TURKEY

SELECTED ISSUES

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INTERNATIONAL MONETARY FUND

TURKEY

SELECTED ISSUES

November 21, 2019

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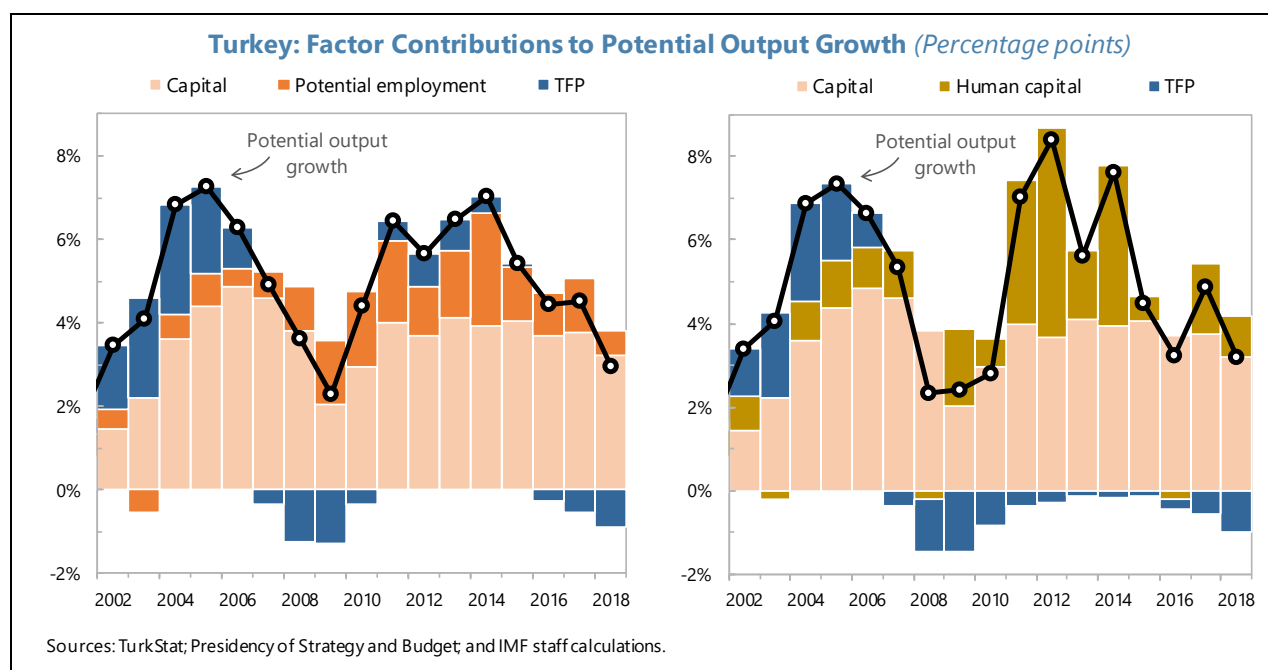## CONTENTS

PRODUCTIVITY PAYOFFS OF STRUCTURAL REFORMS IN TURKEY

A.   Introduction

1.   Turkey's economy has grown rapidly over the past decade, mainly by increasing inputs. With an average annual real growth of around 5½ percent over the last 10 years, Turkey has been one of the fastest growing economies in G20 and other larger emerging markets. However, growth has become more unbalanced. Strong post-2009 output growth has been largely due to increased capital accumulation, driven by construction investment activities and financed, in large part externally, and by rapid credit growth. Labor inputs also contributed positively to growth, supported by a pick-up in female labor force participation—but its contribution appears to have leveled off in recent years. Over the same period, the high investment rate (greater than the neo-classical golden rule benchmark would suggest), together with high inflation and elevated private sector and external debt, point to past over-investment.[1]

Turkey: Factor Contributions to Potential Output Growth *(Percentage points)*

Sources: TurkStat; Presidency of Strategy and Budget; and IMF staff calculations.

2.   Growth prospects have weakened due, among other things, to declining total factor productivity (TFP) growth, calling for well-prioritized productivity-enhancing structural reforms. The high contributions of factor inputs is consistent with average annual TFP growth declining from 1.9 percent in 2002–06 to around zero in 2010–18. As the potential of input-led

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[1] IMF Country Report No. 18/110, Annex I.

growth is slowing, structural reforms are needed to boost productivity and Turkey's medium-term growth potential. Nonetheless, as in many other countries, undertaking structural reforms can be economically and politically challenging including due to their possible temporary costs.[2] Prioritizing reform measures and packaging reforms to benefit from their complementarities are therefore key to the success and durability of reforms.

3.   This paper will assess the role of structural reforms in enhancing productivity growth in advanced and emerging economies, and discuss results that are relevant for Turkey. The paper is structured as follows. To investigate the role of structural reforms in boosting productivity growth, Section B first describes the stochastic frontier set-up for analyzing factors that affect output through technical efficiency; and subsequently presents empirical results. To highlight policy priorities for Turkey, the section also simulates productivity gains from closing the structural reform gaps between Turkey and its benchmark. Section C discusses policy implications and concludes.

B.   Technical Efficiency Gains from Structural Reforms

Empirical Framework

4.   To estimate the impact of structural reforms on productivity growth, TFP growth is decomposed into contributions from common technological change and a country-specific technical efficiency; and is estimated using a stochastic frontier analysis (SFA) approach. Following Cardarelli and Lusinyan (2015); and Lusinyan (2018), the level of output for country i at time t, $Y_{i,t}$, can be written as:

$$Y_{i,t} = \{f(X_{i,t};\beta) \cdot exp(v_{i,t})\} \cdot \theta_{i,t}(Z_{i,t};\delta) \tag{1}$$

where $\{f(X_{i,t};\beta) \cdot exp(v_{i,t})\}$ is the country-specific efficiency frontier – in which $X_{i,t}$ denotes the quantities of inputs (capital and labor); β denotes the vector of parameters that define the production function, $f(\cdot)$; and $v_{i,t}$ is $iid\ N(0,\sigma_v^2)$ random shocks. $\theta_{i,t}(Z_{i,t};\delta)$ is the country-specific distance of the actual output from the efficiency frontier (or the technical efficiency), ranging between $(0,1]$, whereby $\theta_{i,t} = 1$ indicates that the country produces the optimal output at the efficiency frontier.[3] The technical efficiency can in turn be described as a function of structural variables, $Z_{i,t}$, with corresponding parameters, δ.

As opposed to the traditional way of regressing TFP growth, proxied by a Solow-type residual, on structural reforms variables, the SFA approach allows for a simultaneous estimation of the parameters of the stochastic frontier production function, and the model for technical efficiency using a maximum likelihood method (Battese and Coelli, 1995; and Belotti et al, 2013). Using a log-

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[2] See for example Bouis et al (2012), Cacciatore et al (2012), Banerji et al (2016), and IMF (2016).

[3] To focus on the role of country-specific structural reforms, the common technological change is assumed to be zero, as is typically assumed in the existing literature.

linear Cobb-Douglas production function with capital ($K_{i,t}$) and labor ($L_{i,t}$) inputs, Equation (1) can be rewritten as:

Efficiency Frontier: $\quad \ln Y_{i,t} = \beta_0 + \beta_K \ln K_{i,t} + \beta_L \ln L_{i,t} + v_{i,t} - u_{i,t}$ $\qquad\qquad$ (2)

Model of Inefficiency: $\quad u_{i,t} = \delta_0 + \delta_Z \ln Z_{i,t} + w_{i,t}$ $\qquad\qquad\qquad\qquad$ (3)

where $u_{i,t} = -\ln\theta_{i,t}$ is the country-specific inefficiency. The point estimate of technical efficiency can then be calculated as $E\big(exp(-u_{i,t}|e_{i,t})\big)$ with $e_{i,t}$ being the model's error term comprised of the two independent, unobservable, error terms, $v_{i,t} - u_{i,t}$.

5.   The efficiency frontier and technical inefficiency are estimated over cross-country panel data, using a broad range of structural reform variables.[4] A sample of about 110 advanced and emerging economies covering 1990–2017 is constructed for the analysis. Macroeconomic variables—such as real output, stock of capital, employment, and output gap—are obtained from the IMF's World Economic Outlook (WEO) database, the Penn World Table, and the World Bank's World Development Indicators (WDI). A number of data sources are used for structural reform variables covering the areas highlighted by the literature—such as business regulations, labor market (rigidity, wage-setting, skills), and domestic and foreign competition in the product markets.[5] The structural reform variables used in the regressions are those available for a relatively longer time span (See Appendix I for data description and sources). Correlations between structural variables from different sources are also analyzed and presented as robustness checks.

Empirical Results

6.   Indicators of the business and regulatory environment, as well as labor and product markets are found to affect technical efficiency. The results of the SFA regressions using the aggregate indicators of structural reforms are presented in Table 1, with the first sub-panel showing the estimated frontier production function and the second sub-panel showing the simultaneously estimated model of inefficiency. Better regulatory quality to support private sector development and higher competition in the product markets are associated with higher efficiency (negative impacts on inefficiency). Labor market flexibility, as well as education and training, also help reduce inefficiency. In terms of the magnitude of the impact, labor market flexibility seems to be associated with the largest efficiency gains, followed by competition in the product markets, regulatory quality, and education.

7.   Using sub-indicators of these broad reform categories provides a robustness check and highlights specific aspects of labor and product markets that are key to enhancing

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[4] In all regressions, the output gap and output volatility variables are also included in the model of inefficiency to control for cyclical variation which could impact efficiency.

[5] See for example, Prati et al (2013), IMF (2015, 2016), Bordon et al (2016), Biljanovska and Sandri (2018), and Lusinyan (2018). Some of these studies also include variables capturing structural reforms related to the financial sector, such as restriction to bank competition and access to finance. In most SFA specification, the coefficient estimates of these variables are statistically insignificant (results not shown here), and hence are dropped from the analysis.

efficiency. Table 2 displays the results when inefficiency is estimated as a function of detailed structural indicators, which are sub-components of labor market flexibility, product market competition, and education and training.

- Among various aspects of *labor market flexibility*, the analysis suggests a relatively higher efficiency impact from rigidity related to hiring and firing practices, followed by alignment between compensation and productivity. Although good worker-employer relations and flexibility of the wage-setting mechanism are found to have a positive effect on efficiency, the effects are small and/or statistically insignificant.

- In terms of *regulatory environment and competition*, variables related to domestic competition—such as the extent of market dominance and time required to start a business—play a larger role in enhancing efficiency than those related to foreign competition—such as trade barriers.

- Related to *human capital*, quality of education and educational outcomes are positively associated with higher efficiency. However, the effect of on-the-job training in reducing inefficiency is not statistically significant.

Table 1. Stochastic Frontier Analysis with Conditional Inefficiency— Broad Structural Reform Indicators [1/ 2/]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: *Log of GDP in 2011-PPP$ (in millions)*						
Frontier							
Log of capital stock in 2011-PPP$	0.760***	0.753***	0.670***	0.679***	0.654***	0.614***	0.640***
(in millions)	(0.007)	(0.006)	(0.075)	(0.022)	(0.046)	(0.099)	(0.085)
Log of employed persons (in millions)	0.224***	0.230***	0.323***	0.318***	0.332***	0.365***	0.351***
	(0.001)	(0.012)	(0.072)	(0.024)	(0.051)	(0.103)	(0.087)
Time trend	0.006	0.005***	0.006***	0.001	-0.004	-0.003	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.004)	(0.003)	(0.005)
Constant	1.538**	1.776***	2.880***	2.808***	3.345***	3.744***	3.455***
	(0.073)	(0.120)	(0.957)	(0.424)	(0.351)	(1.191)	(0.957)
Mean Inefficiency							
Dummy: Negative output gap			0.215**	0.088***	0.074***	0.116***	0.085***
			(0.100)	(0.010)	(0.004)	(0.037)	(0.019)
Regulatory quality			-0.194***				-0.076***
			(0.056)				(0.013)
Government effectiveness			0.010				0.058
			(0.302)				(0.139)
Labor market flexibility				-0.142***			-0.091***
				(0.012)			(0.024)
Competition					-0.174**		-0.082***
					(0.074)		(0.019)
Education and training						-0.144	-0.063***
						(0.124)	(0.006)
Dummy: Emerging markets			0.074	0.082**	0.033	0.077	0.005
			(0.056)	(0.038)	(0.046)	(0.142)	(0.004)
Constant		-30.393	0.092	0.789***	1.119***	0.838**	1.349***
		(21.640)	(0.187)	(0.103)	(0.145)	(0.423)	(0.020)
Observations	3,024	3,024	2,060	1,041	1,041	1,041	1,030
Number of countries	112	112	111	100	100	100	99
Time period	1990-2017	1990-2017	1996-2017	2007-2017	2007-2017	2007-2017	2007-2017
R2	0.970						
Log likelihood		-1,180.8	-618.6	-130.3	-133.9	-151.9	-118.1

1/ * p<0.1 ** p<0.05 *** p<0.01.
2/ Clustered standard errors (at the income-group level) in parentheses.

Table 2. Stochastic Frontier Analysis with Conditional Inefficiency— Sub-indicators of Structural Reforms [1/] [2/]

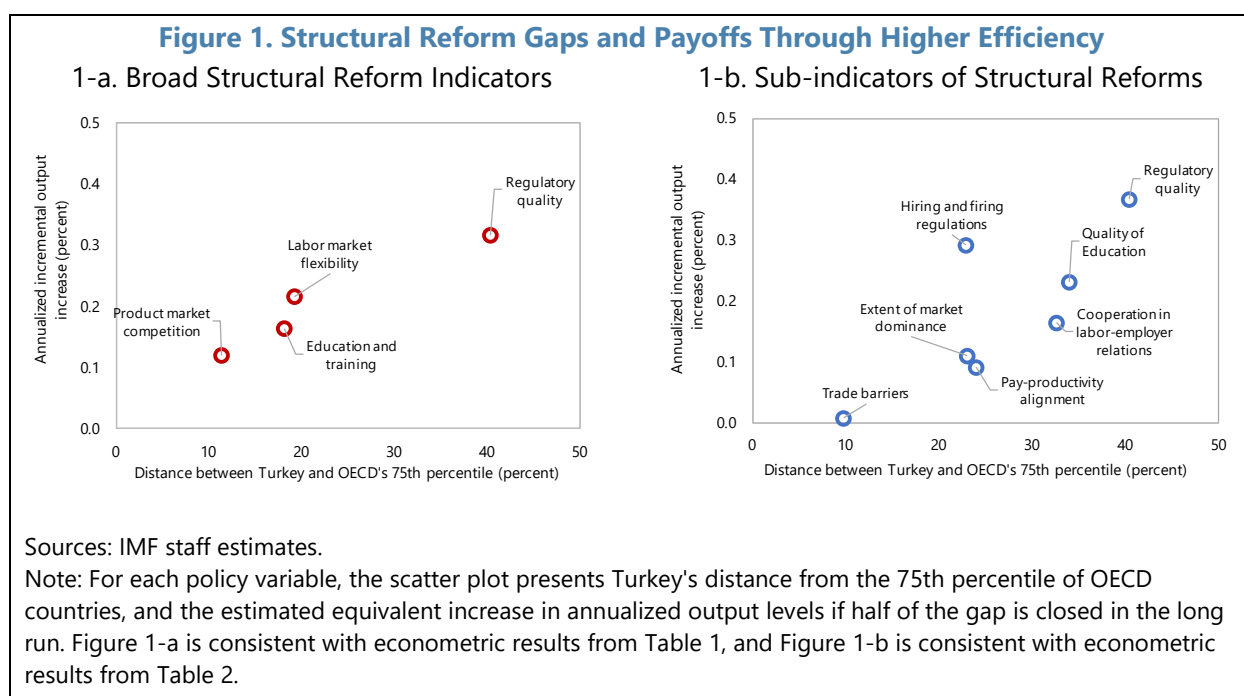|	Dependent variable: *Log of GDP in 2011-PPP$ (in millions)*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Frontier							
Log of capital stock in 2011-PPP$	0.753***	0.670***	0.664***	0.628***	0.643***	0.616***	0.498***
(in millions)	(0.006)	(0.075)	(0.106)	(0.119)	(0.117)	(0.116)	(0.032)
Log of employed persons (in millions)	0.230***	0.323***	0.332***	0.348***	0.335***	0.363***	0.480***
	(0.012)	(0.072)	(0.108)	(0.123)	(0.122)	(0.119)	(0.039)
Time trend	0.005***	0.006***	0.001	0.001	0.000	-0.003	-0.002
	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)	(0.010)
Constant	1.776***	2.880***	3.045**	3.532**	3.335**	3.724**	5.154***
	(0.120)	(0.957)	(1.367)	(1.495)	(1.531)	(1.458)	(0.315)
Mean Inefficiency							
Dummy: Negative output gap		0.215**	0.095***	0.105***	0.088***	0.105***	0.101**
		(0.100)	(0.028)	(0.030)	(0.031)	(0.033)	(0.051)
Regulatory quality		-0.194***	-0.115*	-0.135***	-0.103***	-0.089**	-0.095**
		(0.056)	(0.066)	(0.026)	(0.037)	(0.043)	(0.049)
Government effectiveness		0.010	0.001	0.003	-0.009	0.006	-0.026**
		(0.302)	(0.188)	(0.239)	(0.194)	(0.162)	(0.013)
Hiring and firing regulations			-0.107***		-0.098***	-0.115***	-0.124***
			(0.006)		(0.005)	(0.009)	(0.043)
Cooperation in labor-employer relations			-0.049***		-0.018***	-0.037***	-0.0211**
			(0.011)		(0.006)	(0.013)	(0.010)
Flexibility of wage determination					-0.028	-0.051	-0.076
					(0.046)	(0.039)	(0.173)
Pay-productivity alignment			-0.054***		-0.042**	-0.032*	-0.048**
			(0.010)		(0.019)	(0.017)	(0.012)
Extent of market dominance				-0.089***	-0.065***	-0.039*	-0.044**
				(0.005)	(0.004)	(0.017)	(0.021)
Number of procedures to start business				-0.020	-0.022	-0.026	-0.018
				(0.026)	(0.024)	(0.026)	(0.014)
Number of days to start business				0.028	0.025	0.024	0.090**
				(0.032)	(0.031)	(0.027)	(0.038)
Prevalence of trade barriers				0.092	-0.008**	-0.007**	-0.007**
				(0.083)	(0.004)	(0.003)	(0.003)
Quality of education						-0.052***	
						(0.003)	
Standardized PISA scores [3/]							-0.040**
							(0.016)
On-the-job training						-0.039	-0.260
						(0.055)	(0.173)
Dummy: Emerging market		0.074	-0.026***	-0.036***	-0.028***	-0.034**	-0.006
		(0.056)	(0.010)	(0.001)	(0.010)	(0.016)	(0.136)
Constant	-30.393	0.092	0.584***	0.346	0.560**	1.022***	0.528**
	(21.640)	(0.187)	(0.068)	(0.217)	(0.249)	(0.230)	(0.231)
Observations	3,024	2,060	1,030	1010	1,010	1,010	182
Number of countries	112	111	99	99	99	99	67
Time period	1990-2017	1996-2017	2007-2017	2007-2017	2007-2017	2007-2017	2009-2015
Log likelihood	-2,244.8	-620.4	-132.8	-123.4	-118	-105.2	42.7

1/ * $p<0.1$ ** $p<0.05$ *** $p<0.01$.

2/ Clustered standard errors (at the income-group level) in parentheses.

3/ PISA stands for Program for International Student Assessment.

8. **Structural reform priorities for Turkey can be identified by the expected gains from closing existing structural policy gaps.** Turkey's structural policy gaps are measured by comparing the country to the 75th percentile of OECD countries, and the impacts on long-run real GDP growth are simulated for a scenario that assumes that Turkey moves closer to the OECD benchmark. Specifically, as most reforms take time and their effects typically materialize gradually (see for example Dabla-Norris et al, 2015; Bordon et al, 2016; IMF, 2016; and IMF, Forthcoming), the simulation assumes that the structural policy indicators for Turkey converge towards the chosen OECD benchmark over a twenty-year period. Figure 1 presents both the policy gaps between Turkey and the OECD benchmark and the expected long-run gains from closing half of the gaps based on the SFA regression results from Tables 1 and 2.

- Turkey lags further behind the OECD benchmark in the areas of regulatory quality, quality of education, and worker-employer relations (Figure 1-b, on the x-axis). Meanwhile, the structural policy gaps related to hiring and firing regulations and the extent of market dominance are moderate, and there's only a small gap on foreign competition, measured by the prevalence of trade barriers.

- The simulations show that reducing the gaps in regulatory quality and adopting more flexible hiring and firing regulations are likely to have the strongest impact on technical efficiency (Figure 1-b), raising annualized output levels by around 0.3 percentage points over a 20-year period. Moving towards the OECD benchmark on quality of education would be associated with an additional annualized output levels of 0.2 percentage points. Meanwhile, reducing the extent of market dominance and improving pay-productivity alignment and cooperation in worker-employer relations towards the OECD benchmark would also yield some, albeit smaller, output gains.

Figure 1. Structural Reform Gaps and Payoffs Through Higher Efficiency

Sources: IMF staff estimates.
Note: For each policy variable, the scatter plot presents Turkey's distance from the 75th percentile of OECD countries, and the estimated equivalent increase in annualized output levels if half of the gap is closed in the long run. Figure 1-a is consistent with econometric results from Table 1, and Figure 1-b is consistent with econometric results from Table 2.

9.   The empirical results should not be viewed as precise payoffs, but rather be used to guide reform prioritization. Due to potential endogeneity problems and also relatively smaller gains found in the recent literature (IMF, 2019), these empirical results should be interpreted with caution. Nevertheless, the relative payoff magnitudes across different reforms could help inform policy prioritization.

Cross-checking Structural Reform Variables from Different Data Sources

10.   To minimize bias or other methodological limitations attached to specific structural reform indicators alternative indicators from other sources are also used. While the regression analysis relies mainly on structural reform indicators from the World Bank and the World Economic Forum due to their availability, the correlations between these indicators and similar indicators from other sources—such as the OECD, the Fraser Institute, and the World Bank's Doing Business—are presented in Appendix II. Most structural reform indicators from various sources are strongly correlated with each other, especially those related to business and regulatory environment and labor market conditions, suggesting that the results are generally robust to variable choice and source.[6]

C. Policy Implications and Conclusion

11.   Structural reforms to improve hiring and firing regulations, the business and regulatory environment, and skills are found to have the largest estimated long-term productivity gains for Turkey. Closing each of these policy gaps by half, relative to the OECD benchmark, is associated with output gains equivalent to an increase in annual real GDP growth of around 0.2–0.3 percentage points. Meanwhile, other structural reforms related to both labor and product markets—such as enhancing competitiveness in the product market, better aligning pay and productivity, and improving worker-employer relations—are also expected to yield positive gains equivalent to about 0.1 percentage point increase in the real GDP growth rate.

12.   To bolster Turkey's sustainable medium-term growth prospects, structural reforms should be implemented sooner rather than later, and any possible negative reform impacts in the short run could be limited by a reform sequencing and reform complementarities. Although the dynamic impact of structural reforms and reform complementarities are beyond the scope of this paper, some other studies find that the short-run negative impacts can be mitigated as follows.[7]

- Given short-term macroeconomic challenges, product market reforms could deliver short-term gains that do not depend strongly on the economic cycle, and hence should be undertaken early. Product market efficiency could be enhanced by simplifying business entry and exit and

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[6] The correlations between some product market reform indicators from different sources are slightly weaker, potentially due to a smaller number of observations (as indicators from alternative sources span over a much shorter time period). However, they remain statistically significant.

[7] See, for example, Bouis et al (2012), IMF WEO Chapter (2016), Duval and Furceri (2018), and IMF WEO Chapter (Forthcoming) for discussions on the dynamic impact of structural reforms.

addressing administrative and regulatory barriers to competition (OECD, 2016). In addition, energy prices could follow an automatic pricing mechanism, which would help improve efficiency and contain contingent sovereign liabilities. On the other hand, reforms related to labor markets should be carefully calibrated, especially on job protection, due to potential short-run negative impacts when economic conditions are not as strong.[8]

- In addition, the reform-growth relationship is highly heterogeneous and could be influenced by the country's institutional environment (Prati et al, 2013). Although it was relatively more difficult to advance, improvements in governance seem to have been associated with higher payoffs of structural reforms in some Eastern European countries during the 1990s through mid-2000s (Roaf et al, 2014). IMF (2019) also finds that the quality of governance matters for the magnitude of gains from structural reforms. Particularly in emerging markets and low-income countries, structural reforms can deliver large gains where governance is strong; but will be less successful in paying off where governance is weak.
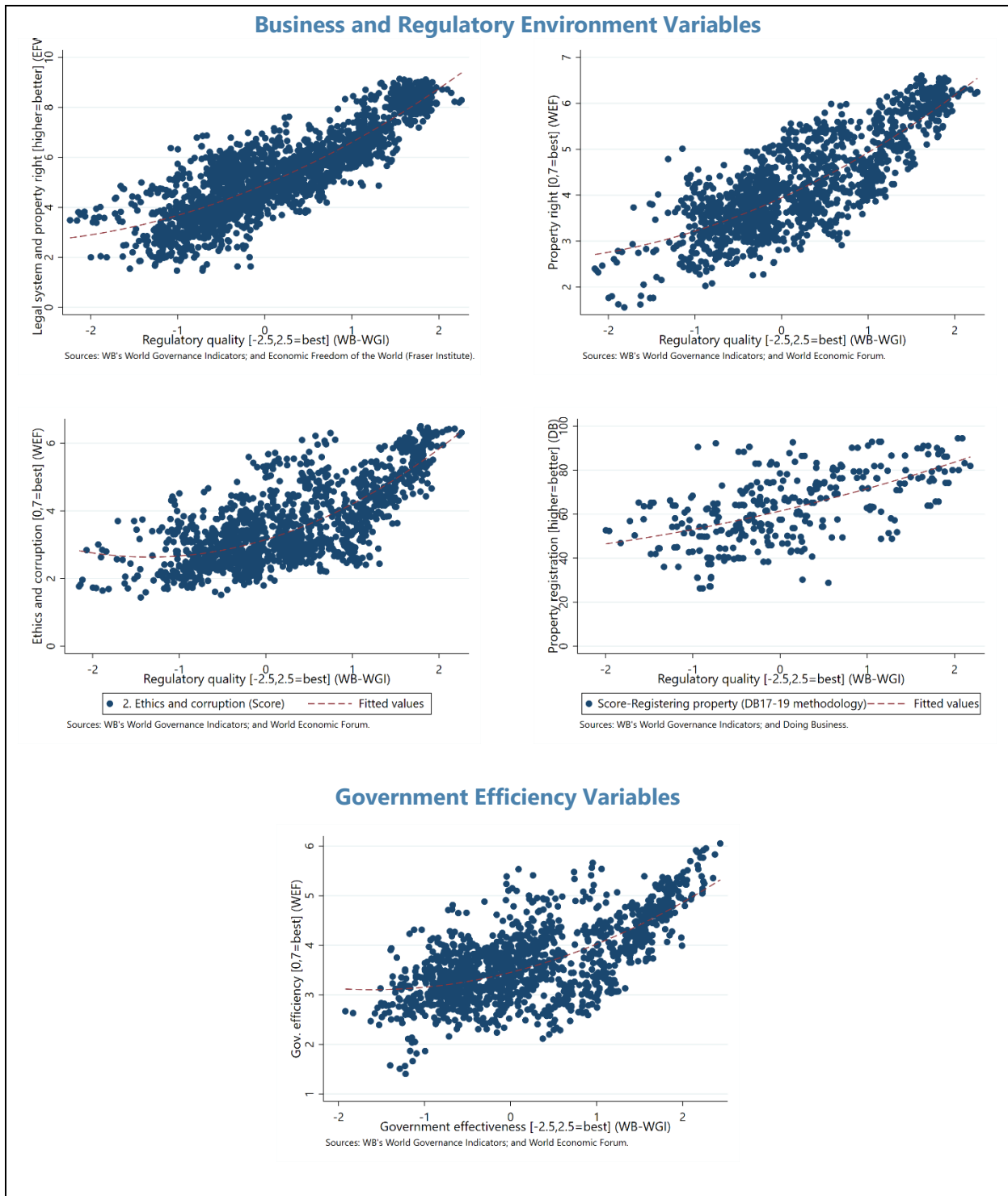
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[8] It is important to note that, in some cases, even with weak demand and limited fiscal and monetary policy support, the short-run negative effects could be reduced by implementing both labor and product market reforms in tandem (Caldera-Sanchez et al, 2016). Product market reforms to reduce entry barriers and enhance stronger competition could help lower prices, increase output and employment, and so reduce the negative impacts of labor market reforms on real wages and employment. A well-communicated, comprehensive, and credible reform package could also help improve business and consumers' confidence, which could in turn boost consumption today and reduce the need for excessive precautionary savings.
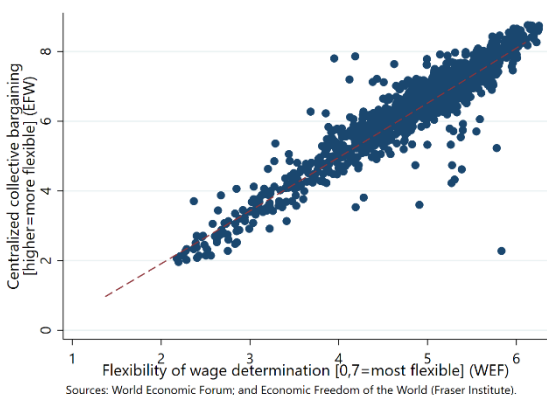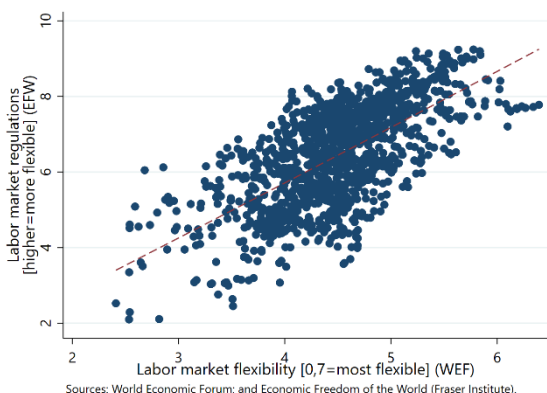
Appendix I. Data Description and Sources

Variable	Description	Source
Macro variables		
Output	GDP in 2011-purchasing power parity (PPP) international dollars (in millions).	IMF WEO
Capital	Total capital stock in 2011-PPP international dollars (in millions).	Penn World Table (PWT), 9.1
Labor	Number of persons being employed (in millions).	PWT, 9.1
Output gap	Estimated output gap (percent of potential GDP).	IMF WEO
Output volatility	5-year coefficient of variation of the output variable.	IMF WEO
Structural reform variables		
Regulatory quality	Indicator of regulatory quality. The index ranges from -2.5 to 2.5 (best).	WB Worldwide Governance Indicators (WGI)
Government effectiveness	Indicator of government effectiveness. The index ranges from -2.5 to 2.5 (best).	WGI
Competitiveness of the product market	Index of product market efficiency, measured by extent of market dominance, effectiveness of anti-monopoly policy, tax incentives, costs and procedures of starting domestic and foreign business, tariffs and non-tariff barriers. The index ranges from 0 (no competition) to 7 (high competition).	World Economic Forum (WEF)
Extent of market dominance	Index of product market efficiency, measured by extent of market dominance. The index ranges from 0 (dominated by only few business groups) to 7 (spread across many firms).	WEF
Procedures to start business	Number of procedures to start business.	WEF
Days to start business	Number of days to start business.	WEF
Prevalence of trade barriers	Index of product market efficiency, measured by trade barriers (both tariff and non-tariff). The index ranges from 0 (least barriers) to 7 (most barriers).	WEF
Labor market flexibility	Index of labor market flexibility, measured by perceptions of union-employer cooperation, flexible hiring and firing practices, and flexibility of wage determination. The index ranges from 0 (inflexible) to 7 (most flexible).	WEF
Efficient use of labor force	Index of labor efficiency, measured by alignment of pay and productivity, country capacity to retain and attract talent, and female labor force participation. The index ranges from 0 (inefficient) to 7 (most efficient).	WEF
Hiring and firing regulations	Index of labor market efficiency, measured by hiring and firing regulations. The index ranges from 0 (rigid) to 7 (least rigid).	WEF
Cooperation in worker-employer relations	Index of labor market efficiency, measured by worker-employer relations. The index ranges from 0 (generally confrontational) to 7 (generally cooperative).	WEF
Flexibility of wage determination	Index of labor market efficiency, measured by wage determination flexibility. The index ranges from 0 (inflexible) to 7 (most flexible).	WEF
Pay-productivity alignment	Index of labor market flexibility, measured by alignment of pay and productivity. The index ranges from 0 to 7 (most aligned).	WEF
Education and training	Index of higher education and training. The index ranges from 0 to 7 (best).	WEF
Quality of education	Index of higher education and training, measured by quality of the education system. The index ranges from 0 to 7 (best).	WEF
On-the-job training	Index of higher education and training, measured by on-the-job skill training. The index ranges from 0 to 7 (best).	WEF
PISA scores	Average PISA scores of the three subjects (reading, maths, sciences).	OECD

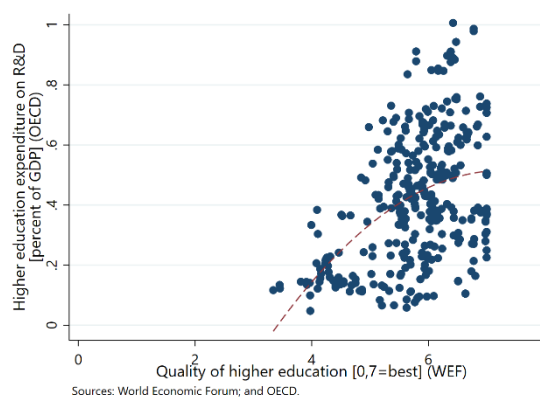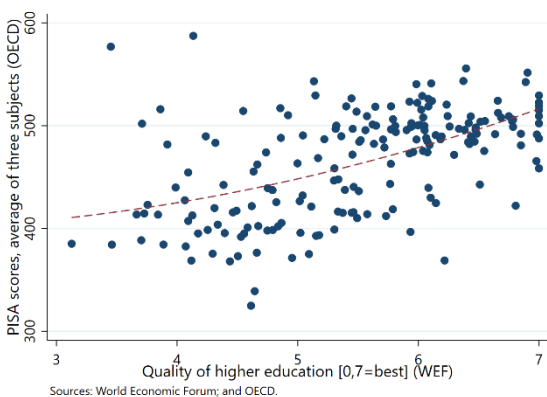| Variable	Description	Source
Structural reform variables for robustness checks		
Legal system and property rights	Rating of legal system and property rights. The higher rating indicates a better quality system.	Economic Freedom of the World (EFW)
Property rights	Index of public institutions, measured by quality and existence of property rights. The index ranges from 0 to 7 (best).	WEF
Ethics and corruption	Index of public institutions, measured by ethical standards and the perception of corruption. The index ranges from 0 to 7 (best).	WEF
Property registration	Index measuring steps, time, and costs involved in registering property.	Doing Business Indicators (DB)
Government efficiency	Index of public institutions, measured by government efficiency. The index ranges from 0 to 7 (most efficient).	WEF
Business regulation	Rating of business regulations, measured by procedures and costs of starting business, licensing restrictions, and tax compliance. The higher rating indicates better performance.	EFW
Adminstrative burdens for corporation	Indicator of product market regulations (PMR), measured by administrative burdens for corporations. The higher indicator represents stricter regulations.	OECD
Adminstrative burdens for sole propreitor firms	Indicator of PMR, measured by administrative burdens for sole propreitor firms. The higher indicator represents stricter regulations.	OECD
Adminstrative burdens for startups	Indicator of PMR, measured by administrative burdens for startups. The higher indicator represents stricter regulations.	OECD
Legal barriers	Indicator of PMR, measured by existence of legal barriers to conduct business. The higher indicator represents stricter regulations.	OECD
Price controls	Indicator of PMR, measured by existence of price controls. The higher indicator represents stricter regulations.	OECD
Scope of SOEs	Indicator of PMR, measured by existence of SOEs. The higher indicator represents larger SOE coverage.	OECD
Tariff barriers	Indicator of PMR, measured by existence of tariff barriers. The higher indicator represents stricter regulations.	OECD
Labor market regulations	Rating of labor market regulations, measured by hiring and firing regulations, costs of dismissals, minimum wages, and centralized collective bargaining. The higher rating indicates better performance.	EFW
Hiring and firing regulations	Rating of hiring and firing regulations. The higher rating indicates higher flexibility (less rigid regulations).	EFW
Collective bargaining	Rating of collective bargaining. The higher rating indicates higher flexibility (less rigid regulations).	EFW
Regulation of regular employment	Indicator of employment protection measured by regulations of regular employment contract. The indicator ranges from 0 to 6 (most restricted).	OECD
Education expenditures	Higher education expenditure on R&D (percent of GDP).	OECD

Appendix II. Cross-checking Structural Reform Variables
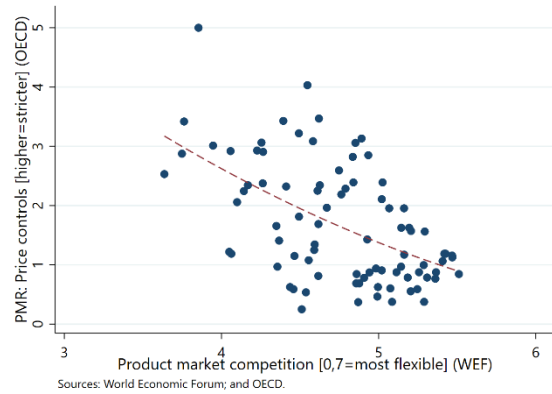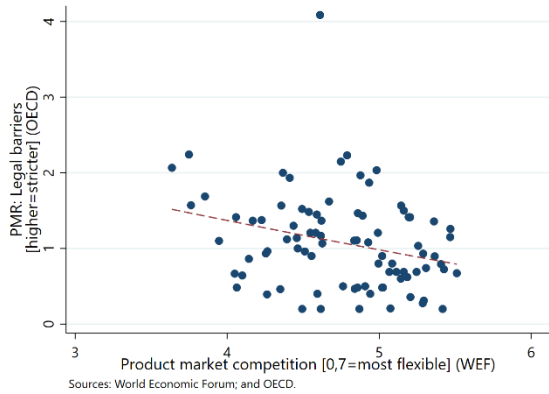
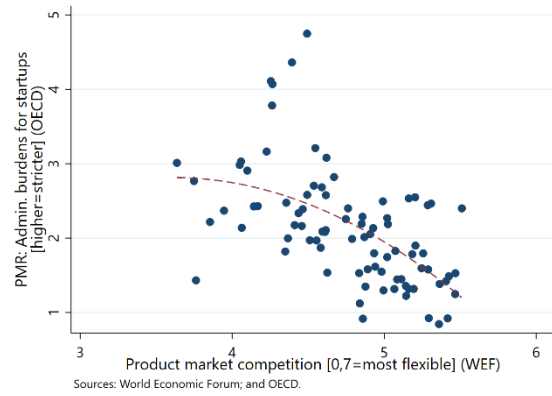## Business and Regulatory Environment Variables

Sources: WB's World Governance Indicators; and Economic Freedom of the World (Fraser Institute).

Sources: WB's World Governance Indicators; and World Economic Forum.

Sources: WB's World Governance Indicators; and World Economic Forum.

Sources: WB's World Governance Indicators; and Doing Business.

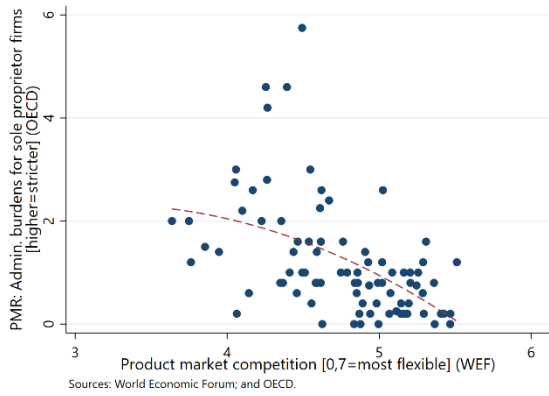## Government Efficiency Variables

Sources: WB's World Governance Indicators; and World Economic Forum.

Labor Market Flexibility Variables

Sources: World Economic Forum; and Economic Freedom of the World (Fraser Institute).

Sources: World Economic Forum; and Economic Freedom of the World (Fraser Institute).

Sources: World Economic Forum; and Economic Freedom of the World (Fraser Institute).

Sources: World Economic Forum; and OECD.

Education Variables

Sources: World Economic Forum; and OECD.

Sources: World Economic Forum; and OECD.

Product Market Regulation and Competition Variables

Sources: World Economic Forum; and OECD.
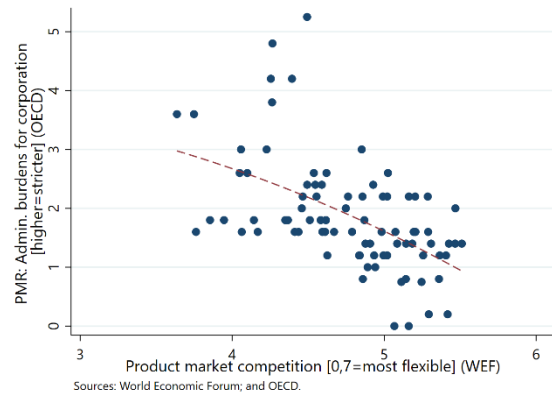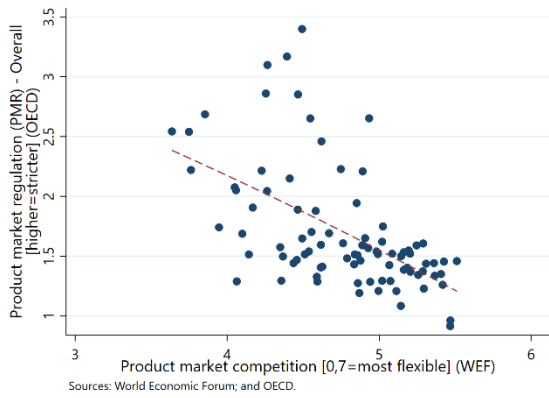
Product Market Regulation and Competition Variables (concluded)

Sources: World Economic Forum; and OECD.

Sources: World Economic Forum; and OECD.
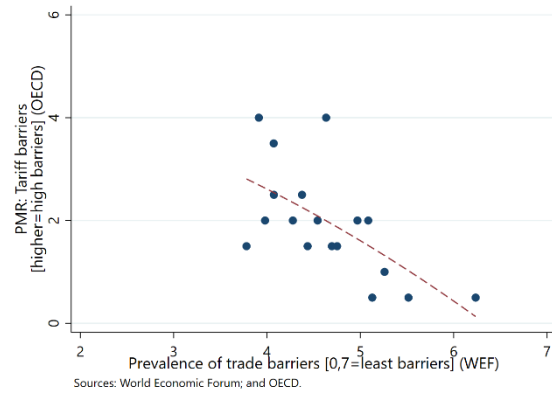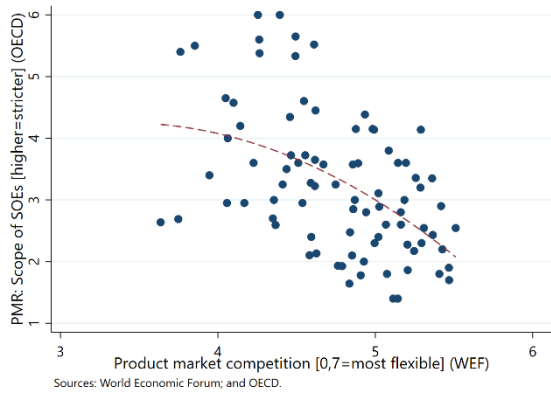
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