per cent of firms report that access to skilled or educated labour is a major or severe constraint and approximately 10 per cent of firms report that it is the largest obstacle. This evidence points clearly towards the fact that, while overall labour supply conditions is not the most pressing issue, there are some concerns about the available quality of labour. As suggested, this may imply that a large hiring cost is eroding job creation, if firms have to invest significant resources to equip the new recruits with skills that were not gained through the education system.

## 3.3  Labour market distortions in North Africa

The misallocation also highlights that labour allocation can be a problem even if the overall level is not such a large concern. In particular, the previous conceptual discussion has highlighted the role of labour movements across firms to ensure that the most productive firms can realize their productive potential, improving output and fundamentally, welfare. Restricted movements of labour across firms hinders productivity growth.

**Figure XII:** Redundancy cost in weeks of salary
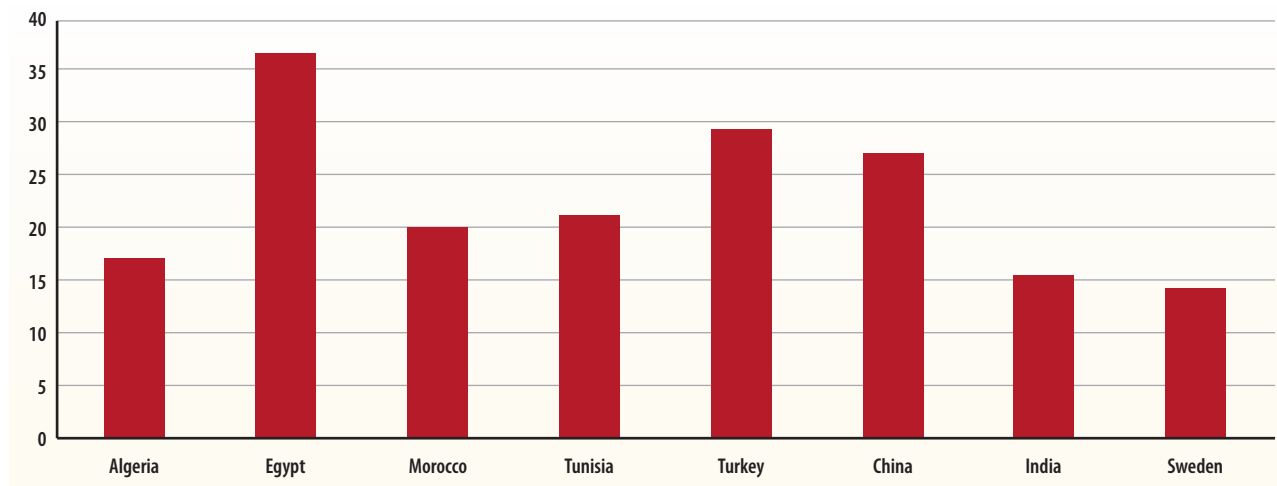


*Source:* World Economic Forum Global Competitiveness Index.

*Note:* Country average redundancy costs in terms of weeks of salary from 2007 to 2017.

## Labour regulation may not be the main concern for firms

In the broader Middle East and North Africa region, the institutions governing the labour market have been found to be very rigid with stringent regulations (Gatti and others, 2013; Pissarides and Véganzonès-Varoudakis, 2006). Job dismissals remain complex and costly in the subregion, as most of the countries have complex regulations that constrain firms' ability to dismiss workers. The difficulty in letting workers go has negative implications for a firm's willingness to recruit and absorb new workers, as they are unable to adjust to changing demand side pressures or increased competitive pressures. This problem becomes particularly important in uncertain economic environments. The costs of firing are assessed in the World Bank Development Indicators as a redundancy cost measure in terms of weeks of salary to be paid to lay off workers. Figure XII presents evidence on the redundancy costs measure across a set of countries. While the redundancy costs are approximately 15 weeks of salary in a developed economy, such as Sweden, they are much higher in Egypt where the redundancy cost is 37 weeks of salary. North Africa, however, does not stand out when compared to the more dynamic Chinese economy or Turkey. In addition, the World Bank Enterprise Survey results suggest that much fewer firms report labour market regulations as major or even severe constraints than the availability of educated labour (14 per cent compared to 23 per cent, on average).

## Public sector employment and wage premiums may distort labour markets

Public employment in the economy can also contribute to labour misallocation. In the Middle East and North Africa, the situation is characterized by two features: a high share of public employment and a public sector wage premium. Figure XIII shows that public sector employment in the subregion is much higher than the average in emerging and developing countries. This is important because public sector employment may have a significant impact on the ability of the private sector to attract and retain highly qualified and skilled employees. Furthermore, as discussed below, public employment may be a method used by politicians to provide patronage, which can significantly erode the ability of the public sector to fulfil its function, as individuals recruited into public sector jobs may not be meritocratically selected.

Stepanyan and Leigh (2015) provide evidence that the creation of public-sector jobs imposes a significant tax on private sector development, crowding out or destroying private sector jobs in middle-income countries. Similarly, Duenwald and Tamirisa (2018) show that there is no negative relationship between public employment and overall unemployment in the Middle East and Central Asia. This suggests that public employment does not necessarily reduce overall unemployment. Conversely, countries with a high share of public employment exhibit lower shares of private employment. Ac-

**Figure XIII:** Public sector employment, 2005-2016 (per cent, period average)
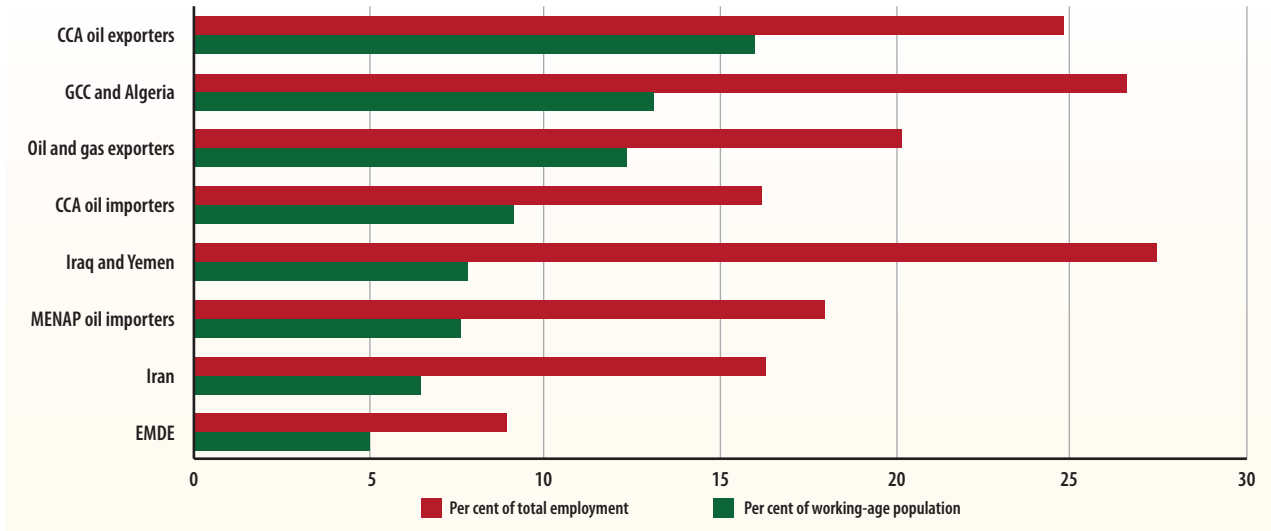


*Source:* IMF (2018).

*Notes:* EMDE, emerging and developing economies; MENAP, Middle East and North Africa + Afghanistan and Pakistan; CCA, Caucasus and Central Asia; GCC, Golf Cooperation Council; EMDE, Emerging Markets and Developing Economies.

cordingly, public employment takes labour out of the private labour market.

In addition to the negative impact that excessive public sector employment can have by crowding out private sector activity, there are concerns that these public sector employees are paid excessively. The public-sector wage bills in the countries in the Middle East and North Africa are excessively high as compared to other emerging and developing countries, as illustrated in figure XIV. This is the area of greatest concern.

**Figure XIV:** Central Government wage bill as a per cent of gross domestic product
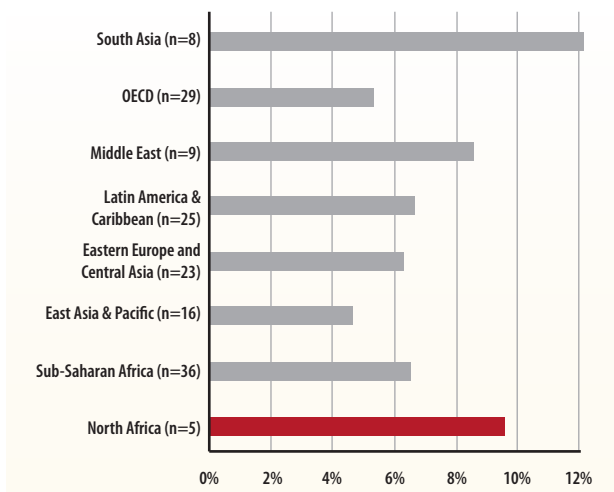


*Source:* World Bank Database (https://data.worldbank.org/).

One reason behind the inflated public sector wage bills is that public employment, in many cases, comes with a wage premium above what the private sector would pay employees. Among the study countries, Morocco and Tunisia stand out as having significant public sector wage premiums, as indicated in figure XV. There is limited evidence that the public sector wage premium paid is merited because of the particularly high productivity of public sector employees in this subregion, suggesting that the wage premiums paid may be a form of patronage rather than to rewarding productive employees. This distortion has significant implications for private sector development.

Furthermore, in addition to the directly distortionary effects, a public-sector pay premium that fails to reflect genuine productivity differences between the public and private sectors has significant indirect negative effects. In particular, public sector wage premiums can have a strong negative impact on skill accumulation and development, the allocation of skills and labour force participation. The fundamental concern is that wages in these distorted markets fail to provide signals about relative scarcity or abundance of certain skills or capabilities.

As a result, public sector employment is perceived as desirable: Gatti and others (2013) document

**Figure XV:** Public to private sector wage gap
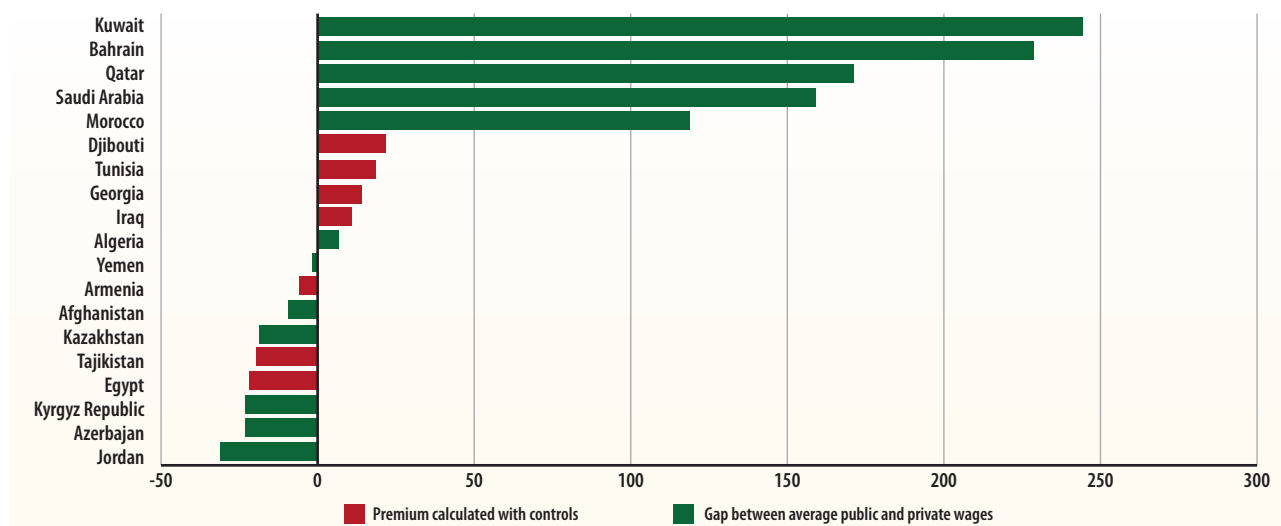


*Source:* IMF (2018).

*Note:* Numbers represent wage premium estimates obtained after controlling for employee characteristics.

a strong preference for public sector jobs in the study region. They write the following:

> The incentives that workers face therefore push MENA [Middle East and North African] labour markets into a low-productivity equilibrium: to increase the chances of securing a public-sector job, young people choose higher education degrees that are not relevant to the private sector. Those who can afford to, spend time queuing for those public-sector jobs, which offer relatively high pay for low productivity.

The negative effect on labour force participation stems from the fact that better paying and secure public jobs can discourage members of a family to get a second salary. This is particularly the case when culture prevents women from working.

Relating this back to the earlier statistics, it is striking that Morocco and Tunisia are also the two countries in which a significant share of firms report that access to skilled labour is the most severe constraint. This strongly suggests that the public sector is absorbing skilled labour, which, otherwise is not available to the private sector, thereby contributing to persistent distortions and output losses in these two countries.

# Chapter 4:  Capital market distortions

Capital market distortions have been identified by broad academic literature as being a main reason for slow development and sectoral adjustment in developing countries. This section contains a discussion on capital market distortions and their impact on the study region.

## 4.1   Framework

One central capital market distortion is simply the lack of availability of credit for some firms or the lack of access to private equity markets. Capital market distortions may also be the result of (a perceived) insecurity of property rights. Insecure property rights affect credit markets because they diminish the value of assets that can be pledged as collateral. If land ownership, for example, is not protected under the law, then firms cannot borrow capital from banks using the land as collateral. This means that making a large investment is impossible for these firms because they lack access to credit. Even worse, investment may not be made if firms fear that the fruits of the investment cannot be enjoyed because property rights are weak.

With the framework presented in section 3, it is easy to illustrate how capital constraints can affect firm performance in the model. Take the production function presented in the theory section, which is reproduced in Figure XVI. The firm in this model has an exogenously given productivity $A_i$, hires capital $K_i$ and workers $L_i$. Capital constraints in this model are incorporated as a hard constraint, whereby a firm can only employ $K_i$ units of capital

as long as this value is lower than some exogenously given upper bound value $\mu_i$. This could be that, given market prices and conditions, the firm's optimal choice of capital $K_i$ is above this $\mu_i$, in which case the firm would be capital constrained. The firm will then hire the maximum amount of capital it can get $K_i = \mu_i$, but this will be lower than what it would optimally like to hire.

How will such a capital constraint affect output? There are several mechanisms at play. First, there is the direct effect: less capital means less output being produced. This is illustrated in figure XVI. The constrained value $\mu_i$ replaces the value of $K_i$ in the bottom equation. As constrained capital is lower than it would be otherwise, output will fall. If capital is 40 per cent lower than it would be without constraints, then output under the typical assumption regarding the capital share ($\alpha = 0.33$) would be 13.2 per cent lower.

However, crucially, this is not the only effect through which capital constraints affect output. Because of being capital constrained, firms hire less labour $L_i$, because the labour in the firm is less productive than it would be with more capital. Accordingly, indirectly, capital constraints are also indirectly suppressing labour demand. The impact of capital constraints on output are particularly severe, if the more productive firms are capital constrained (those with high $A_i$). The problem is particularly severe if firms cannot even enter the market effectively because they cannot finance es-

**Figure XVI:** Capital constraints in the Model



capital used in production

output without constraint $\longleftarrow$ $Y_i = A_i * K_i^{\alpha} L_i^{\beta}$

capital is constrained $\longrightarrow$ $K_i \leq \mu_i$

output is reduced $\longleftarrow$ $Y_i = A_i * (\mu_i)^{\alpha} L_i^{\beta}$
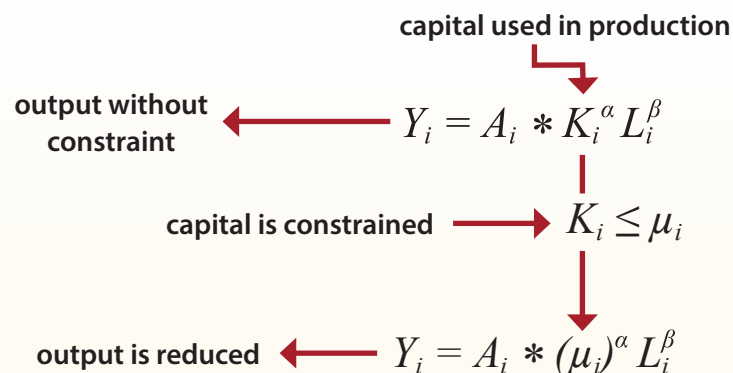
sential but large expenses for technology development, machinery or the set-up of premises.

These subtle misallocation effects will be difficult to measure without good data and theoretical knowledge. However, given the previous discussions in this report, it should be clear that they can have a very large impact on productivity and output growth. In this section, the discussion is first centred on evidence from the World Bank Enterprise Surveys, which show the extent to which capital constraints are regarded as a constraint by firms. The data from the survey are used to derive an estimate of the output loss using the theoretical framework from section 2. The next area of discussion focuses on the academic literature, which provides a wealth of estimates for how much capital constraints can harm output. Importantly, this literature also provides hints regarding the channels through which capital constraints harm structural change.

## 4.2 Capital constraints in North Africa

How important are capital constraints as a problem in North African countries? As part of the World Bank Enterprise Survey, entrepreneurs are asked two questions regarding this issue. The first question is whether "access to finance (availability and cost)" is the largest obstacle the firm faces. The second question focuses on access to finance directly and asks how severe a constraint it is, thereby pro-

viding a rank ordering or a measure of the intensity of the problem.

### *Firms report capital constraints as a major constraint*

Table 6, which includes reports on these questions, shows that the answers deviate dramatically. Seen from a perspective of what is the largest constraint, the respondents in North Africa face relatively fewer constraints than, for example, respondents in China, India and Turkey. As explained in the next section, this is partly the result of respondents in North Africa stating overwhelmingly that political instability is the most important obstacle firms face, as the majority of responses were collected in 2012 and 2013, a period in which significant political uncertainty was an overarching phenomenon in the region.

Turning to the responses regarding what the major or severe constraints are, the response profile looks very different; it suggests deeper structural problems. North African businesses report that they are severely constrained by access to finance. In particular, in comparison with other countries, such as China, India and Turkey, where at most 15 per cent of firms report that they perceive finance as a major or severe constraint, in Egypt, 28 per cent of the firms indicate that finance is a major or severe constraint. It is important to highlight that the World Bank Enterprise Surveys can only interview firms that are already established. This could imply that

**Table 6:** Finance as a constraint

| Variable | Finance as the biggest constraint | Finance as a major or severe constraint |
|---|---|---|
| North Africa | 9.00% | 23.84% |
| Rest of the world | 15.34% | 27.12% |
| Egypt | 10.36% | 28.46% |
| Tunisia | 10.17% | 23.94% |
| Morocco | 9.78% | 27.67% |
| Sudan | 5.68% | 15.28% |
| Turkey | 17.43% | 11.46% |
| Sweden | 6.70% | 3.28% |
| India | 11.67% | 15.11% |
| China | 22.44% | 2.85% |

*Source:* World Bank Enterprise Survey (http://www.enterprisesurveys.org/).

the extent to which finance is a constraint is even more pronounced among entrepreneurs that are planning to set up their own firm, which is an additional margin through which finance constraints can undermine development.

## *The Doing Business reports confirm credit administration as being a problem*

Another impression of the role of financial constraints can be gathered from the Doing Business reports by the World Bank. Two topics of these reports are particularly important when studying access to credit and capital constraints: the difficulty in "getting credit" and the difficulty in "registering a property". The latter serves as a proxy measure indicating how easy it is to register property rights claims, which also deals with the extent to which property can be used as collateral to facilitate access to finance.

Table 7 and Table *8* report on the relative standing of North African countries in these two categories. In each case, the distance to frontier score helps in assessing the absolute level of regulatory performance over time. It measures the distance of each economy to the "frontier," which represents the best performance observed on each of the indicators across all economies. An economy's distance

**Table 7:** Getting credit (Doing Business data)

| Economy | Getting Credit DTF | Strength of legal rights index (0-12) | Depth of credit information index (0-8) | Credit registry coverage (% of adults) | Credit bureau coverage (% of adults) | Getting Credit rank (out of 186) |
|---|---|---|---|---|---|---|
| Middle East & North Africa | 32.5 | 1.7 | 4.8 | 14 | 14.2 | 130 |
| Algeria | 10 | 2 | 0 | 2.9 | 0 | 177 |
| Egypt, Arab Rep. | 50 | 2 | 8 | 7.8 | 25.3 | 90 |
| Libya | 0 | 0 | 0 | 0.6 | 0 | 186 |
| Mauritania | 25 | 2 | 3 | 7.1 | 0 | 159 |
| Morocco | 45 | 2 | 7 | 0 | 25 | 105 |
| Sudan | 15 | 3 | 0 | 0 | 2.4 | 173 |
| Tunisia | 45 | 3 | 6 | 26.9 | 0 | 105 |
| Sweden | 55 | 6 | 5 | 0 | 100 | 77 |
| Turkey | 77 | 4 | 7 | 80.2 | 0 | 55 |
| China | 60 | 4 | 8 | 95.3 | 21.4 | 68 |
| India | 75 | 8 | 7 | 0 | 43.5 | 29 |

*Note:* Data is from the newest Doing Business Report (2017).

**Table 8:** Registering a property (Doing Business Report)

| Economy | Registering Property DTF | Procedures (number) | Time (days) | Cost (% of property value) | Quality of the land administration index (0-30) | Registering Property rank (out of 187) |
|---|---|---|---|---|---|---|
| Middle East & North Africa | 60.91 | 5.7 | 30.3 | 6 | 13.4 | 93 |
| Algeria | 43.83 | 10 | 55 | 7.1 | 7 | 163 |
| Egypt, Arab Rep. | 55.5 | 8 | 75 | 1.1 | 7 | 119 |
| Libya | 0 | No practice | No practice | No practice | No practice | 187 |
| Mauritania | 61.25 | 4 | 49 | 4.6 | 7 | 98 |
| Morocco | 64.35 | 6 | 22 | 6.4 | 15.5 | 86 |
| Sudan | 63.62 | 6 | 11 | 2.6 | 5.5 | 89 |
| Tunisia | 63.21 | 4 | 39 | 6.1 | 11 | 93 |
| Sweden | 90.11 | 1 | 7 | 4.3 | 27.5 | 9 |
| Turkey | 74.67 | 7 | 7 | 3 | 21.5 | 46 |
| China | 76.15 | 4 | 19.5 | 3.4 | 18.3 | 41 |
| India | 47.08 | 8 | 53 | 8.4 | 8.2 | 154 |

*Note:* Data is from the newest Doing Business Report (2017).

**Table 9:** Domestic credit to private sector (per cent of gross domestic product)

| Country | 2000 | 2005 | 2010 | 2015 | 2016 | 2017 |
|---------|------|------|------|------|------|------|
| Algeria | 6.0 | 11.9 | 15.2 | 21.7 | 23.0 | 24.4 |
| Egypt | 52.0 | 51.2 | 33.1 | 26.3 | 34.1 | 28.5 |
| Libya | 20.5 | 7.4 | 9.3 | 35.8 | 29.2 | 17.2 |
| Morocco | 48.6 | 44.0 | 66.9 | 64.2 | 63.8 | 63.3 |
| Mauritania | | 24.7 | 23.7 | | | |
| Sudan | 2.3 | 10.4 | 11.9 | 7.1 | 8.9 | |
| Tunisia | 60.0 | 58.3 | 69.1 | 79.3 | 81.2 | 85.6 |
| China | 111.1 | 111.8 | 126.3 | 152.6 | 156.8 | 155.8 |
| India | 28.7 | 40.6 | 51.1 | 51.9 | 49.5 | |
| Sweden | | 99.9 | 124.4 | 128.8 | 128.8 | 132.2 |
| Turkey | 17.3 | 21.4 | 44.7 | 66.8 | 69.9 | 66.5 |

*Note:* IMF Data. Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.

to frontier is reflected on a scale from 0 to 100, where 0 represents the lowest performance and 100 represents the frontier.

The performance of North African countries with regard to providing firms with the possibility to getting credit is dismal. No country achieves a distance to frontier or ranking better than the worst comparison country. Sweden, the worst performer in terms of distance to frontier (among the reference countries) and ranking is still 13 places above Egypt, the best performer among the North African countries for which data are available. Access to credit in Algeria, Libya and the Sudan is particularly difficult. Mauritania ranks only slightly better. Egypt, Morocco and Tunisia rank similarly and are far away from the frontier. The "getting credit" dimension is also the dimension of the Doing Business rankings in which the subregion as a whole clearly underperforms. This cross-validates that significant shares of firms in North Africa in the World Bank Enterprise Surveys perceive finance to be a severe or major obstacle.

The statistics regarding the registration of property presented in table 8 shows that North African countries perform better in this dimension. Morocco, Sudan and Tunisia are ranked above the median and are clearly higher than India. This suggests that lack of access to finance that is reported in the enterprise surveys is not likely the result of the inability to leverage property or assets as collateral, but instead by such factors as the strength of legal rights, the depth of credit information, the availa-

bility of a credit registry and credit bureau coverage, and other institutions supporting the development of deep financial markets.

## *The problems related to credit creation are also visible in aggregate numbers*

Aggregate numbers further confirm that some countries in North Africa are facing problems providing credit to the private sector. Table 9 shows the share of private domestic credit relative to GDP, which is generally used as a measure for level of development of the credit markets. The levels in Morocco and Tunisia are comparable to Turkey and lag Sweden and China. However, the situation is considerably worse in Algeria, Egypt and Libya, where the provision of credit is even lower compared to India.

## 4.3 The impact of capital constraints on output

How much of a problem are these financial constraints for output? To evaluate this empirically, the firm level data available from the enterprise surveys are used to run a regression of the form

$$\ln Y_i = \beta_1 I_i \ (constrained) + \beta L_i + \eta_{sc} + \varepsilon_i$$

which is derived theoretically from the modelling framework presented in the appendix to this report. The left-hand side of this regression is the value of revenue of the firm and the right-hand

side contains labour costs as a control and a set of fixed effects that control for country by time and sector-specific average differences. The coefficient of interest in this regression is $\beta_1$.

Table 10 gives a report of the results of this regression. For columns (1) and (2) the of question whether access to finance is the biggest constraint is used as a measure of constraint. Column (1) only controls for labour costs and column (2) adds material costs as an additional control. The coefficient falls slightly with the inclusion of the controls, but remains economically and statistically significant. The point estimates suggest that, holding constant the cost of labour and all else, firms that report to be financially constrained have revenue that are more than 60 per cent lower compared to their unconstrained peers. This is a dramatic effect if it is interpreted as a causal relationship. For columns (3) and (4), the definition of financial constraints vary by using a dummy that captures whether the firm reports access to finance as being a major or severe constraint. For columns (5) and (6), both indicators are combined. The message is always the same: firms that indicate that they are being financially constrained report dramatically lower sales for the same observable costs.[11]

The appendix contains an interpretation of these results using the theoretical model in figure XVI. The key insight from the model is that, under the assumption that differences in firm productivity are uncorrelated with capital constraints, the estimated coefficient from table 10 can be interpreted as the impact of capital constraints on the capital stock.[12] If these constraints were to be lifted, an increase in the capital stock utilized by the firm is likely. This can then be used to calculate a counterfactual level of output of these firms without constraints. In addition, the constrained firms would, once freed of their constraints, hire additional labour.

## Simple simulations suggest large losses to output from constraints

Table 11 gives a report of the results of this simulation. The first two columns provide simulations based on column (1) in table 10 without and with labour adjustments. The gains are substantial and indicate that Egypt, for example, would gain between 5 and 6 per cent of output if capital was not constrained. What is particularly interesting in these results is the deviation of the numbers from table 6. Whereas a similar number of firms in Egypt and Tunisia report that the biggest constraint is capital, the simulated gain from lifting these con-

**Table 10:** Impact of financial constraint on sales (revenue)

| VARIABLES | (1) ln(sales) | (2) ln(sales) | (3) ln(sales) | (4) ln(sales) | (5) ln(sales) | (6) ln(sales) |
|---|---|---|---|---|---|---|
| finance is biggest obstacle | -0.689*** | -0.615*** | | | -0.569*** | -0.500*** |
| | (0.188) | (0.175) | | | (0.186) | (0.173) |
| finance is major or severe obstacle | | | -0.374*** | -0.348*** | -0.230** | -0.222** |
| | | | (0.108) | (0.105) | (0.101) | (0.0987) |
| ln(labor costs) | 0.858*** | 0.770*** | 0.863*** | 0.771*** | 0.856*** | 0.767*** |
| | (0.0392) | (0.0410) | (0.0405) | (0.0428) | (0.0394) | (0.0418) |
| ln(material costs) | | 0.0994*** | | 0.101*** | | 0.0989*** |
| | | (0.0155) | | (0.0160) | | (0.0157) |
| country/year/sector fixed effects | yes | yes | yes | yes | yes | yes |
| Observations | 2,215 | 2,215 | 2,198 | 2,198 | 2,198 | 2,198 |
| R-squared | 0.680 | 0.712 | 0.677 | 0.710 | 0.684 | 0.716 |

**Robust standard errors in parentheses**

**\*\*\* p<0.01, \*\* p<0.05, \* p<0.1**

11    This also does not change if other costs, such as power costs or the book value of capital, are controlled.
12    In a working paper, Kuntchev and others (2012) propose an alternative way to measure credit constraints, which circumvents the subjective questions regarding access to finance from the Enterprise Surveys. Similar to the findings in the access to finance questions, less productive and smaller firms appear to be constrained. However, their interpretation of the fact that less productive firms are constrained is that this is a sign that credit markets are efficient, not that lack of capital drives low labour productivity. This should make clear that the interpretation of the coefficients in table 10 critically depend on the assumptions made about the measurability of capital costs and the efficiency of the credit market. Given the results in table 7, there should be some doubt about the latter.

**Table 11:** Simulated gains from lifting financial constraints on output

| | Biggest constraint | | Major or severe constraint | |
|---|---|---|---|---|
| | Gain with capital inflow | Gain with capital and labour inflow | Gain with capital inflow | Gain with capital and labour inflow |
| North Africa | 5.54% | 6.51% | 10.89% | 12.46% |
| Egypt | 5.03% | 5.91% | 11.70% | 13.76% |
| Tunisia | 11.70% | 13.76% | 7.83% | 8.97% |
| Morocco | 3.54% | 4.16% | 7.82% | 8.96% |
| Sudan | 1.88% | 2.21% | 18.88% | 21.61% |

*Source:* Calculations by the authors from World Bank Enterprise Surveys.

straints is more than twice as high in Tunisia. This is because larger or more productive firms are affected by capital constraints in Tunisia when compared to Egypt. Gains in the Sudan are estimated to be the smallest.

The estimated output gains are significantly larger when the results in table 10, column (3) are used to run the simulations. The Sudan is now estimated to gain about 20 per cent in output if capital constraints on its firms were to be lifted. Morocco and Tunisia would gain about 8 per cent and Egypt about 12 per cent.

A question that emerges is why the estimated output gains are so much larger when using the severe constraint measure? As can be seen in table 6, a lot more firms experience capital constraints as a major or severe obstacle. This is reflected in much higher simulated gains. The results that are seen to be more realistic depends on whether the question regarding finance as the "biggest obstacle" or as a "severe or major" obstacle better captures capital constraints. Given the large role played by other constraints in North Africa that are particularly time sensitive – in particular, political instability – in addition to the evidence provided in table 7 and 8, it is likely that the question regarding capital constraints as a major or severe obstacle provides the more accurate better estimate of the situation of firms and therefore also provides a better basis for the analysis of the costs.

In the context of these estimates, the academic literature can serve two purposes. First, the literature employs more sophisticated methods based on more comprehensive firm-level data. This facilitates the estimation of effects, which can be interpreted as causal effects of the constraint. Second, the theory proposed in figure XVI is relatively simple and does not take into account the dynamic effects of the firm selection and growth, which is likely to lead to underestimations. As a result, the academic literature suggests additional channels that have not been covered until now. This literature is discussed in the following sections.

## 4.4 Capital constraints and property rights – What is known?

In an exercise similar to the one used in the previous section, Kalemli-Ozcan and Sorensen (2012) show, using data on African economies from the Productivity and Investment Climate Survey of the World Bank, that moving from a firm in which access to finance is not an obstacle to a firm in which access to finance is a very severe obstacle increases the marginal product of capital by 45 per cent. This reveals that obstacles to credit have important real economic effects. The authors also find a clear positive correlation between country-level misallocation and the strength of property rights, measured using expropriation risk and investment profile variables from the International Country Risk Guide.

### *Weak property rights and financial market imperfections impose severe distortions*

The abolishment of capital and property rights distortions has the potential to be transformative. In an early contribution, Claessens and Laeven (2003) study the differential growth of industries that rely on intangible assets in countries that provide better protection of property rights. Their estimates predict that the relative growth of intangible industries is 1.4 per cent per year higher in a country that efficiently secures property rights, compared

to a country that is not proficient in guaranteeing property rights. These effects are large in relative terms, as the average growth rate in their sample is around 3.5 per cent. Castro, Clementi, and Macdonald (2009) echo this observation. They argue that countries endowed with weaker institutions face higher relative prices of investment goods, invest a lower share of their income, and end up being poorer. Aghion and others (2010) even argue that through the composition of investment, tighter credit can lead to both higher volatility and lower mean growth. Buera, Kaboski, and Shin (2011) developed a quantitative framework to explain the relationship between aggregate and sector-level TFP and financial development across countries. Financial frictions distort the allocation of capital and entrepreneurial talent across production units, adversely affecting measured productivity.

## *The magnitude of productivity losses because of distortions can be very large*

Most recently, the academic literature has turned towards using firm-level data combined with theoretical models to explore the role of the capital market and property rights distortions. Adamopoulos and others (2017) in particular the type of farm-ers who operate in agriculture (selectionuse panel data from China together with a model to assess the effect of misallocation of land, driven by land market institutions, on aggregate productivity. They show that the absence of distortions would generate a large 13.8-fold increase in agricultural labour productivity; a significant increase in agricultural TFP of 4.3-fold; and a substantial reallocation of labour across sectors, with the share of employment in agriculture falling from 46 per cent to 5 per cent.

## *Firm entry and growth of young firms is an important factor for the loss*

Midrigan and Xu (2018) use producer-level data to evaluate the role of financial frictions in determining TFP. Using data from the Republic of Korea, they estimate losses of about 40 per cent of TFP because of capital frictions. These arise mostly on the back of the distortions associated with the decision to enter the modern sector and the technology adoption decisions. In contrast, the TFP losses from the misallocation of capital among modern-sector

producers are a lot smaller (5 to 10 per cent) and account for only a fraction of the overall efficiency losses associated with the tightening of the borrowing constraints. These findings suggest that the framework used in the simulation above, of a misallocation at the intensive margin, captures only a small part of the loss induced by capital constraints. As already suggested, if capital constraints lead to a lack of entry of new firms and if this is the main channel through which they affect productivity growth, then the estimates presented in table 11 are likely to be lower bound. Indeed, Aghion, Fally, and Scarpetta (2007) argue that financial constraints mostly operate along the extensive margin – by preventing firm entry and growth of young firms.

## *The role of property rights as a priority*

There appears to be a hierarchy in which secure property rights are a necessary condition for investments and the absence of credit can be circumvented by existing firms if the property rights are secure. This is also in line with the findings of Ranasinge and Restuccia (2018), who use cross-country micro establishment-level data to document that crime and lack of access to finance are two major obstacles to business operations in poor and developing countries. They show that weak rule-of-law institutions substantially amplify the negative impact of financial frictions, reducing output per capita by 50 per cent. While financial markets are important for development, an essential precondition to reap the gains from financial liberalization is that property rights are secure. However, the data presented in table 7 and 8 suggest that some North African Governments already provide relatively good property rights institutions.

## *Large one-off investments and reduced entry as a likely culprit in North Africa*

The results of Midrigan and Xu (2018) also highlight yet again that firm entry and the adoption of new technologies may be significantly undermined by financial constraints. A key question that arises from all these findings is, does misallocation persist? The first, perhaps most striking puzzle, is that misallocation within existing firms in narrowly defined sectors persists. Banerjee and Moll (2010) provide an overview of the misallocation literature and show that, especially capital misallocation, should

dissipate over time as productive firms save, which will enable them to overcome capital constraints. Banerjee and Moll (2010) discuss several reasons as to why within-sector misallocations persist. They argue that one reason is that political favours and significant differences in expropriation risks exist so that inefficient but politically connected firms can enter or survive. As a result, highly productive firms (those with high $A_i$) underinvest because they fear expropriation or unfair competition from politically connected firms. Another reason is that idiosyncratic and unobservable firm-level shocks affect firms, which, because they are capital constrained, cannot recover quickly. Along these lines Caselli and Gennaioli (2013)where ownership and control are passed on from one generation to the other. We argue that if the heir to the family firm has no talent for managerial decision making, dynastic management is a failure of meritocracy that reduces a firm's total factor productivity (TFP are able to explain a surprisingly large (up to 50 per cent) fraction of the TFP gap across countries.

The other option, and several recent studies seem to support this, is that large one-off investments are necessary, but firms cannot make them because of credit constraints. This is a particularly severe problem for sectors that require large investments to be viable or rely particularly on the development of new and costly technologies. In the light of the Doing Business rankings, this channel may also be particularly important for North African countries. However, this idea is difficult to test in the data, as it would require data on firms that cannot enter or that stay extremely small because the transformational capital is missing. The best evidence is, therefore, cross-country evidence combined with theoretical models, such as those put forward by Buera, Kobowski and Shin (2011), who estimate large effects.

In the next section, the role of capital flows is covered, with a focus on FDI. In the section in which the conceptual framework is introduced, the role that capital flows can play in increasing output is highlighted. In addition to relaxing existing capital constraints, FDI may have further indirect effects on efforts to enhance productivity.

## 4.5 Foreign entry and international capital flows

An alternative approach for assessing the relationship between capital and finance constraints, firm entry and economy-wide productivity is to look at foreign capital inflows. To do this, the decomposition of labour productivity growth is decomposed into within- and between- sector, as presented in section 2 (introduction). In particular, the within growth in labour productivity component – productivity growth that is driven by reallocations within sectors – is analysed together with foreign capital inflows. The underlying reasoning is that, potentially, multinationals are particularly productive and not constrained by local capital markets. Their entry into a market is, therefore, a way to approximate the effect firm entry can have on overall productivity growth. As shown in figure VI, Egypt, Morocco and Tunisia fell behind comparable countries in the 2000s in attracting FDI.

### *Within sector growth and foreign direct investment highlights the role of firm entry*

Figure XVII shows the relationship between within-sector productivity growth and FDI inflows (from the United Nations Conference on Trade and Development (UNCTAD)) for North African countries. As noted in section 2, special attention is needed when studying productivity changes, as they can easily be distorted by the mining sectors, which are generally capital intensive and appear highly productive because of natural resource rents. To account for this, the plot on the left (right) uses the values from the decomposition of productivity growth excluding (including) the mining sector. Across both panels, there is a clear positive relationship between FDI inflows and within sector growth.

One potential way to interpret this positive relationship is that the inflow of external capital into the economy (entry of firms that are likely not capital-constrained firms) leads to productivity growth driven by sector productivity gains.[13] In other words, in periods in which a country experienced

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13    This relationship also holds within countries as well, namely it is also positive and statistically significant in a regression with country and year

**Figure XVII:** Within sector labour productivity growth and foreign direct investment for North African countries, 1994 to 2012
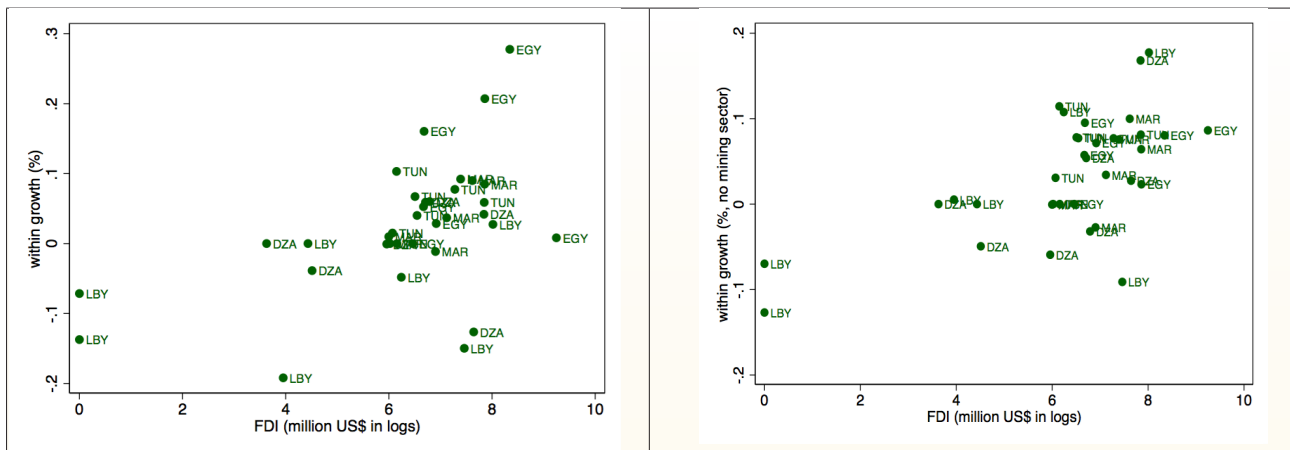


*Sources:* UN-ILO data (for within sector productivity growth) and UNCTAD (for FDI).

*Notes:* Within sector labour productivity calculated using the decomposition method described in section 1 (Introduction). The calculation is done with (left) and without (right) the mining sector to exploit the changes driven by the extremely high relative productivity of that sector. The values presented are smoothed out with moving averages of two lags. Country names: DZA, Algeria; EGY; Egypt; LBY, Libya; Mar; Morocco.

larger FDI inflows, productivity growth is particularly large.

Figure XVII is, of course, not evidence for a causal relationship between FDI and productivity growth, but it does support the notion that entry of productive firms is a key factor that can drive productivity growth. If the slope coefficient in these figures are interpreted as being causal, a tenfold increase in FDI (2.3 n points) leads to a fourteen-fold increase in within-sector labour productivity growth – holding labour sector shares constant.

The previous section highlighted the possible role of international capital flows in enhancing productivity either through relaxing capital constraints or by encouraging firm entry. In the next subsection, the discussion is centred on institutional features found in countries where firms report that they are capital constrained.

## 4.6   The political economy of capital constraints

If capital constraints have such a high economic cost, why are they not lifted? Why is North Africa not more adept in attracting foreign firms and foreign capital? The persistence of capital constraints

and the persistence of misallocation more generally suggests that certain institutional features may facilitate or contribute to the constancy of these inherent inefficiencies. Political economy research can provide the bridge that connects politics, economics and institutions to shed some light on these questions. In this regard, the political economy literature has stressed the role that political connections can play. Acemoglu and Robinson (2000) argue that existing powerful "interest groups" block the introduction of new technologies in order to protect their vested economic rents. As a result, societies need to circumvent such groups to make technological advances.

### *The role of political factors shaping constraints*

There is some direct micro evidence on the role of political factors that can shape capital constraints. Khwaja and Mian (2005), using a loan-level data set of more than 90,000 firms involved in corporate lending in Pakistan, document that significant rents are extended to politically connected firms through the banking sector. They classify a firm as "political" if its director participates in an election and examine the extent, nature, and economic costs of political rent provisions. Their findings suggest that politically connected firms borrow 45

fixed effects.

**Figure XVIII:** Credit capacity and State capacity
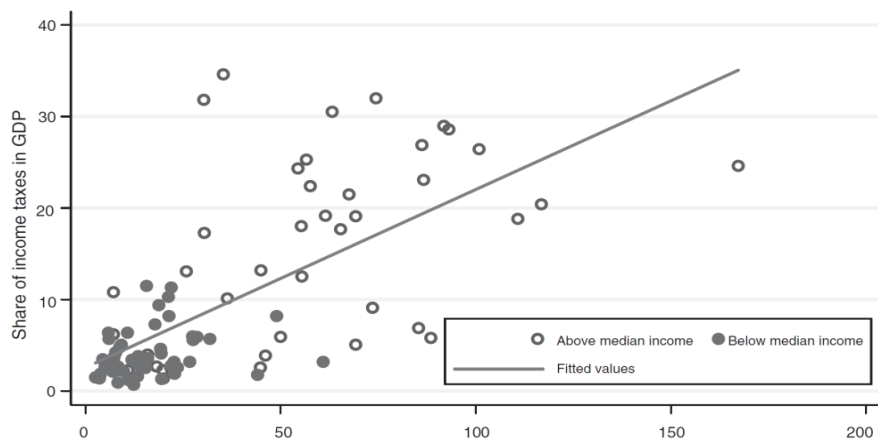


*Source:* Besley and Persson (2009).

per cent more and have 50 per cent higher default rates compared to firms that have no political connection. The preferential treatment of politically connected firms is fully driven by Government or State-owned banks - private banks do not provide political favours (neither does social public banking). They estimate that the economy-wide costs of the rents identified are estimated to be 0.3 to 1.9 per cent of GDP every year. However, their framework to evaluate the costs does not take into consideration the dynamic and general equilibrium effects of providing relatively less productive firms with capital. As suggested by this work, capital is significantly more likely to flow to politically connected firms, which makes political connections a main potential reason for the inefficient allocation of capital.

However, not only are politically connected firms more likely to receive preferential access to finance, Faccio, Masulis, and Mcconnell (2006) show using data from 35 countries that politically connected firms are also significantly more likely to be bailed out compared to similar unconnected firms. In addition, among bailed-out firms, those that are politically connected exhibit significantly worse financial performances than those of their unconnected peers at the time of and following the bailout. This evidence suggests that, at least in some countries, political connections influence the allocation of capital through the mechanism of financial assistance when connected companies confront economic distress.

## Political institutions, fiscal capacity and the functioning of capital markets

Besley and Persson (2009; 2010) provide theoretical and empirical arguments that link political institutions, fiscal capacity and the functioning of capital markets. The key idea of their research is that State capacity is a key factor behind productivity growth. In their framework, "policy choices", market regulation and taxation are constrained by past investments in legal and fiscal capacity. When the incumbent powers have an interest in raising the capacity of the State, economic development will follow. Crucially, called legal capacity (Besley and Persson, 2009) and the power of the State to raise taxes complement each other. Self-interested Governments only have an interest to increase the tax base if they also have the ability to raise taxes. Figure XVIII illustrates this point. It shows that, across countries, the ratio of private credit to GDP, a measure of the availability of credit and the functioning of capital markets, is strongly associated with the share of income taxes in GDP. Whatever drives State capacity also drives credit constraints. This point is discussed further in the following chapter.

# Chapter 5: Distortions to total factor productivity

The fundamental distortion, which leads to large losses from misallocation of labour and capital across firms, comes from factors that affect a firm's TFP, a very broad concept, which is typically a catch-all for all factors that are not directly attributable to capital or labour. This includes technology, the availability of infrastructure, property rights, security and regulation by the State or managerial skills. The focus of this section is on a few topics that are likely to affect structural transformation in North African countries.

## 5.1 Framework

Before analysing the literature on TFP, it helps to return to the conceptual framework, which links the various parts of the report. Figure XIX displays the theoretical framework. TFP is captured by the variable $A_i$ in this framework. If $A_i$ decreases, this affects the productivity of capital and labour, which leads to knock-on effects if the firm can vary the amounts of capital and labour. This is illustrated in figure XIX. If total factor productivity falls from $A_i$ to a lower value, then the demand for capital, $K_i$, and labour, $L_i$, by the firm declines. As a result, the overall effect of a drop in TFP is a lot larger.

In this section, various reasons as to why $A_i$ can be reduced are given. Note that it is possible that the $A_i$ of only some firms falls, for example, because they are threatened by expropriation of their output, or that all firms are affected, for example, by macroeconomic events that lead to political uncertainty. The difference between these types of shocks is that idiosyncratic shocks affecting individual (or groups of firms) have smaller effects on aggregate output and aggregate measures of TFP, especially if the factors of production, capital and labour, are able to move freely to firms that are not affected. Nevertheless, for major macroeconomic shocks that affect all firms, the underlying impact on aggregate productivity may not be immediately the result of misallocation. This section includes a discussion of the important factors that may contribute to shocks in $A_i$ identified by the economic literature.

## 5.2 Instability and productivity dispersion

In this report, specific emphasis is placed on the hidden economic cost that emerges when factor markets do not function effectively, resulting in persistent and significant differences in productivities between firms. To what extent does political instability contribute to these inefficiencies?

To begin with, figure XX shows the extent to which firms in the subregion perceive political instability to be an obstacle for their development. The data used, which are from the World Bank Enterprise

**Figure XIX:** A shock to total factor productivity

output without constraint $\longleftarrow$ $Y_i = A_i * K_i^{\alpha} L_i^{\beta}$

distortions to firm productivity:: $A_i' < A_i$

capital and labour adjust: $K_i' < K_i,\ L_i' < L_i$

output is reduced $\longleftarrow$ $Y_i' = A_i' * K_i'^{\alpha} L_i'^{\beta}$
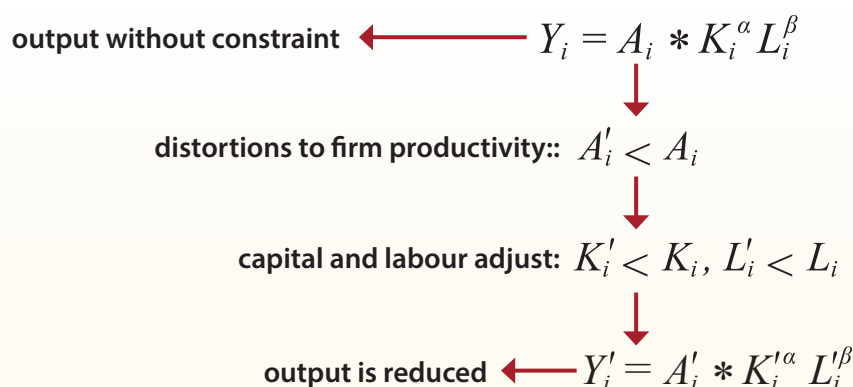
**Figure XX:** Political instability as biggest obstacle to firms



*Source:* Based on data from the World Bank Enterprise Survey (http://www.enterprisesurveys.org/).

**Figure XXI:** Correlation between political stability index and productivity dispersion



*Source:* Based on data from the World Bank Enterprise Survey (http://www.enterprisesurveys.org/).
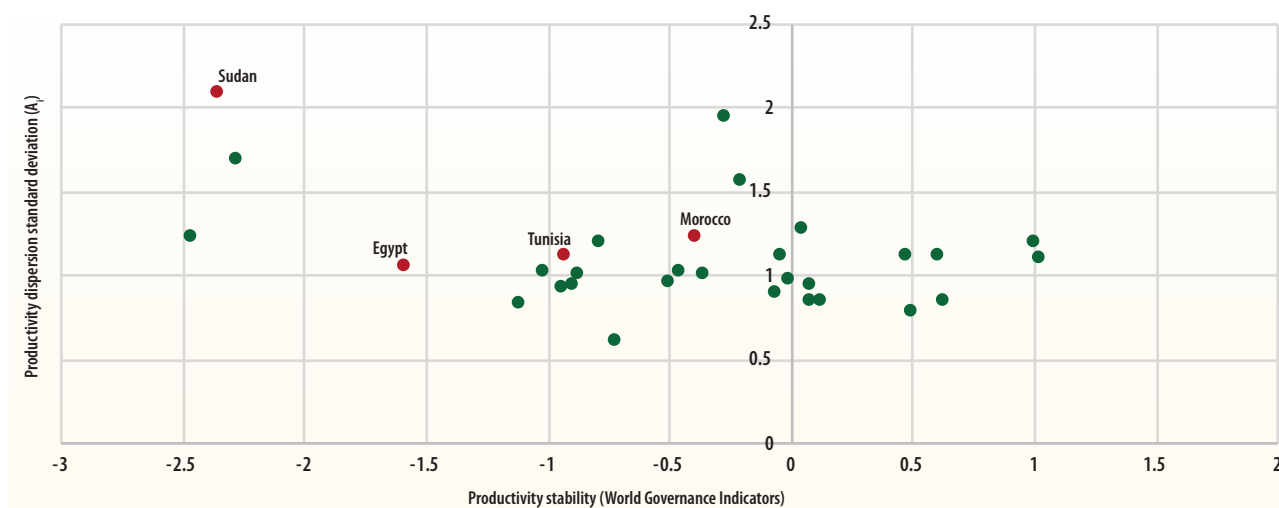
Survey, clearly highlight that political instability is perceived as an important factor undermining private sector development. Political instability is the single most important obstacle quoted by firms in Egypt (35 per cent) and Tunisia (47 per cent). These two countries stand out clearly, in comparison to a few other countries in the subregion and other comparison countries.

## *Political instability is associated with more productivity dispersion*

Linking to the conceptual model presented in chapter 3, uncertainty and political risks result in lower TFP levels and an increased dispersion of the $A_i$ measures, resulting in substantial welfare losses (Hassan and others, 2017). This link is also appar-

ent in the World Bank Enterprise Survey. Figure XXI shows the correlation between the country-level dispersion of the firm-level $A_i$ and proxy measures of political instability. This reveals a significant negative relationship between political stability and the dispersion in the $A_i$: higher degrees of political stability in a country are associated with lower degrees of dispersion in TFP and, as suggested by the analysis in chapter 3, significantly higher levels of output and welfare. The proxy measure of political stability is taken from the World Governance Indicators introduced by Kaufmann, Kraay and Mastruzzi (2011), which captures the perceptions of the likelihood that a government will be destabilized or overthrown by unconstitutional or violent means.

Data are available for four North African countries. In the figure, a ranking is suggested in terms of perceived political stability, measured in 2014, that matches the perceptions of businesses in the World Bank Enterprise Survey data for Egypt and Tunisia as compared to Morocco. However, the Sudan, based on the 2014 uncertainty data, is faring even worse. While the above figure does not immediately reflect the underlying mechanisms through which political instability may cause the broadening of the dispersion in $A_i$, in the previous analysis, the implication that higher degrees of dispersion imply significant output losses is highlighted.

### The role of executive constraints

In addition, irrespective of a country's political regime, weak constraints on the executive may imply that turnover within the executive branch may increase perceptions of political instability or, in particular, (economic) policy uncertainty. In cases in which there are weak executive constraints, politicians have significant leeway in shaping policies. This problem may be amplified by a lack of a free press, which contributes to higher levels of uncertainty, as it prevents society and businesses to form expectations about the possible policy environment under different political leaders. Finally, and again irrespective of the institutional setting, political instability may take the form of fragility or outright conflict, rebellion or protests, which can directly affect the levels of economic activity and perceived risks. While quelling conflict or rebellion with strongman politics may result in reduced levels of direct fragility-related outcomes, such as crime or protests, the perceptions of latent instability may persist, if the underlying grievances that brought about violence are not solved, but are only suppressed. Repression of turmoil generates vast underlying uncertainty as the power of the executive Government is directly linked to policy stability and the treatment of firms.

## 5.3 Uncertainty shocks and investment

Political instability is a major factor that can contribute to low productivity growth through a multitude of channels. Particularly, it can interfere with or discourage processes of capital accumulation and capital deepening, as firms and individuals are reluctant to commit to investing in fixed assets in an environment of uncertainty (Bloom, 2009). Aghion and Banerjee (2005) document, using cross-country regressions, the existence of a strong and negative link between volatility and growth. An important margin through which this effect operates is by discouraging investment.

### The Arab Spring as an uncertainty shock

In the context of the study region, unfortunately, because of the underdeveloped financial markets, available stock market data are limited. The only two countries for which stock market data are readily available are Egypt and Tunisia. In figure XXII, the stock market volatility indices are plotted at the monthly level for these two countries. The data display two distinct peaks in stock market volatility: the first spike is in September 2008 as Lehman Brothers collapsed, marking the onset of the financial crisis, and second, is in early 2011 as the Arab Spring caused widespread uncertainty in financial markets and the wider economy. Importantly, the spikes in stock market volatility are visible even though the stock markets were closed for several weeks in Egypt and Tunisia in January 2011.[14]

The figure suggests that the two countries were hit by two consecutive uncertainty shocks – the financial crisis and a political instability shock. Both occurred within a short period of time, which suggests that their individual macroeconomic effects may have compounded each other, resulting in protracted economic stagnation over a much longer period compared to what the literature on general uncertainty shocks suggests.

In particular, the figure indicated that the spikes in volatility quickly subsided, suggesting that a quick recovery from uncertainty shocks as observed in the United States by Bloom (2009) could have been possible. However, the observation that the economies in the study region have undergone a significant decline in their dynamism since the mid-

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14    This highlights one potential caveat for working with stock market volatility indices as a measure of uncertainty, as it may underestimate the true extent of the underlying uncertainty, if trading is suspended because of uncertainty.

**Figure XXII:** Stock market volatility in Tunisia and Egypt between 2005 and 2018
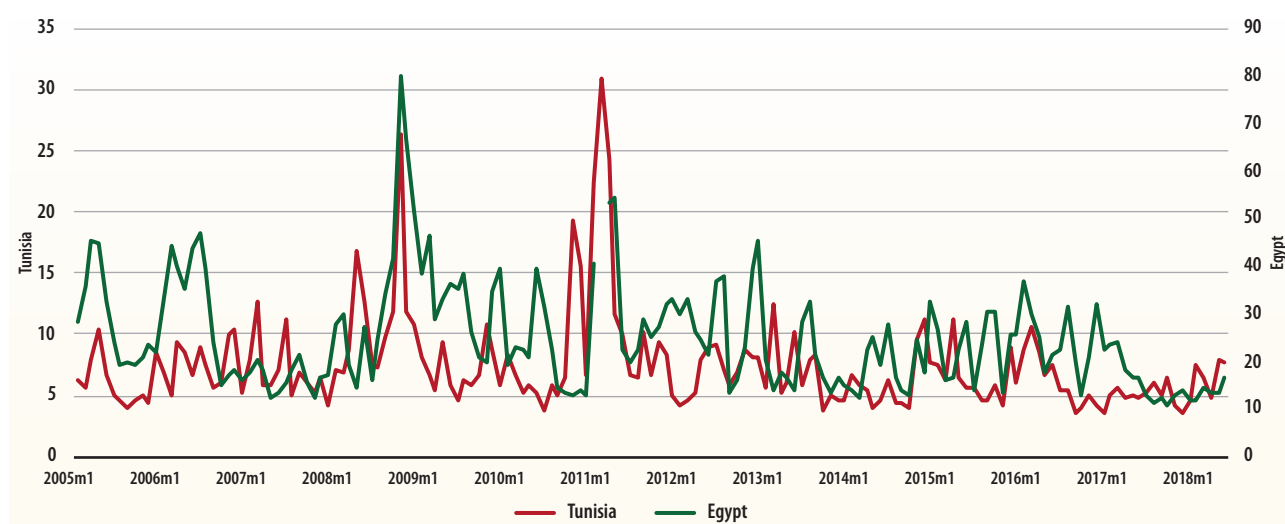


*Source:* IMF (2018).

*Note:* Numbers represent wage premium estimates obtained after controlling for employee characteristics.

2000s suggests that the uncertainty shocks had more persistent effects because of their different nature. In particular, the shocks to political stability and the underlying political institutions since 2010 are profound and may have contributed to more persistent increases in perceptions of instability and uncertainty. In the case of Egypt, a non-democratic regime was temporarily replaced by a democratically elected President, who, in turn was ousted by the military. This institutional change could have increased perceived risks, as weak executive constraints can directly increase uncertainty.

## Economic policy uncertainty can produce prolonged economic effects

Instead of focusing on uncertainty shocks, which could have many underlying origins, Baker, Bloom, and Davis (2013) construct a measure of economic policy uncertainty for the United States and a few other developed and emerging market economies. This measure sheds light on policy-induced uncertainty. The Economic Policy Uncertainty Index is constructed using media content analysis with economic policy anchor terms appearing in the near term indicating risk or uncertainty, such as "uncertain fiscal policy". For the United States and a few other countries, the resulting economic policy uncertainty time series has been exploited to study the dynamic macroeconomic effects of statistically distinct peaks in the Economic Policy Uncertainty Index. The findings suggest that shocks to economic policy uncertainty produce a

sharp contraction and much slower recoveries. For the United States, the increase in economic policy uncertainty from 2006 to 2011 is associated with a peak negative impact of -2.5 per cent on real industrial output alongside with persistent falls in employment, peaking with substantial job losses (2.3 million or 1.4 per cent of employment) occurring after 18 months. The ensuing economic recovery to pre-shock levels of real industrial output takes approximately three years and substantively longer for employment. There are good reasons to believe that the uncertainty that was caused by the political turmoil ensuing the Arab Spring has resulted in distinct and protracted increases in economic policy uncertainty in the subregion, which has had a significant adverse effect on private sector development.

## A news-based uncertainty index for North Africa

It is difficult to construct media-content news-based indices for the countries in the study region because of a lack of available data. In particular, in countries with limited press freedom, leveraging media content may be particularly problematic, as the coverage may be biased. Nevertheless, for this report, similar indices for a set of countries in the study region are constructed using the coverage from the daily dispatches from the Agence France Presse covering news from these countries between 2000 and 2016. A total of 39,017 Agence France Presse dispatches were recorded over this

**Figure XXIII:** An uncertainty news index constructed from Agence France Presse coverage
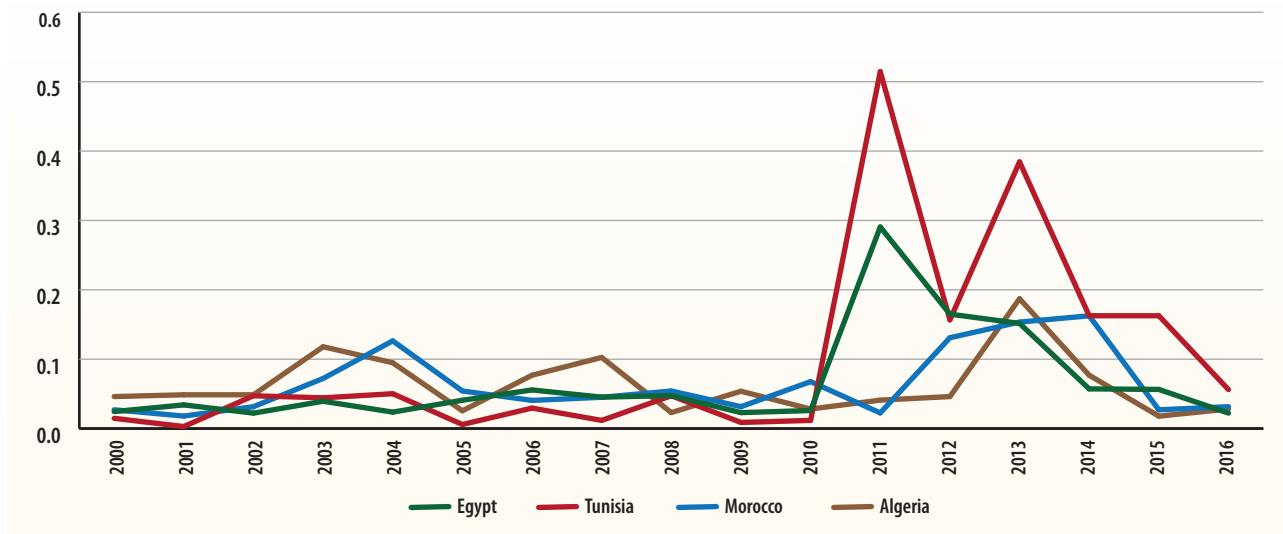


*Source:* IMF (2018).

*Note:* Numbers represent wage premium estimates obtained after controlling for employee characteristics.

time window for Algeria, Egypt, Morocco and Tunisia. The number of times that an article mentions the term uncertainty or synonyms thereof was counted and normalized by the average number of dispatches by country over the 16-year window. The resulting annual time series is plotted out in figure XXIII, which suggests that news coverage since 2010 in the study region countries is more likely using terms or synonyms suggesting uncertainty. Furthermore, it is striking that the decline in uncertainty-related news content is only gradual and slow. For Egypt, the uncertainty index only reached similar levels compared to the period before 2010 in 2014, while in Tunisia, the country in which World Bank Enterprise Survey respondents were most concerned about political instability, even in 2016, the uncertainty index is still above the levels seen before 2010. This suggests that indeed, the political shocks since the Arab Spring may have had persistent effects, raising perceived levels of instability and uncertainty to a persistently higher level, which may explain the rather slow economic recovery.

Finally, Hassan and others (2017) highlight further margin through which uncertainty affects firm behaviour. They suggest that firms exposed to political risk, similar from the aggregate responses documented in the literature on economic policy uncertainty, retrench hiring and investment, and divert efforts to actively lobby and donate to politicians. In particular, in the weakly institutionalized

context with poor oversight from an electorate or a free press, along with limited transparency, this type of lobbying activity may produce outcomes that produce favouritism, distorting the efficient allocation of factors of production.

The next part of this report contains a discussion on how institutions may interact with uncertainty shocks.

## 5.4 Institutions and uncertainty shocks

In the previous discussion, it was suggested that a central feature of the recent instability shocks in the study region was that they may have had much more persistent effects on the wider economy, raising overall levels of perceived uncertainty. This suggests that the impact of uncertainty shocks may be structurally different and strongly depends on the underlying country-specific context and the wider set of institutions.

In this context, Arezki and Fetzer (2017) show that political turnover is significantly and negatively associated, contributing to low growth. A one standard deviation increase in political instability – measured as turnover among ministers within the executive branch of government – is associated with declines in the annual growth rate of GDP per capital by 12 to 33 per cent, significantly lower

rates of capital accumulation and a co-concurrent decrease in TFP. The estimates specific to the North African subregion are very similar to the estimates obtained globally and are not driven by the political instability starting in 2011; they have remained fairly stable over time. While this may suggest that political turnover is bad for growth and economic development, the most important insight is that this relationship is non-existent for countries that have strong executive constraints. While the adoption of rigid political regimes and autocratic rule may foster stability in terms of lowering average levels of political turnover, the perceptions of latent risks may persist; in particular, non-democratic countries with weak executive constraints are likely to be much more vulnerable to volatility.

One way to gauge the effect of this risk on the economy is to look at OECD country credit risk, which is classifying countries in connection with their agreement on minimum premium fees for official export credits. Countries are classified into one of eight categories (0-7) through the application of a two-step methodology, which involves the Country Risk Assessment Model. The model produces a quantitative assessment of country credit risk based on the payment experience reported by the participants, the financial situation and the economic situation based primarily on International Monetary Fund (IMF) indicators. This is then augmented by a qualitative assessment of the model results by country risk experts from OECD members in order to integrate factors not fully taken into account by the model. Libya, Mauritania and the Sudan all rank 7 in this risk ranking. Egypt ranks 6, Tunisia ranks 5 and Morocco ranks 3.

### *Foreign direct investment, growth volatility and executive constraints*

Lack of microeconomic data for most of the study region countries makes it difficult to provide formal evidence on the link between investment and instability or volatility more broadly. The best evidence available can be attributed to FDI, which typically is reported by third countries (reporting on German FDI in Tunisia is reported by German authorities). Besley and Mueller (2018a) study the link between growth volatility, institutions and

**Table 12:** Foreign investment with strong executive constraints

|  | Egypt | Tunisia | Morocco |
|---|---|---|---|
| Simulated increase in model 1 | 89% | 91% | 99% |
| Simulated increase in model 2 | 45% | 49% | 67% |

*Notes:* Simulations use estimates from Besley and Mueller (2018) and volatility estimates from the Penn World Tables 7.0 for each country. For model 2 a more pessimistic scenario for the decrease in perceived volatility when executive constraints get adopted is assumed.

FDI. The adoption of strong executive constraints is associated with significantly lower volatility in growth and is resulting in significantly larger inflows of capital to countries. For the three main study countries, Besley and Mueller (2018a) provide estimates, summarized in table 12, that suggest that FDI could increase by between 45 and 99 per cent if the countries in the study region were to adopt strong executive constraints. The adoption of strong executive constraints can directly reduce growth volatility, as is also suggested by Arezki and Fetzer (2017).

This suggests that the economic impacts of volatility and political-turnover induced perceived uncertainty strongly depend on the underlying institutional environment, with executive constraints being particularly important in raising political-turnover induced policy uncertainty.

## 5.5 Expropriation, predation and State capacity

As discussed in section 4, some authors of literature on misallocation have taken the view that expropriation risk is a channel through which distortions can persist. Expropriation risk can be modelled both as a fall in $A_i$ (if output is taken away) or as a higher cost of $K_i$ (if capital is taken away). Johnson, McMillan, and Woodruff (2002) stress that firms facing the risk of lost output will not reinvest their profits, which perpetuates distortions. There is also extensive literature in development economics which shows the risk that capital and, in particular, land being expropriated can have a severe economic impact.[15] Banerjee and Iyer (2005),

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15    In that regard, Goldstein and Udry (2008), for example, show large efficiency losses in agriculture in Ghana.

for example, show that the distribution of historic property rights in Indian states has had a large impact on technology adoption in agriculture. Consequently, large relative productivity gains were reported in the long run in areas in which the United Kingdom of Great Britain and Northern Ireland had invested in individual titling programmes. This is also an area in which Besley and Persson (2009) see the core channel for the strong, positive relationship between State capacity, functioning capital markets and aggregate output.

## *Role of predation and crime*

An additional channel through which the lack of State capacity leads to distortions is the danger of predation by criminals. Besley and Mueller (2018b)"ISSN":"19457715","abstract":"This paper studies the consequences of predation when firms deploy guard labor as a means of protecting themselves. We build a simple model and combine it with data for 144 countries from the World Bank enterprise surveys, which ask about firm-level experiences with predation and spending on protection. We use the model to estimate the output loss caused by the misallocation of labor across firms and from production to protection. The loss due to protection effort is substantial and patterns of state protection at the micro level can have a profound impact on aggregate output losses. Various extensions are discussed. (JEL D22, D24, J24, K40, L84, O17 use the World Enterprise Surveys and a simple model to argue that predation has a far larger effect through the misallocation it leads to than the direct effect through the loss of output. The reason is that firms try to protect against predation, which generates an additional loss through the labour (or capital) that is hired to guard the output instead of producing it. Their main estimates suggest losses of 3.3 per cent of output for the Sudan, 1.4 per cent for Egypt and 0.5 per cent for Morocco. These are substantial, of course, but do not suggest that crime and predation are the main cause of distortions in these economies.

The capacity of the State to support the private sector through a functioning bureaucracy appears to be lacking in North Africa. The Doing Business reports conducted by the World Bank suggest that there is considerable heterogeneity in the North African subregion with some countries, such as Algeria, Libya and Mauritania, ranked towards the

**Figure XXIV:** Average ranking in the Doing Business surveys

| Country | Rank | Country | Rank |
|---------|------|---------|------|
| Sweden | 10 | Egypt | 128 |
| Turkey | 60 | Mauritania | 150 |
| Morocco | 69 | Algeria | 166 |
| China | 78 | Sudan | 170 |
| Tunisia | 88 | Libya | 185 |
| India | 100 | | |

*Source: World Bank (2018)*

bottom. However, even though Morocco and Tunisia are ranked higher, there is still considerable room for improvement.

## *The bureaucracy as a source of distortions*

A major problem in this context is obviously corruption. Bandiera, Prat and Valletti (2009)we analyze purchases of standardized goods by Italian public bodies and exploit a policy experiment associated with a national pro- curement agency. A revealed preference argument implies that if public bodies with higher costs are more likely to buy from the procurement agency rather than from traditional suppliers, cost differences are more likely to be due to passive waste. We find that: (i, however, provide convincing evidence from Italy to show that an even more important source of inefficiency is the lack of ability in the bureaucracy. This changes the task for policy considerably towards building capacities.

One way to gauge the joint problem of the bureaucracy as a source of distortions is presented in the World Bank Enterprise Surveys. The surveys included queries on whether corruption is a constraint, but also whether licensing and permits or tax administration are a problem. The latter can be used as a measure of (in)competence. Figure XXV shows the average score for questions regarding the administration as a constraint on the vertical axis and corruption as a constraint on the horizontal axis. In all cases, the figures are the average of what firms report as a major or severe constraint. A score of 0.4 on the corruption scale, for example, means that 40 per cent of firms see corruption as a major or severe constraint.

**Figure XXV:** Bureaucracy as a constraint: incompetence or corruption?



*Source:* World Bank Enterprise Survey (http://www.enterprisesurveys.org/).
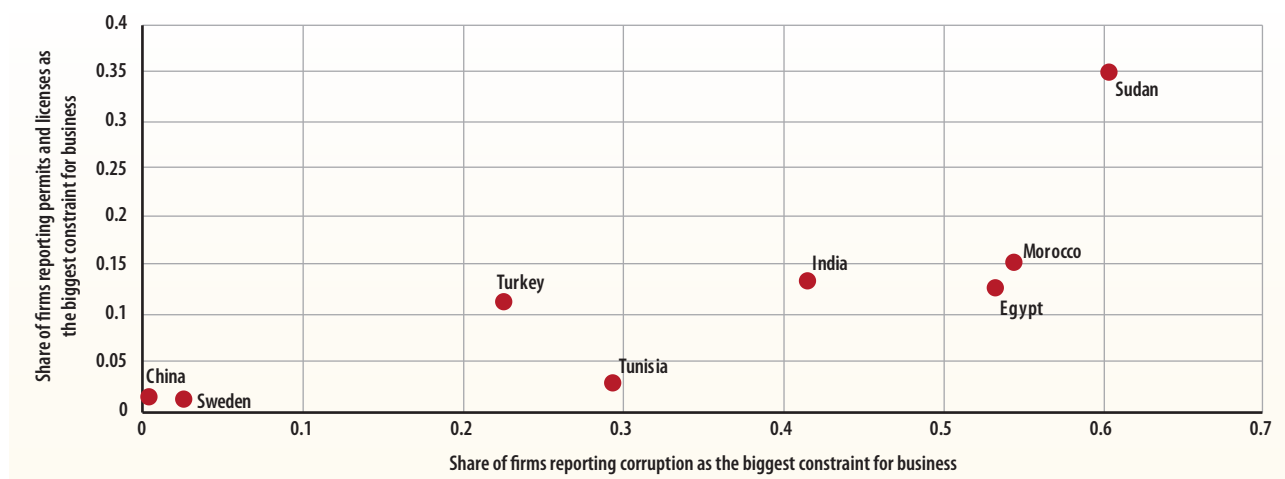
## *Perceptions of the bureaucracy and corruption as a constraint on firms in North Africa*

The picture that emerges is quite consistent: within North Africa, Tunisian authorities appear to pose the least constraints on firms regarding corruption and administration. The Turkish administration also poses relatively less constraints.[16] More than 50 per cent of Moroccan, Egyptian and Sudanese firms report corruption as a major or severe constraint. Sudanese firms also report the administrative part to be a severe constraint. This, however, seems to be less of a problem in the other countries. What is, perhaps, most striking about figure XXV is that China has a similar share for both dimensions to Sweden – a much more developed economy.

Two factors in the bureaucracy here seem important. The first is the structure of recruitment and promotion. There is considerable evidence that bureaucratic careers can provide very powerful incentives for bureaucrats.[17] In particular, strengthening career incentives through clear career paths and civil service entry exams can be a powerful lever to raise efficiency. The performance of China fits very well with this, as civil service exams and bureaucratic careers have a long history in the coun-

try. Political influence on the allocation of posts to bureaucrats, on the other hand, has been found to have a detrimental effect on bureaucratic efficiency.[18] In other words, political insulation of the bureaucracy may lower the control of politics over the bureaucracy, but it could raise efficiency. Bai and Jia (2016) show, using historic Chinese data, that the use of the career civil service can even add to regime stability because it gives politically unconnected workers the possibility to reach positions of power.

The second factor for bureaucratic efficiency is the wages that are paid to bureaucrats and their intrinsic motivation. One concern with using wage incentives to attract individuals to public office is that this may crowd out public service motivation.[19] Dal Bo, Finan, and Rossi (2013) use experimental data from Mexico to show that higher wages attract more able applicants as measured by their IQ, personality, and proclivity towards public sector work. They do not find evidence for adverse selection effects on motivation. In some areas, such as tax collection, it is possible to use performance pay. Khan, Khwaja, and Olken (2016) have shown that this can increase tax revenue without lowering the evaluation of the tax system by the taxpayers. However, the crucial constraint for payments is the wage paid in the private sector and the State budget.

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16   Indeed, data from Doing Business reports show a similar picture. Tunisia and Turkey are ranked, for instance, as ninety-fifth and ninety-sixth with regard to "easiness of dealing with construction permits", respectively. The same holds – with different proportions – for other dimensions of the Doing Business rankings, such as "easiness of starting a business": one hundredth vs. eightieth, respectively.

17   See Iyer and Mani (2012) and Bertrand and others (2018) for evidence from the career civil service in India.

18   See Mueller (2015) for theory and Xu (2017) for evidence.

19   See Macchiavello (2008) for a theoretical discussion.

## *Complementarity between legal and fiscal capacity*

On a more abstract level, both of these literatures point towards the role of investments in State capacity, through organizational reforms or higher wages. In this case, the complementarity between legal and fiscal capacity as proposed by Besley and Persson (2009) seems extremely relevant. Investing in State capacity is, above all, an investment in the bureaucratic capacity to tax or provide public services. Table 13 indicates that the ability of the State in collecting taxes moved up until 2014 in North Africa. The pattern is highly consistent with the Doing Business statistics in African countries, with the exception of Algeria, which is a large oil exporter and accordingly, the basis of its budget is different. In table 13, the increase in Tunisia of the rise in measured State capacity is notable. In 2014, the country overtook Morocco in terms of ability to raise taxes. Egypt, the largest economy in North Africa, lags far behind these two economies. The situation in the Sudan and Libya is very worrying, whereas Mauritania is developing its capacity to tax. Globally, some countries in North Africa, such as Morocco and Tunisia, are performing better than China and India and post similar results to Turkey. This suggests that the largest constraint for the performance of the bureaucracy in these economies is in service delivery and not taxation.

## 5.6   **Political connections**

An important factor behind divergences in TFP, $A_i$, is political connections. Politically connected firms seem to reap large economic benefits from these connections. Evidence provided by Fisman (2001) from Indonesia suggests that stocks by politically connected firms generated higher returns by 23 percentage points simply because of the firms' political connection. Chekir and Diwan (2014) show that during the uprisings of 2011, the stocks of the connected firms fell, on average, by 12.8 percentage points (conditional only on sectors), and by 16.1 percentage points (conditional on firms' sectors and characteristics) on account of those connections. Acemoglu, Hassan, and Tahoun (2018) show that in the nine trading days following the fall of former President Hosni Mubarak, the value of firms connected to his party, the National Democratic Party fell by about 13 percentage points relative to the value of non-connected firms, indicating a perception of major rent shifts away from these firms in the Egyptian Stock Exchange. In a similar fashion, Draca and others (2017) show that stock prices of firms connected to the regime of the Islamic Republic of Iran respond much more strongly to news shocks that indicate the possibility of economic sanctions being relaxed. Rijkers, Freund and Nucifora (2012)using firm-level data from Tunisia for 1994-2010. Data on investment regulations are merged with tax and firm-level census data in which 220 firms owned by the Ben Ali family are identified. These connected firms outperform their competitors in terms of employment, output, market share, and profits, as well as employment and profits growth, and sectors in which they are active are disproportionately subject to authorization requirements and FDI restrictions.

**Table 13:** Tax revenue as a per cent of gross domestic product

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Algeria** | 38.5 | 40.4 | 37.2 | 45.0 | 34.9 | 34.3 | 36.9 | 37.1 | 34.3 | 31.8 |
| **Tunisia** | 18.9 | 18.5 | 19.1 | 20.5 | 19.8 | 20.1 | 21.1 | 21.0 | 21.4 | 22.5 |
| **Morocco** | 21.0 | 21.5 | 23.9 | 26.5 | 23.5 | 22.8 | 23.0 | 23.9 | 22.3 | 22.0 |
| **Mauritania** | 13.1 | 11.9 | 12.3 | 12.0 | 11.1 | 13.0 | 12.8 | 17.4 | 17.6 | 18.3 |
| **Egypt** | 14.1 | 15.8 | 15.3 | 15.3 | 15.7 | 14.1 | 14.0 | 13.2 | 14.3 | 13.0 |
| **Sudan** | 8.2 | 7.6 | 7.1 | 6.7 | 7.0 | 6.6 | 6.4 | 5.4 | 6.3 | 5.8 |
| **Libya** | 2.9 | 2.9 | 3.1 | 3.3 | 4.3 | 3.8 | 1.6 | 1.2 | 1.2 | 1.4 |
| **Sweden** | 34.1 | 34.2 | 33.2 | 33.0 | 33.2 | 32.3 | 32.6 | 32.4 | 32.9 | 32.7 |
| **Turkey** | 18.8 | 19.0 | 18.9 | 18.2 | 18.6 | 19.7 | 20.1 | 20.1 | 21.2 | 20.6 |
| **China** | 15.5 | 16.0 | 17.0 | 17.1 | 17.2 | 17.9 | 18.5 | 18.8 | 18.8 | 18.7 |
| **India** | 15.7 | 16.9 | 17.6 | 16.5 | 15.2 | 16.1 | 16.4 | 17.0 | 16.7 | 16.6 |

*Source:* IMF World Revenue Longitudional Data

These findings point towards a particular mechanism through which political connections may affect the distribution of firm productivities in the economy. If politically connected firms manage to lobby the government to grant them protection from competition inside or outside the country, then the distribution of firm productivity is affected. The argument here is similar to the theoretical argument made by Parente and Prescott (1999). Monopolies, provided and defended by the State, may prevent the adoption of new technologies – entry of firms with high $A_i$ in the framework. Based on this, the stronger the political connections, the greater the amount of resources a group of potential adopters of a superior technology must spend to overcome resistance to the use of that technology and the greater the distortion in firm productivity. While the relationship between competition and innovation is complicated, as indicated by Aghion and others (2005), the review article by Holmes and Schmitz (2010) leaves little doubt that increased competition raises industry productivity. Of particular interest are the findings of Bloom, Schankerman, and Van Reenen (2013), who examine the impact of Chinese import competition on broad measures of technical change — patenting, information technology, and TFP — using new panel data across twelve European countries from 1996 to 2007. They show that Chinese import competition led to increased technical change within firms and the reallocation of employment between firms towards more technologically advanced firms. These within and between effects were about equal in magnitude, and account for 14 per cent of European technology upgrading over the period 2000-2007. However, rising Chinese import competition also led to declines in employment and the share of unskilled workers.

What reforms could be implemented to push back the role of political connection? Faccio (2006) finds that political connections are less common in the presence of more stringent regulation of political conflicts of interest. However, by its very nature, the distortions caused by political connections grow from the very centres of power and change, accordingly, can be difficult. Evidence provided in the present report suggests that there are large general economic benefits to be attained by adopting a more transparent approach. In this context it is particularly interesting that Besley and Mueller (2018a) find that the inflow of foreign capital with the adoption of strong executive constraints is most prevalent in politically connected sectors.

# Chapter 6: Policy implications and conclusion

## 6.1   Main findings

Structural transformation, the allocation of resources (labour and capital) from less productive to more productive sectors, has been one of the guiding stars of development policy in recent decades. In this report, it is argued that based on recent academic literature, North African Governments should focus on a broader idea – the optimal allocation of resources across firms within and between sectors.

Governments play a crucial role in this regard, as distortions to this allocation come from market imperfections, which State intervention can either solve or exacerbate. State intervention is, for example, necessary to tackle market imperfections, such as non-competitive practices, addressing information constraints or ensuring enforcement in credit markets. However, the State also ensures that markets exist, for example, by providing property rights. For this report, two broad categories of how Government can contribute to the misallocation of resources are spelled out:

- Lack or insufficient intervention by the State: it does not intervene enough to correct market failures;

- Policy "errors": policies may not address a problem in the right way, which may itself create distortions. Policy "errors" can occur:
  - When designing a policy;
  - When implementing a policy.

In both cases, inadequate action by the State can be the result of the following:

- Nature of instruments: instruments used, by nature, can generate distortions:
  - Examples: taxation usually creates distortions, and subsidies to some firms distort the level playing field.

- Action at the level of policy implementation:
  - Example: bureaucrats use discretionary power to discriminate between firms and favour some firms over others.

- Action at the level of policy design:
  - Example: firms with political power influence regulation in their favour.

### *The results summarized in a data grid*
To summarize the empirical findings, a grid is provided in table 14, in which various outcomes and policy measures are captured from a large list of sources, such as independent think tanks, IMF, the World Bank and the United Nations. Some of these measures are based on calculations presented in the report.

The first aspect to highlight is that several countries in North Africa are dynamic, reporting considerable growth in employment, GDP per capita and improvements in the human development index in the last decade. Libya is an exception to this, as the country has descended into civil war in the last decade. Tunisia, on the other hand has posted GDP per capita growth of 2.87 per cent on average over the reported period and the Human Development Index score of Morocco improved by 7.2 percentage points to 0.667 in 2017.

However, this general positive movement is being outpaced by population growth in the subregion and remains low relative to more dynamic countries outside of North Africa. Even though, on average, employment seems to grow as to compensate labour force growth (they have been growing, on average, 2.6 per cent and 2.47 per cent, respectively), figure I shows that the trend in employment growth has become flatter in recent years. Labour productivity growth in Algeria and Libya was negative at slightly greater than -1.24 and -9.05 per cent, respectively. That contrasts sharply with 6.23, 5.4 and 5.4 per cent, respectively, in Egypt, Morocco and Tunisia. Outside the subregion, Turkey and

India posted increases of 7.9 and 16.8 per cent, on average, in productivity growth rates in the same period.

How could productivity growth be enhanced? The report shows through careful analysis that the core pillar of growth is productivity within sectors, the increase of productivity in firms within the same sector. It is argued that much of this can be achieved through the reallocation of labour and capital from less productive firms to those that are more productive. Indeed, the within-sector growth in North Africa is considerable, on average, about 2.1 per cent, but it lags other subregions. Within-sector productivity growth in India and Turkey, for instance, is about 15 and 11 per cent, respectively.

This implies that misallocation within sectors could be the key to understanding productivity growth or the lack thereof. Optimally, micro firm-level data can be used to understand this misallocation. However, the report has shown that a measure of the misallocation of labour and capital across firms can be estimated through a dispersion measure of firm productivity estimates taken from the World Bank Enterprise Surveys. The grid table shows a productivity dispersion just over 1 for the economies in North Africa for which data are available in the surveys. This is relatively high when compared to other countries and indicates relatively large potential gains in productivity and output from the reallocation of labour and capital.

The misallocation of resources has two basic components. Labour market distortions are, in principle important and, indeed, 32.8 per cent of firms in Tunisia and 30.5 per cent in Morocco report that access to an adequately educated workforce is a major or severe constraint. An issue that is particularly pressing in North Africa is the female labour market participation, which leads to a reduction in the effectiveness of the labour supply. Women have been at the forefront of structural transformation and economic development in other countries. Their relative absence from the labour market in North Africa prevents human capital from being used optimally. A second significant distortion in labour markets is caused by excessive public-sector employment. In Egypt, the share of the public sector in total employment is estimated at about 30 per cent, almost twice as high as formal private sector employment. Furthermore, public sector pay-premiums distort the labour market, while rigidities in hiring and firing undermine job creation and support informal employment.

The constraints imposed by the labour market or labour market regulations are cited less frequently by firms compared to the constraints faced by firms in accessing credit or finance. Approximately 31 per cent of firms in Morocco, and 26 per cent of firms in Tunisia report that finance is a major or severe constraint. This problem, however, appears to be prevalent across the subregion. This observation also is very much in line with the very low scores for the countries in the subregion on the "access to credit" dimension of the World Bank's Doing Business index. Similarly, underdeveloped stock or equity markets imply that capital markets continue to play a small role in the allocation of capital across economic sectors. There is a close association between reporting finance as a constraint and low productivity at the firm level. Simple simulations conducted for the report suggest that relaxing capital constraints may increase output by between 9 and 22 percentage points through a dramatic increase in labour productivity and the inflow of capital.

Providing a stable, rules-based environment for firms is a precondition for the optimal allocation of capital. The ability of markets to provide access to capital is critically affected by the ability of the State to provide property rights protection, an effective judiciary and adequate bankruptcy laws. The findings in the report suggest that such an environment should also attract foreign firms, which would boost competition and improve the allocation of resources further, leading to increased productivity growth.

The public sector, rather than supporting private sector growth, has been identified as a major impediment to private sector development by giving rise to an excessive bureaucracy. Indeed, in this report, the two dimensions of this have been highlighted in the enterprise surveys, administrative incompetence and corruption, which are positively related and make an important difference to the rapidly developing economy of China, for example. Firms report that corruption and incompetent ad-

**Table 14:** Grid table with summary statistics of North African countries

| | Algeria | Egypt | Mauritania | Morocco | Libya | Tunisia | Sudan |
|---|---|---|---|---|---|---|---|
| ***Overall economic development*** | | | | | | | |
| GDP/capita growth | 1.75% | 2.49% | 1.25% | 3.08% | -2.37% | 2.87% | 3.98% |
| Employment growth | 2.8% | 2.45% | 3.03% | 2.26% | 2.5% | 1.84% | 2.65% |
| Labour Force growth | 2.34% | 2.55% | 3.03% | 1.89% | 2.44% | 1.81% | 2.67% |
| Human Develop. Index change [a] | 5.9% | 5.5 | 4.7% | 7.2% | -3.6% | 3.6% | 6% |
| Tax revenue/GDP [b] | 37.04% | 14.4% | 13.9% | 23.04% | 2.5% | 20.2% | 6.7% |
| Tax revenue/GDP change [b] | -6.7% | -1.1% | 5.2% | 1% | -1.5% | 3.6% | -2.4% |
| ***Economy sector shares*** [c] | | | | | | | |
| Agriculture | 11.5% | 27.9% | 53.6% | 36.3% | 9.67% | 13.5% | - |
| Services | 55.1% | 47.9% | 36.2% | 43.8% | 65.8% | 57.3% | - |
| Manufacturing and Industry | 33.3% | 24.1% | 10.08% | 19.8% | 24.4% | 29.04% | - |
| ***Institutions*** | | | | | | | |
| Polity 2 [d] | 2 | -4 | -2 | -4 | -7 | 7 | -4 |
| Executive constrains [d] | 5 | 3 | 2 | 4 | 1 | 6 | 2 |
| Executive constrains change [d] | 0 | 0 | 0 | 1 | 0 | 4 | 0 |
| Doing Business (2018) rank | 166th | 128th | 150th | 69th | 185th | 88th | 170th |
| ***Overall measures of distortions*** | | | | | | | |
| Productivity growth [e] | -1.24% | 6.23% | - | 5.4% | -9.05% | 5.4% | - |
| Within sector growth [e] | 1.08% | 11.08% | - | 5.39% | -21.4% | 5.6% | - |
| Between sector growth [e] | -2.32% | -4.84% | - | 0.01% | 3.39% | -0.24% | - |
| Dispersion measure (WBES) [f] | - | 1.01 | - | 1.09 | - | 1.09 | 1.55 |
| Simulated GDP gains - finance constraints [g] | - | 13.7% | - | 8.9% | - | 8.9% | - |
| ***Labour market measures of distortions*** | | | | | | | |
| Constraints: inadequately educated workforce | - | 12.7% | - | 30.5% | - | 32.8% | 17.6% |
| Central government wage bill/GDP [h] | 7% | 7% | - | 13% | - | 10% | - |
| Female labour market participation [i] | 15.2% | 22.2% | 30.89% | 25.2% | 25.7% | 24.6% | 23.6% |
| ***Capital market measures of distortions*** | | | | | | | |
| Constraint: access to finance | - | 26.5% | - | 31.7% | - | 26.7% | 29% |
| FDI/capita [j] | 55.9 | 84.9 | 129.4 | 81.6 | 310.4 | 168.04 | 49.3 |
| Getting credit rank [k] | 177th | 90th | 159th | 105th | 186th | 105th | 173rd |
| Registering property rank [k] | 163rd | 119th | 98th | 86th | - | 93rd | 89th |
| Domestic credit/GDP [l] | 24.3% | 28.5% | 23.1% | 63.3% | 17.2% | 85.5% | 8.8% |
| ***TFP measures of distortions*** | | | | | | | |
| Constraint: Uncertainty (political instability) | - | 77.6% | - | 30.5% | - | 46.7% | 67.4% |
| Uncertainty index increase since 2010 [m] | 9.3% | 255% | - | 70.2% | - | 858% | - |
| Simulated FDI growth -executive constraints [n] | - | 89% | - | 99% | - | 91% | - |
| Constraint: corruption | - | 53.5% | - | 54.6% | - | 29.6% | 60.6% |
| Constraint: tax administration | - | 15.8% | - | 22.2% | - | 12.6% | 65.3% |
| Constraint: business licensing and permits | - | 12.5% | - | 15.2% | - | 2.7% | 34.9% |
| GDP loss from crime [o] | - | 1.40% | - | 0.50% | - | - | 3.30% |

*Notes:* Values displayed for countries' averages from 1994 to 2013, growth for yearly growth rates, if not otherwise mentioned. Simulated GDP gains stand for simulations from the model presented in Section 2 (confirm) using firm data from World Bank Enterprise Survey (WBES). Constraint statistics stand for share of firms reporting the constraint as a major / severe limitation for business. [a] Human Development Index from United Nations Development Programme; changes from 2005 to 2015. [b] Tax revenue/GDP data from IMF World Revenue Longitudinal Data, changes between 2005 and 2014. [c] Data from latest available period in UN-ILO data (2013). [d] Data from Polity IV project from 2016, executive constrains stands for the `xconst` index, changes for yearly changes in levels (not percent points) from 2008 to 2017. [e] Productivity data from UN-ILO; within/between decomposition done following the method in the Appendix. [f] Dispersion in $A_i$ obtained estimating regressions described in section 3 and provided in Table 2 using WBES data from 2004 onwards. [g] Simulated GDP gains from lifting finance constraints as described in Section 5.3. [h] Data from IMF GFS as of 2015, spanning from 2000 to 2013. [i] Data from International Labour Organization from 2015. [j] Thousands of current US$/population, FDI data from UNCTAD, population from World Bank data. [k] Data from the Doing Business project, 2017. [l] Domestic credit to private sector from DataMarket data from latest available period (2015). [m] Relative change in Uncertainty news index since 2010 (see Figure 27). [n] Simulated increase in FDI with adoption of strong(er) executive constraints, as described in Table 12, row 1. [o] GDP losses from crime and predation as described in Section 6.6.

ministration are considerable constraints in North Africa, especially in the Sudan, but also very common in Egypt and Morocco. However, when the Doing Business rankings was used for this report, Morocco had improved considerably its performance and Tunisia had also made strides in that regard. Egypt, Libya, Mauritania and the Sudan are extremely low ranked. This pattern is broadly consistent with a direct measure of fiscal capacity, the share of tax revenue in GDP, which is relatively high in Morocco and Tunisia, but low in the other countries in the subregion (except for Algeria, because of its resource wealth). Two factors affect the competence of the bureaucracy - the selection and promotion of bureaucrats and the funding available for paying bureaucrats. Dramatic differences in these factors are visible across North Africa. According to IMF, public sector pay consumes a whopping 13 per cent of GDP in Morocco.

An underlying problem among North African countries has been the distortions to markets brought about by violence and protracted political turmoil. The enterprise surveys conducted in 2013 suggest that this was an extremely important issue and that affected economies at the time and in the sample, Tunisia and Egypt paid a high price for the uncertainty. However, in this report, it is argued that the problem of political uncertainty goes further than visible turmoil and violence. The absence of constraints on executive action, a consequent of the absence of a strong legislature and independent judiciary, had resulted in a considerable increase in political uncertainty and, hence, expected volatility. In this regard, Tunisia has improved its situation considerably, while Algeria and Morocco have made slight improvements in this area. In Egypt, despite considerable political changes, constraints have not strengthened and in Libya, Mauritania and the Sudan, constraints are almost absent. The findings of this report suggest that this has very real and large economic costs in terms of the ability of these countries to attract foreign capital, as investors seem to be aware of the risks implied by the absence of executive constraints.

Perhaps the most important underlying distortion in the economies of North Africa is generated by politically connected and publicly owned firms. Good data on this are difficult to attain, but recent academic research presented in several case

studies suggests that the economic benefit gained through political connections is considerable in the subregion. Such large benefits to political connections imply that unconnected firms cannot compete or, in many cases, even enter the market. This endangers innovation, dynamism and, ultimately, the ability of these economies to export. In Egypt, a considerable share of the economy is directly controlled by the Government, which complicates the flow of talent and capital towards new, more productive firms. Similarly, in Algeria, the economy is dominated by the public sector, with the Government owning numerous large enterprises and public banks. In Tunisia, the Government effectively controls the credit market, through direct ownership of the three main banks and ownership of minority stakes in nine other smaller banks. This creates distortions, as the banking sector props up loss-making State-owned enterprises, extends credit on non-commercial terms, or provides credit based on political connections, worsening the already inefficient allocation of capital.

## 6.2   Policy implications

The most important overarching policy conclusion from the misallocation perspective is that there are large, hidden costs to resources flowing to politically connected firms. The cost of misallocation of resources is not the cost of the resources themselves. The costs are what a more productive firm could have achieved with these resources. For example, if a credit of $1 million is given to a firm for political reasons, then the cost of this allocation is what the most productive firm in the economy could have generated with that amount. This simple idea should motivate and guide government policy in North Africa. In the following section, three priority areas to improve allocative efficiency in the long run are laid out.

### Labour market reform; flexibility with security

Flexibility of the labour market often is advocated as a requirement to improve labour market outcomes. Relaxing constraints faced by firms to adjust labour is important, however this should be done by increasing security for workers in parallel. Most North African countries lack a sufficiently protective unemployment insurance system. Massive

churning is a key aspect of structural transformation, and protection of workers is important to prevent vulnerability and contribute towards workers' bargaining power. Labour market deregulation should be accompanied by the development of sound social protection systems.

## Strengthen executive constraints

Strengthening executive constraints is a precondition for establishing some form of separation of power. Separation of power is achieved if no single authority (typically the executive) has sole control over the policymaking process. It implies the distribution of power across several authorities, with transparent consultative processes and defined roles and authorities. Excessive control of the policymaking processes within a single entity can lead to large political uncertainties, especially if there is a lack of transparency and communication. This is more straightforward in some countries in North Africa. Tunisia, for example, has experienced a radical change in this regard because of the change in its political system. The country has managed to lift executive constraints to a level that is extremely close to a level at which large foreign capital inflows can be expected. However, strengthening constraints is also possible without a complete overhaul of the political system. For example, the central banks in most economies in North Africa enjoy some level of independence, and the executive is, therefore, constrained in interfering with monetary policy. Algeria and Morocco, in particular, have managed to strengthen executive constraints without changing the way executives are recruited.

### Strengthen judicial capacity

A key step to developing executive constraints is the strengthening of an independent judiciary. Improvements in the legal system can support private sector development and foreign investment, as it can help reduce perceived country-specific risks. The transformation towards a system that fully supports the rule of law and is recognized as such can be slow: reputational capital needs to be built steadily over time. The World Justice Project data from 2017 and 2018 point towards several weaknesses and can provide a guide for institutional reforms. In Morocco, for example, the Government has considerable influence in the process of criminal justice. In Tunisia, a relative weakness is

corruption in the civil justice system. Egypt urgently needs to reform with regard to capacity of the judicial system. In addition, the creation of special units with strong independence can yield benefits. The installation and empowerment of a corruption watchdog, which can launch independent investigations, for example, may be a visible commitment to reduce excessive discretionary power of the executive and thus, can deliver similar positive effects, as rendered by broader changes in the system.

### Build checks and balances into local and national systems

Another option is to use the checks and balances built into the different layers of local and national government. Avis, Finan, and Ferraz (2018), for example, examine the extent to which government audits of public resources can reduce corruption by enhancing political and judiciary accountability. They do this in the context of an anti-corruption programme in Brazil, which randomly audits municipalities for their use of federal funds and find considerable effects. The Government of China has launched several initiatives that experiment with institutions at the local level, including press freedom, to hold local bureaucracies accountable. Episodes of instability in North Africa may provide strong incentives for Governments in the subregion to ensure stability by prosecuting civil society and repression. However, research strongly suggests that a more effective way to ensure stability in the long run is to allow political grievances to be voiced within the institutions of the State. The local level can be the perfect testing ground for this. For example, Fetzer and Kyburz (2018) show that in Nigeria, when local governments are appointed in an ethnically biased fashion, shocks to government revenue, such as volatility in oil prices, are increasingly associated with instability and political violence; under locally elected governments, this relationship becomes weaker. Martinez-Bravo and others (2014) find that the introduction of local village elections in China increased public goods expenditure financed by villagers, which, in turn, led to a moderate decline in income inequality, and likely reduced corruption.

## *Build effective State capacity*

Building State capacity is crucial for supporting the powers of the market to allocate resources efficiently. A key building block for strengthening State capacity is to fight corruption and increase competence within governments.

### Improve motivation and the selection of bureaucrats

Given the relatively well-financed bureaucracies in North Africa, the conclusion of this report is that the motivation and selection of bureaucrats must improve. The data presented in the grid are particularly interesting for Morocco in this regard. On the one hand, the Government's wage bill is extremely high when compared to GDP and the country is ranked fairly high in the Doing Business rankings (69 compared to 166 in Algeria). On the other hand, however, firms report corruption and tax administration to be substantial obstacles. Consequently, this is an area in which dramatic improvements can be made. This is also very clearly the case for Egypt, which is ranked 128 in the Doing Business survey and for Libya, Mauritania and the Sudan, where local firms report a high burden from corruption and the countries are ranked extremely low in the Doing Business survey.

For countries that finance their bureaucracy well but their performance lags, recruitment and promotion inside the bureaucracy play crucial roles. In the long run, it is a mistake to use recruitment and promotion to provide patronage and to select cronies regardless of their competence. The practice leads to an ineffective and oversized bureaucratic apparatus, which harms the public sector by undermining tax collection, the administration of credit regulation, firm licensing and the provision and defense of property rights. In most countries included in this report, there is an absence of transparency in appointing senior government positions. Civil service reform is, therefore, an important avenue to enhance the public sector in fulfilling its role, complementing and supporting private sector development. Important dimensions along which such reforms may take place are the strengthening of a merit-based recruitment process free of political influence, generally increased recruitment standards, transparency over the recruitment processes and the strengthening of career concerns, such

as by increasing the connection between performance and promotions.

### Tackle conflicts of interest

Fighting distortions in the bureaucracy also means fighting conflicts of interest, which may be the source of corruption. Conflict of interest is defined as any situation that arises allowing an opportunity for an official to influence decision-making to serve his or her personal interest through other influential individuals and officials in civil service or public office. One common example is the case of corruption in public procurement, whereby government contracts to private sector firms may be skewed towards benefiting firms that are owned or controlled by relatives or the family of public officials. The remedy requires special legislation that prevents and criminalizes such conduct, as it is considered a form of corruption. It is also important to adopt codes of conduct that public employees must commit themselves to. According to Transparency International, there is no comprehensive legislation that prevents conflict of interest regarding senior officials in public office in most of the countries included in this report. Article 36 of the Moroccan constitution-2011 stipulates that "violations of conflict of interest shall be punishable by law…". The country has only very recently passed a law (in 2015) defining these violations. Tunisia, on the other hand, while advancing on some anti-corruption fronts, has experienced a setback with the adoption of a controversial reconciliation law. Despite strong public opposition, the law grants amnesty to corrupt public officials who served prior to 2011. However, based on the grid data, Egypt, Libya, Mauritania and the Sudan face much more severe challenges in this area.

### Increase transparency and strengthen civil society

Increasing transparency of decision-making processes within a bureaucracy can strengthen civil society. The adoption of freedom of information laws can improve the ability of civil society and the media to access public data and contest decisions. Key aspects for allocative efficiency are the budget process, tenders and purchases and contracts with the private sector and investment companies. Increased accountability and the threat of exposure of corrupt practices may reduce the extent of abuse

of discretionary power wielded by bureaucrats and local officials. The adoption of electronic government facilities may, by facilitating the interactions between citizens and firms, and the government, reduce the bureaucracy burden and further limit the discretionary power of civil servants. The improved data collection capabilities that e-government may provide can further complement the improvement in statistical capacity, which increases the ability of the bureaucracy to make informed evidence-based decisions. Research also shows that such a process can save the central Government considerable resources. Banerjee and others (2016), for example, study the adoption of an electronic register and release of public funds, which cut out the local bureaucracy in India, and find that the scheme reduced resource needs by a striking 17 per cent of expenditure.

## New information technologies, as big data, artificial intelligence and block chain offer new tools to efficiently deliver public services and public policies to firms

Below are practical recommendations that can make use of new information technologies:

- For the policy process:
  - Make it more inclusive to prevent narrow interests from capturing policies:
    » Systematic publication of laws before they are passed to the parliament;
    » Systematic public consultation of representatives of civil society, such as experts, researchers and business associations.

  - Make publicly available any information used to design the policy, and publish information on, for example, the objectives, the costs, the population targeted and estimation of expected results of the policies;
  - Publish any information on the assistance and privileges given to firms, especially large firms.

- For policy implementation:

  - Use information technologies to efficiently deliver public services and policies to firms;
  - Provide online information on existing policies designed to help firms:
    » Provide an interactive tool in which the firm can enter its characteristics and get information on relevant policies;
    » Promote open data such that any firm can get information to compare itself to its counterparts.

  - Give firms the power to "challenge" bureaucrats, to contest any decision:
    » For example, a special web platform where the firm can contest a decision and the bureaucrat must explain his or her decisions;
    » A special body acting similar to an ombudsman.

## Establish sound institutions in addition to engaging in active industrial policy

It is not effective to use enhanced State capacity to provide targeted benefits to a few industries or specific firms even if history provides some evidence that this industrial policy can work. The reason behind this is that industrial policies are often hard to alter once in place (Buera, Moll, and Shin, 2013). This inertia can result in well-intended policies having sizable negative long-run effects on aggregate output and productivity. Financial frictions, for example, provide a rationale for providing subsidized credit to productive entrepreneurs to alleviate the credit constraints they face. In the short run, such targeted subsidies have the intended effect and raise aggregate output and productivity. In the long run, however, subsidies prop up entrepreneurs that were formerly productive, but are now less productive, while impeding the entry of newly productive individuals. Accordingly, aggregate output and productivity are depressed. Industrial policies then lead to idiosyncratic distortions that disproportionately affect productive establishments, and temporary growth miracles followed by growth failures. Therefore, rather than "just" engage in active industrial policy, the policy focus should be on developing sound institutions, with an effective bureaucracy, strong protection

of property rights, a conducive regulatory regime and sufficient availability of public infrastructure to support private initiatives.

## *Relax credit constraints*

In the report, the role access to finance has on constraining private sector development and the large gains that may be realized if capital flows to the most productive firms are highlighted.

### Priority is ensuring property rights

The economics literature is in agreement on the role of secure property rights as a pre-condition for removing financial constraints for firms. Property rights affect credit markets directly and improve the self-financing willingness of firms. Mauritania, Morocco, the Sudan and Tunisia are similarly ranked on this dimension by the Doing Business surveys (around the world median). Algeria, Egypt and Libya fare much worse and need to strengthen the registry of property rights urgently. Upholding creditor rights and a simplification of bankruptcy procedures can help develop financial markets and entrepreneurship.

### Broaden access to capital

According to the Doing Business survey, credit institutions in North Africa are extremely underdeveloped. Improving these institutions will improve access to finance by firms, which is regarded as a major constraint by those firms throughout the region. Domestic access to capital for firms can be broadened further by deepening the financial markets. To date, stock markets in the subregion are not well developed, implying that equity is not broadly available as a source of capital. In Algeria, alternative sources of financing, such as venture capital, are far less accessible compared to other peer group countries. Reforms to strengthen the development of financial markets are important to increase access to finance to private sector firms through different finance instruments (debt versus equity). On the institutional side, the strengthening of competition laws, bankruptcy laws and insolvency regimes can constrain non-competitive practices, and further improve access to finance for the private sector.

### Limit the public sector footprint on lending markets

Regarding bank lending, in Tunisia and similarly in Algeria, most of the banking sector is controlled by the Government, which is associated with significant distortions, as government-controlled banks do not adhere strictly to commercial considerations when allocating credit, resulting in inefficient State-owned enterprises getting access to finance, or credit being extended based on political connections. Similarly, in Egypt, public sector borrowing is crowding out lending to the private sector, while the low bank penetration limits deposit mobilization. The development of an infrastructure to support cashless transactions and electronic payments may foster further financial inclusion and can strengthen capital markets. Privatization of State-owned enterprises and the establishment of public-private partnerships can potentially attract (foreign) capital, broaden financial markets and encourage competition. The extent of privatization needs to be aligned with overall strategic interests and primarily be aimed at reducing market power and supporting competitive practices to reduce the public-sector footprint in areas of the economy that should be led by private sector initiatives, such as tourism and other service industries.

### Reduce barriers to foreign direct investment

Access to capital can be increased by actively facilitating and supporting FDI. Currently, FDI is deterred in some countries by regimes, such as the Algerian 49/51 rule, under which 51 per cent of new investment in the country must be owned by Algerians. This limits foreign investment, entrepreneurship and results in non-realization of the significant gains from technology transfers that FDI are known to bring. To attract FDI, rather than opting for direct monetary incentives, which have been proven to be ineffective and come with significant fiscal burden, emphasis should be placed on developing a broader regulatory and business environment conducive to overseas investors. An important feature is to ensure investors are secure about their assets by effectively enforcing property rights and adhering to the rule of law and due and transparent ju-

dicial processes. Furthermore, capital flows can be supported through the adoption of a lean bureaucratic process. The adoption of a two-track system in India through the "Make in India" initiative may serve as a good example and it effectively grants automatic approval for investment in a number of sectors. According to IMF, in Tunisia, investors face restrictions in sectors that account for more than 50 per cent of the economy. Such authorization requirements, fiscal advantages and investment restrictions effectively shelter privileged connected firms from competition and discourage the entry of new firms, which limits productivity growth and distorts the efficient allocation of capital across firms.

## 6.3   Conclusion

In the present report, it is argued that slow productivity growth and structural transformation in North Africa are factors behind the distortions that create misallocation of production factors in the economy. It is noted that more efficient institutions can reduce market imperfections and distortions created by public policies. In addition, the report provides fields of reform to reduce distortions and improve allocative efficiency.

To a large extent, international publications, such as the Doing Business surveys and the World Bank Enterprise Surveys, were used in preparing the report to gain an understanding of the role of the State in structural transformation in North Africa. The provision of additional micro data, for example, such as the World Bank Enterprise Surveys, at national levels, would be extremely valuable for gaining a better understanding on what holds firms back and how the allocation of the means of production in North Africa could be improved. Accordingly, the provision of firm level micro data would allow governments to understand constraints and develop the appropriate State capacity to support the private sector.

# Appendix

## Within and between growth

This section includes a description of the technique used to decompose labour productivity growth into the within and between components. The idea is to create a statistic in relative terms that can be compared and averaged out across countries, as done in section 1 (Introduction) of the report. Importantly, the idea of decomposing productivity growth into between (variations in productivity coming from labour flows across sectors) and within (changes in productivity caused by increases in sector specific productivities) components is not new. Indeed, McMillan, Rodrik, and Verduzco-Gallo (2014) preformed an extensive analysis of the importance of the labour flows into relatively more productive sectors in the economic growth of economies in Latin America and Asia. As of motivation, their methodology is briefly described to show how it differs from the methodology used in this study.

## Formal framework

Define $\hat{Y}_t = Y_t/L_t$ the economy-wide labour productivity in period t and the set of sectors in an economy. Define, moreover, $y_{it} = Y_{it}/L_{it}$ and $\theta_{it} = L_{it}/L_t$ as sector i's labour productivity and labour share at period t. Then, McMilan, Rodrik, and Verduzco-Gallol (2014) decompose economy's labour productivity changes from t − k to t as

$$\widehat{\Delta Y_t} = \sum_{i \in \mathcal{L}} \theta_{it-k} \Delta y_{it} + \sum_{i \in \mathcal{L}} y_{it} \Delta \theta_{it}$$

Where Δ stands for changes from t−k to t. Intuitively, this methodology is used to decompose economy-wide labour productivity into (a) sector specific gains in productivity weighted by the sector's labour share in the base period (t − k) – the within sector component – and (b) changes in sector's labour share weighted by its productivity at t – the between component.

This practical decomposition comes with a drawback – it is done in levels and complicates across countries comparisons and averages in relative terms, such as in growth rates. In order to build a decomposition of productivity growth rates, economy-wide labour productivity is rewritten as the weighted average of sector specific productivities, namely

$$Y_t = \sum_{i \in \mathcal{L}} \theta_{it} y_{it}$$

As such, changes from t to t − k can be written as

$$\Delta Y_t = \sum_{i \in \mathcal{L}} (\theta_{it} y_{it} - \theta_{it-k} y_{it-k})$$

and growth rates

$$\frac{\Delta Y_t}{Y_t} = \sum_{i \in \mathcal{L}} (\theta_{it} \frac{y_{it}}{Y_{t-k}} - \theta_{it-k} \frac{y_{it-k}}{Y_{t-k}}) \quad (2)$$

In Equation (2) it is possible to see how the decomposition proposed links to that of Equation (a). Productivity growth can come from two sources: (b) labour flows into relatively more productive sectors ($\theta_{it} - \theta_{it} - k \geq 0$ and $\frac{y_{it-k}}{Y_{t-k}} \geq 1$) and/or (ci) increases in sector specific productivities $\frac{y_{it}}{Y_{t-k}} > \frac{y_{it-k}}{Y_{t-k}}$. The advantage of the methodology from Equation (2) is that it allows for comparison of factors deconstructing productivity growth rates in a *ceteris paribus* fashion. That is, by holding sector specific productivities constant (i.e. $y_{it} = y_{it-k} \forall i, t$), Equation (2) boils down to

$$\frac{\Delta Y_t}{Y_t} = \sum_{i \in \mathcal{L}} \Delta \theta_{it} \frac{y_{it}}{Y_{t-k}} \quad (3)$$

Analogously, the relative within growth component is obtained holding sector labour shares constant, namely $\theta_{it} = \theta_{it-k} \forall i, t$. If so, Equation (2) simplifies into

$$\frac{\Delta Y_t}{Y_t} = \sum_{i \in \mathcal{L}} \theta_{it-k} \frac{\Delta y_{it}}{Y_{t-k}}. \quad (4)$$

which again resembles the within component from Equation (1) but weighted by the economy-wide labour productivity in the base period. Its interpretation is analogous – it accounts from growth rates in labour productivity due to changes in sector specific productivities holding sector labour shares fixed.

## Decomposing the productivity growth for North African countries

The decomposition of productivity growth rates into the within and between components above

were chosen for this work because of its interpretability in terms of growth rates. It allows comparison and aggregations across countries in a much neater way. As an illustration of how the two components look, data from the International Labour Organization are used to estimate the productivity growth rates and the between and within components from Equation (3) and (4) for the North African countries. These data contain, among other information, data on economy-wide and sector productivities and sector specific labour shares. The sectors in the data are aggregations of ISIC industry codes into agriculture, mining, manufacturing, construction, wholesale and transports and communication.

Year on year changes generate great volatility in the time series, as productivity measures are extremely noisy (especially in mining). For the empirical estimation, the temporal lag was set as k = 3[20.]

One important issue with this estimation was the relative productivity of the mining sector if compared to other sectors – it is, on average, 100 times more productive. That is obviously a consequence of the large capital intensity of that sector. As such, small changes in productivity and labour shares in the mining sectors induces a large variation in the economy-wide productivity and "hides" the variation caused by within and between growth in other sectors. Accordingly, the estimation of the growth rates of productivity and its decomposition with and without the mining sector are performed. For the latter, the productivity of the mining sector was subtracted from the economy-wide productivity $Ŷ_t$.

Figure I shows that exercise. In it, the averages of labour productivity growth and its decomposed elements for the North African countries, from 1994[21] to 2013, are plotted. The left plot shows the results including the mining sector in the economy. The takeaway is the relevance of both within and between movements in the growth of labour productivity in those countries. Nevertheless, if one looks at the right plot, which presents the results from the calculations excluding the mining sector, the story is different. It turns out that changes in labour productivities because of labour movements between sectors contribute little to economy-wide productivity. Instead, the within sector productivity gains seem to be driving the productivity growth in those economies.

## Case study for illustration

In order to illustrate the decomposition of labour productivity growth further, the case of Algeria and Morocco is reviewed. Table 1, panel A shows

**Figure I:** Average labour productivity growth decomposed into within and between growth with (left) and without (right) the mining sector for North African countries from 1994 to 2013
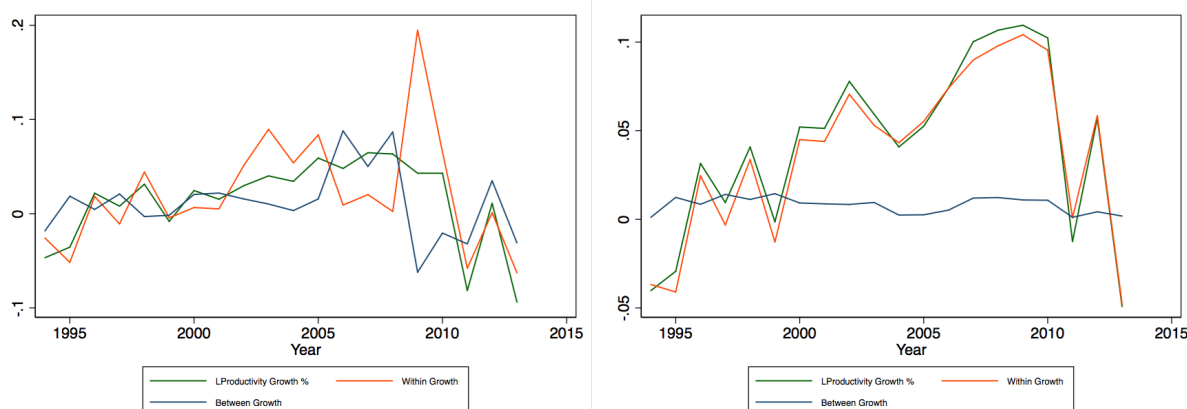


*Notes:* Labour productivity, within and between growth are calculated following the methodology in Equation (2), 4 and 3, respectively. The left plot provides the results of these calculations including the mining sector, the right one excluding.

*Source:* International Labour Organization data.

20   The same calculations were done using longer lags, which provided slightly smoother series of growth and within/between components. However, it did not change much the overall relation of the components of interest with the labour productivity growth in the North African countries.

21   The series misses the observations from 1991 to 1993 as growth rates (and its decomposed elements) are calculated with respect to the third lag.

**Table 1:** Labour productivity growth and its decomposition into within and between components in North African countries from 1991 to 2013

| | GDP/Capita Growth | Panel A: All Sectors | | | Panel B: Excluding Mining Sector | | |
|---|---|---|---|---|---|---|---|
| | | Productivity Growth | Within Growth | Between Growth | Productivity Growth | Within Growth | Between Growth |
| **Algeria** | 1.15% | -0.3% (1.5) | 0.2% (2.2) | -0.2% (2) | 1.1% (2.5) | 0.3% (1.7) | 0.1% (0.2) |
| **Egypt** | 2.24% | 2% (1.6) | 1.5% (3.1) | 0.5% (3.3) | 2.2% (1.1) | 0.7% (1.2) | 0.04% (0.3) |
| **Libya** | -2.37% | -0.1% (8.9) | -0.2% (5.2) | 0.4% (2.1) | 0.6% (6.3) | 0.3% (3.8) | 0.04% (0.1) |
| **Morocco** | 2.63% | 1.8% (1.7) | 0.4% (1.5) | 0.08% (0.6) | 1.9% (1.9) | 0.3% (1.4) | 0.1% (0.3) |
| **Tunisia** | 2.81% | 1.7% (.011) | 0.5% (.01) | -0.01% (.002) | 2.5% (.01) | 0.7% (.012) | 0.07% (.001) |
| **NA Countries\*** | 1.68% constant | 1.2% (4.2) | 0.5% (3.3) | 0.2% (2.4) | 1.7% (3.2) | 0.4% (2.1) | 0.09% (0.2) |

*Notes:* GDP/capita in constant 2010 USD. Values in Panel A and B stand for countries' average in percentage points; values in parenthesis for standard deviations. The decomposition of productivity growth into within and between component is done following the methodology in the Appendix. Panel B excludes mining sector given its intrinsic high productivity and low labour share. *Sudan is not included due to missing sector specific productivity data.

*Source* of data: GDP/capita from World Bank Data, others from International Labour Organization (ILO).

that the former exhibits labour productivity loss averaged out in the period of study. The between growth seems to be, on average, the element driving that loss. More interestingly, when the productivity growth and its decomposition are calculated excluding the mining sector (panel B), there is a switch.

Average labour productivity growth is positive throughout that period and the between growth seems also to contribute to it, on average. The reason for this change is, as already mentioned, the extremely high productivity of the mining sector when compared to the other sectors. On average, labour in the former is about 50 times more productive than other sectors in that country. As such, subtle changes in labour in that sector is reflected as large changes in sector and economy-wide productivities through the between component. That is shown in figure II, left panel – the labour shares in the mining sector and the between component of labour productivity growth covary almost perfectly. The idea of this exercise is to show that, using the current methodology, the between component reflects labour flows into more (less) productive sector positively (negatively).

On the other side, Morocco exhibited an increase in productivity, according to table 1, in the period

of interest. Moreover, the within component of growth seems to account for a reasonable share of it. That is the case, also, when reviewing productivity growth excluding the mining sector (panel B). To illustrate how economy-wide productivity growth in induced by within sector productivity gains, the transportation sector of that economy is used as an example. That sector is the second most productive of the economy, after mining. Moreover, during the period of analysis, that sector exhibits large gains in productivity. Accordingly, looking at within growth and labour productivity in that sector, it shows the relation of productivity growth in competitive sectors and gains in economy-wide productivity driven by it. That is illustrated in figure II, right panel. It shows that increases in sector specific productivities translate into economy-wide productivity in the within growth component of the decomposition from Equation (4).

## Simulation of a two-firm economy

Production in firm i in sector s is:

$$Y_i = A_i K_i^\alpha L_i^\beta$$

Assume that both firms are active in the same sector. Optimally the use of labour and capital is given by the first order conditions

$$\beta A_i K_i^{\alpha} L_i^{\beta-1} = w$$
$$\alpha A_i K_i^{\alpha-1} L_i^{\beta} = r$$

or, rewritten,

$$K_i = \left(\frac{\alpha A_i L_i^{\beta}}{r}\right)^{1/(1-\alpha)}$$

$$L_i = \left(\frac{\beta A_i K_i^{\alpha}}{w}\right)^{1/(1-\beta)}$$

plugged back in we get the optimal labour usage

$$L_i^* = \left(\frac{\beta\left(\frac{\alpha}{r}\right)^{\alpha/(1-\alpha)}}{w}\right)^{(1-\alpha)/(1-\alpha-\beta)} A_i^{1/(1-\alpha-\beta)}$$

$$K_i^* = \left(\frac{\alpha\left(\frac{\beta}{w}\right)^{\beta/(1-\beta)}}{r}\right)^{(1-\beta)/(1-\alpha-\beta)} A_i^{1/(1-\alpha-\beta)}$$

so that a span of control assumption $\alpha + \beta < 1$ is needed to have the two firms share the production. Otherwise, the more productive firm would combine all production onto itself.

Local labour markets and international credit markets are assumed to assume that the overall supply of labour is given by L. It is straightforward to show that the market clearing wage with two firms is given by the equation

$$L^{(1-\alpha-\beta)/(1-\alpha)}w - \left(\beta\left(\frac{\alpha}{r}\right)^{\frac{\alpha}{1-\alpha}}\right)\left(A_1^{\frac{1}{1-\alpha-\beta}} + A_2^{\frac{1}{1-\alpha-\beta}}\right)^{\frac{1-\alpha-\beta}{1-\alpha}} = 0$$

labour employed in firm 1 is then

$$L_1 - \frac{(A_1(K_1^*)^{\alpha})^{\frac{1}{1-\beta}}}{(A_2(K_2^*)^{\alpha})^{\frac{1}{1-\beta}} + (A_1(K_1^*)^{\alpha})^{\frac{1}{1-\beta}}}L = 0$$

Two cases are simulated:

|  | Case 1 | Case 2 |
|---|---|---|
| L | 100 | 100 |
| $\alpha$ | 0.528 | 0.528 |
| $\beta$ | 0.272 | 0.272 |
| $A_1$ | 1 | 1 |
| $A_2$ | 1 | 2 |
| r | 0.05 | 0.05 |

Where the capital and labour intensities come from a "span of control" argument: α = 0.66 * 0.8 = 0.528 and β = 0.34 * 0.8 = 0.272. The results of the simulation are in the following table:

|  | Case 1 | Case 2 |
|---|---|---|
| w | 0.72407 | 2.375 |
| $K_1$ | 1405.6 | 279.41 |
| $K_2$ | 1405.6 | 8941.2 |
| $L_1$ | 50 | 3.03 |
| $L_2$ | 50 | 96.97 |
| Y | 266.2 | 873.16 |

Which clearly shows that total output Y more than triples in case 2.

The figure in the text is calculated by maintaining all parameter values but fixing $A_1 = 1$ and varying $A_2$. Two scenarios are contrasted. In the first scenario, labour is allocated symmetrically. So that output in this scenario is given by

$$Y_{1E} = \left(\frac{\alpha 50^{\beta}}{r}\right)^{\frac{\alpha}{1-\alpha}}(50)^{\beta}6 + A_2\left(\frac{\alpha A_2 50^{\beta}}{r}\right)^{\frac{\alpha}{1-\alpha}}(50)^{\beta}$$

In the second scenario the allocation is efficient

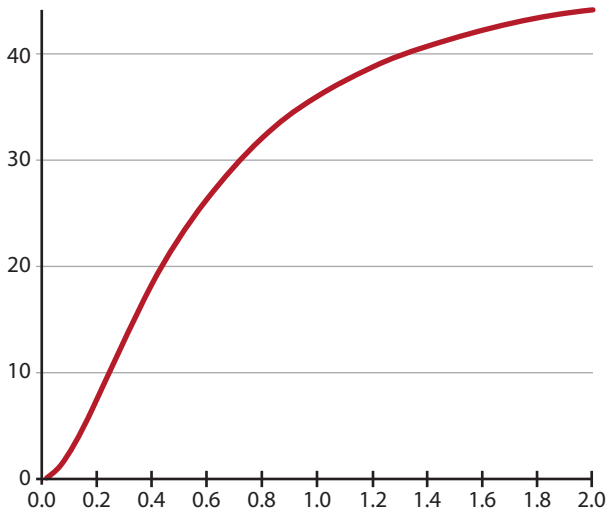$$Y_E = K_1^{*\alpha}L_1^{*\beta} + A_2 K_2^{*\alpha}L_2^{*\beta}$$

with

$$L_i^* = \left(\frac{\beta\left(\frac{\alpha}{r}\right)^{\alpha/(1-\alpha)}}{w}\right)^{(1-\alpha)/(1-\alpha-\beta)} A_i^{1/(1-\alpha-\beta)}$$

and

$$K_i^* = \left(\frac{\alpha\left(\frac{\beta}{w}\right)^{\beta/(1-\beta)}}{r}\right)^{(1-\beta)/(1-\alpha-\beta)} A_i^{1/(1-\alpha-\beta)}$$

The relative difference of the two scenarios gives the output loss of misallocation. In the figure below, this as a function of d is plotted. Where d is defined so that $A_2 = 2d + 1$. The parameter d is then the standard deviation (dispersion) of productivities of the two-firm economy. This leads to the following graph

## Identifying assumptions in capital constraints regressions

Take again the production function $Y_i = A_i K_i^\alpha L_i^\beta$ and assume that some firms are capital constrained which means or, when the constraint bites $K_i = \mu_i/r$.

So that, biting capital constraints mean that

$$Y_i = A_i \left(\frac{\mu_i}{r}\right)^\alpha L_i^\beta$$

so that with logs

$$lnY_i = lnA_i + \alpha lnK_i^* + \beta lnL_i^*$$

Assuming that $corr(A_i, \mu_i) = 0$ an estimate of the impact of constraints is obtained by regressing output on labour and a dummy that captures the constraint $I_i$ (constrained) $\in \{0, 1\}$. The coefficient $\beta_1$ in the regression

$$lnY_i = \beta_1 I_i(constrained) + \beta L_i + \eta_{sc} + \epsilon_i$$

is then capturing $\alpha \ln(\frac{\mu_i}{r}) - \ln K_i$. In other words, a direct measure of the extent of the constraint is attained. Note, however, that the assumption $corr(A_i, \mu_i) = 0$ is extremely strong and unrealistic if financial intermediaries can distinguish between productive and unproductive firms. Most likely $corr(A_i, \mu_i) < 0$, i.e. firms with higher $A_i$ become less constrained. Then, t that ($I_i$ (constrained) is attained, $\varepsilon_i$) $< 0$ and $\beta_1$ is biased downwards. This important point is ignored, as an attempt is made to derive an upper bound on the effect of constraints in this respect. The identifying assumption makes it possible to calculate the counterfactual capital stocks without constraints as K/ $\underline{\mu_i} = e^{-\beta_1/\alpha}$. In order to get the right adjustment, it is taken into account that labour will adjust upwards in constrained firms. In fact, what would happen in a proper general equilibrium model is that wages would increase. Assume instead that unemployed labour would be sufficient to fill in the additional labour without a change in wages. Note that optimal labour is given by $L_i = \left(\frac{\beta A_i K_i^\alpha}{w}\right)^{1/(1-\beta)}$, so that the relative increase in labour is

$$\frac{L_i}{L_i'} = \frac{\left(\frac{\beta A_i K_i^\alpha}{w}\right)^{1/(1-\beta)}}{\left(\left(\frac{\beta A_i(\frac{\mu_i}{r})}{w}\right)^{1/(1-\beta)}\right)}$$

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