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Identifying Structural Reform Gaps in Emerging Europe, the Caucasus, and Central Asia

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Identifying Structural Reform Gaps in Emerging Europe, the Caucasus, and Central Asia[1]

Prepared by Norbert Funke, Asel Isakova, and Maksym Ivanyna

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Abstract

Using data from the World Economic Forum's *Global Competitiveness Report* as an example, this paper compares structural indicators for 25 countries in Emerging Europe, the Caucasus, and Central Asia with a generic country with similar charactersitics that is 40 percent richer as well as a country with the average EU income. This comparison suggests that improvements will be particularly crucial in the areas of institutions, financial market development, infrastructure, goods and labor market efficiency and areas related to innovation. For the generally more ambitious goal of reaching average EU income, the reform needs are correspondingly larger. The methodology focuses on (approximate) comparisons between countries and does not try to establish the link between structural reforms and growth. While we test for changes in empirical specifications, caveats relate to the quality of structural indicators, possible non-linearities, and reform complementarities. The approach can be applied to other indicators and at a more granular level.

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CONTENTS **PAGE**

TABLES

FIGURES

I. Introduction

Structural reforms are often seen as central to increasing potential growth, which has declined since the global financial crisis began, and to reduce public debt. In many advanced economies, interest rates have hit the zero lower bound and fiscal space is limited. Structural reforms are advocated to stimulate growth and reduce public debt. In emerging markets, they are expected to promote faster economic convergence and to overcome the middle-income trap. At the 2014 G-20 meeting, structural reforms were emphasized as a means of promoting recovery, with governments agreeing to adopt national growth strategies. Since then the emphasis on structural reforms has been renewed.

There is empirical cross-country evidence that structural reforms are beneficial for growth,[2] with a more recent analysis suggesting that short- and medium-term impacts depend on economic conditions (Duval, Furceri, et al. 2016). A number of empirical microeconomic studies have demonstrated the positive effect of particular national reforms (e.g., Besley and Burgess 2002; Fabiano and Viviano 2011; Banerjee, Duflo, and Qian 2012). However, macroeconomic and microeconomic studies of structural reforms do not often make it easy to compare reform needs in different areas. Cross-country regressions usually use an aggregate index of reforms that lacks detail, and microeconomic studies are often too granular, with their results dependent on country- and reform-specific institutions. Meanwhile, because government resources are limited, there is a need to prioritize reforms.

On average, countries with higher per capita income tend to score better on structural indicators, as evidenced by the close correlation between level of development and structural reform indicators. Moreover, reform priorities may change over time as development advances, moving from basic institutional and macroeconomic reforms to reforms to improve efficiency, such as those related to human capital, product, labor and financial markets, and reforms that focus on innovation policies (see also World Economic Forum 2015).

In identifying essential reforms, authorities may want to take into account explicitly the level of development. As countries aspire to achieve a higher level of development, authorities might ask how a country compares to a (generic) country with similar characteristics but which has already achieved a certain higher level of income?[3] Such comparisons can provide additional insights compared to looking at absolute scores or rankings of various reform indicators. Countries that may look quite similar in terms of structural indicators—for example, countries with a similar overall ranking in the 2015–16 Global Competitiveness Index, such as Slovenia (59), Macedonia

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[2] See Acemoglu, Simon, and Robinson 2004; Barkbu et al. 2012; Bordon, Ebeke, and Shirono. 2016; Dabla-Norris, Ho, and Kyobe 2013, 2016; Gomes et al. (2011); IMF 2015, 2016; McAdam and Stracca (2015); Ostry, Prati, and Spilimbergo 2009; Vamvakidis 2009. However, some studies recommend caution: Krugman (2014) considers a blanket call for structural reforms to be "intellectually lazy and destructive"; and some reforms may hurt, especially in the short run (see, e.g., Babecky and Havranek 2013).

[3] This question is often implied in reports like the IMF Article IV reports, when a country's reform indicators are compared to such benchmarks as regional neighbors, countries with similar income, or other structural characteristics.

(60), Hungary (63), Georgia (66), Slovak Republic (67) and Montenegro (70)—may in fact be viewed differently once the level of development is taken into account.

Prior to the global financial crisis, between 2000–2007 per capita GDP in the ECA region increased by about 60 percent on average but is projected to grow by only about 20 percent between 2015–21. It appears unlikely that countries will on average achieve pre-crisis growth rates in the coming years. At the same time, projected growth rates for the coming years are unsatisfactorily low. The best performing country in the region, Georgia, is projected to grow by some 40 percent during 2015-2021, broadly in line with the average of the regional average during the years prior to the global financial crisis and the projected regional average growth rate for the coming years. We take some middle ground and use a 40 percent increase in income as one of two benchmarks.

In this paper, we compare in a cross-sectional analysis structural indicators for 25 countries in emerging Europe, the Caucasus, and Central Asia (ECA)[4] with those of a generic country that is 40 percent wealthier as well as a country with the average EU income. Using data from the World Economic Forum (WEF) 2015-16 *Global Competitiveness Report* (GCR) as example, Section 2 describes the empirical methodology. Section 3 presents the findings, transforms the gaps into a heat map, and discusses the results. Section 4 identifies the largest gaps in the region on a more disaggregated level. Section 5 performs some robustness checks. Finally, Section 6 discusses some limitations of the approach and possible extensions.

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In the benchmarking exercise that assumes that countries in the region aspire to increase their incomes by 40 percent in the coming years, about one-third to more than half of the countries were found to have large reform needs in institutions, financial market development, infrastructure, goods and labor market efficiency, and areas related to innovation. With the generally more ambitious goal of reaching the average income in the EU (with the exception of Slovenia), the list of reforms expands considerably. The findings are reasonably robust to changes in various model specifications.

The analysis involves several caveats, including those related to (1) the quality and consistency of data, (2) the nature of the link between structural indicators and per capita income, and (3) and reform complementarities. It is inherently difficult to collect reliable structural reform data; country-specific biases cannot be ruled out. To illustrate our approach, we use data from the GCR, which is based on survey data, unlike other indicators, such as the World Bank (WB) Doing Business Indicators, which are generally based on the application of rules and regulations. While the assessment of certain reform areas covered in the GCR and WB reports leads on average to broadly similar results, in a given country the results based on different data sources may differ. The paper abstracts from explicitly linking structural reforms to growth. The time series available are short and include the period after the global financial crisis, during which macro policies differed widely. That is why the focus of this analysis is on comparing structural indicators to a "generic" country with higher income per capita.

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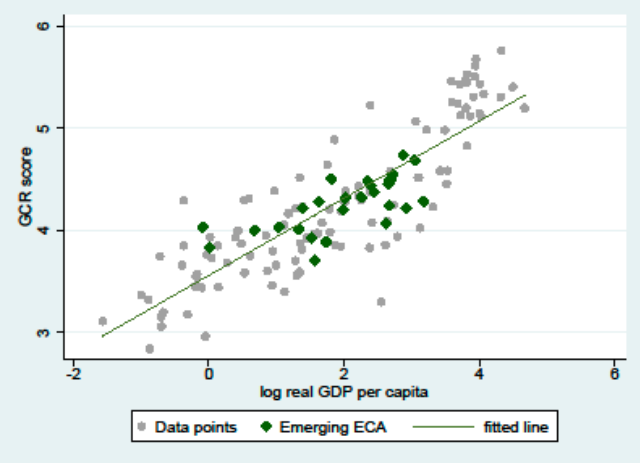
[4] The paper looks at the region in a holistic manner, notwithstanding that countries are at different development stages. For example, the Czech Republic belongs to the "other advanced economies" grouping while Slovakia and Slovenia are both "advanced euro area economies" in the Fund's World Economic Outlook classification.

II. Structural Reform Gaps: Estimation

A number of studies have used benchmarking to identify reform needs. In its "Going for Growth" analysis, the OECD (2013, 2015) benchmarks countries against the OECD median.[5] The World Bank (2015) *Doing Business* report computes scores for distance to the frontier. The *Transition Report* of the European Bank for Reconstruction and Development compares countries to the absolute maximum score on a number of reform indicators. For CESEE countries IMF (2016) uses various benchmarks, including advanced Europe and benchmarks for drivers of growth (labor, investment, and productivity). However, none of these methodologies take the level of income explicitly into account in benchmarking. Benchmarking indicators to level of development or other structural characteristics is common in other areas of economics, such as for example in the tax effort literature[6] or the IMF External Balance Assessment methodology (Phillips et al. 2013).

To measure the degree of structural development, we use the GCR data from the 2015-16 report. The GCR reports more than 126 indicators for up to 148 countries; these are grouped in 12 broad areas, which the report calls pillars: 1–institutions, 2–infrastructure, 3–macroeconomic environment, 4–health and primary education, 5–higher education and training, 6–goods market efficiency, 7–labor market efficiency, 8–financial market development, 9–technological readiness, 10–market size, 11–business sophistication, and 12–innovation. Each country is scored on each pillar from 1 (worst) to 7 (best).

Figure 1. GCR Score and GDP per Capita in 2015



Source: WEF 2015, JVI.

[5] The advantage of the OECD "Going for Growth" project over this study is that it links particular policies to outcomes, while we mostly deal with outcomes directly.

[6] See, for example, Haldenwang and Ivanyna, 2012

Empirically, there is a close positive correlation between per capita income and structural indicators (Figure 1): countries with higher per capita income tend to have better structural indicators. There is a similar correlation between disaggregated structural reform indicators and real GDP per capita (Figure 2).

Figure 2. Global Competitiveness and Real GDP per Capita, 2015

Close correlations between Structural Indicators and GDP per Capita

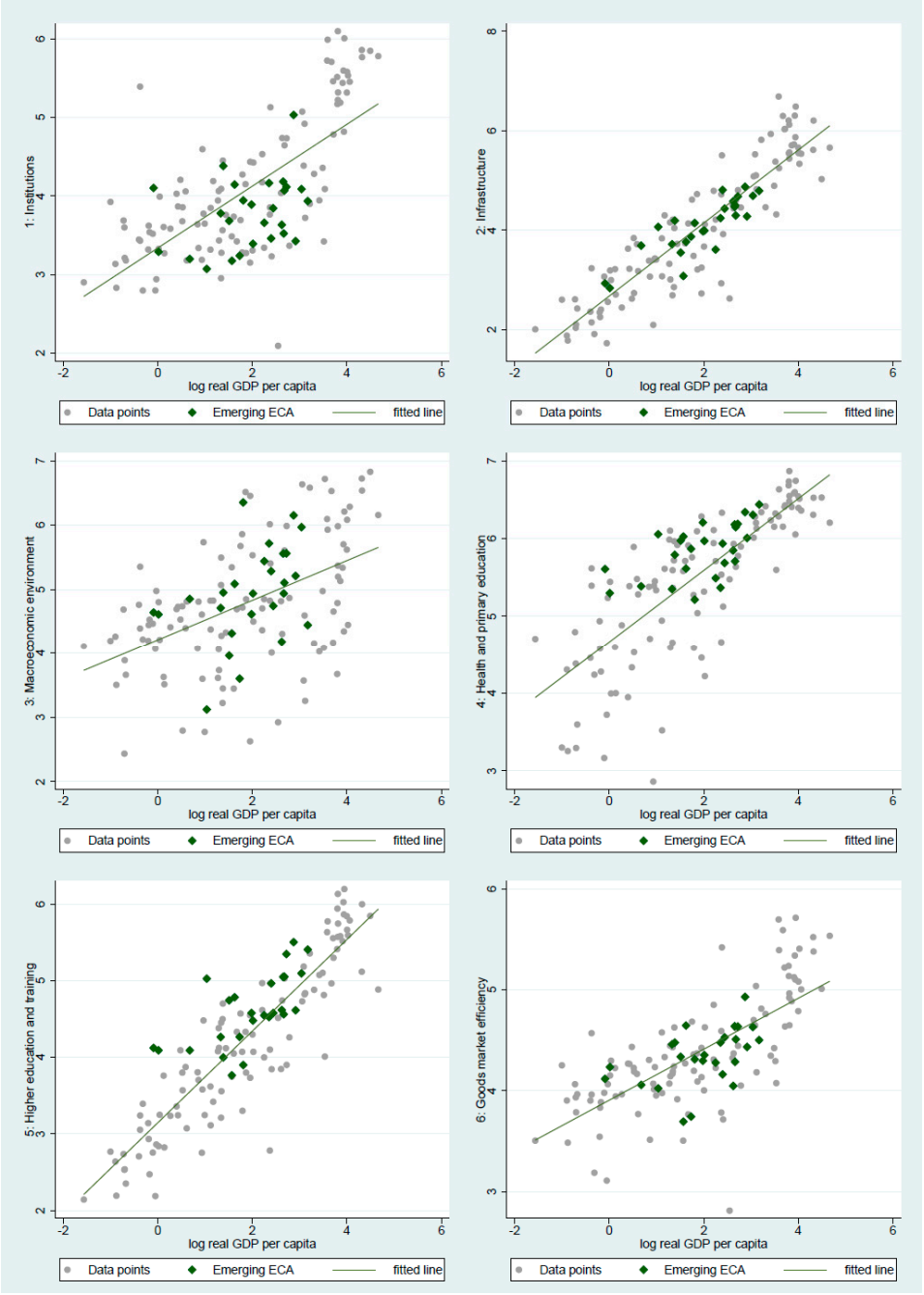
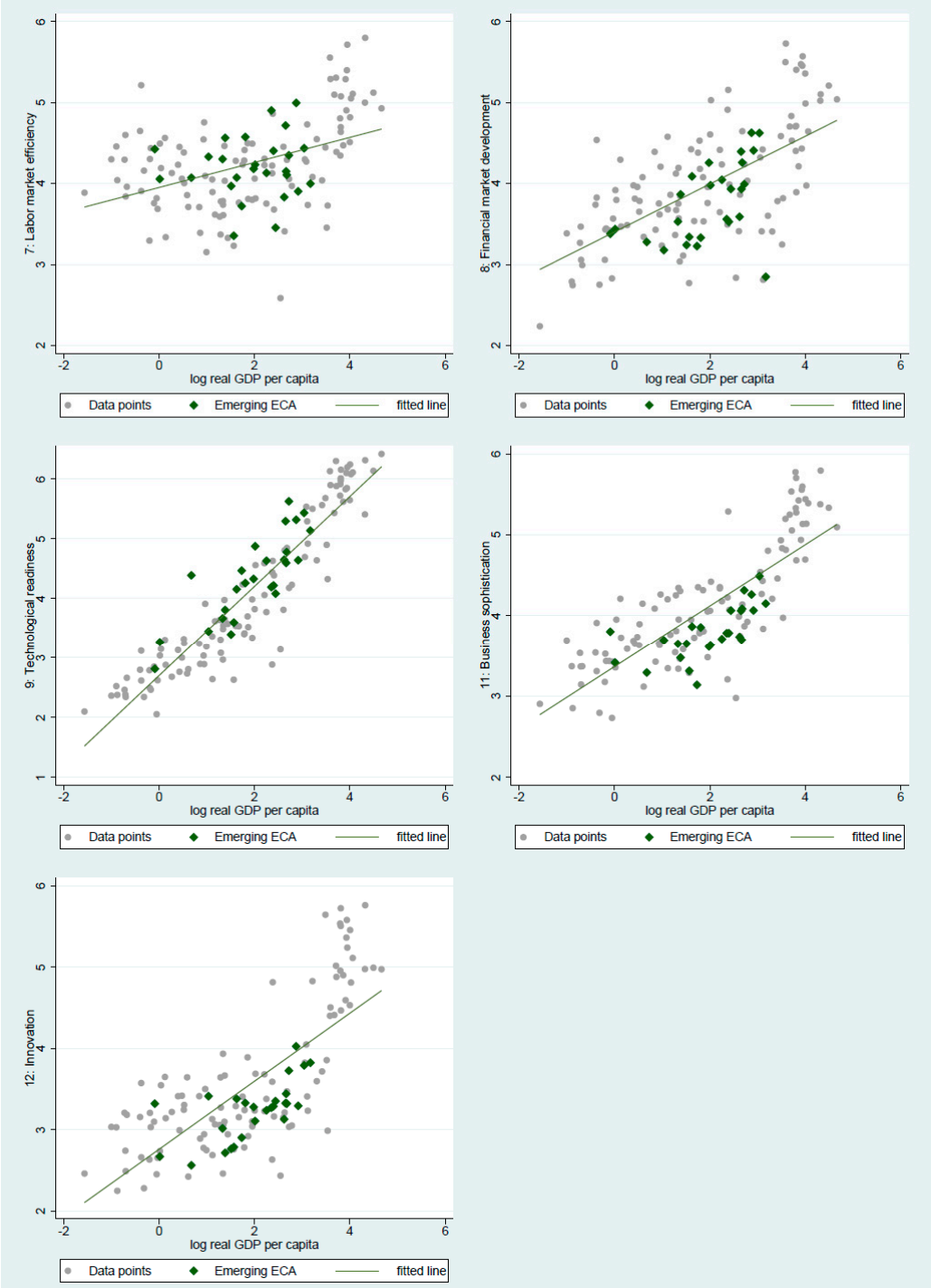


Figure 2 (cont). Global Competitiveness and Real GDP per Capita, 2015



Source: WEF 2015.

Note: For each pillar, scores are specified on the vertical axis and each country is scored from 1 (worst) to 7 (best). Pillar 10 (market size) is excluded from the analysis.

In what follows, we estimate the formal link between reform indicators and per capita income, as well as other structural characteristics. We then use the results to compare structural indicators of a given country to those with a generic country that has a 40 percent higher per capita income. We begin by running the following regression for each indicator:

$$I_i^k = \alpha + \beta X_i + \epsilon_i, \quad (1)$$

where I_i^k is indicator *k* in country *i* and X_i is the set of controls; α, β estimated parameters, ε_i the error term. To proxy for level of development, we take the logarithm of annual income per capita in 2015 (measured by GDP per capita) in 2005 prices.

As the initial specification, we choose the regression that includes only a constant and per capita income. As with GDP per capita, all structural reform indicators are logged in order to give less weight to potential outliers. The summary statistics are provided in Appendix Table A1.1.

The difference (or gap) k between the structural indicator in country i and that of a generic country with 40 percent higher income is defined as the residual in regression evaluated for a country with a 40 percent higher income (1):

$$gap_i^k = I_i^k - \hat{\alpha} - \hat{\beta} Y_{i(+40\ percent)} \quad (2)$$

Each gap is weighted by the inverse of its standard deviation to unify the units of measurement; this allows for comparisons both between countries and between indicators within the same country. For example, if a *k*-gap in country *i* is Z, that means that in that country indicator k is Z standard deviations from the trend of a country which is 40 percent richer. If the distribution of the *k*-gap is close to normal, a gap of –1.65 means that relative to a generic country with 40 percent higher per capita income, country *i* performs worse than 95 percent of the sample. A positive Z implies a positive gap for country *i*—it performs better than an average hypothetical country with a 40 percent higher income per capita and other structural characteristics.

Table 1 shows the regression results based on the initial specification for 11 out of 12 GCR pillars.[7] As expected, in all areas covered by the GCR index, income per capita has a positive and statistically significant coefficient. On average, across all reform areas richer countries tend to be more advanced on structural reforms. However, the fit varies across different reform indicators. It appears closest in the areas of infrastructure and technological readiness. The link appears weakest in the area of labor markets, in part reflecting that labor market rigidities persist in several advanced economies. To check for the sensitivity of the results, for each pillar, Appendix 2

[7] Because part of market size, the size of the domestic market, is not really a reform area and the result is not statistically significant, this pillar is excluded from the analysis.

presents eight different specifications of equation (1), including dummies for ECA and resource-rich countries[8], estimations with other regional and country-specific dummies and GDP per capita squared, to account for possible nonlinearity. Resource-rich countries trail others with the same income in almost all reform areas, which suggests that resource rents may at least partially crowd out structural reforms. On average ECA emerging countries tend to perform relatively better in a few areas than countries elsewhere with a similar income level, for example in infrastructure quality, macroeconomic environment, education and health care, and technological readiness. However, on average these countries tend to lag in the areas of institutions, business sophistication, and innovation.[9] Overall, the results are qualitatively similar across different specifications. Countries with a higher per capita income tend to score better on structural reform indicators.

Table 1. Regression Results: Initial Specification

Dependent Variable - Logarithm of GCR Pillar Score

Variables	Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5	Pillar 6	Pillar 7	Pillar 8	Pillar 9	Pillar 11	Pillar 12
lngdp_pc	0.07***	0.15***	0.05***	0.07***	0.12***	0.05***	0.03***	0.06***	0.15***	0.07***	0.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)
Constant	1.47***	1.31***	1.64***	1.73***	1.42***	1.59***	1.60***	1.48***	1.32***	1.48***	1.33***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Observations	132	132	132	132	132	132	132	132	132	132	132
R-squared	0.45	0.80	0.21	0.56	0.77	0.48	0.15	0.38	0.86	0.63	0.54
Adjusted R2	0.45	0.80	0.20	0.55	0.77	0.48	0.15	0.38	0.86	0.62	0.54
AIC	-179.4	-199.7	-121.1	-232.4	-239.8	-318.3	-236	-202.6	-264.1	-277.6	-185.9

Robust standard errors in parentheses

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

Source: Authors' calculations.

[8] For example, resource-rich countries generally have lower public debt and higher saving rates, which would boost their score on macroeconomic environment, only controlling for their income. Emerging ECA countries generally tend to have relatively higher levels of higher education – a legacy of the past policies. An additional reason to include the dummies is to more precisely estimate the relationship between structural reform stance and income per capita

[9] Debt as a percent of GDP is an important subcomponent of pillar 3 that measures the macroeconomic environment.

III. Benchmarking: Results

In what follows, we analyze structural reform indicators using two benchmarks: countries with per capita income that is higher by 40 percent, and a hypothetical country with income per capita equivalent to the EU average. Figure 3 shows the resulting differences (gaps) for structural indicators for 25 ECA countries. The blue bars represent the range of gaps relative to the case with 40 per cent higher per capita income calculated from eight different specifications; the green diamonds show the size of the gaps based on our initial specification again relative to a country with 40 per cent higher per capita income; and the red diamonds mark the average weighted gap across all specifications. The average gap is a weighted average of gaps from all eight specifications, using the absolute values of the Akaike information criterion as weights.[10] Finally, blue circles define the size of reform gaps relative to a hypothetical country with EU average per capita income. The gap from our initial specification (green diamonds) is generally close to the average gap (red diamonds) for most pillars and countries, except several cases, but reform gaps relative to the EU average are in most cases larger.

Tables 2–3 transform visually the gaps between the structural indicators of a country and its two generic comparators into reform heat maps: differences compared to a generic country with a 40 percent higher per capita income, and gaps relative to the EU average.[11] We define a gap to be *very large* if it is smaller than –1.65; *large* if it is between –0.5 and –1.65; *medium* if it is between –0.5 and 0.5; and *low* if it is above 0.5 standard deviations. While the thresholds involve some judgment, the interpretation is intuitive if the distribution of gaps approximates a normal distribution.[12] For example, a gap of –0.5 means that the country is performing worse than about 70 percent of the sample (assuming a specific income level). A gap of –1.65 implies that the country is below the 5th percentile. A gap of zero means the country is performing as well as about half of the countries in the sample. While a positive gap implies that a country is on an income-adjusted basis in the better half of the sample, it does not mean that there is no need for reform.

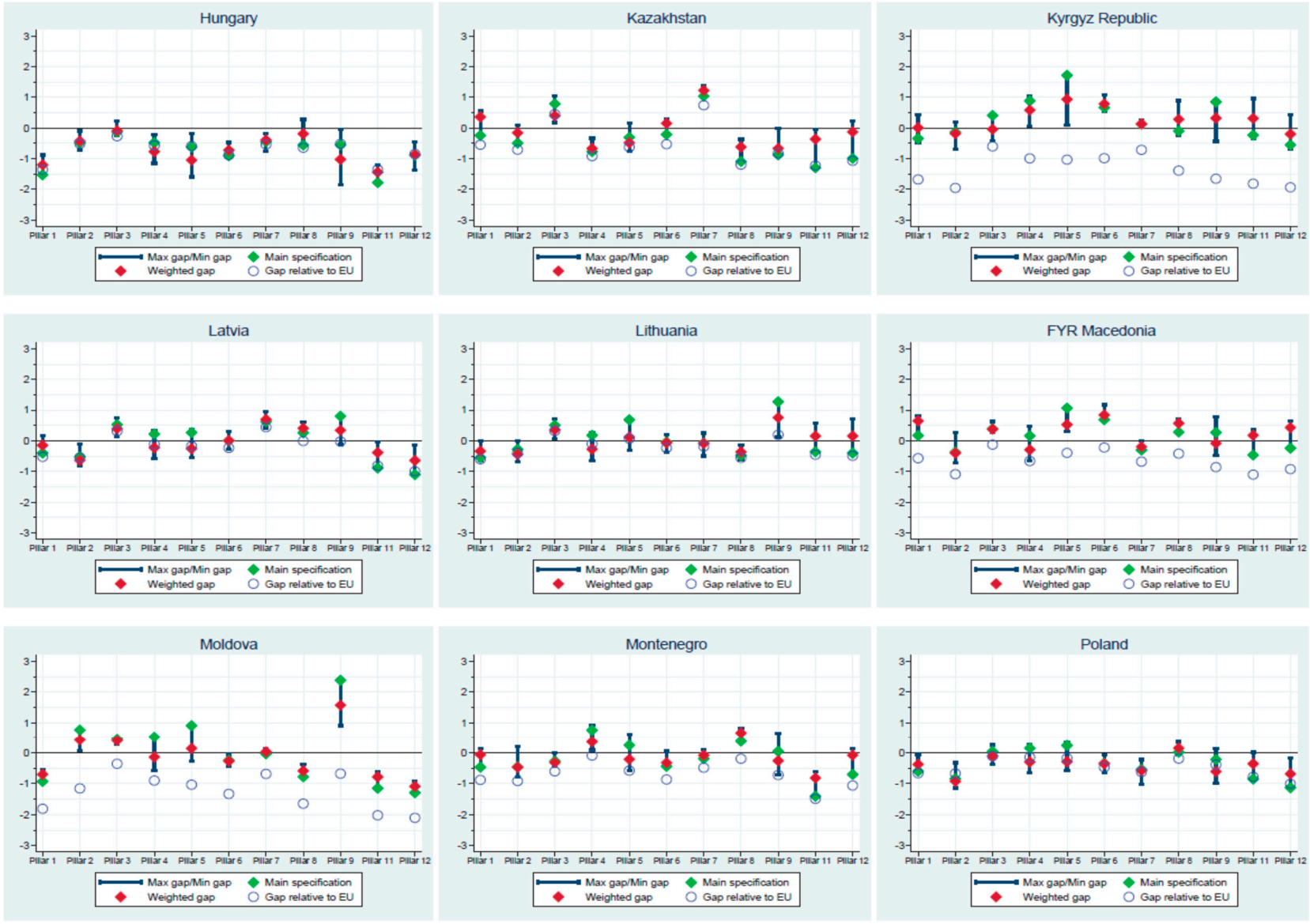
[10] Specifically, the weight of a gap from specification *i* is calculated as: $\omega_i = \frac{|AIC_i|}{\sum_i |AIC|}$.

[11] Appendix table A1.2 shows the (absolute) scores of the global competitiveness index (1-7(best)) for each pillar.

[12] On average, for 2015 the reform gaps in 135 countries approximate a normal distribution reasonably well: 5.6 percent of them are very large (smaller than –1.65), and 28 percent are smaller than –0.5. See also Appendix 5.

Figure 3. Reform Gaps: Comparing Structural Reform Indicators to Various Benchmarks

The vertical axis depicts the standard deviation from the trend of the generic benchmark. A negative number implies that the country lags (see text). 1–institutions, 2–infrastructure, 3–macroeconomic environment, 4–health and primary education, 5–higher education and training, 6–goods market efficiency, 7–labor market efficiency, 8–financial market development, 9–technological readiness, 11–business sophistication, and 12–innovation.



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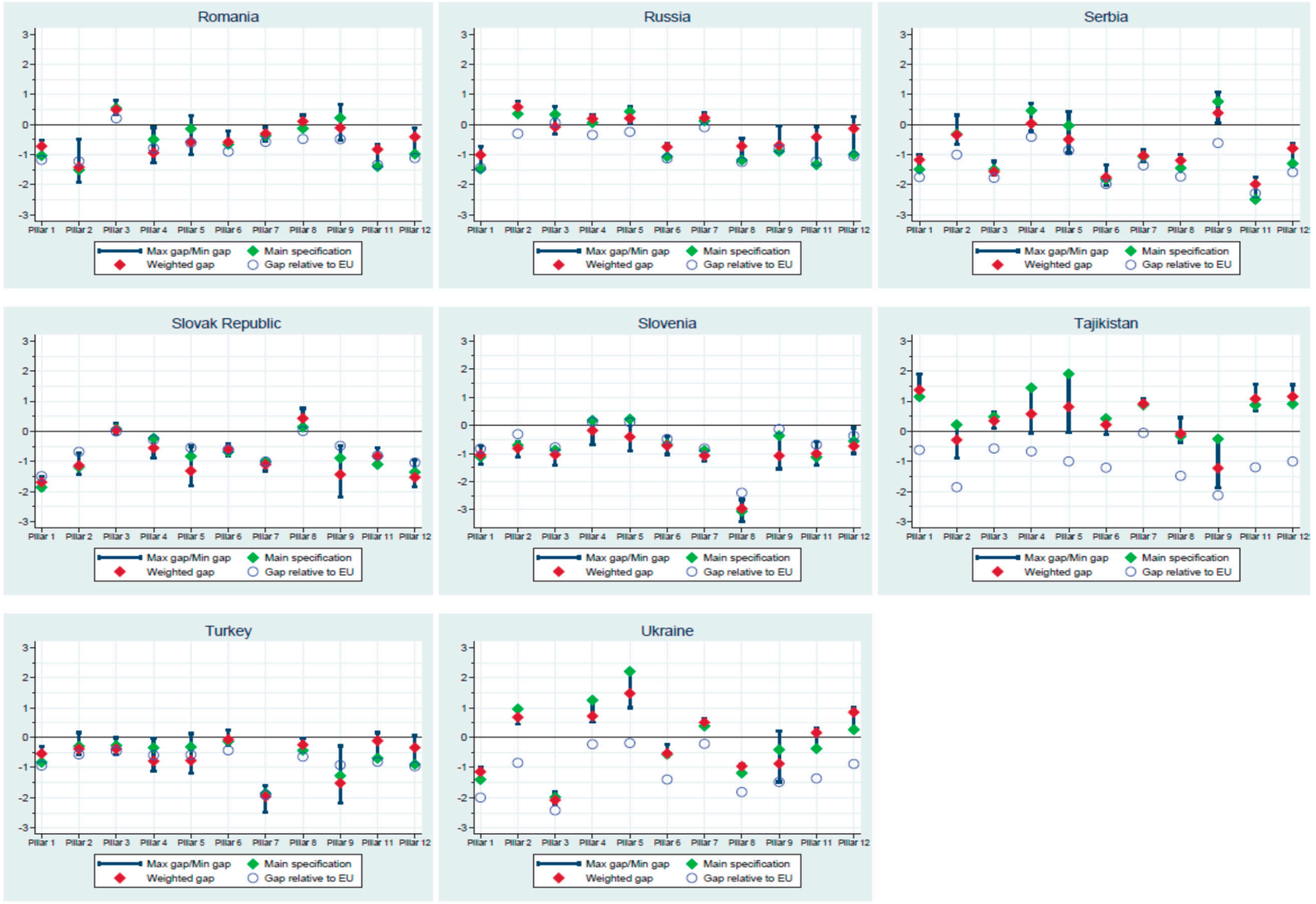


The vertical axis depicts the standard deviation from the trend of the generic benchmark. A negative number implies that the country lags (see text). 1–institutions, 2–infrastructure, 3–macroeconomic environment, 4–health and primary education, 5–higher education and training, 6–goods market efficiency, 7–labor market efficiency, 8–financial market development, 9–technological readiness, 11–business sophistication, and 12–innovation.

Table 2. Reform Needs Based On Comparing Structural Reform Indicators in Emerging ECA to a Generic Country with 40 Percent Higher per Capita Income

	Institutions	Infra-structure	Macro-economic environment	Health and primary education	Higher education and training	Goods market efficiency	Labor market efficiency	Financial market development	Techno-logical readiness	Business sophi-stication	Innovation
Albania	LARGE	LARGE	LARGE	LOW	LOW	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	LARGE
Armenia	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	LARGE	LARGE
Azerbaijan	MEDIUM	MEDIUM	LOW	LARGE	LARGE	MEDIUM	LOW	LARGE	MEDIUM	large	MEDIUM
Bosnia and Herzegovina	LARGE	VERY LARGE	MEDIUM	LOW	LARGE	VERY LARGE	VERY LARGE	LARGE	LARGE	VERY LARGE	LARGE
Bulgaria	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LARGE	LARGE
Croatia	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE
Czech Republic	LARGE	LARGE	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE
Estonia	LOW	MEDIUM	LOW	MEDIUM	LOW	LOW	LOW	LOW	MEDIUM	LARGE	MEDIUM
Georgia	LOW	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	LARGE	LARGE
Hungary	LARGE	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE	MEDIUM	LARGE	LARGE	VERY LARGE	LARGE
Kazakhstan	MEDIUM	MEDIUM	LOW	LARGE	MEDIUM	MEDIUM	LOW	LARGE	LARGE	LARGE	LARGE
Kyrgyz Republic	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM	LOW	MEDIUM	LARGE
Latvia	MEDIUM	LARGE	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	LOW	LARGE	LARGE
Lithuania	LARGE	MEDIUM	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM
Macedonia	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Moldova	LARGE	LOW	MEDIUM	low	LOW	MEDIUM	MEDIUM	LARGE	LOW	LARGE	LARGE
Montenegro	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE
Poland	LARGE	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	LARGE
Romania	LARGE	LARGE	LOW	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE
Russian Federation	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE
Serbia	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	VERY LARGE	LARGE	LARGE	LOW	VERY LARGE	LARGE
Slovak Republic	VERY LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE
Slovenia	LARGE	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	VERY LARGE	MEDIUM	LARGE	LARGE
Tajikistan	LOW	MEDIUM	MEDIUM	LOW	LOW	MEDIUM	LOW	MEDIUM	medium	LOW	LOW
Turkey	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	VERY LARGE	MEDIUM	LARGE	LARGE	LARGE
Ukraine	LARGE	LOW	VERY LARGE	LOW	LOW	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM

Table 3. Reform Needs Based on Comparing Structural Reform Indicators s in Emerging ECA Relative to EU Average Income

	Institutions	Infra-structure	Macro-economic environment	Health and primary education	Higher education and training	Goods market efficiency	Labor market efficiency	Financial market development	Techno-logical readiness	Business sophi-stication	Innovation
Albania	LARGE	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	VERY LARGE	LARGE	LARGE	VERY LARGE
Armenia	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE
Azerbaijan	LARGE	LARGE	LOW	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE
Bosnia and Herzegovina	VERY LARGE	VERY LARGE	LARGE	MEDIUM	LARGE	VERY LARGE	VERY LARGE	LARGE	LARGE	VERY LARGE	VERY LARGE
Bulgaria	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	MEDIUM	LARGE	MEDIUM	LARGE	LARGE
Croatia	LARGE	MEDIUM	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE
Czech Republic	LARGE	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Estonia	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	LARGE	MEDIUM
Georgia	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	MEDIUM	LARGE	LARGE	VERY LARGE	VERY LARGE
Hungary	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE	LARGE	LARGE	LARGE	LARGE
Kazakhstan	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LOW	LARGE	LARGE	LARGE	LARGE
Kyrgyz Republic	VERY LARGE	VERY LARGE	LARGE	LARGE	LARGE	LARGE	LARGE	LARGE	VERY LARGE	VERY LARGE	VERY LARGE
Latvia	LARGE	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE
Lithuania	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM
Macedonia	LARGE	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	MEDIUM	LARGE	LARGE	LARGE
Moldova	VERY LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE	LARGE	LARGE	VERY LARGE	VERY LARGE
Montenegro	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE
Poland	LARGE	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	LARGE
Romania	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE
Russian Federation	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE
Serbia	VERY LARGE	LARGE	VERY LARGE	MEDIUM	LARGE	VERY LARGE	LARGE	VERY LARGE	LARGE	VERY LARGE	LARGE
Slovak Republic	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE
Slovenia	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM	LARGE	VERY LARGE	MEDIUM	LARGE	MEDIUM
Tajikistan	LARGE	VERY LARGE	LARGE	LARGE	LARGE	LARGE	MEDIUM	LARGE	VERY LARGE	LARGE	LARGE
Turkey	LARGE	LARGE	MEDIUM	LARGE	LARGE	MEDIUM	VERY LARGE	LARGE	LARGE	LARGE	LARGE
Ukraine	VERY LARGE	LARGE	VERY LARGE	MEDIUM	MEDIUM	LARGE	MEDIUM	VERY LARGE	LARGE	LARGE	LARGE

Source: Authors' calculations

See text for thresholds.

While the rule on differences between structural indicators could be formulated directly in terms of percentiles, showing distances from the mean has two advantages: (1) It is likely to provide a more objective pattern of the gaps if the distribution is skewed,[1] and (2) the percentiles are harder to interpret when the gaps are relative to an absolute benchmark, such as the EU average.

To gauge the robustness of each gap, we look at the spread between specifications. A gap is interpreted as robust if its maximum or minimum distance from all eight specifications is no more than one threshold apart from the gap based on the main specification. For example, if the main gap is 0.2, the minimum is –0.4, and the maximum is 0.7, then the gap is considered robust, because only one threshold is crossed (0.5). If the main gap is 0.2, the minimum is –0.4, but the maximum is 1.7, then the gap is not robust, because two thresholds are crossed (0.5 and 1.65). Non-robust gaps are marked on the heat maps by small letters, robust gaps are capitalized (e.g., LARGE—robust, large—not robust). Almost all of our main specification gaps are robust.[2]

Tables 2–3 show that despite some relatively common reform challenges, ECA countries are quite heterogeneous. Assuming countries in the region want to raise per capita income by 40 percent over the next 7–10 years, the largest needs are in the areas of institutions, financial market development, infrastructure, product and labor market efficiency, and areas related to innovation. While reform needs are generally large, a few selected countries have a small number of reform areas in "red", including some low-income countries. In addition to reform progress, this also reflects that the methodology explicitly takes into account the level of income, thus countries with a lower per capita income are not expected to score as well on structural indicators as countries with a higher level of income. However, other factors may play a role as well, such as measurement errors in the perception-based structural indicators and omitted variables.

Compared to countries where income is equivalent to that of an average EU country, most ECA countries have ample space for improvement (Table 3). The choice of the benchmark obviously affects the size of the difference in structural indicators. The higher the income associated with the benchmark, the larger the gap tends to be.

IV. Reform Gaps Disaggregated

Differences between structural indicators of a country and a hypothetical country with higher per capita income can also be calculated at a more disaggregated level. GCR reports sub-pillar data for over 100 indicators. To illustrate the most common challenges, Table 4 shows for each pillar

[1] While on average for all pillars the distribution of gaps approximates a normal distribution, for some pillars the distribution is skewed to the left: More countries with large negative gaps than large positive ones. See Appendix 4.

[2] To provide an even fuller picture of the variation of gaps between the eight specifications, Appendix 4 reports the standard deviations of gaps for all specifications. The average deviation from the mean in emerging ECA is 0.28.

(continued…)

the sub pillars (areas) with the largest differences (gaps). Based on our initial specification, the table lists areas that in at least three countries were among the top 10 largest gaps.[3]

Results at a more granular level broadly reflect those of the aggregate level. In 10 out of 11 main GCR pillars, there are three or more large reform gaps at a more granular level in emerging ECA countries, which underlines the breadth and heterogeneity of reform needs in the region. Challenges in a few areas, however, do seem more widespread. The list of reforms at a more granular level is longer in the areas of institutions, business sophistication, goods market efficiency, labor market efficiency, financial market development. The granular analysis identifies at least three key areas in infrastructure, technological readiness and R&D innovation.

Table 4. Largest Reform Gaps at a More Disaggregated Level

Pillar	Subpillars	Pillar	Subpillars
Institutions (53)	Efficiency in challenging regulations, settling disputes Diversion of public funds Judicial independence Property rights protection (incl. intellectual, minority shareholders) Favoritism in gov't decisions, bribes Transparency of policymaking Strength of reporting standards	**Infrastructure (25)**	Quality of air transport Quality of roads Quality of ports, railroads
Macroeconomic environment (4)		**Health and primary education (11)**	Business impact of HIV/AIDS, tuberculosis, malaria
Higher education and training (15)	Extent of staff training Quality of management schools		
Goods market efficiency (31)	Time, procedures required to start business, Intensity of local competition, anti-monopoly policy Buyer sophistication Prevalance of foreign ownership, impact of rules on FDI	**Labor market efficiency (32)**	Country capacity to attract talent Capacity to retain talent Redundancy costs, flexibility of wage determination Reliance on professional management
Financial market development (21)	Soundness of banks Financing through local equity mkts Availability, affordability of financial services Regulation of security exchanges	**Technological readiness (15)**	Firm-level technology absorption Internet bandwidth, subscriptions Availability of latest technologies
Business sophistication (39)	Local supplier quality, quantity Extent of marketing Production process sophistication State of cluster development Willingness to delegate authority Value chain breadth Nature of competitive advantage	**R&D Innovation (26)**	Availability of scientists and engineers PCT patent applications Quality of scientific research institutions, collaboration

Subpillars, which are among the 10 top largest gaps at least in three countries.
Numbers in brackets - total number of subpillars among the 10 top largest gaps in a given pillar.
Source: author's calculations.

[3] We dropped some subpillars that in our judgment are likely to be unimportant for economic growth (e.g., fixed telephone lines). In some cases, we merged similar subpillars.

V. Robustness Checks

To test further for the robustness of the main results, we re-estimated the relationship for the whole time period separately for each income group and for a different set of reform indicators: the World Bank Doing Business indicators. In addition, we use a different methodology.

V.1 Reform Gaps over Time and across Income Groups

When the eight specifications described are re-estimated using the average for the 2006–14 period, the findings are consistent with previous results: income per capita is positively correlated with structural indicators for each pillar, and again, being a resource-rich country was associated with weaker performance across most pillars, except for the macroeconomic environment. Results for the ECA region are somewhat different for two pillars, infrastructure and technological readiness. For the whole time period, the ECA dummy is no longer positive and significant, pointing to some improvement in these two areas in recent years.

When re-estimating our specifications separately for four different income groups, based on the World Bank classifications of high-income, upper-middle-income, lower-middle-income, and low-income countries, in most cases the results are consistent with our main findings. Even within the more homogenous income groups and with much smaller samples, income per capita remains positively correlated with structural reform indicators. However, we find a statistically significant relationship between income per capita and the labor market pillar only for high-income countries and the sample as a whole.

V.2 Reform Gaps with Doing Business Indicators

So far, the analysis has used GCR indicators as examples. These indicators are based on a survey of business executives on a number of topics. They fall into the category of perception-based indicators, which aim at capturing the views of relevant groups, for example in terms of the quality of various institutions and policies in a given country. The advantage of perception-based indicators is that they capture the views of those who benefit from enhanced legislation and better rules and they not only focus on the existence of a law but also on the quality of its implementation. Disadvantages may be related to the sampling design, a possible sample selection bias, and room for interpretation in the formulation of the questions. Perception-based measures are also often scaled in a somewhat arbitrary way or units that are difficult to interpret, and such a scale can sometimes be unclear to respondents. It may be difficult to link the results of the assessment to particular policy interventions.

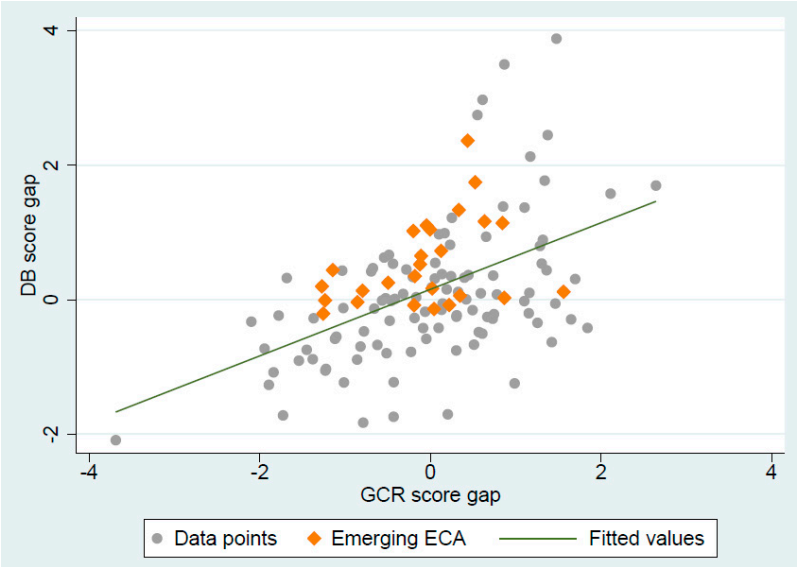
Indicators based on primary data, which are considered fact based, focus on the existence of specific laws, regulations, or rules “on the books”. Fact-based indicators tend to involve more clarity in documenting whether a country has a regulation in place in a certain area or certain types of regulatory institutions. Furthermore, these indicators often reflect existing legislation, which makes these indicators “actionable” as policy makers can change laws. However, indicators based on primary data also have a number of drawbacks that one needs to take into account. Laws may not be observed or effective and there could be laws that potentially conflict

with each other. The connection to outcomes may be challenging to establish. In sum, both indicators have their advantages and shortcomings, and therefore, a detailed analysis of a particular country should include a comparison of different types of indicators.

While testing a large number of alternative indicators is beyond the scope of this paper, as an example we apply the same methodology to estimate reform gaps using a few selected World Bank Doing Business (DB) indicators[4], an example of an indicator based on primary data, and compare the DB and the GCR reform gaps. While the scope of these indicators and the methodology differ, there is also substantial overlap in reform areas.

Income per capita remains positively correlated with the DB indicators. Figure 4 suggests that at the aggregate level gaps based on GCR and DB indicators (overall GCR score vs. DB score) are positively correlated. This relationship holds not only at the aggregate level but also for sub-indicators that look at relatively similar areas—for example, for the DB getting credit indicator and the GCR financial markets development indicator, or the DB paying taxes and the GCR total tax rate and incentives of taxation to invest indicators, even when controlling for overall GCR and DB scores. While the two sets of indicators are positively correlated, the R^2 ranges from 0.3 to 0.5, which is relatively low, so in some cases they may give a different signal.[5] In 2015 in emerging ECA, countries that show up more favorably in the GCR than the DB indicators in these areas are Tajikistan, Azerbaijan, Kazakhstan, Ukraine, the Russian Federation, and Turkey. Assessed less favorably are Georgia, Estonia, Macedonia, and Armenia.

Figure 4. GCR and Doing Business Score Gaps Compared



[4]See also World Bank, "Doing-Business – Answers to Frequently Asked Questions" for a description and comparison of Doing Business Indicators.

[5] Note that in principle the two sets of indicators measure different things: GCR encompasses significantly more reform areas than DB does. That may be driving part of the difference.

Table 5. GCR and Doing Business Indicator Gaps

	DB overall b/se	DB overall b/se	DB overall b/se	DB getting credit b/se	DB paying taxes b/se	DB paying taxes b/se
GCR overall	0.49***		0.29***	-0.24**		
	(0.08)		(0.11)	(0.10)		
GCR goods markets efficiency		0.49***	0.28**		0.54***	0.23***
		(0.08)	(0.11)		(0.08)	(0.07)
GCR financial markets development				0.46***		
				(0.09)		
DB overall				0.49***		
				(0.08)		
GCR effect of taxation on incentives to invest						0.22**
						(0.08)
GCR total tax rate						0.50***
						(0.07)
Constant	0.15**	0.15**	0.15**	0.09	0.04	0.05
	(0.08)	(0.08)	(0.07)	(0.07)	(0.08)	(0.06)
Observations	130	130	130	130	130	130
R^2	0.25	0.24	0.28	0.39	0.27	0.57

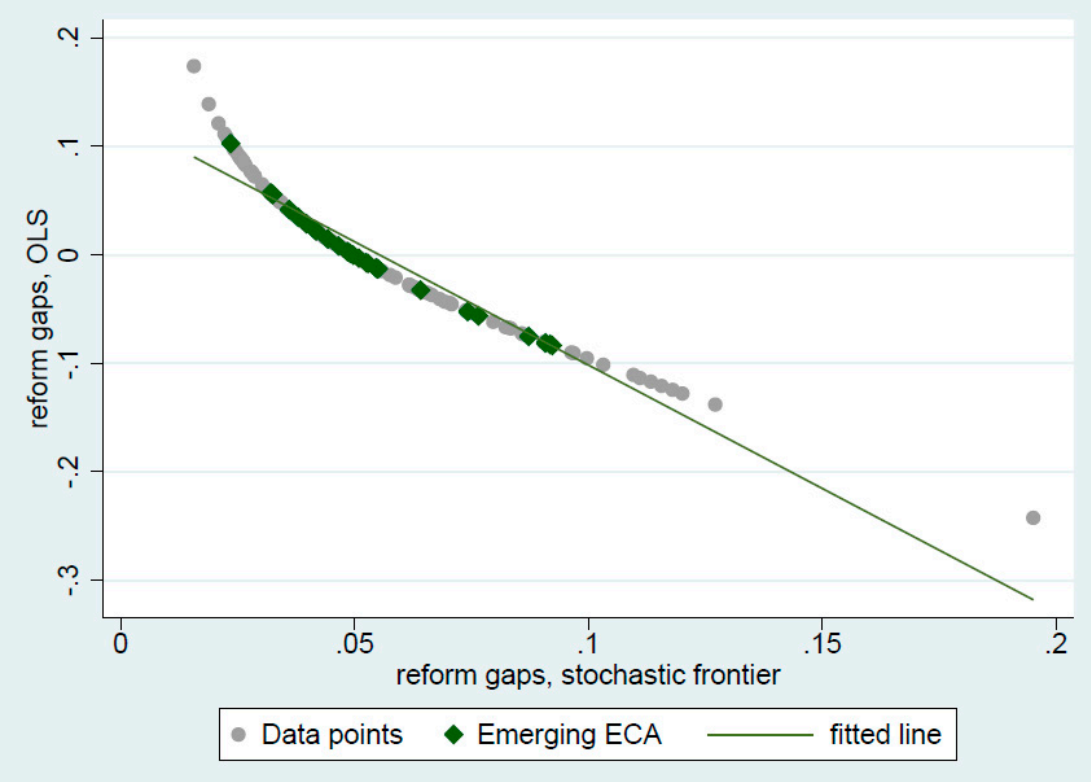
V.3 Reform Gaps Using Stochastic Frontier Analysis

As an alternative to OLS we also estimate the reform needs using stochastic frontier analysis. Stochastic frontier analysis estimates the productivity frontier – which in our case refers to the country with the highest level of a structural reform indicator given its income – and the distance of other countries to this frontier. Here, the parametric approach assumes a linear relationship between the output (level of structural reform) and the input (log GDP per capita). One difference between the stochastic frontier analysis and OLS is that stochastic frontier analysis estimates an additional error term (called the inefficiency term), which is always non-negative – the distance of a country to the frontier. In OLS the reform gap is the difference between actual and the trend, whereas in stochastic frontier analysis it is the difference between actual and the most productive economy (frontier), and so it is always positive by definition. The stochastic frontier analysis relies on more assumptions than OLS, in particular about the distribution of the inefficiency term, and its estimation procedure is less straightforward.

We employ the parametric version as formulated in Aigner et. al. 1977, where the inefficiency term is distributed half-normally. The regression specification is the same as is for the OLS – the only dependent variable we use is log GDP per capita. The dependent variable the aggregate GCR score.

Figure 5 depicts the reform gaps based on the OLS versus those based on the stochastic frontier analysis. The fit between the two is close (R^2 of regression one on another is 0.93), while the ranking of countries is generally preserved. Overall, we expect both methods to yield similar results in terms of country ranking and relative magnitude of the gaps.

Figure 5: Reform Gaps: OLS vs. Stochastic Frontier



Note: Underlying indicator – aggregate GCR score, 2015. Main specification is used both for OLS and stochastic frontier estimations (the only dependent variable is log GDP per capita). For the stochastic frontier estimation, the distribution of the inefficiency term is half-normal.

V.4 Reform Gaps: Additional Alternative Specifications

We run two additional alternative specifications to estimate the structural reform gaps and see if there is a large difference with our main specification. First, instead of actual GDP per capita as in our main specification, we use potential GDP per capita to estimate the reform gaps, reflecting the medium-term nature of the analysis. Potential GDP per capita is estimated for each country using a Hodrick-Prescott filter, and taking into account a three-year ahead forecast. Without taking into account business cycle fluctuations, countries with large negative output gaps may appear to perform deceptively well. However, as reported in Table A.3.1, in 2015 there is little difference between the two measures – the corresponding heat maps are almost identical. Another alternative specification relates to the choice of the benchmark. In the main specification, the benchmark is a 40% increase in income over the next 7-10 years for all countries. This bar may be high for richer countries of the region, while for the poorest countries in the region 40 percent growth over ten years may not be ambitious enough, given the average

speed of convergence between rich and poor countries over the last decade. Therefore, in our alternative specification we use country-specific GDP growth targets as implied by a simple growth regression. To obtain the projections, we use results of the regression of average GDP per capita growth during 2005-2015 and log GDP per capita in 2004, estimated for the sample of Emerging ECA countries. A negative coefficient on log GDP per capita suggests that there was convergence between richer and poorer countries in the region during the last ten years. This implies higher GDP growth projections for poorer countries (as high as 64% for Tajikistan, and 63% for Kyrgyz Republic), and lower GDP growth projections for richer countries (as low as 19% for Czech Republic and 17% for Slovenia). Consequently, as depicted in Table A.3.2, the reform needs are higher for poorer countries as compared to the main specification, and they are lower for the richer countries in the region. The within-country ranking of reform gaps does not change though.

VI. Conclusions

On average countries with higher per capita income tend to score better on structural indicators. Empirical evidence suggests that at least in the medium term structural reforms are conducive to increasing potential growth. However, in some cases reverse causality or mutually reinforcing developments cannot be ruled out. Better-off countries may be able to more easily afford to be more advanced in the structural area.

While this paper does not analyze directly the link between structural reforms and growth, it offers a bird's-eye view of structural reform needs as a first step to a more detailed analysis. As countries strive to increase per capita income, the answers to certain auxiliary questions may provide guidance to policymakers on reform priorities: Assuming a country aspires to increase per capita income by say 40 percent in the next 7-10 years, how does a country compare to a generic country that has already achieved the higher level of income? How does a given country compare to one with the income of an average EU country?

While reform needs are country-specific, the results here suggest that in coming years reform needs in the region are largest in the areas of institutions, financial market development, infrastructure, goods and labor market efficiency, and areas related to innovation. The approach also helps detect more granular reform elements in each of these areas. For example, at a more granular level, there are important reform needs in the labor market related to wage flexibility and the ability to attract and retain talent.

The analysis does not directly link structural reforms to growth. Still, the underlying hypothesis is that if the difference between an indicator in country i and the same indicator in a generic country with 40 percent higher income is particularly large, then it is likely that closing the difference will be desirable and would bring a certain growth dividend. But it could still be true that closing a smaller difference in one area may be more beneficial than closing a larger gap elsewhere.

As with any analysis, the results depend on (i) how reliable the underlying data are and (ii) how well the underlying regressions characterize the true process. Measurement errors in the data would distort the estimated gaps and may lead to misleading conclusions. Moreover, the

estimated gaps could also reflect missing explanatory variables in the regression and the unobserved factors may bias results. Despite these caveats, we see the approach as a first step in a comprehensive analysis of the structural reforms needs—an overview, which needs to be supplemented by further analysis, country knowledge, and judgment.

Appendix 1: Summary Statistics

Table A1.1 Structural Reform Indicators: Summary Statistics 1/

	count	mean	sd	p10	p90
Pillar 1: Institutions	132	4.07	0.86	3.19	5.46
Pillar 2: Infrastructure	132	4.04	1.22	2.43	5.71
Pillar 3: Macroeconomic environment	132	4.79	0.96	3.60	6.15
Pillar 4: Health and primary education	132	5.52	0.89	4.28	6.44
Pillar 5: Higher education and training	132	4.26	1.01	2.78	5.59
Pillar 6: Goods market efficiency	132	4.38	0.53	3.78	5.13
Pillar 7: Labor market efficiency	132	4.24	0.56	3.61	5.00
Pillar 8: Financial market development	132	3.95	0.70	3.11	4.99
Pillar 9: Technological readiness	132	4.09	1.21	2.63	5.91
Pillar 10: Market size	132	3.91	1.16	2.57	5.45
Pillar 11: Business sophistication	132	4.07	0.71	3.31	5.28
Pillar 12: Innovation	132	3.54	0.85	2.67	4.98
GDP per capita, thousands 2010 USD	132	15.81	20.41	0.83	45.41
=1 if from Emerging ECA		0.20	0.40	0.00	1.00
=1 if from SSA		0.23	0.42	0.00	1.00
=1 if OECD member and HIC as of 2010		0.23	0.42	0.00	1.00
=1 if resource-rich (IMF 2012)		0.30	0.46	0.00	1.00

1/ 132 countries for which all data is available.
Source: GCR 2015, authors' calculations.

Table: A1.2 Global Competiveness Index: Score (1-7 (best))

Country	*Institutions*	*Infra-structure*	*Macroe-conomic environment*	*Health and primary education*	*Higher education and training*	*Goods market efficiency*	*Labor market efficiency*	*Financial market development*	*Techno-logical readiness*	*Business sophi-stication*	*Innovation*
Albania	3.68	3.55	3.96	5.97	4.74	4.34	3.97	3.24	3.40	3.65	2.76
Armenia	3.78	3.72	4.71	5.35	4.26	4.46	4.30	3.53	3.67	3.65	3.02
Azerbaijan	3.94	4.15	6.35	5.22	3.90	4.31	4.57	3.33	4.26	3.86	3.33
Bosnia and Herzegovina	3.18	3.08	4.32	6.03	3.77	3.69	3.36	3.34	3.60	3.31	2.79
Bulgaria	3.39	3.99	4.94	5.97	4.48	4.35	4.23	3.98	4.87	3.64	3.11
Croatia	3.63	4.58	4.19	5.85	4.62	4.05	3.83	3.59	4.65	3.74	3.13
Czech Republic	4.09	4.69	5.97	6.31	5.10	4.63	4.44	4.62	5.43	4.49	3.79
Estonia	5.03	4.87	6.15	6.34	5.50	4.93	5.00	4.63	5.32	4.26	4.03
Georgia	4.38	4.19	4.95	5.79	4.00	4.48	4.56	3.87	3.81	3.48	2.71
Hungary	3.52	4.51	4.94	5.71	4.56	4.29	4.15	3.93	4.60	3.70	3.44
Kazakhstan	4.16	4.25	5.72	5.37	4.53	4.48	4.90	3.56	4.19	3.79	3.27
Kyrgyz Republic	3.29	2.84	4.62	5.30	4.09	4.23	4.06	3.44	3.27	3.41	2.67
Latvia	4.18	4.47	5.56	6.18	5.05	4.64	4.72	4.39	5.29	4.06	3.33
Lithuania	4.12	4.68	5.56	6.19	5.35	4.64	4.35	3.99	5.63	4.32	3.73
Macedonia	4.14	3.77	5.09	5.61	4.79	4.65	4.07	4.09	4.15	3.87	3.38
Moldova	3.20	3.69	4.86	5.39	4.09	4.06	4.07	3.28	4.39	3.29	2.56
Montenegro	3.89	3.98	4.62	6.21	4.58	4.30	4.18	4.26	4.33	3.62	3.28
Poland	4.07	4.30	5.11	6.15	5.05	4.51	4.11	4.26	4.78	4.09	3.32
Romania	3.66	3.61	5.44	5.49	4.55	4.28	4.13	4.05	4.63	3.71	3.24
Russian Federation	3.46	4.81	5.29	5.94	4.96	4.16	4.40	3.53	4.22	3.79	3.29
Serbia	3.24	3.87	3.60	5.87	4.27	3.74	3.72	3.23	4.47	3.14	2.90
Slovak Republic	3.43	4.28	5.21	6.01	4.62	4.43	3.90	4.41	4.64	4.07	3.29
Slovenia	3.93	4.79	4.45	6.44	5.41	4.50	4.00	2.85	5.14	4.15	3.83
Tajikistan	4.10	2.93	4.64	5.61	4.12	4.12	4.42	3.38	2.81	3.80	3.32
Turkey	3.84	4.43	4.75	5.69	4.58	4.53	3.46	3.93	4.08	4.07	3.35
Ukraine	3.07	4.07	3.12	6.06	5.03	4.02	4.33	3.18	3.45	3.70	3.41

Source: GCR 2015-16.

Appendix 2: Regression Results: Different Specifications*

Table A2.1 Regression Results for Pillar 1, Institutions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.07***	0.07***	0.07***	0.08***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		-0.08***	-0.07***	-0.10**		-0.02	-0.02	-0.00
		(0.02)	(0.02)	(0.05)		(0.02)	(0.02)	(0.04)
oecd_hic			0.04	-0.02			-0.08**	-0.08**
			(0.04)	(0.04)			(0.03)	(0.04)
RR_dummy		-0.04	-0.03	-0.03		-0.03	-0.04*	-0.04*
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.01				0.06
				(0.07)				(0.08)
region2				-0.01				0.02
				(0.05)				(0.05)
region3				-0.02				0.05
				(0.06)				(0.06)
region4				0.01				0.07
				(0.06)				(0.06)
region5				-0.16***				-0.04
				(0.06)				(0.06)
region6				0.01				0.08
				(0.06)				(0.05)
gdpcap_thous					0.01***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.47***	1.50***	1.50***	1.52***	1.50***	1.51***	1.51***	1.47***
	(0.02)	(0.02)	(0.02)	(0.06)	(0.01)	(0.02)	(0.02)	(0.06)
Observations	132	132	132	131	132	132	132	131
R-squared	0.45	0.49	0.50	0.61	0.57	0.58	0.60	0.66
Adjusted R2	0.45	0.48	0.48	0.58	0.57	0.57	0.58	0.62
AIC	-179.4	-185.5	-184.8	-205.1	-210.4	-208.9	-211.3	-218

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.2 Regression Results for Pillar 2, Infrastructure

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.15***	0.15***	0.15***	0.14***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		0.01	0.01	-0.03		0.08***	0.08***	0.03
		(0.02)	(0.02)	(0.03)		(0.02)	(0.02)	(0.04)
oecd_hic			-0.01	-0.03			-0.09**	-0.07*
			(0.03)	(0.03)			(0.04)	(0.04)
RR_dummy		-0.07***	-0.07***	-0.06**		-0.05*	-0.07**	-0.06**
		(0.02)	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)
region1				-0.07				-0.05
				(0.06)				(0.08)
region2				-0.02				0.04*
				(0.02)				(0.02)
region3				-0.05				0.03
				(0.04)				(0.05)
region4				-0.10**				-0.11**
				(0.04)				(0.06)
region5				-0.10**				0.01
				(0.04)				(0.05)
region6				0.05				0.10**
				(0.03)				(0.04)
gdpcap_thous					0.02***	0.02***	0.02***	0.02***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.31***	1.33***	1.33***	1.41***	1.37***	1.37***	1.37***	1.42***
	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)	(0.03)	(0.03)	(0.05)
Observations	132	132	132	131	132	132	132	131
R-squared	0.80	0.81	0.81	0.84	0.69	0.71	0.72	0.77
Adjusted R2	0.80	0.81	0.81	0.83	0.68	0.71	0.71	0.75
AIC	-199.7	-205.8	-204	-208.5	-138.4	-146.7	-148.7	-161.6

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.3 Regression Results for Pillar 3, Macroeconomic Environment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.05***	0.06***	0.06***	0.07***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		0.04	0.04	0.09		0.08***	0.08***	0.19***
		(0.03)	(0.03)	(0.06)		(0.03)	(0.03)	(0.07)
oecd_hic			-0.03	-0.01			-0.11**	-0.06
			(0.04)	(0.05)			(0.05)	(0.05)
RR_dummy		0.07**	0.06**	0.07**		0.07**	0.05*	0.06*
		(0.03)	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)
region1				0.13				0.20*
				(0.11)				(0.12)
region2				0.03				0.05
				(0.07)				(0.07)
region3				0.06				0.13
				(0.09)				(0.10)
region4				0.11				0.16
				(0.09)				(0.10)
region5				0.06				0.17*
				(0.09)				(0.10)
region6				0.17*				0.24**
				(0.09)				(0.10)
gdpcap_thous					0.00***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00	-0.00	-0.00***	-0.00**
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.64***	1.61***	1.61***	1.50***	1.68***	1.63***	1.63***	1.45***
	(0.02)	(0.03)	(0.03)	(0.09)	(0.02)	(0.02)	(0.02)	(0.11)
Observations	132	132	132	131	132	132	132	131
R-squared	0.21	0.25	0.25	0.30	0.20	0.26	0.29	0.35
Adjusted R2	0.20	0.23	0.23	0.24	0.19	0.24	0.26	0.29
AIC	-121.1	-123.5	-122.1	-116.8	-117.5	-123.6	-126.6	-124.8

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.4 Regression Results for Pillar 4, Health and Primary Education

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.07***	0.07***	0.07***	0.05***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		0.05***	0.05***	-0.00		0.08***	0.09***	0.01
		(0.01)	(0.01)	(0.01)		(0.02)	(0.02)	(0.01)
oecd_hic			-0.02	-0.02			-0.06**	-0.03*
			(0.02)	(0.02)			(0.02)	(0.02)
RR_dummy		-0.07***	-0.07***	-0.06***		-0.06***	-0.07***	-0.06***
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.01				-0.00
				(0.05)				(0.06)
region2				0.02				0.04
				(0.03)				(0.03)
region3				0.02				0.05
				(0.03)				(0.03)
region4				-0.15***				-0.15***
				(0.05)				(0.04)
region5				-0.04				-0.00
				(0.03)				(0.04)
region6				0.04				0.06**
				(0.03)				(0.03)
gdpcap_thous					0.01***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.73***	1.74***	1.74***	1.83***	1.76***	1.77***	1.77***	1.83***
	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)	(0.02)	(0.03)
Observations	132	132	132	131	132	132	132	131
R-squared	0.56	0.63	0.63	0.75	0.44	0.54	0.55	0.73
Adjusted R2	0.55	0.62	0.62	0.73	0.43	0.52	0.53	0.70
AIC	-232.4	-250.8	-249.6	-286.5	-199.3	-220.9	-221.6	-273.8

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Note*: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.5 Regression Results for Pillar 5, Higher Education and Training

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.12***	0.12***	0.11***	0.09***				
	(0.01)	(0.00)	(0.01)	(0.01)				
emerg_ECA		0.08***	0.08***	0.03		0.14***	0.14***	0.07**
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.03)
oecd_hic			0.01	-0.00			-0.04	-0.03
			(0.02)	(0.02)			(0.03)	(0.02)
RR_dummy		-0.04**	-0.04*	-0.03		-0.03	-0.04	-0.02
		(0.02)	(0.02)	(0.02)		(0.02)	(0.03)	(0.02)
region1				-0.09*				-0.08
				(0.05)				(0.06)
region2				-0.02				0.02
				(0.02)				(0.02)
region3				-0.09**				-0.04
				(0.03)				(0.04)
region4				-0.16***				-0.17***
				(0.04)				(0.05)
region5				-0.08**				-0.01
				(0.03)				(0.04)
region6				0.01				0.05*
				(0.03)				(0.03)
gdpcap_thous					0.02***	0.02***	0.02***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.42***	1.42***	1.42***	1.54***	1.47***	1.46***	1.46***	1.54***
	(0.01)	(0.01)	(0.01)	(0.04)	(0.02)	(0.02)	(0.02)	(0.04)
Observations	132	132	132	131	132	132	132	131
R-squared	0.77	0.81	0.81	0.85	0.63	0.71	0.71	0.80
Adjusted R2	0.77	0.80	0.80	0.83	0.62	0.70	0.70	0.78
AIC	-239.8	-259.3	-257.6	-272.7	-174.6	-203.1	-202.2	-235.2

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central, Eastern Europe, Central Asia and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.6 Regression Results for Pillar 6, Goods Market Efficiency

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.05***	0.04***	0.04***	0.05***				
	(0.00)	(0.00)	(0.01)	(0.01)				
emerg_ECA		-0.01	-0.01	-0.03		0.01	0.02	0.02
		(0.01)	(0.01)	(0.02)		(0.01)	(0.01)	(0.02)
oecd_hic			0.01	-0.02			-0.05**	-0.05**
			(0.02)	(0.02)			(0.02)	(0.02)
RR_dummy		-0.03*	-0.03	-0.02		-0.02	-0.03*	-0.03*
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.04*				-0.01
				(0.02)				(0.03)
region2				-0.03**				-0.02
				(0.01)				(0.01)
region3				-0.05**				-0.01
				(0.03)				(0.03)
region4				-0.04				-0.02
				(0.03)				(0.03)
region5				-0.11***				-0.04
				(0.03)				(0.03)
region6				0.01				0.05**
				(0.02)				(0.02)
gdpcap_thous					0.01***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.59***	1.60***	1.60***	1.65***	1.61***	1.61***	1.61***	1.63***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.03)
Observations	132	132	132	131	132	132	132	131
R-squared	0.48	0.50	0.50	0.59	0.52	0.54	0.55	0.61
Adjusted R2	0.48	0.48	0.48	0.55	0.51	0.52	0.54	0.57
AIC	-318.3	-318.8	-316.9	-327	-327.3	-327.6	-330.4	-332.5

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.7 Regression Results for Pillar 7, Labor Market Efficiency

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.03***	0.03***	0.02*	0.03***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		-0.01	-0.00	-0.04		0.02	0.02	0.03
		(0.02)	(0.02)	(0.03)		(0.02)	(0.02)	(0.03)
oecd_hic			0.06*	-0.01			-0.02	-0.06*
			(0.03)	(0.03)			(0.03)	(0.03)
RR_dummy		-0.01	0.00	0.00		-0.00	-0.00	-0.00
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.19***				-0.12**
				(0.05)				(0.05)
region2				-0.11***				-0.10***
				(0.02)				(0.02)
region3				-0.21***				-0.16***
				(0.04)				(0.03)
region4				-0.11***				-0.05
				(0.03)				(0.04)
region5				-0.23***				-0.15***
				(0.03)				(0.04)
region6				-0.09***				-0.04
				(0.03)				(0.03)
gdpcap_thous					0.00***	0.00***	0.00***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00	-0.00	-0.00	-0.00*
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.60***	1.60***	1.60***	1.75***	1.60***	1.60***	1.60***	1.68***
	(0.01)	(0.02)	(0.02)	(0.03)	(0.01)	(0.02)	(0.02)	(0.04)
Observations	132	132	132	131	132	132	132	131
R-squared	0.15	0.16	0.18	0.37	0.31	0.31	0.31	0.48
Adjusted R2	0.15	0.14	0.16	0.32	0.30	0.29	0.29	0.43
AIC	-236	-232.4	-235	-254.3	-260.6	-257.2	-255.8	-276.7

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.8 Regression Results for Pillar 8, Financial Market Development

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.06***	0.06***	0.06***	0.08***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		-0.05***	-0.06***	0.03		-0.02	-0.02	0.11**
		(0.02)	(0.02)	(0.06)		(0.02)	(0.02)	(0.06)
oecd_hic			-0.04	-0.02			-0.10**	-0.05
			(0.04)	(0.05)			(0.04)	(0.05)
RR_dummy		-0.03*	-0.04**	-0.04*		-0.03	-0.05**	-0.05**
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.05				-0.01
				(0.06)				(0.06)
region2				-0.20***				-0.18***
				(0.03)				(0.02)
region3				-0.15***				-0.09*
				(0.05)				(0.05)
region4				-0.07				-0.05
				(0.06)				(0.06)
region5				-0.11**				-0.01
				(0.05)				(0.05)
region6				-0.05				0.01
				(0.05)				(0.05)
gdpcap_thous					0.01***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00**	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.48***	1.50***	1.50***	1.58***	1.51***	1.53***	1.52***	1.55***
	(0.01)	(0.02)	(0.02)	(0.05)	(0.01)	(0.02)	(0.02)	(0.05)
Observations	132	132	132	131	132	132	132	131
R-squared	0.38	0.42	0.42	0.51	0.36	0.38	0.41	0.50
Adjusted R2	0.38	0.40	0.41	0.47	0.35	0.36	0.38	0.46
AIC	-202.6	-205.7	-205.5	-211.3	-196.4	-194.9	-199.5	-208.6

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.9 Regression Results for Pillar 9, Technological Readiness

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.15***	0.14***	0.13***	0.13***				
	(0.00)	(0.00)	(0.01)	(0.01)				
emerg_ECA		0.05***	0.06***	0.01		0.13***	0.13***	0.09**
		(0.02)	(0.02)	(0.03)		(0.02)	(0.02)	(0.03)
oecd_hic			0.06***	0.03			-0.04	-0.02
			(0.02)	(0.03)			(0.03)	(0.03)
RR_dummy		-0.07***	-0.05***	-0.05***		-0.05**	-0.06***	-0.05***
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.11***				-0.07
				(0.03)				(0.04)
region2				0.01				0.06***
				(0.01)				(0.01)
region3				-0.04				0.04
				(0.03)				(0.04)
region4				-0.06*				-0.05
				(0.04)				(0.04)
region5				-0.07**				0.05
				(0.03)				(0.04)
region6				0.03				0.10***
				(0.02)				(0.03)
gdpcap_thous					0.02***	0.02***	0.02***	0.02***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.32***	1.34***	1.34***	1.40***	1.38***	1.38***	1.38***	1.38***
	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)	(0.02)	(0.04)
Observations	132	132	132	131	132	132	132	131
R-squared	0.86	0.89	0.90	0.91	0.78	0.84	0.84	0.87
Adjusted R2	0.86	0.89	0.89	0.90	0.77	0.84	0.84	0.86
AIC	-264.1	-288.6	-293.9	-298.8	-197.3	-236.7	-235.9	-248.7

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.10 Regression Results for Pillar 11, Business Sophistication

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.07***	0.07***	0.06***	0.06***				
	(0.00)	(0.00)	(0.01)	(0.01)				
emerg_ECA		-0.08***	-0.07***	-0.10***		-0.03***	-0.03***	-0.04
		(0.01)	(0.01)	(0.03)		(0.01)	(0.01)	(0.03)
oecd_hic			0.05**	0.02			-0.01	-0.01
			(0.02)	(0.02)			(0.02)	(0.02)
RR_dummy		-0.05***	-0.04**	-0.03*		-0.04**	-0.04**	-0.03**
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.04				-0.00
				(0.05)				(0.06)
region2				-0.02				-0.00
				(0.04)				(0.04)
region3				-0.06				-0.01
				(0.05)				(0.05)
region4				-0.06				-0.03
				(0.05)				(0.05)
region5				-0.10**				-0.02
				(0.05)				(0.05)
region6				-0.01				0.04
				(0.05)				(0.05)
gdpcap_thous					0.01***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.48***	1.51***	1.51***	1.57***	1.50***	1.52***	1.52***	1.54***
	(0.01)	(0.01)	(0.01)	(0.05)	(0.01)	(0.01)	(0.01)	(0.05)
Observations	132	132	132	131	132	132	132	131
R-squared	0.63	0.69	0.71	0.73	0.70	0.73	0.73	0.74
Adjusted R2	0.62	0.69	0.70	0.71	0.70	0.72	0.72	0.72
AIC	-277.6	-299.6	-303.9	-301.8	-306.1	-312.3	-310.6	-303.9

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Table A2.11 Regression Results for Pillar 12, Innovation

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp_pc	0.09***	0.08***	0.06***	0.06***				
	(0.01)	(0.01)	(0.01)	(0.01)				
emerg_ECA		-0.09***	-0.07***	-0.11**		-0.03**	-0.03**	-0.02
		(0.02)	(0.02)	(0.04)		(0.02)	(0.02)	(0.04)
oecd_hic			0.15***	0.10***			0.06*	0.05
			(0.03)	(0.04)			(0.03)	(0.04)
RR_dummy		-0.06***	-0.03	-0.03		-0.05**	-0.04**	-0.03*
		(0.02)	(0.02)	(0.02)		(0.02)	(0.02)	(0.02)
region1				-0.07				-0.01
				(0.08)				(0.08)
region2				-0.05				-0.03
				(0.06)				(0.06)
region3				-0.10				-0.04
				(0.08)				(0.08)
region4				-0.07				-0.02
				(0.08)				(0.08)
region5				-0.16**				-0.06
				(0.07)				(0.07)
region6				-0.00				0.06
				(0.07)				(0.07)
gdpcap_thous					0.01***	0.01***	0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
gdp_sq					-0.00***	-0.00***	-0.00***	-0.00***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	1.33***	1.38***	1.38***	1.46***	1.36***	1.38***	1.39***	1.40***
	(0.02)	(0.02)	(0.02)	(0.07)	(0.01)	(0.02)	(0.02)	(0.08)
Observations	132	132	132	131	132	132	132	131
R-squared	0.54	0.61	0.67	0.72	0.70	0.72	0.73	0.75
Adjusted R2	0.54	0.60	0.66	0.70	0.70	0.71	0.72	0.73
AIC	-185.9	-200.7	-223	-229.4	-239.1	-243.6	-244.6	-244

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: emerg_ECA is a dummy for countries in Central and Eastern Europe, Central Asia, and the Caucasus; oecd_hic is a dummy for members of the OECD; RR_dummy is a dummy for resource-rich countries; and regional dummies are dummies for six geographical regions in the following order: South Asia, Europe and CIS, MENA, Sub-Saharan Africa, Latin America, and Asia and the Pacific, relative to the seventh region, North America.

Appendix 3. Differences in Structural Reform Indicators in Emerging ECA: Alternative Specifications

Table A3.1. Heat Map: Differences in Structural Reform Indicators s in Emerging ECA Relative to a Generic Country with 40% Higher Income – Potential Output instead of Actual Output

	Institutions	*Infra-structure*	*Macro-economic environment*	*Health and primary education*	*Higher education and training*	*Goods market efficiency*	*Labor market efficiency*	*Financial market development*	*Techno-logical readiness*	*Business sophi-stication*	*Innovation*
Albania	LARGE	LARGE	LARGE	LOW	LOW	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	LARGE
Armenia	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	LARGE	LARGE
Azerbaijan	MEDIUM	MEDIUM	LOW	LARGE	LARGE	MEDIUM	LOW	LARGE	MEDIUM	large	MEDIUM
Bosnia and Herzegovina	LARGE	VERY LARGE	MEDIUM	LOW	LARGE	VERY LARGE	VERY LARGE	LARGE	LARGE	VERY LARGE	LARGE
Bulgaria	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LARGE	LARGE
Croatia	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	VERY LARGE	LARGE
Czech Republic	LARGE	LARGE	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE
Estonia	LOW	MEDIUM	LOW	MEDIUM	LOW	LOW	LOW	LOW	MEDIUM	LARGE	MEDIUM
Georgia	LOW	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	LARGE	LARGE
Hungary	LARGE	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE	MEDIUM	LARGE	LARGE	VERY LARGE	LARGE
Kazakhstan	MEDIUM	MEDIUM	LOW	LARGE	MEDIUM	MEDIUM	LOW	LARGE	LARGE	LARGE	LARGE
Kyrgyz Republic	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM	LOW	MEDIUM	LARGE
Latvia	MEDIUM	LARGE	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	LOW	LARGE	LARGE
Lithuania	LARGE	MEDIUM	LOW	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM
Macedonia	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Moldova	LARGE	LOW	MEDIUM	low	LOW	MEDIUM	MEDIUM	LARGE	LOW	LARGE	LARGE
Montenegro	MEDIUM	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE
Poland	LARGE	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	LARGE
Romania	LARGE	LARGE	LOW	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM	LARGE	LARGE
Russian Federation	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE
Serbia	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	VERY LARGE	LARGE	LARGE	LOW	VERY LARGE	LARGE
Slovak Republic	VERY LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE
Slovenia	LARGE	LARGE	LARGE	MEDIUM	MEDIUM	LARGE	LARGE	VERY LARGE	MEDIUM	LARGE	LARGE
Tajikistan	LOW	MEDIUM	MEDIUM	LOW	LOW	MEDIUM	LOW	MEDIUM	medium	LOW	LOW
Turkey	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	VERY LARGE	MEDIUM	LARGE	LARGE	LARGE
Ukraine	LARGE	LOW	VERY LARGE	LOW	LOW	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM

Table A3.2. Heat Map: Differences in Structural Reform Indicators in Emerging ECA Relative to a Generic Country with Higher Income – Projected 10-year GDP Per Capita Growth

	Institutions	*Infra-structure*	*Macro-economic environment*	*Health and primary education*	*Higher education and training*	*Goods market efficiency*	*Labor market efficiency*	*Financial market development*	*Techno-logical readiness*	*Business sophi-stication*	*Innovation*
Albania	LARGE	LARGE	LARGE	LOW	LOW	MEDIUM	LARGE	LARGE	LARGE	large	VERY LARGE
Armenia	MEDIUM	MEDIUM	MEDIUM	medium	low	LOW	MEDIUM	LARGE	MEDIUM	LARGE	LARGE
Azerbaijan	MEDIUM	MEDIUM	LOW	LARGE	LARGE	MEDIUM	LOW	LARGE	MEDIUM	large	large
Bosnia and Herzegovina	VERY LARGE	VERY LARGE	LARGE	LOW	LARGE	VERY LARGE	VERY LARGE	LARGE	LARGE	VERY LARGE	VERY LARGE
Bulgaria	VERY LARGE	large	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LARGE	very large
Croatia	VERY LARGE	MEDIUM	LARGE	medium	medium	VERY LARGE	LARGE	LARGE	MEDIUM	VERY LARGE	VERY LARGE
Czech Republic	LARGE	LARGE	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	low	MEDIUM	LARGE
Estonia	LOW	MEDIUM	LOW	low	LOW	LOW	LOW	LOW	LOW	LARGE	MEDIUM
Georgia	LOW	LOW	MEDIUM	LOW	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	VERY LARGE	VERY LARGE
Hungary	VERY LARGE	LARGE	MEDIUM	LARGE	LARGE	LARGE	LARGE	large	medium	VERY LARGE	LARGE
Kazakhstan	MEDIUM	LARGE	LOW	LARGE	MEDIUM	MEDIUM	LOW	LARGE	LARGE	very large	LARGE
Kyrgyz Republic	LARGE	LARGE	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM	low	large	LARGE
Latvia	MEDIUM	LARGE	LOW	low	low	MEDIUM	LOW	MEDIUM	LOW	LARGE	very large
Lithuania	LARGE	MEDIUM	LOW	low	LOW	MEDIUM	MEDIUM	LARGE	LOW	MEDIUM	large
Macedonia	MEDIUM	large	MEDIUM	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	MEDIUM	large	MEDIUM
Moldova	LARGE	LOW	LOW	low	low	MEDIUM	MEDIUM	LARGE	LOW	VERY LARGE	VERY LARGE
Montenegro	LARGE	large	MEDIUM	LOW	MEDIUM	LARGE	MEDIUM	LOW	MEDIUM	VERY LARGE	LARGE
Poland	LARGE	LARGE	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	LARGE	very large
Romania	LARGE	VERY LARGE	LOW	LARGE	MEDIUM	LARGE	MEDIUM	MEDIUM	MEDIUM	VERY LARGE	LARGE
Russian Federation	VERY LARGE	LOW	MEDIUM	MEDIUM	LOW	LARGE	MEDIUM	LARGE	LARGE	very large	LARGE
Serbia	VERY LARGE	large	VERY LARGE	LOW	MEDIUM	VERY LARGE	LARGE	VERY LARGE	LOW	VERY LARGE	VERY LARGE
Slovak Republic	VERY LARGE	VERY LARGE	MEDIUM	MEDIUM	LARGE	LARGE	LARGE	MEDIUM	LARGE	LARGE	VERY LARGE
Slovenia	LARGE	LARGE	LARGE	low	low	LARGE	LARGE	VERY LARGE	medium	LARGE	LARGE
Tajikistan	LOW	medium	LOW	LOW	LOW	MEDIUM	LOW	MEDIUM	LARGE	LOW	LOW
Turkey	LARGE	MEDIUM	MEDIUM	LARGE	MEDIUM	MEDIUM	VERY LARGE	MEDIUM	LARGE	LARGE	LARGE
Ukraine	VERY LARGE	LOW	VERY LARGE	LOW	LOW	LARGE	MEDIUM	LARGE	LARGE	LARGE	MEDIUM

Note: Country X is compared with a generic country whose income per capita is the same as that of country X, projected for 2024. The projected GDP per capita growth in country X is implied from a regression of GDP per capita growth in 2005-2015 on GDP per capita in 2004, estimated on a sample of Emerging ECA countries.

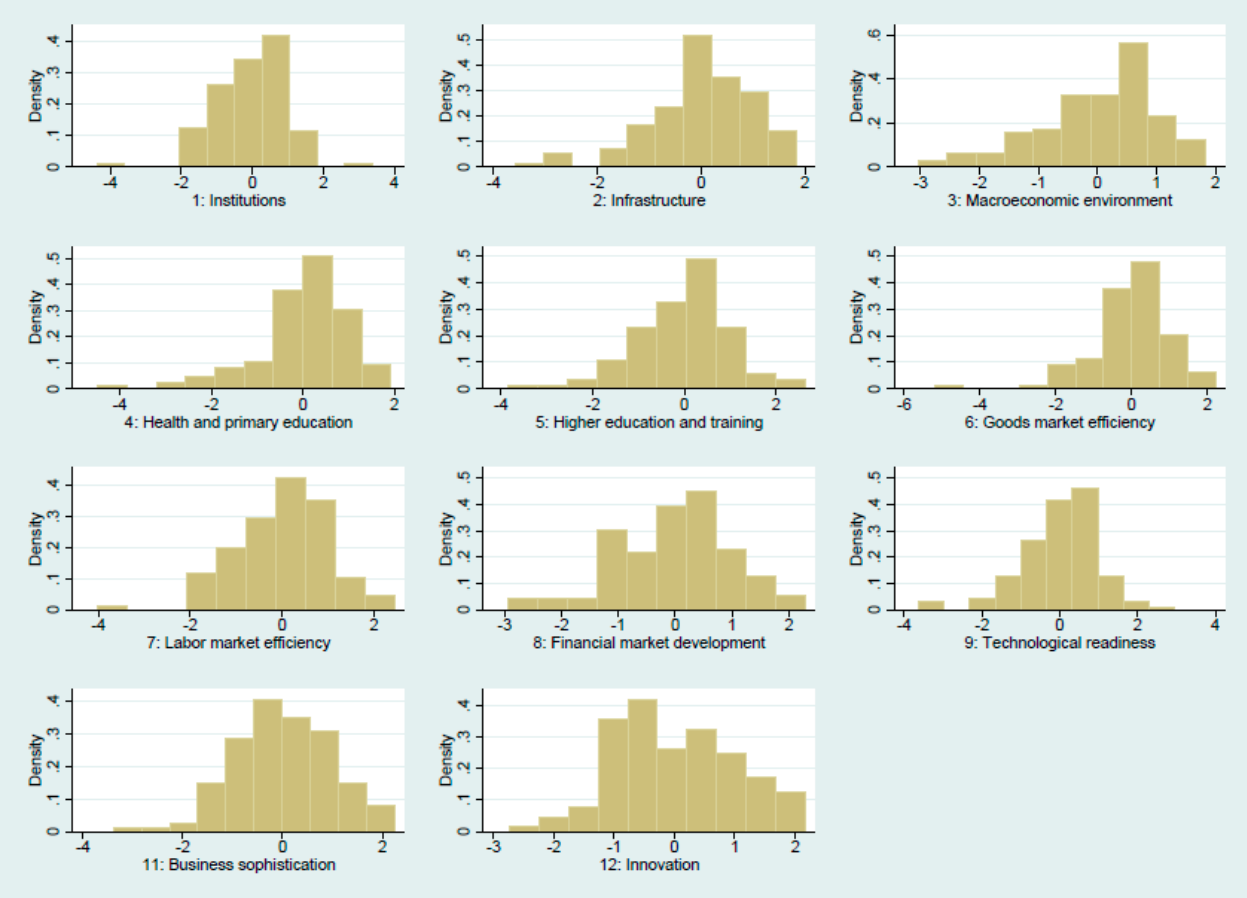
Appendix 4. Standard Deviations of Gaps across Specifications

Pillar	Albania	Armenia	Azerbaijan	Bosnia and Herze	Bulgaria	Croatia	Czech Republic	Estonia	Georgia	Hungary	Kazakhstan	Kyrgyz Republic	Latvia
Institutions	0.29	0.16	0.31	0.13	0.16	0.18	0.25	0.42	0.22	0.31	0.31	0.41	0.18
Infrastructure	0.16	0.24	0.15	0.40	0.31	0.25	0.21	0.23	0.21	0.30	0.19	0.59	0.27
Macroenvironment	0.30	0.08	0.26	0.10	0.12	0.19	0.16	0.19	0.08	0.21	0.30	0.32	0.15
Health and primary education	0.06	0.44	0.19	0.33	0.35	0.37	0.29	0.29	0.37	0.33	0.16	0.43	0.34
Higher education and training	0.22	0.44	0.42	0.57	0.46	0.46	0.39	0.36	0.49	0.49	0.31	0.74	0.39
Goods market efficiency	0.16	0.11	0.18	0.17	0.17	0.19	0.21	0.29	0.12	0.28	0.18	0.32	0.16
Product market efficiency	0.08	0.08	0.13	0.16	0.10	0.19	0.19	0.32	0.12	0.25	0.13	0.10	0.12
Finanacial sector development	0.24	0.11	0.25	0.10	0.14	0.16	0.25	0.28	0.13	0.31	0.24	0.46	0.13
Technological readiness	0.36	0.50	0.19	0.57	0.34	0.44	0.41	0.43	0.48	0.61	0.30	0.84	0.34
Business sophistication	0.44	0.22	0.48	0.18	0.25	0.23	0.27	0.29	0.20	0.29	0.46	0.56	0.27
Innovation	0.34	0.19	0.44	0.16	0.25	0.26	0.26	0.33	0.14	0.37	0.43	0.44	0.29

Pillar	Lithuania	FYR Macedonia	Moldova	Montenegro	Poland	Romania	Russia	Serbia	Slovak Republic	Slovenia	Tajikistan	Turkey	Ukraine
Institutions	0.18	0.21	0.19	0.19	0.18	0.17	0.25	0.14	0.22	0.20	0.35	0.17	0.14
Infrastructure	0.24	0.28	0.37	0.31	0.29	0.41	0.15	0.29	0.27	0.20	0.66	0.27	0.26
Macroenvironment	0.16	0.09	0.12	0.12	0.17	0.13	0.32	0.13	0.18	0.16	0.25	0.16	0.13
Health and primary education	0.34	0.40	0.47	0.32	0.34	0.43	0.11	0.36	0.29	0.30	0.58	0.40	0.34
Higher education and training	0.37	0.37	0.52	0.44	0.39	0.46	0.23	0.47	0.46	0.38	0.82	0.47	0.41
Goods market efficiency	0.16	0.14	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.15	0.35	0.17	0.13
Product market efficiency	0.14	0.08	0.05	0.10	0.16	0.11	0.10	0.11	0.16	0.12	0.11	0.22	0.08
Finanacial sector development	0.15	0.14	0.19	0.14	0.14	0.14	0.24	0.11	0.27	0.26	0.40	0.14	0.12
Technological readiness	0.33	0.43	0.60	0.46	0.42	0.42	0.29	0.38	0.57	0.46	0.93	0.58	0.53
Business sophistication	0.30	0.27	0.23	0.24	0.27	0.25	0.46	0.17	0.26	0.22	0.46	0.29	0.21
Innovation	0.36	0.29	0.20	0.28	0.29	0.28	0.43	0.19	0.31	0.24	0.31	0.29	0.24

Appendix 5. Histograms of Gaps

Figure A5.1 Histograms of Gaps: Main Pillars



Source: Own computations. Note: gaps are relative to a peer with the same income per capita.

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