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# Assessing the Impact of Structural Reforms on Potential Output: The Case of Morocco

Hippolyte Balima, Olivier Bizimana, and Ananta Dua

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WORKING PAPER

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**Assessing the Impact of Structural Reforms on Potential Output: The Case of Morocco**  
**Prepared by Hippolyte Balima, Olivier Bizimana, and Ananta Dua\***

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**Abstract:** This paper assesses Morocco’s potential output and the scope for structural reforms to reverse the downward trend in economic performance observed since the Global Financial Crisis. Using multivariate filtering (MVF) techniques, our analysis finds that the downward secular trend in potential growth was primarily driven by the decline in the contribution of labor inputs. We then combine production function and general equilibrium model approaches to provide estimates of the potential macroeconomic impact of Morocco’s structural reform agenda. The results suggest that the planned structural reforms could deliver sizable output gains in the medium to long term with reforms that would reduce the large gender gap in Morocco’s labor market yielding the greatest payoffs.

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**WORKING PAPERS**

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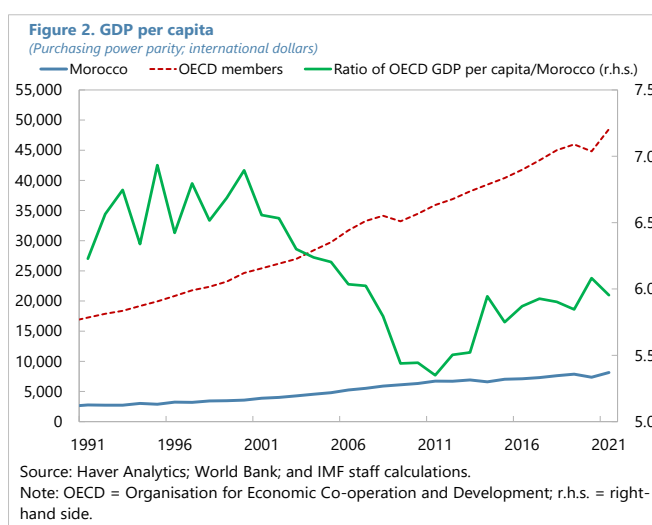
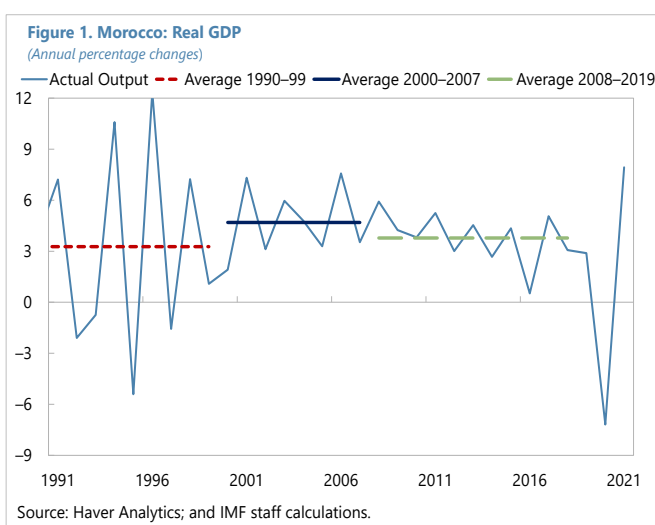
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## I. Introduction

A well-known stylized fact of the Moroccan economy is the deceleration of GDP growth after the mid-2000s (Figure 1). This has slowed Morocco's output convergence to Organization for Economic Co-operation and Development (OECD) countries (Figure 2) and raised questions regarding whether the country's growth potential has weakened. While real GDP bounced back rapidly in 2021 from the health crisis and drought-related recession in 2020, questions remain as to whether the pandemic and climate change may have further impacted Morocco's growth prospects.



Against this background, Morocco's policymakers have made boosting the economy's growth potential a priority. In the aftermath of the pandemic, several reforms were launched, including a comprehensive overhaul of social protection and health systems, a reform of the education systems, and several measures to develop the private sector and improve product market competition and governance, in line with the recommendations of the New Development Model (NMD) report. Although well-designed structural reforms can have meaningful effects on economic activity and welfare, there is substantial uncertainty regarding the magnitude and timing of their impact (Bouis and Duval, 2011; Duval and Furceri, 2018; and IMF, 2019).

The objective of this paper is to address two main questions: (1) How has Morocco's potential output growth evolved over the past two decades and how has it been affected by the pandemic crisis? And (2) What are the potential effects of Morocco's structural reform agenda on potential output in the medium to long term?

To answer these questions, we use a series of standard methodologies to estimate Morocco's potential growth, its main drivers, and the impact of the pandemic, including multivariate filtering (MVF) techniques. To provide a quantitative assessment of the potential effects of structural reforms on output,

we use a battery of structural indicators of quality of governance, education, social protection, health, and product market competition, and apply a distance-to-frontier approach to assess Morocco's gaps relative to the average OECD country in each of these areas. Using a local projection method à la Jordà (2005), we estimate the average impact of structural reforms (reform multipliers) on output in emerging market and developing economies. We then use a production function approach and the IMF's *Flexible System of Global Models* (FSGM) to estimate the long-term impact of reforms that close Morocco's gaps in structural indicators under different scenarios.

The results suggest that Morocco's downward trend in potential output growth since the mid-2000s was mainly driven by a decline in the contribution of labor inputs, with the pandemic affecting potential output mainly via its impact on total factor productivity. But Morocco's planned structural reforms could deliver sizable output gains in the medium to long term and reverse these trends. The impact would depend on the timing and effectiveness of their implementation. If the reforms were to reduce by half the current gaps relative to the average OECD country in the next 15 years, Morocco's potential output level could increase by between 5 percent and 10 percent.

The rest of the paper is organized as follows. Section II estimates Morocco's potential output and its drivers and assesses the impact of the pandemic. Section III discusses Morocco's ongoing agenda of structural reforms. Sections IV computes reform indices and estimates the reform multipliers. Section V and VI quantify the macroeconomic effects of structural reforms using a production function framework and model-based simulations, respectively. We summarize our findings in section VII.

## II. Morocco's Potential Output Estimates

In this section, Morocco's potential output is estimated using a MVF approach.<sup>1</sup> This methodology defines potential output as the level of output consistent with stable (nonaccelerating) inflation, based on two key relationships, namely (a) between inflation and cyclical unemployment (the deviation of the unemployment rate from the level consistent with stable inflation or NAIRU) (Phillips curve), and (b) between cyclical unemployment and the output gap (Okun's law):

$$\begin{aligned}\pi_t &= \pi_t^e + \delta u_t + \varepsilon_t^\pi \\ u_t &= \tau y_t + \varepsilon_t^u\end{aligned}$$

where  $\pi_t$  is inflation,  $y_t$  is the output gap,  $u_t$  is cyclical unemployment,  $\pi_t^e$  is inflation expectations, and  $\varepsilon_t^\pi$  and  $\varepsilon_t^u$  are disturbance terms. The parameters in these equations ( $\delta$ ,  $\tau$ ), together with data on actual

<sup>1</sup> See Alichì et al., (2015) and Blagrove et al., (2015) for more details on the MVF.

output growth, inflation, and unemployment are used to derive estimates of potential output and the NAIRU, which are unobserved.<sup>2</sup>

The MVF model is estimated using data from 1990 to 2019 (see Table 1 for the sources of data). The pandemic related collapse of output in 2020 and its rapid rebound in 2021 represent a structural break that is likely to introduce a downward bias in the estimates of potential growth before 2020.<sup>3</sup> To avoid this problem, potential output before the crisis is estimated using data prior to 2020, and those estimates are then frozen.<sup>4</sup> Moreover, the sample was extended beyond 2021 using projections until 2023 from the October 2021 *World Economic Outlook*.

To shed light on the drivers of potential growth in Morocco, a standard Cobb-Douglas production function was used:

$$\bar{Y}_t = \bar{A}_t \bar{L}_t^\alpha K_t^{(1-\alpha)}$$

in which  $\bar{Y}_t$  is the potential output estimated with the multivariate filter;  $K_t$  is the stock of capital;  $\bar{L}_t$  is potential employment;  $\bar{A}_t$  is trend total factor productivity (TFP), which is treated as a residual; and  $\alpha$  is the income share of labor. Potential employment ( $\bar{L}_t$ ) in turn can be expressed as a function of the estimate of NAIRU ( $\bar{U}_t$ ), the working-age population ( $W_t$ ), and the trend labor force participation rate ( $\bar{LFRP}_t$ ):<sup>5</sup>

$$\bar{L}_t = (1 - \bar{U}_t) W_t \bar{LFRP}_t$$

Potential growth is calculated as  $\Delta \ln(\bar{Y}_t) = \Delta \ln(\bar{A}_t) + \alpha \Delta \ln(\bar{L}_t) + (1 - \alpha) \Delta \ln(K_t)$ .

<sup>2</sup> The model also requires “expert judgement” on steady-state values and near-term forecasts of observables as well as unobservable variables (output gap, potential growth, and NAIRU). The steady-state values for GDP growth and the unemployment rate are assumed to be equal to the pre-pandemic historical average (between 2010 and 2019).

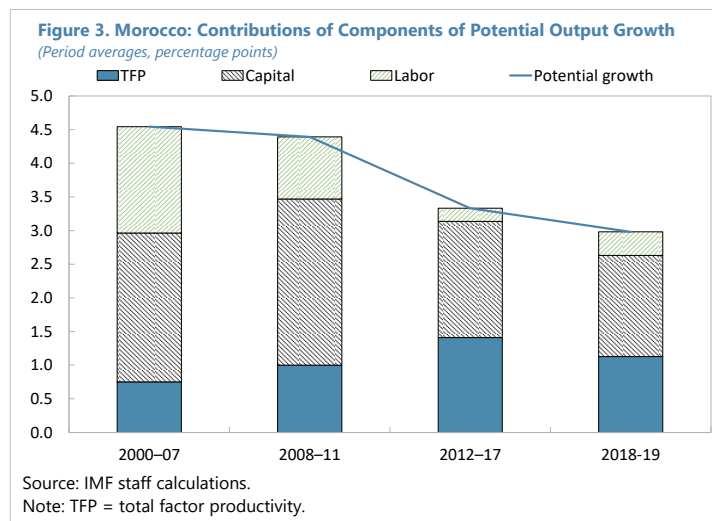
<sup>3</sup> Filtering methods compute the trend value of a variable using its past and future values. Estimates of the trend become more unstable toward the end of the sample due to fewer available future values (the well-known end-of-sample problem). To correct this problem, the projections from the October 2019 *World Economic Outlook* were used because they are not affected by the pandemic shock.

<sup>4</sup> Bodnár et al., (2020) used a similar approach.

<sup>5</sup> The trend labor force is obtained by detrending (using a Hodrick-Prescott filter) the participation rate.

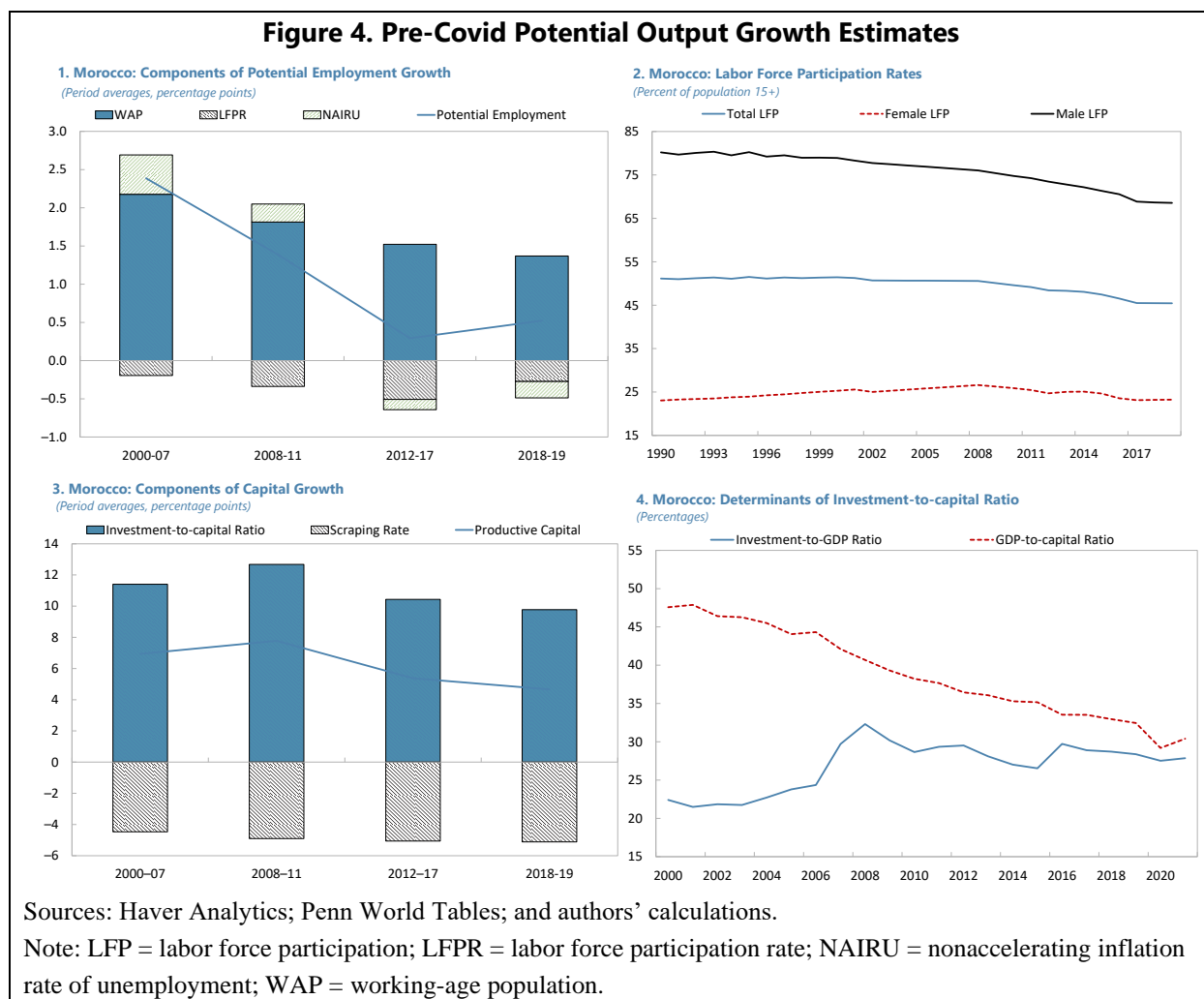
This estimate shows that, after averaging about 4.5 percent between 2000 and 2007, Morocco's potential output growth began to slow after the Global Financial Crisis to reach about 3 percent right before the pandemic (Figure 3).<sup>6</sup> This reflects different contributions from production factors and their productivity:

- *Labor inputs:* The contribution of trend employment to potential growth declined from 1.6 percentage points between 2000 and 2007 to about 0.3 in 2018–19, accounting for about three-quarters of the drop over that period. This performance was largely driven by slower growth of Morocco's working-age population and to a lesser extent by the decline of the trend labor force participation rate (by about 6 percentage points) (Figure 4). Estimates of the NAIRU declined, but from the very high level of about 13.3 percent in 2000 to about 10.2 percent in 2019 (Figure 4).
- *Capital stock:* The contribution from capital accumulation fell from 2¼ percentage points in the early 2000s to about 1.5 percentage points in 2018–19. This reflects an investment-to-GDP ratio that rose between 2000 and 2007 and stabilized in the following years (slightly below 30 percent) (Figure 4). By contrast, the growth rate of capital productivity (the ratio of GDP to capital stock) has been on a downward trend over the past two decades.
- *Total factor productivity:* The TFP contribution to potential output growth rose from 0.8 percentage points in 2000–07 to 1.1 percent in 2018–19. Being calculated as a residual, TFP can capture factors other than technical progress, such as the effects of changes in hours worked, labor quality, and capital utilization.

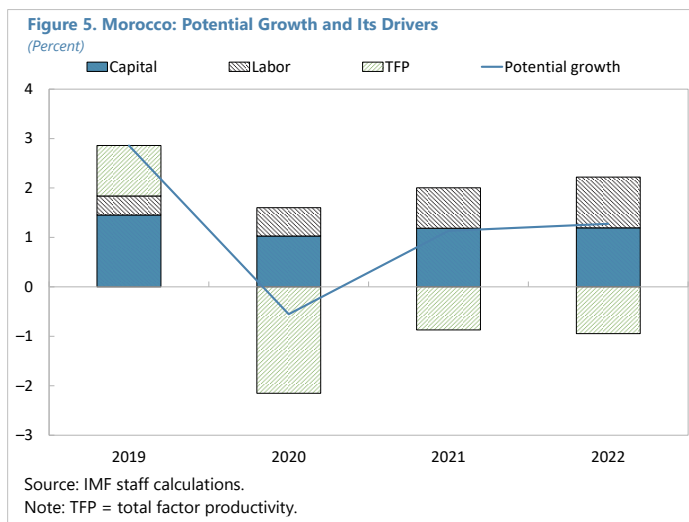


<sup>6</sup> Our results are broadly consistent with previous studies on Morocco. For example, using three different methods (Hodrick-Prescott filter, production function, and multivariate filter), Chafik (2017) found that Morocco's potential growth declined from about 4.5 percent between 2000 and 2007 to about 4 percent between 2008 and 2016.





Potential output is estimated to have contracted by about 0.5 percent in 2020 (Figure 5). The combination of the pandemic and the drought caused a large fall in investment in 2020, the largest contraction since the beginning of the series. As a result, the contribution of capital accumulation to potential growth dropped from 1.5 percentage points in 2019 to 1 percentage point in 2020. Potential employment growth remained broadly unchanged at 0.5 percent in 2020 as the continued expansion in working-age population offset the slight uptick in the estimated NAIRU, while the trend labor force participation rate



remained roughly unchanged. Hence, the contribution of labor to potential output growth fell slightly by 0.1 percentage point in 2020. Still, most of the decline of potential growth in 2020 is explained by the fall in TFP (the estimated contribution of TFP to potential output growth went from 1 percentage point in 2018–19 to about –2 percentage points in 2020). This may reflect the adjustment costs to work routine and supply chains of the containment measures adopted in response to the health crisis, as well as costly reallocation of resources across sectors. On the upside, the acceleration of digitalization caused by remote working and containment measures is likely to boost TFP, although this effect may only be more visible over time.

As the economy reopened and investment picked up in 2021–22, potential output growth rose to about 1 percent, driven by capital accumulation (the contribution of capital input to potential growth accelerated by about 0.2 percentage point) and labor input (the contribution of potential employment increased in 2021–22 by about 0.5 percentage point, reflecting the recovery in the participation rate and continued expansion in working-age population). TFP continued to contract during the economic recovery, albeit at a slower pace, with a contribution of about –1 percentage point in 2021–22 (Figure 5).

### III. Morocco's Agenda of Structural Reforms: An Overview

Morocco has launched an ambitious post–COVID-19 structural reforms agenda to boost potential output and make growth more inclusive in the medium term. Key areas where Morocco has initiated or unveiled deep reforms include:<sup>7</sup>

- *Social protection and health sector:* The reform, which started in 2020, aims at extending health care coverage to all Moroccans and improving the efficiency and targeting of the country's social safety nets. A series of decrees has been approved in 2021 and 2022 to include self-employed individuals (about 11 million Moroccans) into a new mandatory insurance health care scheme, while those previously benefiting from free health care will be given the option of using both public and private health care starting from 2023. A complete overhaul of the health care system also began in 2022, with the objective of improving efficiency and quality of the supply of health care.<sup>8</sup> The reform of Morocco's social protection system also envisages the extension of conditional cash transfers (family

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<sup>7</sup> The government's reform agenda includes other areas, such as reforms of the taxation and pension systems, the liberalization of the electricity market, and a new strategy to address water scarcity. Because these reforms are still at an early stage, we do not consider them in the paper.

<sup>8</sup> The supply of health care will be reorganized around new regional health care centers under the direction of a new national high-health authority. The reform also foresees the building of new hospitals, the recruiting of additional medical personnel with remuneration linked to productivity, the introduction of protocols that favor family doctors and local practices, and greater use of digitalization to facilitate exchange of patient information.

allowances), pensions (to self-employed people), and unemployment insurance, as well as the introduction of a unified social registry to better target Morocco's social programs.<sup>9</sup>

- *Education:* The 2019 Education Act aimed at starting universal preschool education; enhancing teachers' formation and assessment; redesigning curricula at all levels, including by prioritizing STEM (science, technology, engineering, and math) and early reading at primary levels; and reducing regional disparities in education. In 2022, a new four-year roadmap was unveiled that aims at (1) reducing by one-third the drop-out rate in primary education, (2) increasing by one-third the number of students with basic skills at the end of primary school, and (3) doubling the number of students who benefit from extracurricular activities. Achieving these objectives will require more investment in physical capital (school infrastructure) and human capital (with an overhaul of the recruiting, training, and payment of teachers).
- *Product market:* The ongoing reform of the state-owned enterprise (SOE) sector introduces a national agency responsible for the valorization, strategic management, and monitoring of Moroccan SOEs. The reform aims at (1) eliminating the SOEs whose mission is deemed no longer essential, (2) merging the SOEs that operate in the same sector to exploit potential synergies, and (3) corporatizing all SOEs with commercial activities to strengthen their governance. Together with the operationalization of the Mohammed VI Fund, the implementation of a new charter of investment, and continued strengthening of competition and consumer protection legislative frameworks, these reforms are expected to foster market neutrality between public and private sector firms and to provide an important contribution to private sector development.
- *Governance:* Morocco has also accelerated reforms that should improve the quality of governance. This includes progress in the fight against corruption, with the National Authority for Probity, Prevention, and the Fight Against Corruption (INPPLC) now endowed with the necessary means and legal framework to implement the national anticorruption strategy, with the appointment of the INPPLC's secretary general and members of its board of directors in late 2022. This legal framework is expected to improve the effectiveness of anticorruption measures. Efforts are also ongoing, including those to strengthen the country's penal procedural code, reinforce its whistleblower legislation, and introduce more preventive measures in the fight against corruption.
- *Gender gaps:* At 21 percent in 2021, the rate of participation by Moroccan women in the labor force lags other countries at a similar income level. Several recent initiatives promote gender equality. Among these, increasing preschool enrollment rate from the current 70 percent to 100 percent by 2028 should help the participation of women in the labor market. In particular, Bank Al-Maghrib

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<sup>9</sup> All Moroccan households wishing to apply for social programs will need to register under the unified social registry. Each household will be assigned a "standard of living" score based on self-declared and verified information on socioeconomic status, and its eligibility for social programs will depend on the scores being below certain thresholds.

required credit institutions, through a dedicated regulation issued in 2022, to i) take the gender dimension into account in defining their strategic orientations, ii) integrate gender into their financing and investment strategies, and iii) design banking products and services for women, especially entrepreneurs, as well as dedicated refinancing mechanisms such as Gender Bonds. In addition, the new development model has laid out proposals to double women's labor force participation rate by 2035. These include i) promoting work flexibility solutions for women in the workplace, including extending flexible work in public and private institutions and paternity leave); ii) implementing large-scale solutions for affordable childcare and mobility; iii) strengthening education, training, support, and financing mechanisms for Moroccan women; iv) aligning the entire legal system with the constitutional principle of equal rights and parity; and v) increasing awareness of gender equality, by rethinking the representations of the female model in school curricula and in the media, including through communication campaigns on gender parity, and the participation of women in work and in the economic and social development of the country.

## IV. Estimating the Reform Multipliers

In this section, we estimate reform multipliers. We start from structural indicators in the areas of governance, education, social protection and health, and product market regulation using a large sample of 155 emerging and developing economies over the period 1980-2021.<sup>10</sup> Second, following IMF (2019), we use a local projection method (Jordà, 2005) to estimate the time-varying effects of changes in each individual indicator on output.

### A. Structural Indicators

We build structural indicators in the areas where Morocco has initiated reforms (see Table 1 for details about the indicators). We use a series of measures (sub-indicators) that encapsulate different aspects of those reforms, to capture their intended objectives. We standardize each sub-indicator to vary between 0 and 100 and then take their simple average, with a higher value indicating a stronger performance in the reform area. We also employ a principal component analysis as a robustness check, by taking the first component of the set of sub-indicators for each reform area, and find the results broadly comparable.<sup>11</sup>

- The *governance indicator* is computed as the average of the six Worldwide Governance Indicators (WGIs): (1) control of corruption, (2) political stability and absence of violence, (3) rule of law, (4) government effectiveness, (5) regulatory quality, and (6) voice and accountability. Several studies suggest that governance reforms can significantly improve countries' long-term output and growth directly by leveling the playing field and incentivizing more productive firms to invest and recruit,

<sup>10</sup> The list of emerging and developing economies is defined following the WEO country classification. Table 2 lists the countries in our sample.

<sup>11</sup> These results are available upon request from the authors.

and indirectly by increasing other areas of reforms' payoffs through the reform complementarity channel (Mo, 2001; IMF, 2019). For instance, legal system reforms and property rights help create pre-conditions for market-based economic activities and therefore promote private sector development, entrepreneurship, and investment (Dabla-Norris et al., 2013; and IMF 2015).

- The *education* indicator captures education participation and outcomes. It includes seven variables: (1) gross pre-primary enrollment ratio, (2) gross primary enrollment ratio, (3) primary completion rate, (4) out-of-school rate for children of primary school age, (5) lower secondary completion rate, (6) average years of schooling, and (7) adult literacy rate. There is evidence that education affects output and growth by increasing the human capital of the labor force (Benos and Zotou, 2014). Endogenous growth models also suggest that education can shift the innovative capacity of an economy by fostering its knowledge of new technologies, products, and processes (Hanushek and Woessmann, 2008). The evidence also suggests that the payoffs of education reforms typically materialize in the longer term (Dabla-Norris et al., 2013).
- The *social protection and health* indicator captures social protection and health outcomes, and health systems' infrastructure. The index includes seven variables: (1) neonatal mortality rate, (2) infant mortality rate, (3) life expectancy at birth, (4) universal health service coverage, (5) the number of physicians per thousand people, (6) the number of nurses and midwives per thousand people, and (7) the number of hospital beds per thousand people. Research indicates that social protection and health supply policies can support output and growth outcomes in many ways: i) at the individual level by strengthening and protecting human capital and other productive assets, and alleviating constraints on poor individuals' capabilities to contribute to the formal productive economy; ii) at the local economy level by reinforcing community assets and infrastructure, including through positive spillovers to non-beneficiaries; and iii) more broadly at the macro level by acting as stabilizers of aggregate demand and contributing to social stability (Alderman and Yemtsov, 2014; Mathers and Slater 2014).
- The *product market competition* indicator includes three variables: (1) the extent of market dominance, (2) administrative requirements, and (3) bureaucracy costs. The impact of product and labor market reforms has received greater attention, especially for advanced economies. Studies found that product and labor market deregulation reduces and redistributes rents (through the effects on entry costs, the degree of competition, and the bargaining power of workers), and therefore boosts aggregate labor productivity and employment over the long term (Barnes et al., 2013; Bouis and Duval, 2011; Duval and Furceri, 2018; IMF, 2019). In the case of Morocco, well-designed market reforms could substantially increase output and employment in the medium term (Sarr et al., 2019).

## B. Estimating Reform Multipliers

The local projection method (Jordà, 2005) is used to estimate “reform multipliers” for the average emerging market and developing economy. The local projection specification takes the following form:

$$y_{i,t+k} - y_{i,t-1} = \alpha_i + \lambda_t + \beta_k SR_{i,t} + \theta X_{i,t} + \varepsilon_{i,t}$$

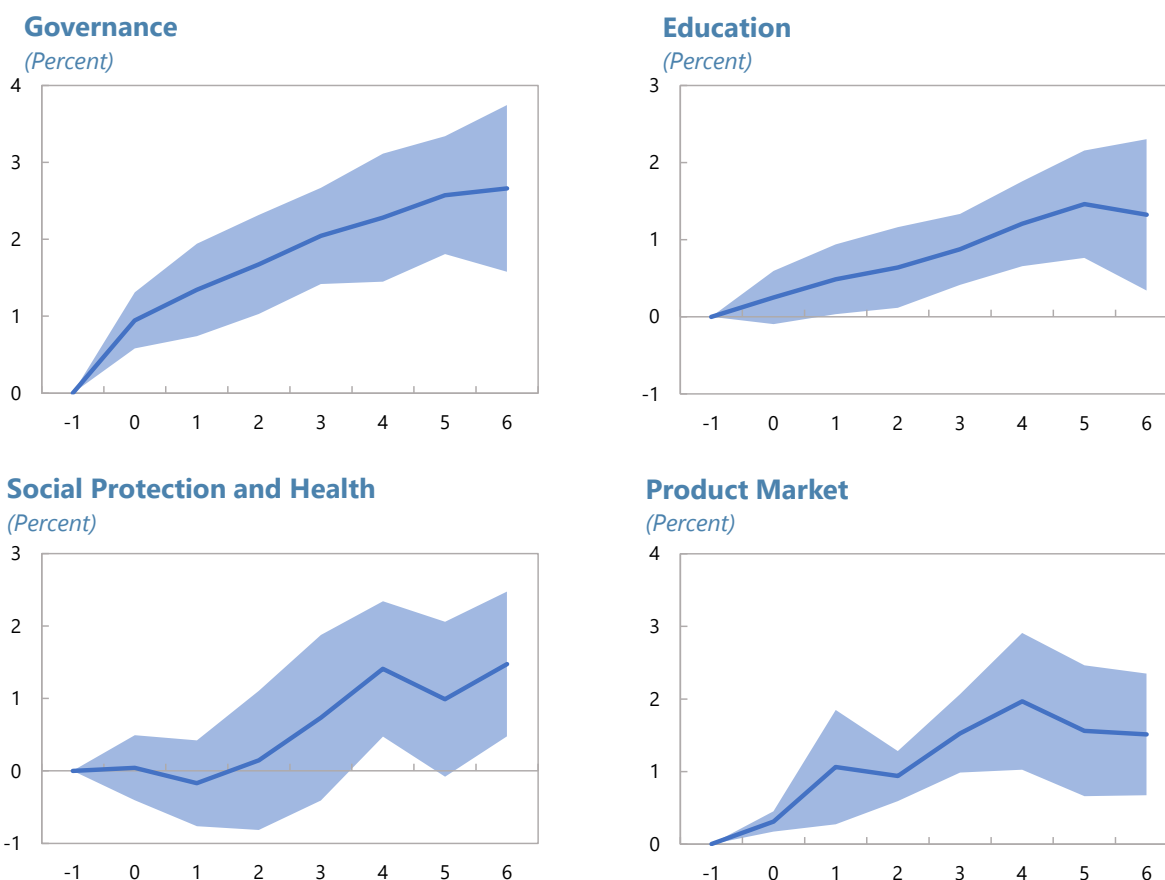
where  $y_{i,t}$  is the log of output for country  $i$  in year  $t$ ;  $k$  denotes the time-varying dimension, with  $k = 0, 1, 2, \dots, 6$ ;  $\alpha_i$  and  $\lambda_t$  denote fixed effects at the country and time dimensions, respectively, included to control for country-specific and time-specific unobservable factors;  $SR_{i,t}$  is the structural reform, defined as the change in the structural reform index;  $X_{i,t}$  is a set of control variables, included to account for the other drivers of output that may distort the actual impact of reforms (omitted variable bias). Following IMF (2019), the set of control variables include lags of the dependent variables, past economic growth, and past reforms. By focusing only on the future impact of structural reforms, the above specification helps address potential reverse causality issues.

We estimate the above equation for each  $k = 0, 1, 2, \dots, 6$  and compute impulse response functions using the estimated coefficients  $\beta_k$ . We also derive the impulse response functions' confidence bands at a 10 percent level of significance using the estimated standard errors of the  $\beta_k$  coefficients. These standard errors are clustered at the country level.

Figure 6 reports the estimated impulse response functions for governance, education, social protection and health, and product market regulation reforms. To facilitate the interpretation, we compute the impulse responses associated with major reforms, defined as an annual change in the structural reform index above two standard deviations of the distribution (see Christiansen et al., 2009; IMF, 2019).

The results in Figure 6 show that these reforms have sizeable positive effects on output, and the magnitude of their effects increases over time.<sup>12</sup> In addition, the quantitative effects vary across reform areas. Governance reforms tend to pay off quickly and have the largest effects on output, while the quantitative effects of education reform, social protection and health reforms, and product market deregulation are broadly comparable. Typically, an improvement in governance increases output by about 2½ percent after six years. Reforms of the education system, and health and social protection as well as deregulations in the product market, lead to an increase in the level of output of about 1½ percent six years later.

<sup>12</sup> We also estimate the effects of the reforms on employment and investment. The results suggest that social protection and health, product market, and governance increase employment by about 0.2 percent to 0.4 percent at a six-year horizon. The results for investment suggest that governance reform has the largest payoff (increasing investment by 4.7 percent at a six-year horizon); while the effects of education, social protection and health, and product market are broadly comparable.

**Figure 6. Average Effects of Reforms on Output**

Source: Authors' calculations.

Note:  $x$ -axes in years;  $t = 0$  is the year of the shock. The lines denote the response to a major historical reform (two standard deviations). The shaded areas denote 90 percent confidence bands.

## V. Assessing the Impact of Structural Reforms on Output: A Production Function Approach

We use the distance-to-frontier approach and a production function to assess the potential effects of reform on Morocco's output. We first calculate Morocco's structural gaps relative to the OECD average in the areas of the country's reform agenda. We then use these gaps and the estimated reform multipliers (for governance, education, social protection and health, and product market regulation reforms) to

quantify the potential output gains using a production function approach. For gender gaps, the potential impact of reforms to boost women's participation in the labor market is directly evaluated using the gap in the participation rate relative to the average OECD level.

### A. Assessing Morocco's Structural Gaps

Morocco's distance from the average OECD country on each of the indicators is quantified using the latest available data points for different indices. Formally, the *structural gap*,  $SG_i$ —or relative distance from best performers is calculated as the relative difference between the structural indicators for Morocco and the OECD average in each reform area:  $((SR_i^* - SR_i)/SR_i^*)$ , where  $SR_i$  is the value of the structural index for Morocco in reform area  $i$ , and  $SR_i^*$  represents the value of this index for the OECD average.

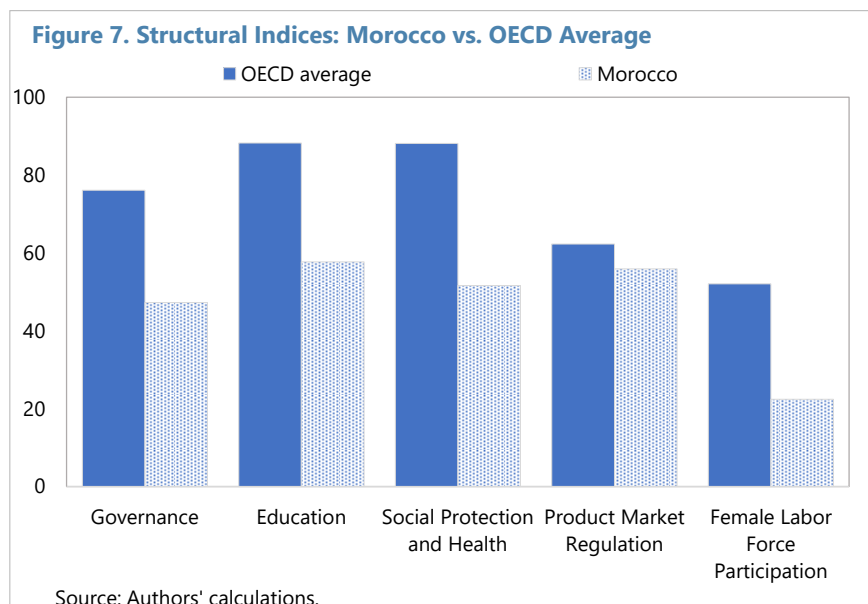
Figure 7 presents an overview of the identified reform gaps relative to the OECD average. Morocco shows relatively large reform gaps in nearly all areas considered, which suggests that, a priori, the country could reap significant economic benefits from policy improvements to reduce these gaps. In particular:

- The *governance* indicator shows that Morocco's score is about 40 percent lower than the OECD average, mainly driven by gaps in the sub-indicators of control of corruption and voice and accountability (Annex Figure 1).
- The *education* indicator suggests that Morocco's score is about 35 percent below the average OECD country. This gap mainly reflects Morocco's relatively low scores in pre-primary and primary enrolments, lower secondary completion, and average years of schooling compared to the OECD average (Annex Figure 2).
- The *social protection and health* indicator is about 40 percent lower in Morocco compared to the OECD average, mainly due to differences in endowments with human capital (availability of medical practitioners including physicians and nurses) and physical capital (availability of hospital beds) (Annex Figure 3).
- The *product market* competition indicator shows a relatively lower gap with the OECD of about 10 percent, which is explained by market dominance in the corporate sector (Annex Figure 4).
- As for *gender gaps*, Morocco's female labor force participation (FLFP) is only about two-fifths of the average OECD level.<sup>13</sup>

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<sup>13</sup> For gender gap, we compare a measure of labor market outcome instead of structural reform indicators. This is consistent with the NMD report which sets a target on FLFP.





## B. The Effects of Structural Reforms on Morocco's Output

We use a standard production function to quantify the potential output impact of closing the structural reform gaps:

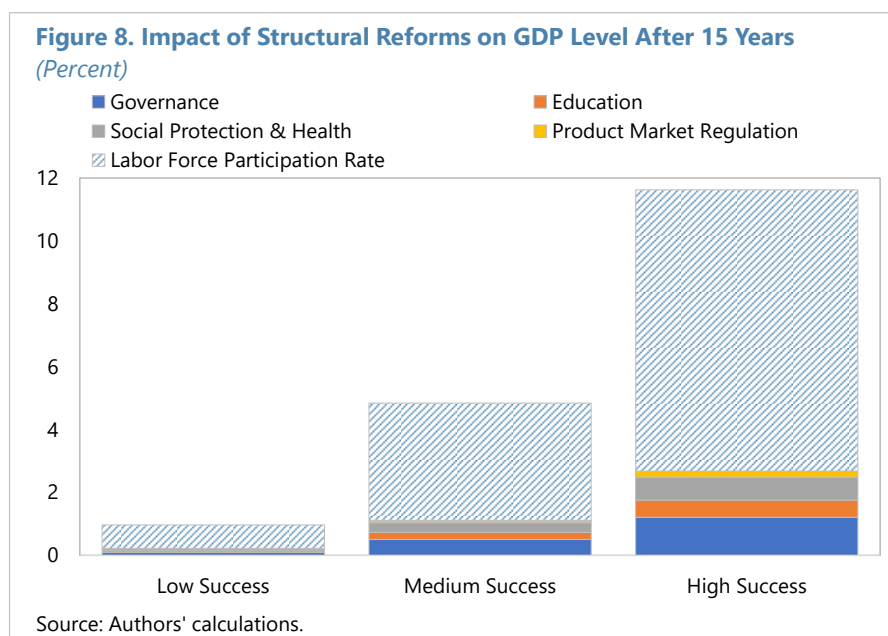
$$Y = A L^{\alpha} K^{1-\alpha}$$

where  $Y$  is GDP,  $A$  is TFP,  $K$  is the capital stock,  $L$  is the effective labor input, and  $\alpha$  is the share of labor income.  $L$  is the number of workers, defined as  $L = w * p * e$ , where  $w$  is the working-age population (aged 15 and older),  $p$  is the labor force participation rate, and  $e$  is the employment rate.

The governance, education, social protection and health, and product market reforms are assumed to directly impact TFP,  $A$ ; and reforms to boost women's participation in the labor market affect output directly through an increase in  $p$ , the aggregate labor force participation rate. The impact of structural reforms on the level of GDP is then assessed using the estimated multipliers and the gap vis-à-vis the OECD average. Specifically, the *output impact of reform*,  $RI_i$  is calculated as the product of the estimated multiplier for the average emerging market and developing economy in each reform area from the local projection regression,  $\hat{\beta}_k$ , and Morocco's structural gap vis-à-vis the OECD average:

$RI_i = \hat{\beta}_k \times ((SR_i^* - SR_i)/SR_i^*)$ . This calculation provides an estimate of the magnitude of the maximum output impact a specific structural reform could achieve if it moved Morocco to best practice in that area. The effects of reforms to raise FLFP are mapped into changes in Morocco's aggregate labor force participation rate relative to the OECD average in the production function. In addition, to match the timeline set by the NMD report, the output gains are assessed after 15 years. To illustrate the large uncertainty around estimates, three different scenarios were considered:

- A *medium-success reform scenario* assumes that the reforms of governance, education, social protection and health, and product market would close half of the distance between Morocco and the OECD average over a period of 15 years. In addition, this scenario assumes that Morocco's FLFP would increase to about 34 percent (from about 22 percent in 2022) over 15 years. As a result, it was found that real GDP would increase by about 5 percent over 15 years on a cumulative basis (Figure 8).
- In a *low-success reform scenario*, Morocco's reforms of governance, education, social protection and health, and product market would close only 10 percent of the gap with the OECD average over a period of 15 years. In addition, FLFP would increase to only 25 percent over this period. In this case, the level of output would increase by about 1 percent over 15 years on a cumulative basis (Figure 8).
- In a *high-success reform scenario*, the structural reforms of governance, education, social protection and health, and product market would close 80 percent of Morocco's gap over 10 years—that is, Morocco's score in these indices would be about 20 percent above the OECD average after 15 years. FLFP would increase to about 50 percent over this period. In this case, output could increase cumulatively by about 12 percent over 15 years (Figure 8).



## VI. Assessing the Macroeconomic Impact of Structural Reforms: A Model-Based Analysis

### A. The Model and Simulation Assumptions: Using the IMF's FSGM

In this section, the IMF's Flexible System of Global Models (FSGM) was used to simulate the dynamic macroeconomic effects of structural reforms on Morocco's potential output and fiscal position. The FSGM is an annual, multiregional, general equilibrium model of the global economy combining both micro-founded and reduced formulations of various economic sectors (see Andrieu et al., 2015 for more details).<sup>14</sup> In the model, total consumption consists of spending both from households that can save and from those who can only consume out of current income. Firms produce goods and services using labor and their holdings of private capital. Potential output is based on Cobb-Douglas production function with trend TFP, the steady-state labor force, NAIRU, and capital stock. The effects of structural reforms on potential output are captured through their impact on the factor inputs and TFP. The government budget constraint ensures a stable nonexplosive public debt-to-GDP ratio in the long term, while in the short-term fiscal policy accommodates the impact of the business cycle.<sup>15</sup> Lump-sum transfers are assumed to adjust over time to ensure that long-term debt remains sustainable.<sup>16</sup> Monetary policy is determined by a reaction function that links interest rates to expected inflation in the medium term.

Using the FSGM to assess the macroeconomic effects of structural reforms has several benefits. First, it allows quantification of output gains and potential costs both in the short term and medium to long term once the reforms are expected to have paid off. Second, it sheds light on the transmission channels through which the reforms affect the economy. Third, it permits analysis of the impact of the reforms in isolation, and simultaneously. Fourth, it allows the assessment of the fiscal implication of the reforms. The fiscal impact of the reforms depends on how they are financed. In these simulations, two options are considered:

- *Budget-neutral reforms* (option 1). The fiscal costs of the reforms are fully offset by a decrease in other public expenditures.<sup>17</sup> In particular, the simulations assume that the additional spending

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<sup>14</sup> This analysis uses the Middle East and Central Asia Department Model, a module of the FSGM, which contains individual blocks for 12 countries—including Morocco and seven other countries from the Middle East and Central Asia—and 10 regions (including four Middle East and Central Asia subregions)—and the rest of the world.

<sup>15</sup> We refer to the government's long-term fiscal balance target as the "structural balance."

<sup>16</sup> In principle, any expenditure or tax instrument in FSGM can be used for this purpose. We chose lump-sum transfers for their non-distortionary effect.

<sup>17</sup> In the model simulations, the reforms of education, social protection and health are assumed to increase government spending in line with the estimates contained in the 2023 budget. In particular, the social protection and health care reform is projected to cost about 2.5 percent of GDP per year at steady state, while the reform of the education system will cost about 0.3 percent of GDP annually (IMF 2023). Product market and governance reforms, as well as policies to reduce the gender gap in the labor market, are assumed to be implemented at no direct fiscal costs.

associated to the reforms is offset by a reduction in lump-sum transfers that keeps the structural deficit unchanged.

- *Debt financing* (option 2). The budgetary cost of the reforms is fully financed with additional public debt. Under this scenario, the structural deficit increases with the additional discretionary spending, while lump-sum transfers adjust to cover the increased debt-service costs from the higher debt. Following Kumar and Baldacci (2010), it is assumed that each unit increase in the public debt-to-GDP ratio causes an increase of the sovereign risk premium of 3 basis points.<sup>18</sup>

The reforms simulated in the model are designed to match those computed using the production function framework in the previous section. We assume that all reforms are implemented simultaneously. The move toward best practice is assessed after fifteen years, consistent with the NMD report's timeline. The effects of reforms are mapped into gradual changes in TFP and in the aggregate labor force participation rate. The reforms of governance, education, social protection and health, and product market are all modeled as a shock to TFP—that is, the estimated impact of these reforms on potential output from Figure 8 is now used to calibrate an exogenous shock to TFP in the model. For example, in the medium scenario, the impact of governance reform is modeled as a TFP shock of 0.5 percent over 15 years—that is, the estimated increase in TFP and output from the production function in Figure 8. Similarly, the education reform is assumed to lead to an increase in TFP of 0.2 percent over 15 years. The overall package of reforms, excluding the gender gap, is assumed to boost TFP by about 1.1 percent after 15 years. The total labor force participation rates are assumed to increase by about 6 percentage points in the medium reform scenario, whereas the upper bound and lower bound assume an increase of about 13 percentage points and 1 percentage point, respectively.

## B. Model-Based Results

The simulation results show that the effects of structural reforms are sizable in the medium and long term in all scenarios:

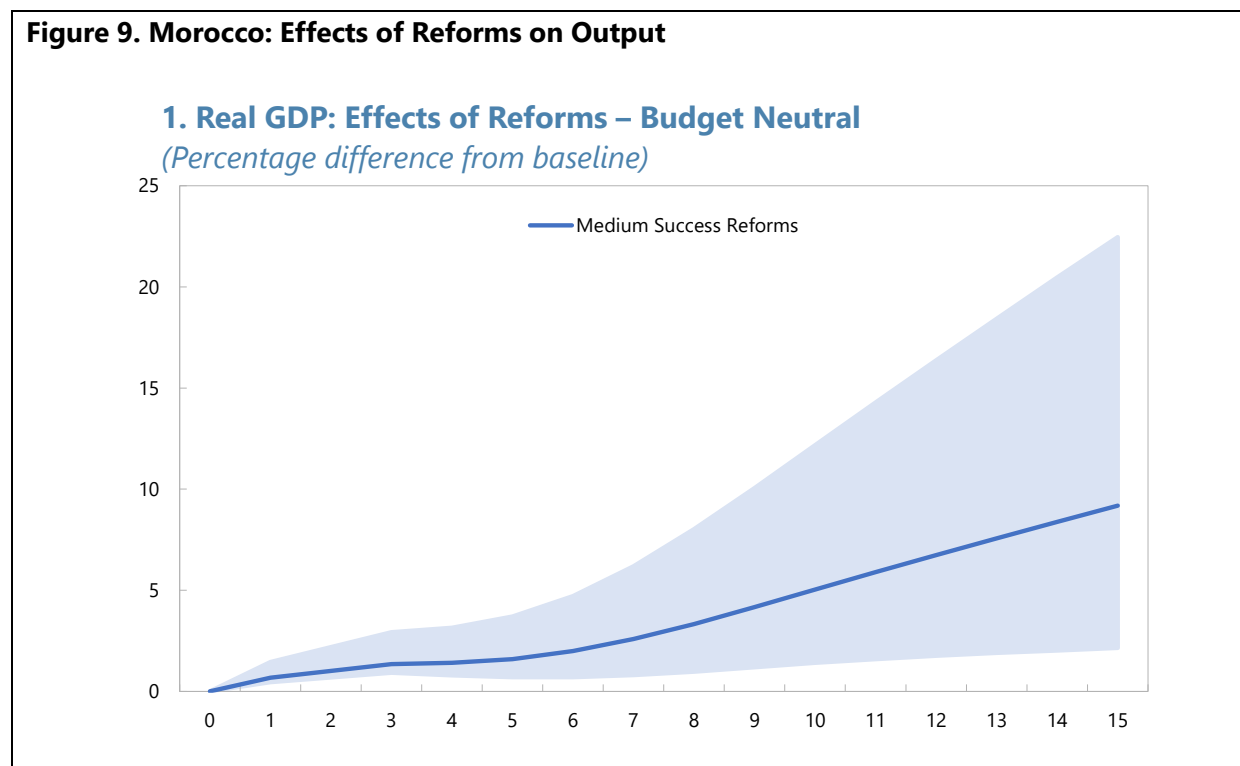
- The reforms of governance, education, social protection and health, and product market have significant impact on long-term output. These reforms are mapped into an exogenous permanent shock in TFP that ranges from about 2.7 percent to 0.2 percent in the high- and low-success scenarios, respectively (Figure 9). The resulting rise in the marginal productivity of capital and labor stimulates private investment and raises labor demand, which lifts consumption in the long term (Figure 10). In the budget-neutral scenario, cumulative increases of real output over a 15-year period range from 2.3 to 22 percent (and about 10 percent in the medium-success scenario) (Figure 9). These larger output

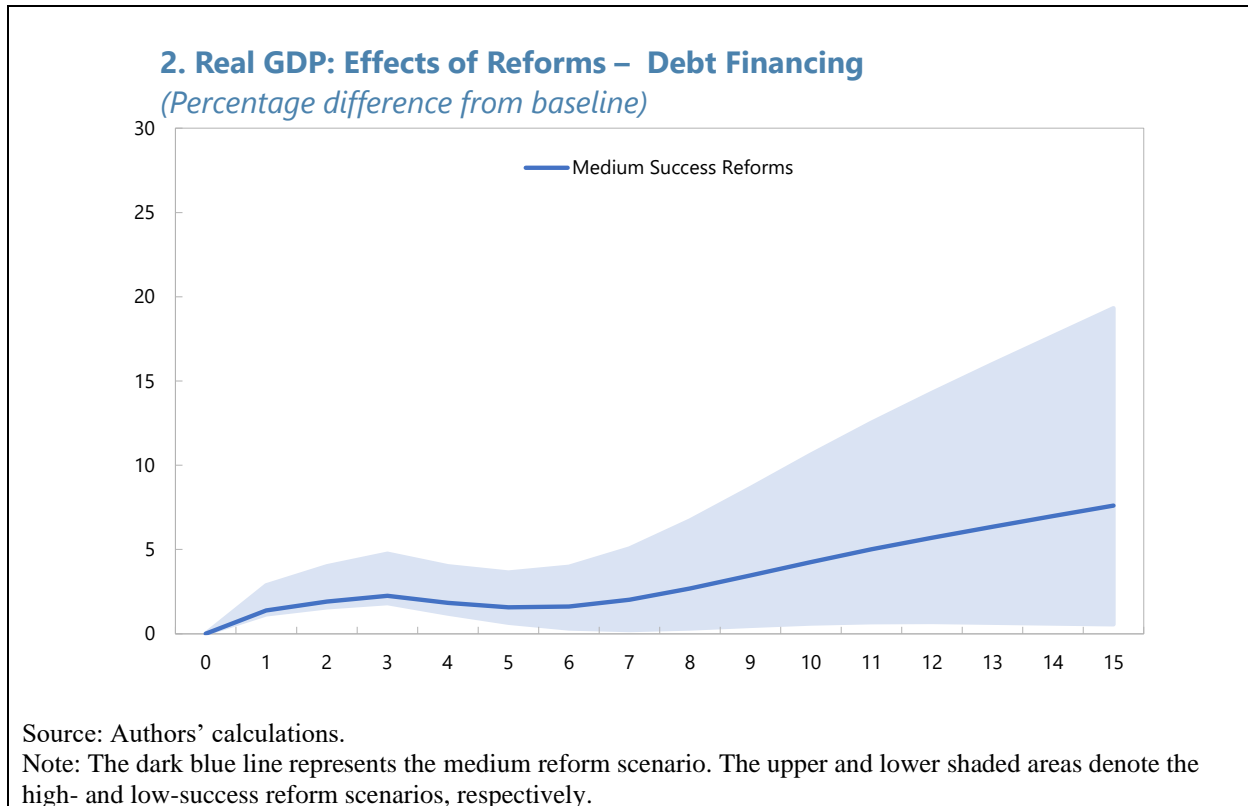
<sup>18</sup> The assumption of 3 basis points is based on Kumar and Baldacci (2010), who find that appropriate risk premium elasticities would be in the range of 3–5 basis points for a panel of advanced and emerging market economies.

gains compared with the production function approach mainly reflect the spillovers (dynamic impact) of higher productivity on capital accumulation and labor in the model. In addition, the simulations incorporate the fiscal gains from reforms in the medium term.

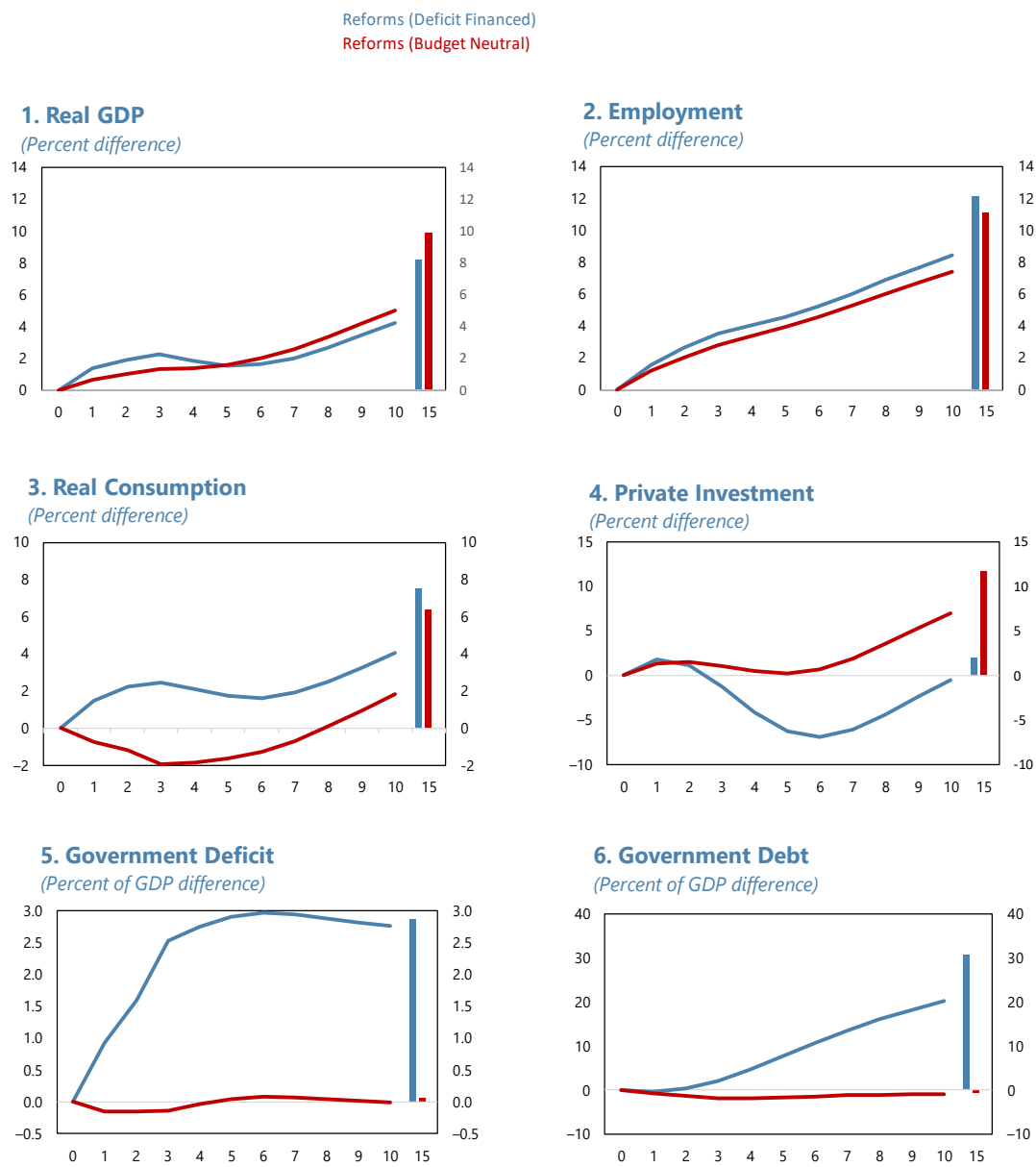
- The reduction of the gender gaps yields the largest payoffs in the medium to long term (Figure 11). The increase in FLFP is associated with cumulative output gains over the next 15 years that are twice as large as those produced by the other reforms. These sizable gains reflect the large structural gaps relative to the average OECD country in the labor force participation rate, and hence the significant increase required to reduce it.
- In the long term, reforms are less effective in the debt-financing scenario (Figure 10). In the short term, higher multiplier effects from the increase in public spending to finance social protection and education reforms boost private consumption and therefore output. But in the long term, the increase in the government's borrowing costs from the higher level of debt crowds out private investment and depresses the capital stock, partially offsetting the output gains from higher productivity. Cumulative real GDP gains over the following 15 years are estimated in a range between 0.5 percent and 20 percent (about 8¼ percent in the medium-success scenario).

**Figure 9. Morocco: Effects of Reforms on Output**



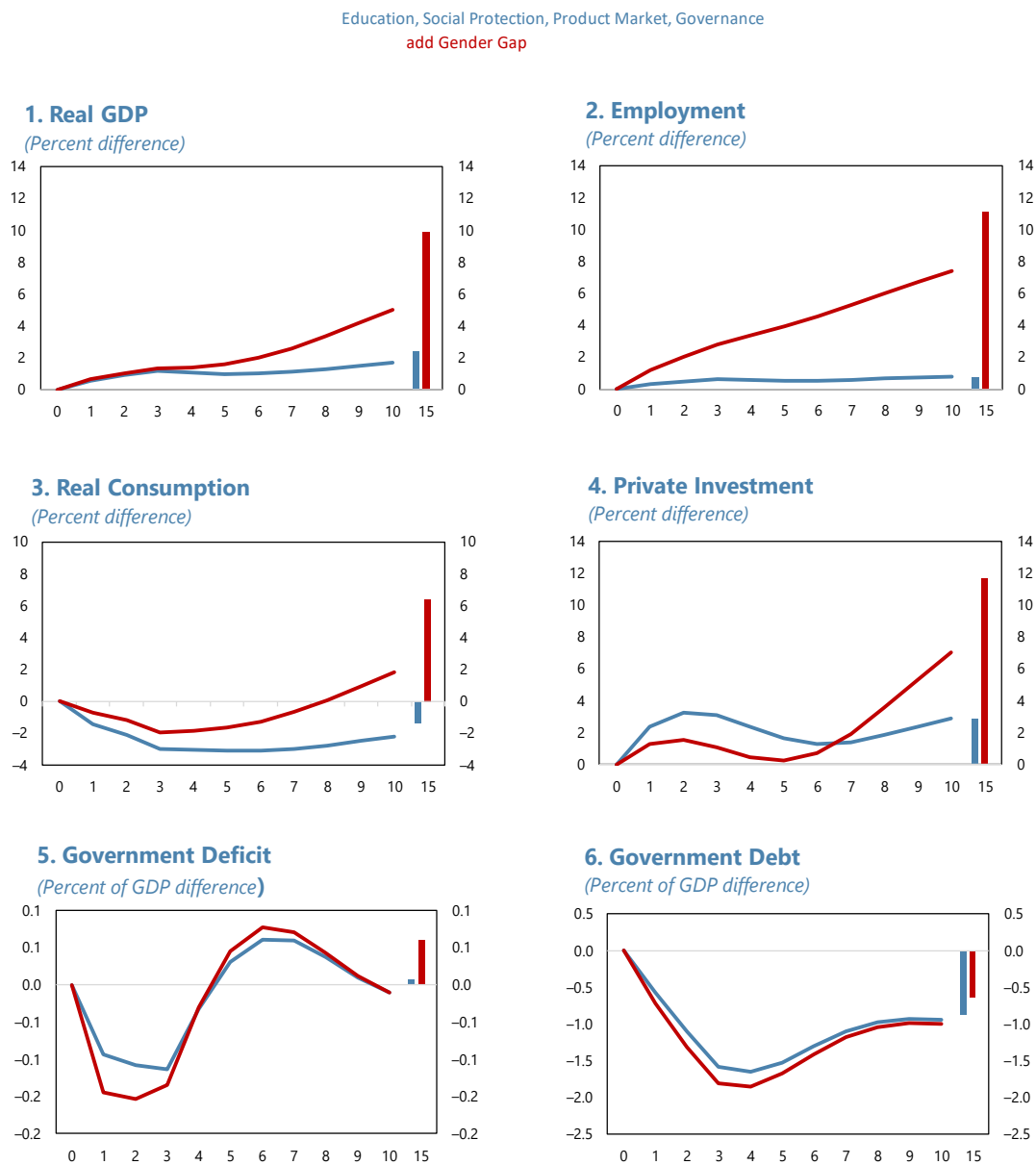


**Figure 10. Morocco: Macroeconomic Effects of Reforms – Medium Success**



Source: Authors' calculations.

**Figure 11. Morocco: Macroeconomic Effects of Reforms – Medium Success (Budget Neutral)**



Source: Authors' calculations.



## VII. Conclusion

The downward trend in Morocco's growth prospects over the last two decades, together with the likely scarring from the pandemic recession, raises concerns about the country's continued convergence toward higher-income status. In this paper, we estimated potential output in Morocco and the impact of pandemic shock on its drivers. We find that the downward secular trend in potential growth observed since the mid-2000s was primarily driven by the decline of labor force participation and higher NAIRU, whereas the pandemic affected the supply side of the economy mainly via its impact on total factor productivity.

The announced structural reform agenda can do much to reverse these trends. The production function approach suggests that if in the next 15 years these reforms were to halve Morocco's current structural gaps relative to the average OECD country, Morocco's real output could increase by about 5 percent at the end of this period under a "medium success" scenario. Model-based simulations confirm that there are large output gains to be reaped from the implementation of the reform package: if neutral on the fiscal budget, these reforms could improve output by 10 percent under the same assumptions about their effectiveness. Given the relatively larger starting gap in FLFP, reforms that would reduce the gender gap in Morocco's labor market appear to be particularly critical to improving potential output, accounting for about three-fourths of the overall output gain in the long term.

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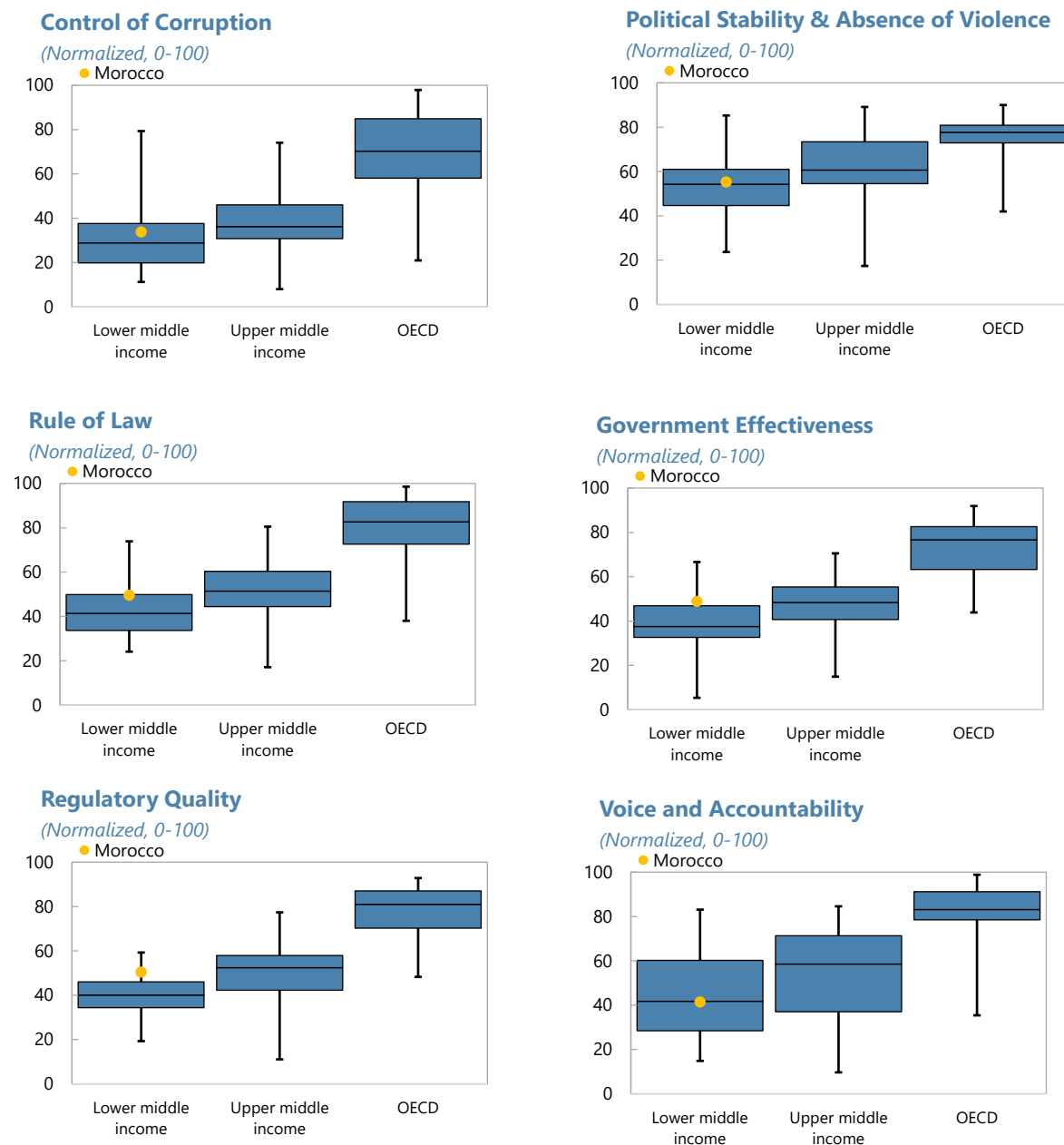
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# Annex

## Reform Indicators

**Annex Figure 1. Governance**



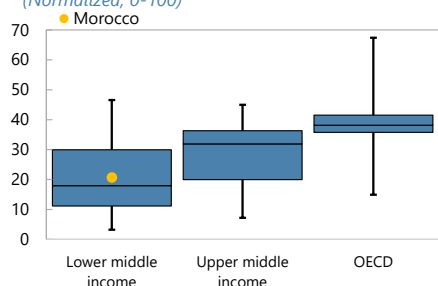
Source: World Bank, Worldwide Governance Indicators; and IMF staff calculations.

Note: OECD = Organisation for Economic Co-operation and Development. These indicators range between 0 and 100, with a higher score indicating a stronger performance.

### Annex Figure 2. Education

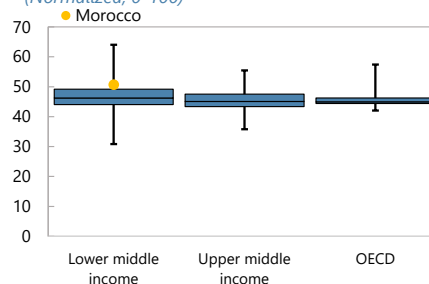
**Pre- Primary Gross Enrolment Ratio**

(Normalized, 0-100)



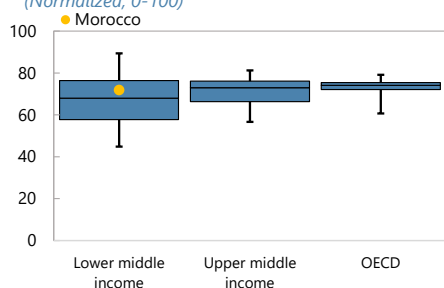
**Primary Gross Enrolment Ratio**

(Normalized, 0-100)



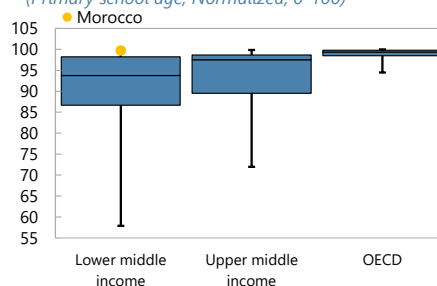
**Primary Completion Rate**

(Normalized, 0-100)



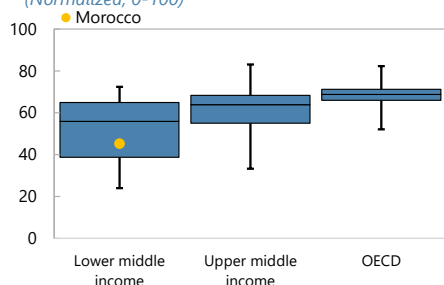
**Out-of-School Rate**

(Primary school age; Normalized, 0-100)



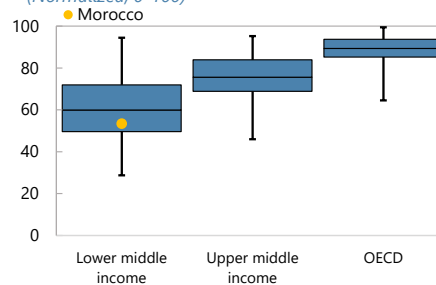
**Total Lower Secondary Completion Rate**

(Normalized, 0-100)



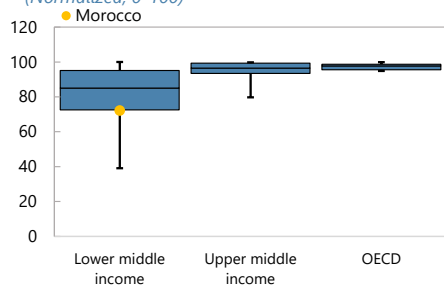
**Average Years of Schooling**

(Normalized, 0-100)



**Adult Literacy Rate**

(Normalized, 0-100)

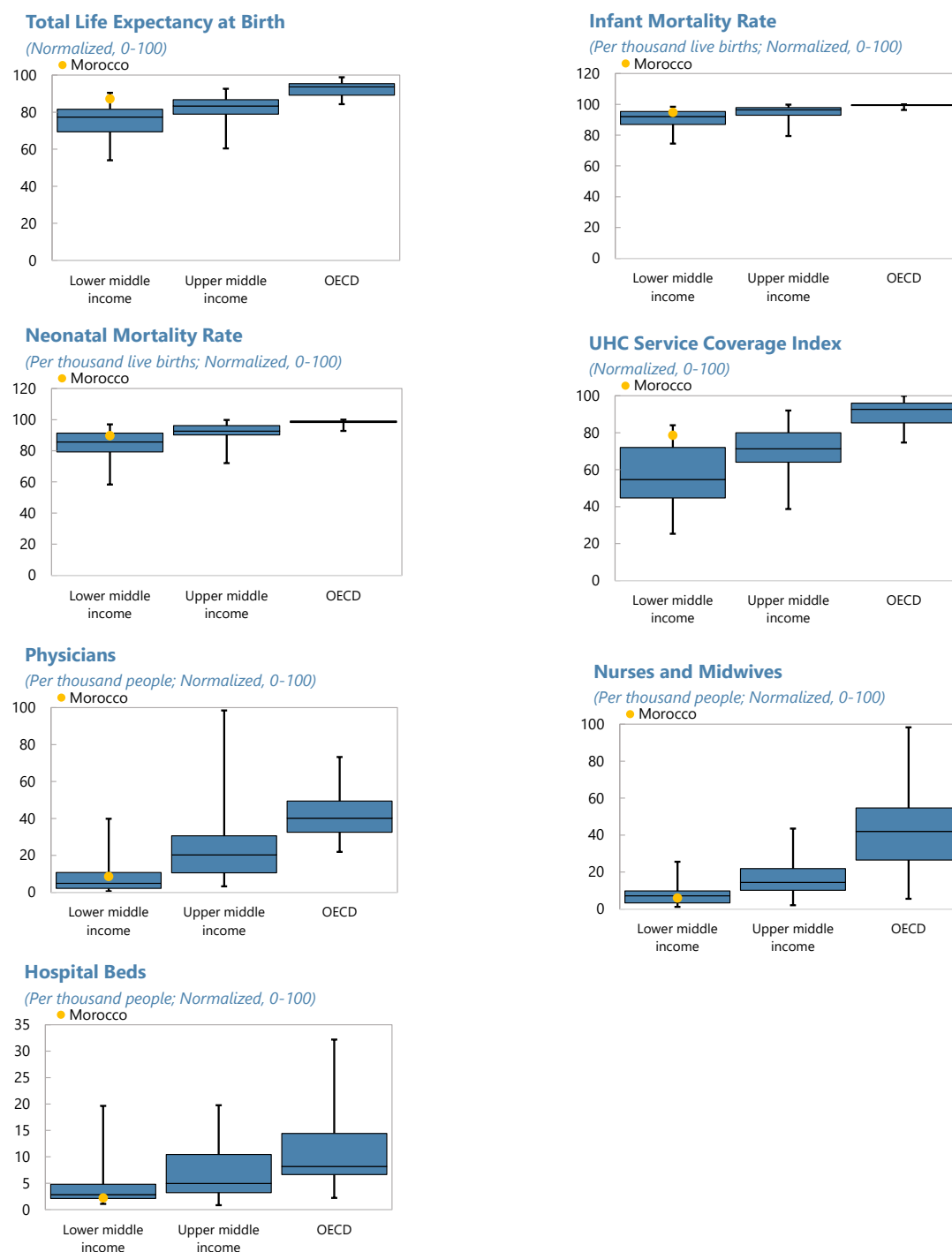


Source: World Bank, World

Development Indicators; Institute for Health Metrics and Evaluation; and IMF staff calculations.

Note: OECD = Organisation for Economic Co-operation and Development. These indicators range between 0 and 100, with a higher score indicating a stronger performance.

### Annex Figure 3. Social Protection and Health



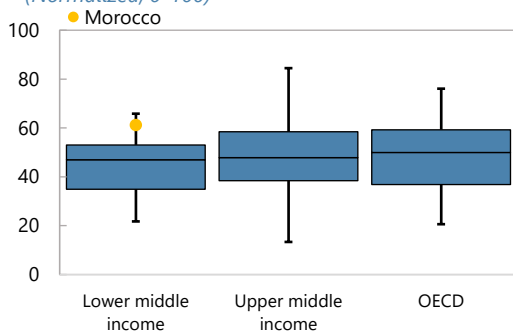
Source: World Bank, Worldwide Governance Indicators; and IMF staff calculations.

Note: OECD = Organisation for Economic Co-operation and Development; UHC= Universal Health Coverage. These indicators range between 0 and 100, with a higher score indicating a stronger performance.

**Annex Figure 4. Product Market**

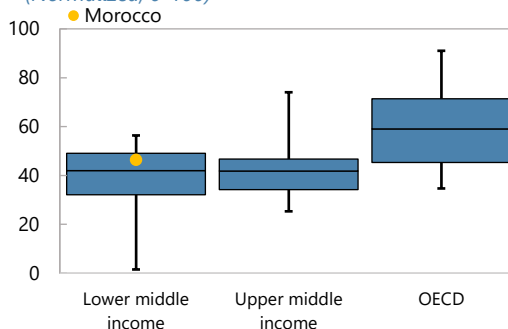
**Administrative Requirements**

(Normalized, 0-100)



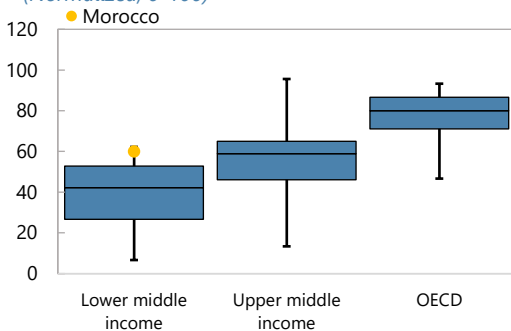
**Extent of Market Dominance**

(Normalized, 0-100)



**Bureaucracy Costs**

(Normalized, 0-100)



Source: World Economic Forum, Global Competitiveness Index 4; and IMF staff calculations.

Note: OECD = Organisation for Economic Co-operation and Development. These indicators range between 0 and 100, with a higher score indicating a stronger performance.

## Data Sources and Country Coverage

Table 1. Definitions and Sources of Variables		
Variables	Definitions	Sources
<b>Governance</b>		
Control of Corruption	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	
Government Effectiveness	Government Effectiveness captures perceptions of the quality of public services, quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	
Political Stability and Absence of Violence/Terrorism	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	World Bank Worldwide Governance Indicators
Regulatory Quality	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	
Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	
Voice and Accountability	Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	
<b>Education</b>		
Gross enrolment ratio, primary, both sexes (%)	Total enrollment in primary education, regardless of age, is expressed as a percentage of the population of official primary education age.	
Out-of-school rate for children of primary school age, both sexes (%)	The number of students of the official age for primary education is subtracted from the total population of the same age. The result is expressed as a percentage of the population of the official age for primary education.	
Gross enrolment ratio, pre-primary, both sexes (%)	Total enrollment in pre-primary education, regardless of age, is expressed as a percentage of the total population of official pre-primary education age.	
Primary completion rate, total (% of relevant age group)	Primary completion rate, or gross intake ratio to the last grade of primary education, is the number of new entrants (enrollments minus repeaters) in the last grade of primary education, regardless of age, divided by the population at the entrance age for the last grade of primary education.	UNESCO Institute for Statistics
Lower secondary completion rate, total (% of relevant age group)	Lower secondary education completion rate is measured as the gross intake ratio to the last grade of lower secondary education (general and pre-vocational). It is calculated as the number of new entrants in the last grade of lower secondary education, regardless of age, divided by the population at the entrance age for the last grade of lower secondary education.	
Adult literacy rate	Adult literacy rate is the percentage of people ages 15 and above who can both read and write with understanding a short simple statement about their everyday life.	
Average years of schooling	Expected years of schooling is the number of years a child of school entrance age is expected to spend at school, or university, including years spent on repetition. It is the sum of the age-specific enrolment ratios for primary, secondary, post-secondary non-tertiary and tertiary education.	Institute for Health Metrics and Evaluation
<b>Social Protection and Health</b>		
Life expectancy at birth, total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	
Mortality rate, infant (per 1,000 live births)	Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.	United Nations
Mortality rate, neonatal (per 1,000 live births)	Neonatal mortality rate is the number of neonates dying before reaching 28 days of age, per 1,000 live births in a given year.	
UHC service coverage index	Coverage index for essential health services (based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access). It is presented on a scale of 0 to 100.	World Health Organization
Physicians (per 1,000 people)	Physicians include generalist and specialist medical practitioners.	
Nurses and midwives (per 1,000 people)	Nurses and midwives include professional nurses, professional midwives, auxiliary nurses, auxiliary midwives, enrolled nurses, enrolled midwives and other associated personnel, such as dental nurses and primary care nurses.	World Health Organization, OECD
Hospital beds (per 1,000 people)	Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centers. In most cases beds for both acute and chronic care are included.	World Health Organization
<b>Product market</b>		
Administrative requirements	This measures how regulations restrain entry and reduce competition. A high score indicates that prices are determined in the markets.	
Bureaucracy costs	This measures how bureaucratic procedures restrain entry and reduce competition. A high score indicates free entry in the market so that there is no increase in the cost of producing goods.	
Extent of market dominance	It characterizes the corporate activity in the country. 1= dominated by a few business groups; 7= spread among many firms and uses 2011-12 weighted average.	World Economic Forum
<b>Potential output growth and its components</b>		
Potential output growth	Potential output growth estimated using the multivariate filter	Authors' estimate using the multivariate filter
NAIRU	Nonaccelerating inflation rate of unemployment	
Capital stock	Total stock of capital	Penn World Tables and authors' estimates based on the perpetual inventory method.
Depreciation rate of capital stock	Depreciation rate of the capital stock	Penn World Tables
Working-age population	Working-age population	UN Department of Economic and Social Affairs International Labor Organization Estimates and Projections
Labor force participation	Labor force participation	
<b>Other macroeconomic variables</b>		
Gross domestic product	Gross domestic product in constant prices denominated in the national currency	
Real GDP growth	Growth rate of real GDP	IMF, World Economic Outlook; and HCP
Inflation	Inflation rate	
Unemployment	Unemployment rate	



Table 2. List of countries in the sample

Afghanistan	Dominica	Madagascar	Senegal
Albania	Dominican Republic	Malawi	Serbia
Algeria	Ecuador	Malaysia	Seychelles
Angola	Egypt	Maldives	Sierra Leone
Antigua and Barbuda	El Salvador	Mali	Solomon Islands
Argentina	Equatorial Guinea	Marshall Islands	Somalia
Armenia	Eritrea	Mauritania	South Africa
Aruba	Eswatini	Mauritius	South Sudan
Azerbaijan	Ethiopia	Mexico	Sri Lanka
Bahamas, The	Fiji	Micronesia, Fed. States of	St. Kitts and Nevis
Bahrain	Gabon	Moldova	St. Lucia
Bangladesh	Gambia, The	Mongolia	St. Vincent and the Grenadines
Barbados	Georgia	Montenegro, Rep. of	Sudan
Belarus	Ghana	Morocco	Suriname
Belize	Grenada	Mozambique	Syria
Benin	Guatemala	Myanmar	Tajikistan
Bhutan	Guinea	Namibia	Tanzania
Bolivia	Guinea-Bissau	Nauru	Thailand
Bosnia and Herzegovina	Guyana	Nepal	Timor-Leste, Dem. Rep. of
Botswana	Haiti	Nicaragua	Togo
Brazil	Honduras	Niger	Tonga
Brunei Darussalam	Hungary	Nigeria	Trinidad and Tobago
Bulgaria	India	North Macedonia	Tunisia
Burkina Faso	Indonesia	Oman	Türkiye
Burundi	Iran	Pakistan	Turkmenistan
Cabo Verde	Iraq	Palau	Tuvalu
Cambodia	Jamaica	Panama	Uganda
Cameroon	Jordan	Papua New Guinea	Ukraine
Central African Republic	Kazakhstan	Paraguay	United Arab Emirates
Chad	Kenya	Peru	Uruguay
Chile	Kiribati	Philippines	Uzbekistan
China	Kosovo	Poland	Vanuatu
Colombia	Kuwait	Qatar	Venezuela
Comoros	Kyrgyz Republic	Romania	Vietnam
Democratic Republic of the Congo	Lao P.D.R.	Russia	West Bank and Gaza
Congo, Republic of	Lebanon	Rwanda	Yemen
Costa Rica	Lesotho	Samoa	Zambia
Côte d'Ivoire	Liberia	São Tomé and Príncipe	Zimbabwe
Djibouti	Libya	Saudi Arabia	



# PUBLICATIONS

**Assessing the Impact of Structural Reforms on Potential Output: The Case of Morocco**  
Working Paper No. WP/2023/222