



European Bank
for Reconstruction and Development

Croatia: Corporate sector background paper

Strengthening private sector productivity to support long-term growth (February 2018)¹

Executive summary

The Croatian economy returned to growth after a protracted recession in 2015 but the country's long-term convergence needs to be underpinned by several measures to address population aging, slow productivity growth and the still relatively weak business environment. Croatia's actual and potential growth as well as total factor productivity declined significantly since the crisis. This paper looks at how convergence and its main driver, productivity, can be revived. Simulation results, based on empirical evidence, show that targeted and coordinated policy actions focusing on the improvement of the business environment can lift economic growth and productivity after a relatively short period of time.

The main policy implications from the paper's empirical findings related to productivity growth are the following:

- Productivity should be the main driver of long-term growth, especially given the expected adverse demographic developments. Falling population makes continuous improvements in productivity even more necessary.
- Investments are key to support productivity growth, as Croatia has one of the largest investment gaps among EBRD countries.
- The reform agenda, focusing on improving the business environment, should be accelerated as it has a strong positive impact on productivity. Croatia may want to focus on areas where

¹ Paper prepared by Peter Tabak (Lead Economist, Department of Economics, Policy and Governance) and Emir Zildzovic (former economic analyst at the EBRD). Sanja Borkovic provided valuable research assistance. We are grateful for comments by Laura Bardone, Gerrit Bethuyne, Arian Perić, Maria Pletikosa, Kristian Orsini, Vukašin Ostojić and Nora Strähle from the European Commission as well as Vedrana Jelusić-Kašić, Alexander Plekhanov, Artur Radziwill, Mattia Romani and Peter Sanfey from the EBRD. The views presented in this paper are those of the authors only and not of the EBRD.

it still trails peer countries, like easing the issuance of construction permits, faster insolvency resolution, removal of obstacles to establishing a new business and registering property.

- The strong negative impact of NPLs and high leverage on productivity highlights the importance of measures aimed at debt resolution and the need for more equity financing for corporates. This may call for stepping up regulatory efforts supporting NPL resolution through coordinated efforts among the authorities and international financial institutions providing technical assistance or potential co-investments alongside private investors.
- Further balanced improvements in infrastructure can support productivity enhancement. Past spending on motorway infrastructure has been beneficial but investments should be stepped up in other neglected areas like railway transport or communal infrastructure.
- Macroeconomic stability, including sustainable public finances, is essential for faster productivity and economic growth as they reduce economic uncertainty and support investments.
- Broadening access to finance and stronger governance are preconditions for future TFP growth. Capital market development and improvements in the quality of corporate governance are important drivers of TFP.
- More innovation, including through targeted use of EU funds, should support TFP growth.

Targeted reforms can unlock productivity growth, providing visible results already in the short-term. In particular, measures aimed at tackling high corporate NPLs and leverage, improvements in the quality of corporate governance and the business environment, financial market development, improvements in innovation capacity, and prudent macroeconomic policies (most notably achieving fiscal sustainability) would result in TFP growth in the range of 2.5-3.0 per cent annually over the next five years and (*ceteris paribus*) would accelerate GDP growth by a similar rate.

1. Motivation for the paper

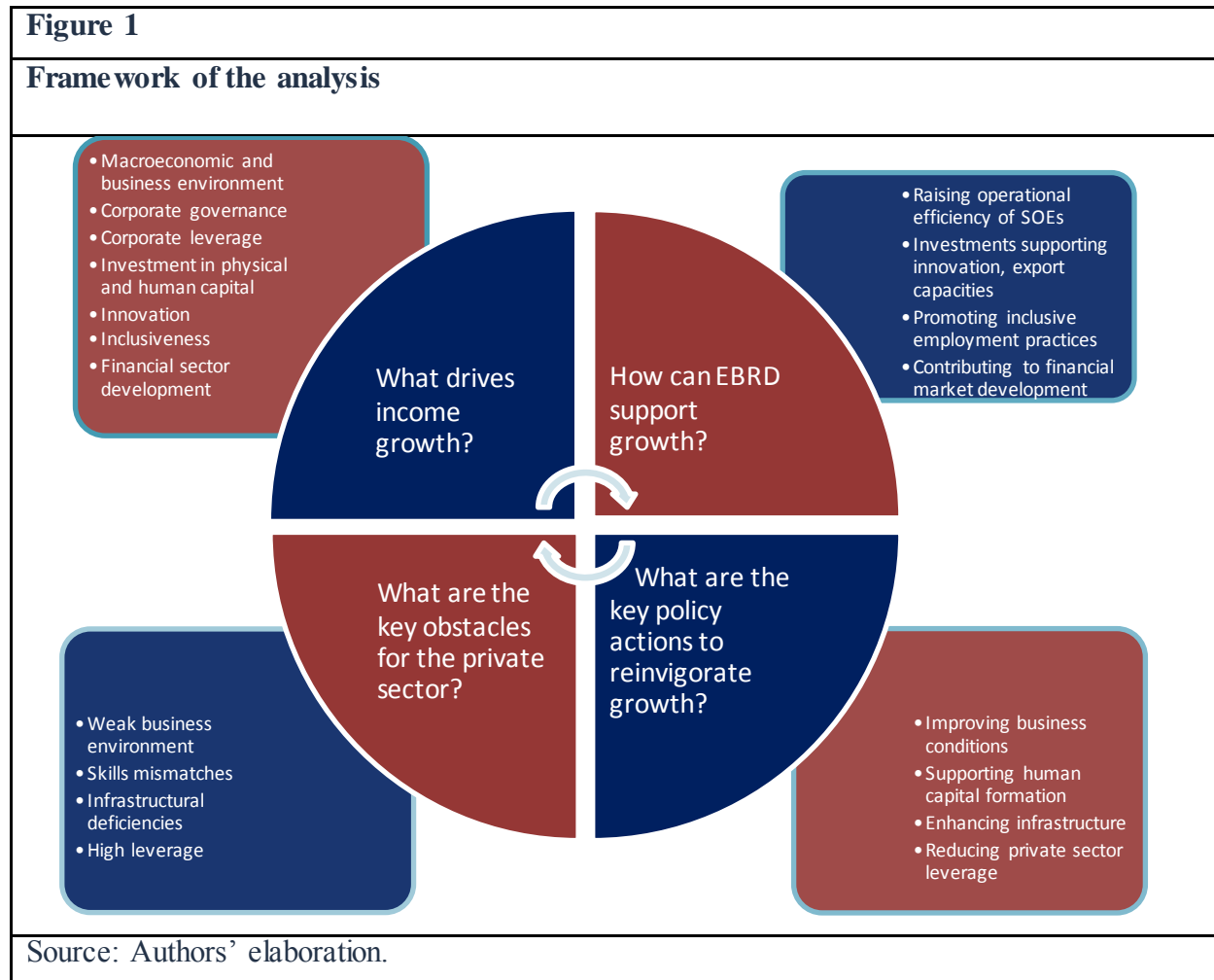
This EBRD background paper focuses on factors significantly affecting private sector performance. The study served as a background for the EBRD country strategy for Croatia, helping the identification of the main strategic directions and themes.²

Private sector productivity growth in Croatia should be the main driver of economic convergence, given the expected long term decline in working age population. Croatia had relatively weak productivity dynamics after the crisis compared with other new EU member states, justifying a detailed look at the drivers of productivity growth. The productivity of state-owned enterprises (SOEs) is also an important issue due to their still relatively large share in the economy and comparatively (vs. Central and Eastern Europe) weak economic performance.³

The paper presents key financial performance statistics of private and public companies in Croatia, in comparison to Central and Eastern European (CEE) as well as Western Balkans (WB) countries. The two peer groups are relevant as most of Croatia's economic indicators fall between those of the two country groups, and there are strong historical and economic ties with these (especially WB) countries.

² The latest EBRD strategy for Croatia can be found under: <http://www.ebrd.com/strategy-and-policy-coordination/strategy-for-croatia.pdf>.

³ See Tabak-Zildzovic (2018).



2. Macroeconomic context

The long recession, ending only in 2014, calls for a strong focus on accelerating growth. The Croatian economy declined by a cumulative 12 per cent between 2009 and 2014, the second largest contraction in the EU after Greece. GDP growth of 2.3 per cent in 2015 and 3.2 per cent in 2016 was supported by a good tourist season, stronger external demand and lower oil prices. However, Croatia would need persistently high growth rates to reduce high unemployment which stood at around 12 per cent over the past year⁴ (with a particularly high rate of youth unemployment, 28.3 per cent). After deflation in 2014-16 due to slow recovery of domestic demand, weak wage dynamics and subdued commodity prices, with the further economy recovering, inflation has started to pick up and reached 1.1 per cent in 2017.

Problems with long-term growth prospects should be addressed by reforms of the business environment. The EBRD forecast foresees 2.6 per cent growth in 2018 (a mild slowdown from 2.9 per cent forecasted for 2017), driven by domestic demand. Private consumption sentiment will be supported by falling unemployment and strong tourism revenues given the increased security risks in some other tourist destinations, while investment will benefit from favourable financial conditions and expected increased EU funds absorption. Risks to the forecast relate to

⁴ Average of Q4 2016 to Q3 2017.

potential effects of Agrokor's financial troubles on its subsidiaries and suppliers, high corporate over-indebtedness in general and slow structural/business environment reforms. Despite some improvements in business sentiment, private investments may stay weak, due to remaining structural weaknesses but also still relatively low rankings on global competitiveness lists.⁵ Inefficient government bureaucracy, tax rates as well as regulations, policy instability and corruption remain the main obstacles for doing business in the country. In the absence of further reforms, Croatia's potential growth is estimated to be below 1 per cent (EC, 2016) as productivity growth has been weak and is expected to remain low.

Economic policy should focus on fiscal sustainability to provide a stable economic environment, underpinning private investment and long-term growth. Croatia was under the Excessive Deficit Procedure (EDP) from January 2014 to June 2017. Previously, the government focused mainly on the revenue side of the budget (i.e. raising the intermediate VAT rate, abolishing certain tax reliefs, increasing excises on cigarettes and gasoline and introducing a savings tax), avoiding targeted spending cuts and structural reforms. Public debt, which surpassed 85 per cent of GDP in 2014, may have negatively affected private sector financing as the share of bank claims on government almost doubled between 2008 and 2015, reaching nearly 30 per cent of total bank claims at end-2015. Weak fiscal performance was followed by the downgrade of Croatia's sovereign debt rating to below investment grade by all three main credit agencies.

Fiscal sustainability improved significantly in 2015 and 2016. The general government deficit contracted from 5.1 per cent of GDP in 2014 to 0.9 per cent in 2016, on the back of growing revenues supported by the economic recovery as well as lower expenditures on social benefits and wages. As a result, public debt started falling in 2016. Although Croatia has exited the EDP in 2017, fiscal discipline needs to be sustained and underpinned by more structural measures. The government should opt for targeted public expenditure cuts, higher EU fund absorption, and improved efficiency of state-owned enterprises (SOEs).

The banking sector, with high capital buffers, can support economic convergence if high corporate NPLs and over-indebtedness are resolved. The banking system's capital buffers are strong (the capital adequacy ratio stood at 22.7 per cent in September 2017) but still relatively high level of NPLs (12.5 per cent in September 2017), high corporate leverage (the debt of companies with long-term debt to EBITDA over 10 or negative was around 36 per cent of GDP in 2014⁶) and weak economic prospects have kept credit growth negative since mid-2012. Over the past three years, the central bank introduced certain measures to address the NPL problem, including changes in provisioning, treatment of restructured loans, compulsory minimum haircuts and collection periods for real estate and moveable property, which helped to lower NPLs from over 17 per cent in 2014.

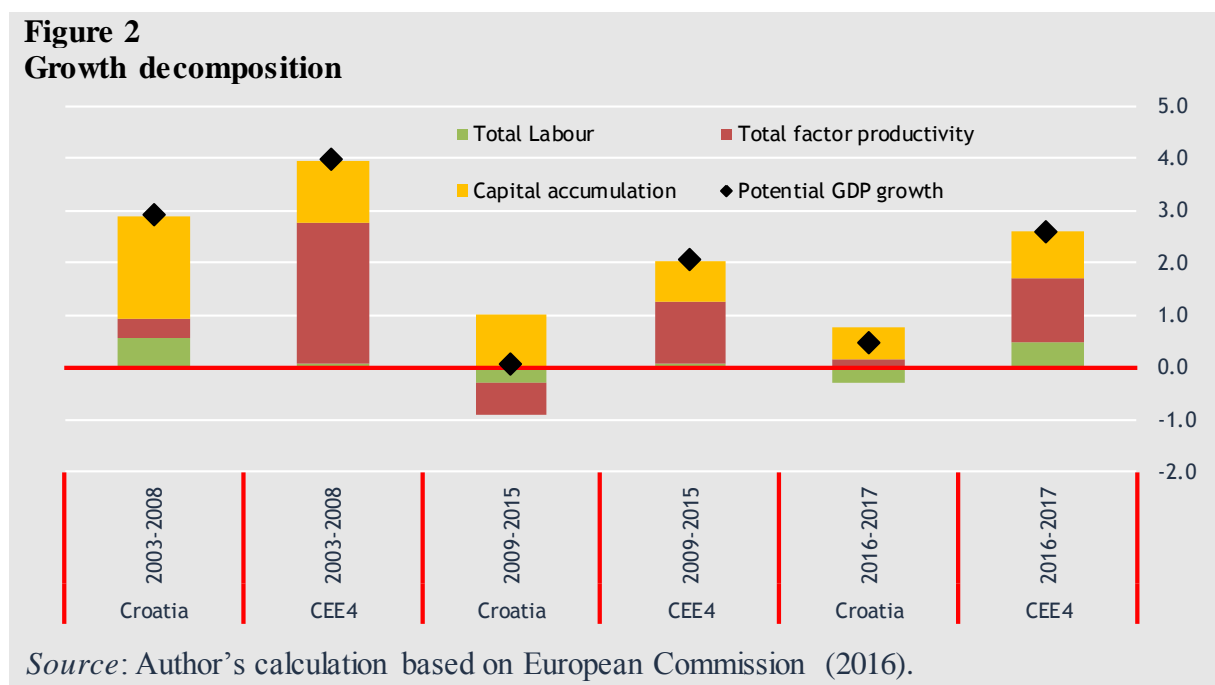
⁵ Croatia ranks 51st out of 190 economies in the World Bank's Doing Business 2018 report (World Bank, 2018) and 74th out of 137 countries in World Economic Forum's Global Competitiveness Index (World Economic Forum, 2017).

⁶ See Box 3 in EBRD (2017).

3. Methodological framework for the productivity analysis in Croatia

3.1. Growth decomposition

Croatia's long-term growth potential declined sharply over the past decade. Potential annual growth⁷ dropped to a mere 0.1 per cent over 2009-2015 from 2.9 per cent over 2003-2008, reflecting weaker productivity growth, declining investments and negative demographics (Figure 2). Assuming no policy change, potential growth is expected to stay low, below 1 per cent annually, according to the European Commission (European Commission, 2016). The main positive contribution may come from total factor productivity⁸ which has improved recently (although still low compared to CEE countries) while negative labour market trends and weak investments continue to hamper growth prospects. Only a dynamic private sector, underpinned by strong investment flows and a more flexible labour market, can accelerate productivity and ultimately long-term growth.



3.2. Capital accumulation

Low investment activity is a key factor behind weak long-term growth prospects. Investments in Croatia fell sharply after 2008 and remained significantly below CEE levels over 2009-2015 (Figure 3). EBRD estimates show that Croatia's investment gap (6.8 per cent of GDP)⁹ is one of the largest among the countries of operations (Figure 4). The estimated

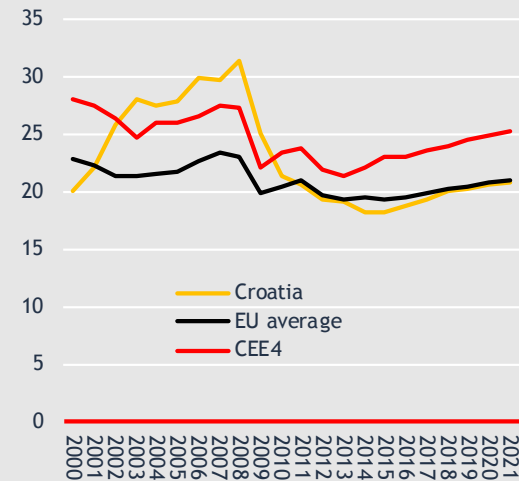
⁷ Potential GDP and GDP growth is the level and growth of output that an economy can sustain at a constant inflation rate. Although an economy can temporarily produce above its potential level of output by utilising its existing capacities more intensively, that could lead to higher inflation in the long term.

⁸ Total factor productivity (TFP) is the portion of output not explained by the amount of inputs but by the way how efficiently and intensely the inputs are utilised in production.

⁹ The investment gap was calculated based on the theoretical investment level of a country with a certain level of development, based on an estimation including a wide range of countries. If actual investment was lower than this theoretical level, the country experienced an investment shortfall.

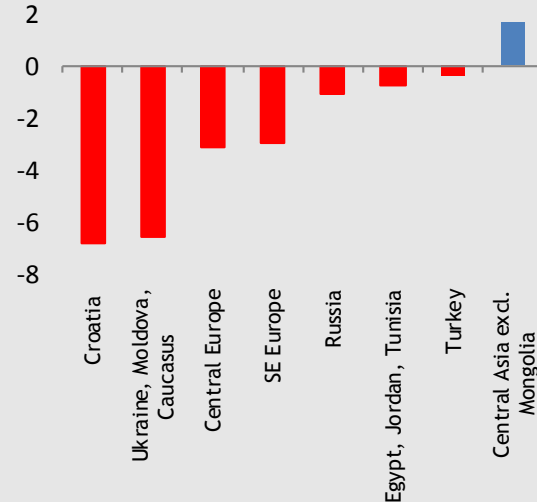
structural level of investment of 25 per cent of GDP implies cumulative under-investment of 38.5 per cent of GDP over 2009-2015, which could explain the lack of income convergence. According to the latest IMF forecast (IMF 2016), investments are expected to converge to EU levels, but will remain 5 per cent of GDP lower than in CEE4 countries.

Figure 3
Aggregate investments
(% of GDP)



Source: IMF WEO April 2016.

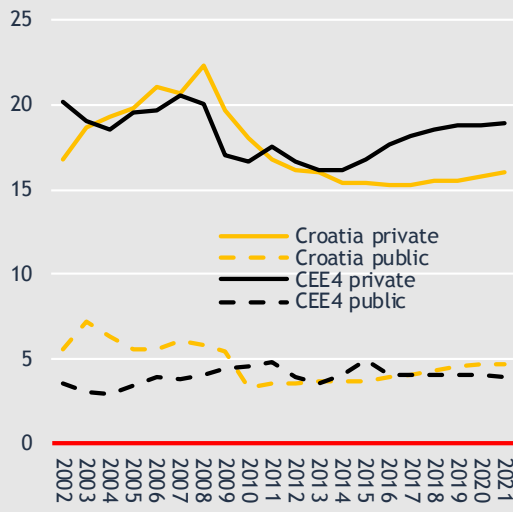
Figure 4
Estimated investment surplus/shortfall
(% of GDP)



Source: EBRD Transition report 2015-2016.

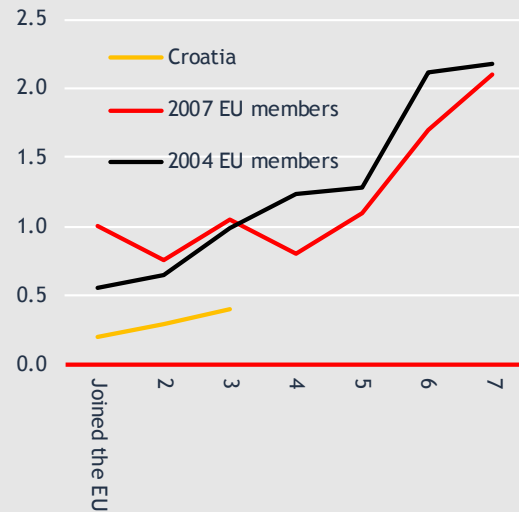
The investment gap is mostly attributable to the private sector. Private investments declined sharply after 2008 and remained persistently low over the past seven years, at around 15 per cent of GDP (Figure 5). Public investments dropped significantly in 2010 from a very high level, contributing to the decline in overall investments, and have been below those recorded in CEE4. Public investments could have been higher since the EU accession if Croatia had been more successful in utilising EU funds. The comparison with other new member states shows underutilization of EU funds in early post-accession years (Figure 6). There is a risk that the necessary fiscal adjustment needed to reduce public debt in a sustainable way may force cuts in public investments from budgetary sources that may not be completely offset by the rise in the utilization of EU funds. Thus, it is all the more important to look into the main obstacles faced by private sector investors.

Figure 5
Public vs. private investments
(% of GDP)



Source: IMF WEO April 2016.

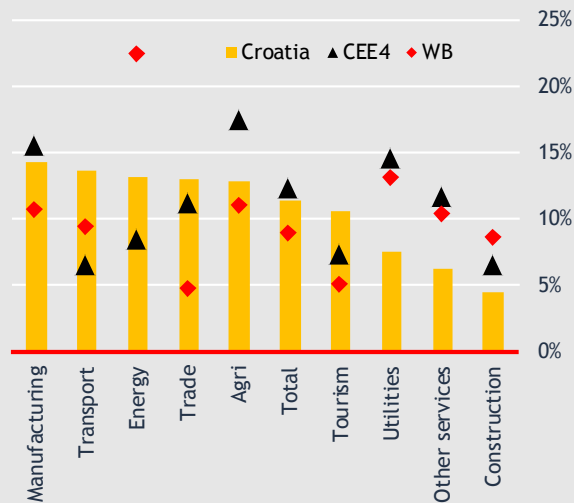
Figure 6
Inflows of EU funds
(% of GDP, years after joining the EU)



Source: Eurostat.

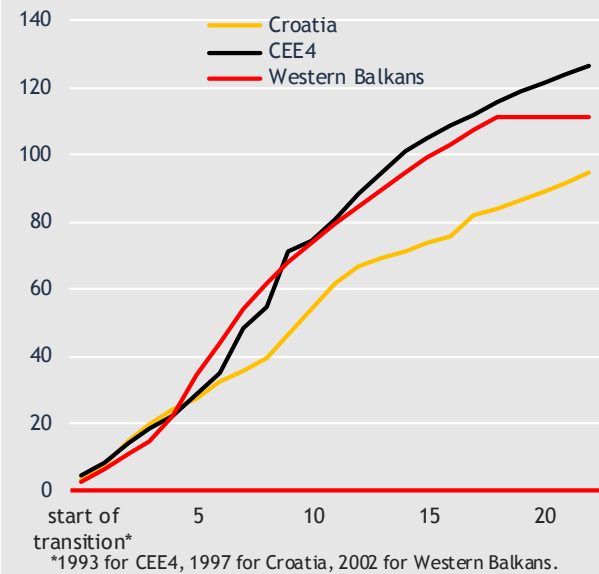
Firm level data on investments show large gaps in several sectors over 2012-2104. While manufacturing companies had the highest ratio of investments relative to the book value of their fixed assets in Croatia, these remain below CEE4 average levels (Figure 7). The largest investment gaps relative to CEE4 are seen in agriculture and the utilities sector. On the other hand, investments in transport, trade, energy and tourism were high relative to peers.

Figure 7
Investments of private sector firms by sector (% of fixed assets, 2012-2014 average)



Source: Authors' calculations based on BVD

Figure 8
Cumulative FDI inflows since the start of transition, in % of GDP

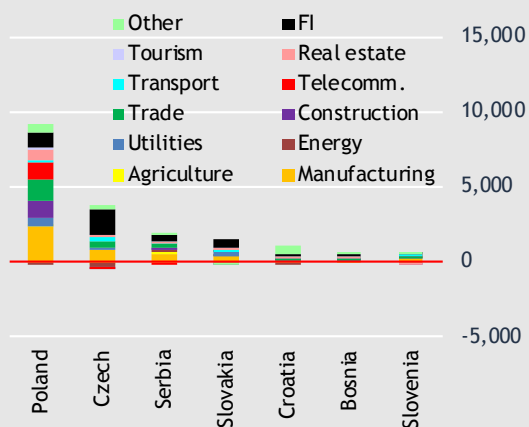


Source: Authors' calculations

Foreign direct investments remained below regional levels. Over the past two decades Croatia attracted less foreign investments (in terms of GDP) than CEE and Western Balkans countries (Figure 8). The underinvestment was particularly large over 2010-2015 when net inflows averaged around €1 billion (Figure 9). FDI structure has been also far from balanced (Figure 10): the low level of investments in manufacturing (16.7 per cent of cumulative FDI inflows, far below that of the Czech Republic at 33.4 per cent) may highlight broader problems with Croatia's competitiveness. Attracting more FDI would be important for Croatia in order to boost productivity through necessary technological transfers. Given the still low FDI stock (Figure 11) and relatively skilled labour force¹⁰ the country could attract larger FDI inflows if it provides the necessary business conditions but will have to compete with neighbouring countries (like Serbia) offering lower labour costs.

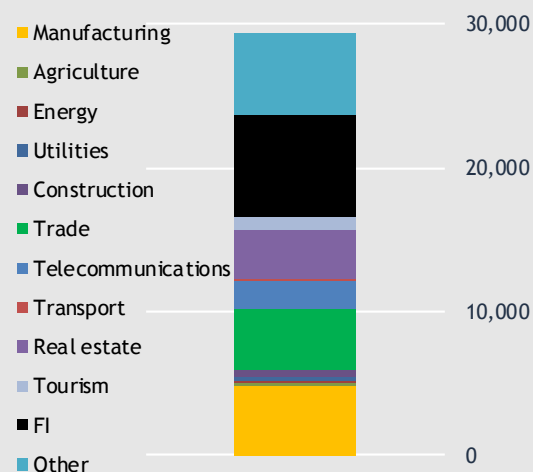
¹⁰ Despite relatively high share of tertiary graduates there are indications of skills mismatches (e.g. high youth unemployment), requiring stronger focus on training and retraining (young) people.

Figure 9
FDI inflows by economic activity
 (EUR million, 2010 – 2015 average)



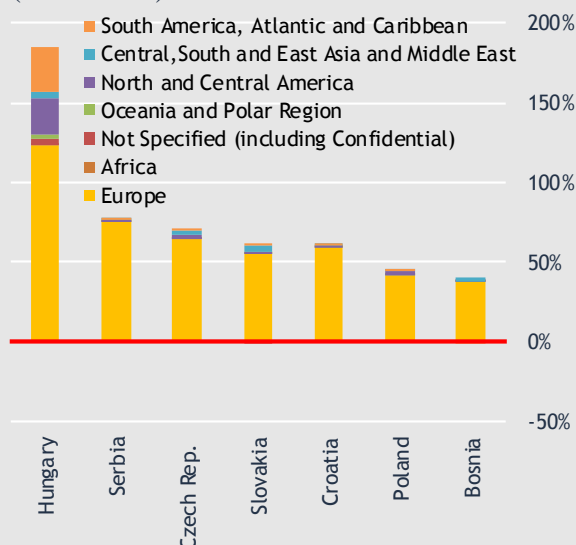
Source: National central banks.

Figure 10
FDI inflows by economic activity
 (EUR million, 1993 – 2015 cumulative)



Source: HNB.

Figure 11
FDI stocks by countries of origin in 2014
 (% of GDP)



Source: IMF Coordinated Direct Investment

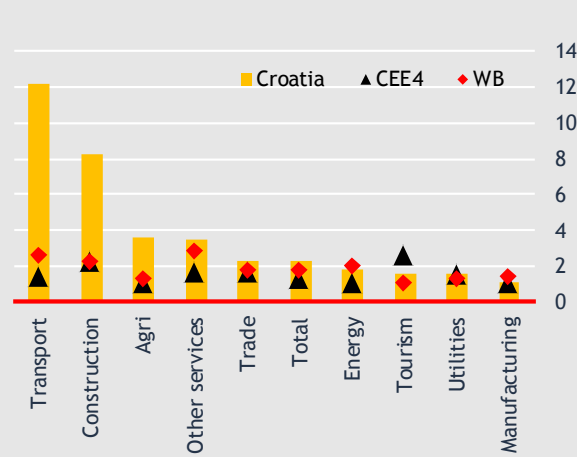
High indebtedness may constrain investment by Croatian firms as shown by international experience.¹¹ Empirical evidence shows that this is particularly true if growth opportunities are limited (Lang et al., 1996). Corporate leverage is higher in Croatia than in CEE countries in all sectors of the economy with the exception of tourism (Figure 12). Due to higher financing costs¹² and weak economic growth, in most of the sectors (agriculture, energy and manufacturing),

¹¹ See Cecchetti et al, 2011.

¹² Still high public debt levels might contribute to high corporate financing costs through the country risk premium.

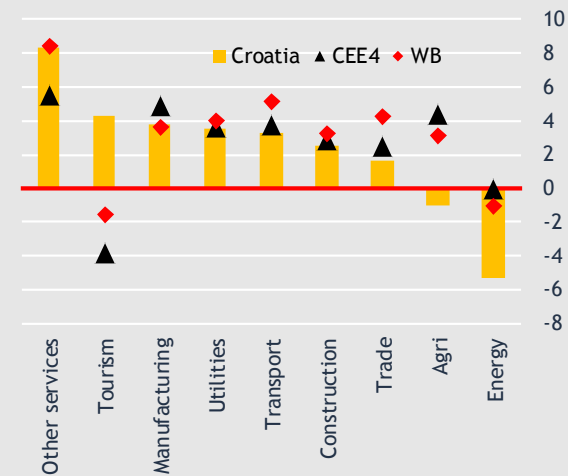
Croatian corporates were on average less profitable over 2012-2014 than CEE and WB peers (Figure 13). Over the same period, almost 50 per cent of Croatian companies exhibited negative average profitability, some 10 percentage points more than in the CEE4 (Figure 14). Internal sources (retained earnings) may have supported investments but remain insufficient if external financing is constrained, e.g. because of lower global liquidity and/or higher cost of finance. Reducing the degree of euroisation of the Croatian economy could also help bring down financing costs and eliminate exchange rate risk (especially for unhedged borrowers). In addition, improvements in access to equity markets, including public and private equity financing, are necessary to reduce leverage and unlock investment growth.

Figure 12
Private sector leverage
 (Debt to equity ratio, 2012-2014 average)



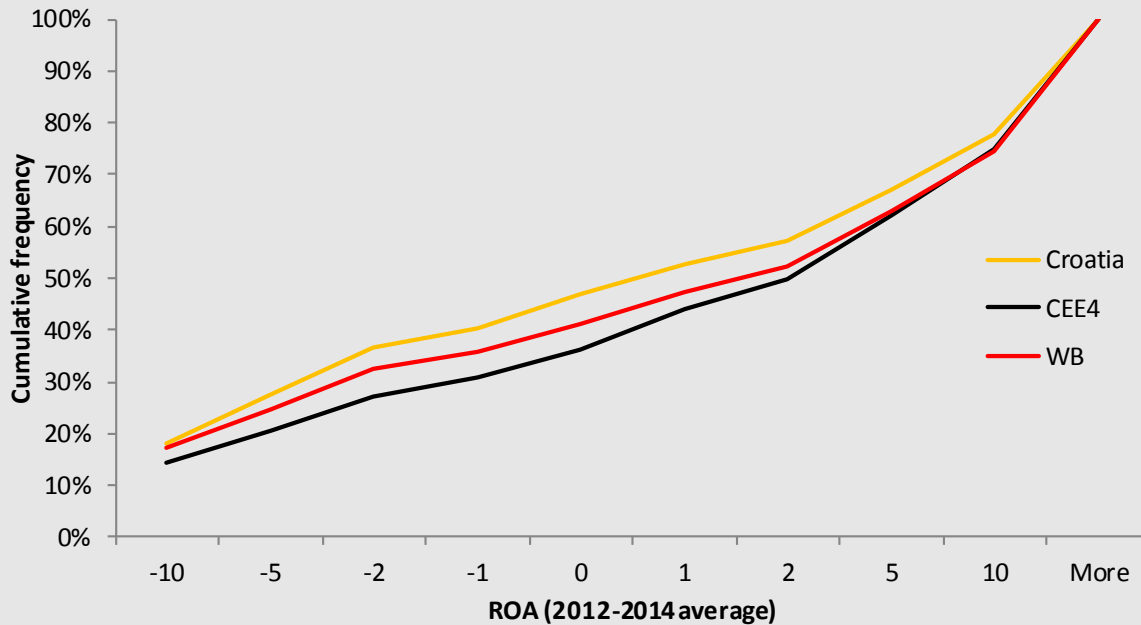
Source: Authors' calculations based on BVD

Figure 13
Return on assets in the private sector
 (in %, 2012-2014 average)



Source: Authors' calculations based on BVD

Figure 14
Return on assets in the private sector¹³
 (2012-2014 average)

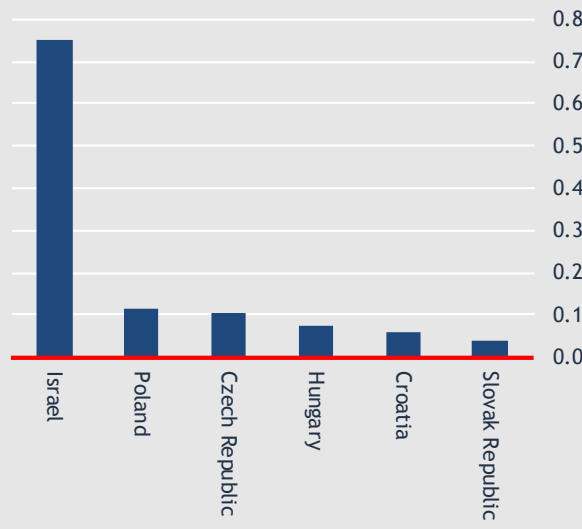


Source: Authors' calculations based on BVD ORBIS.

Corporate investments should focus more on innovation to keep competitiveness. Croatian corporate investment in research and development is low, as is evident from the number of patent applications (Figure 15). Manufacturing companies were the most innovative ones in 2014, but the number of patents was still very small compared to manufacturing firms from the CEE4 countries (Figure 16).

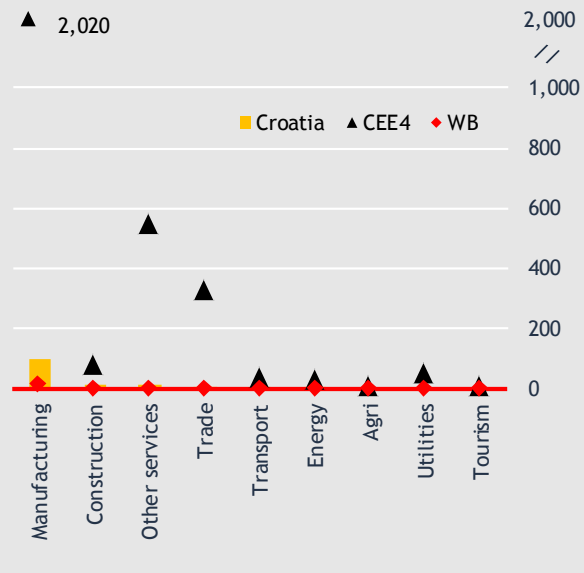
¹³ Firm level indicators are calculated using the data from BVD ORBIS. The sample includes 30,542 private firms from Croatia, 94,572 from Poland, 96,318 firms from Czech Republic, 92,283 from Hungary, 29,687 from Slovakia, 94,572 from Serbia and 30,704 from Bosnia.

Figure 15
Patent applications in 2013
 (per 1000 people)



Source: Author's calculations based on World Development Indicators

Figure 16
Number of patents per sector in 2014



Source: Authors' calculations based on BVD ORRIS

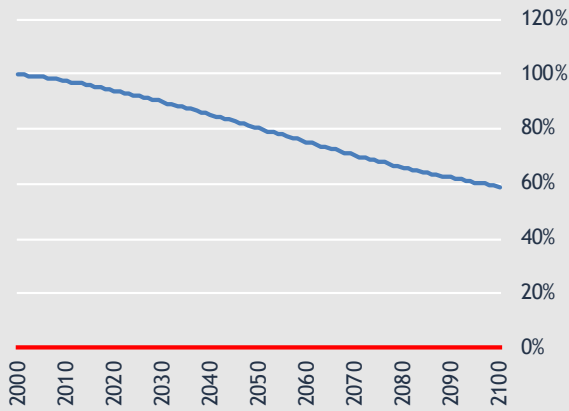
Overall, the analysis suggests that raising capital accumulation is necessary to support long term growth and this will also require speeding up reforms aimed at improving the business environment.¹⁴ In addition, further capital market development is needed to improve access to financing for smaller companies. Additional sources of equity financing are particularly important given the high leverage in the country. Finally, more needs to be done in stimulating R&D investments. The support in this respect could come from better use of EU innovation funds.

3.3. Labour and human capital

Croatia faces significant demographic challenges, highlighting the need for improvements in human capital. Croatia's population is expected to shrink significantly over the coming decades, affected to a large extent by high mortality and low birth rates, as well as potentially remaining outward migration, affected both by push (for unemployed people) and pull factors (for the highly-skilled) (Figure 17). The negative effects of declining population on growth could be offset by improvements in human capital (mostly in the form of better education and training) that makes labour more productive. Thus, the continuous quest for increasing the productivity of the labour force (including in tourism, one of the major contributors to GDP), should be high on the agenda. This may include the restructuring of existing companies to achieve more value added or reallocating the labour force towards sectors with higher value added. This is all the more important as Croatia still lags CEE4 countries in most areas in the quality of education and training (Figure 18).

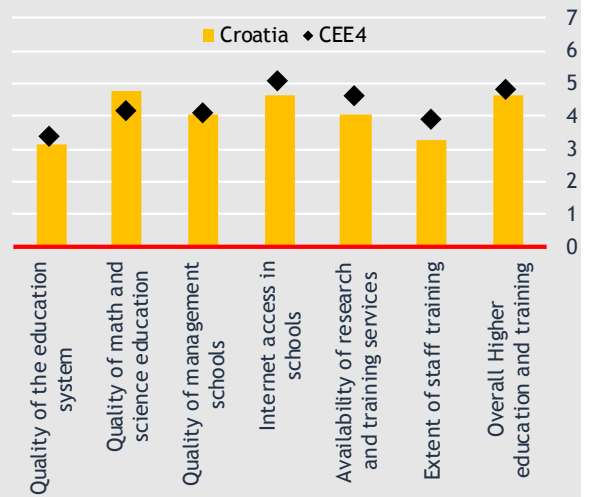
¹⁴ Detailed discussion of channels of transmission of business environment reforms on investments is given e.g. in White and Fortune (2015).

Figure 17
Population projection
(2015=100)



Source: UN.

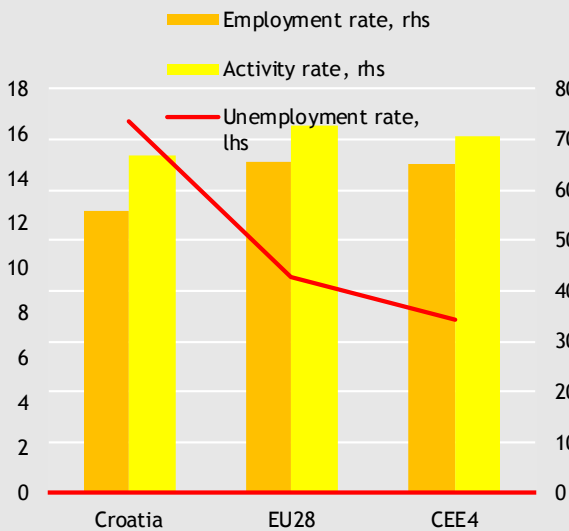
Figure 18
Quality of education and training
(1-7 best)



Source: Global Competitiveness report 2015-2016, World Economic Forum

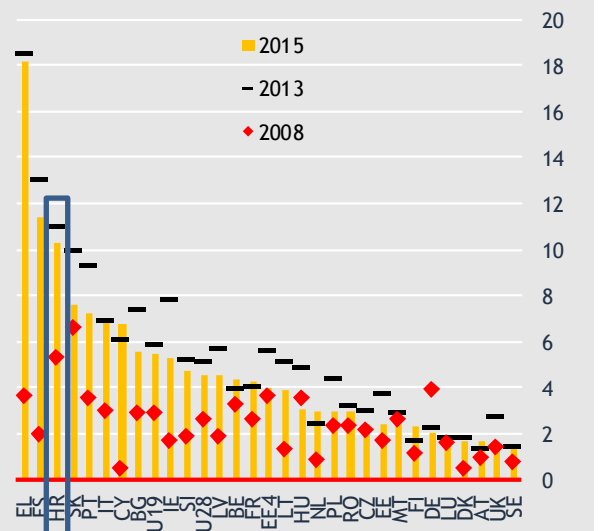
High unemployment and low activity rates highlight the remaining structural rigidities in the labour market. Despite a recent decline, unemployment (and especially long-term unemployment) remains significantly above the EU average and comparable countries from the CEE region (Figures 19 and 20). In addition, the activity rate is low showing that, during the prolonged recession, many workers stopped active job search and left the labour force. Their reintegration might be more challenging given the loss of their skills during the period of inactivity.

Figure 19
Labour market indicators



Source: Eurostat.

Figure 20
Long-term unemployment rate
(% of active total population 50-64)



Source: Eurostat.

Skills mismatches may contribute to high youth unemployment. Youth unemployment at above 40 per cent remains among the highest in the EU (Figure 21), although it decreased somewhat from the peak in 2013, potentially as a result of government programmes (European Commission, 2015). As shown by an EBRD survey,¹⁵ young workers often lack practical training which reduces their employability.

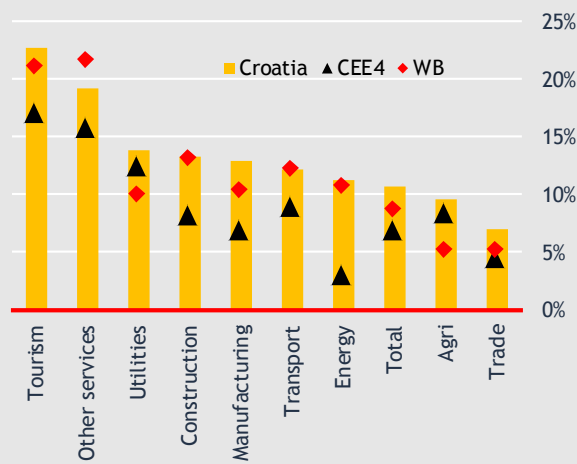


High labour costs relative to the value added may negatively affect investments and growth. The high share of labour costs in operating revenues (especially in tourism¹⁶, services and utilities) compared to CEE peers (Figure 22) points to the availability of efficiency gains in labour utilisation and may have a negative effect on profits, thus limiting internal sources for investments. High labour costs may be one of the factors rendering Croatia less attractive for new investments and negatively affecting export competitiveness. The value added per 1 euro of labour cost is below the EU average for most sectors, except for agriculture, financial activities as well as information and communication technology (ICT) (Figure 23).

¹⁵ The survey asked 352 enterprises in Albania, Bosnia and Herzegovina, Croatia, FYR of Macedonia, Kosovo, Montenegro and Serbia about their views and perceived obstacles to traineeships and internships.

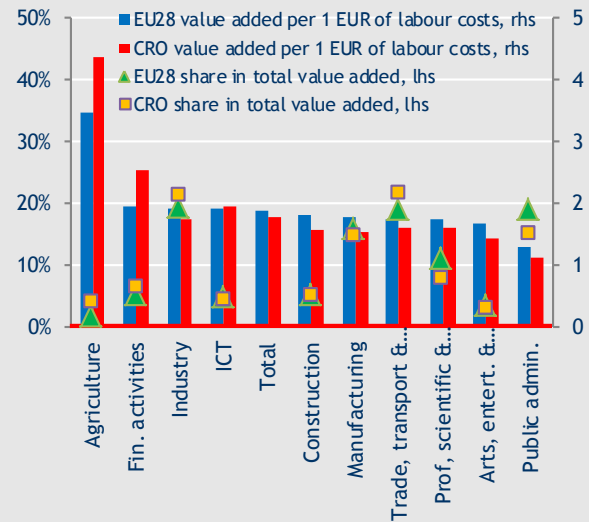
¹⁶ Findings for the tourism sector might have been affected by the fact that the sector is dominated by accommodation in private housing which is not included in the statistics.

Figure 22
Employment costs to operating revenues
in the private sector
 (in per cent, 2012-2014 average)



Source: Authors' calculations based on BVD

Figure 23
Labour productivity
 (value added per 1 EUR of labour cost)



Source: Authors' calculations based on

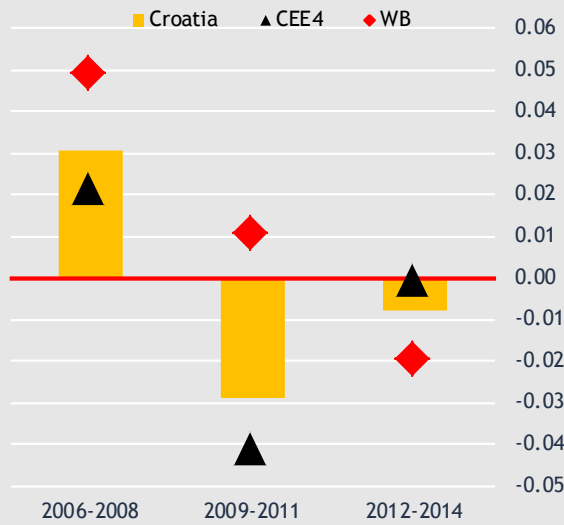
4. Private sector productivity trends and challenges

In order to understand the determinants of productivity developments better, this section uses firm level data over 2006-2014 to estimate total factor productivity growth and its drivers in Croatia. The first part shows the evolution of total factor productivity across different sectors of the Croatian economy and benchmarks it with peers from CEE and Western Balkans. Then the key drivers of total factor productivity are estimated and potential future paths for productivity growth under alternative scenarios are derived.

4.1. Total factor productivity across sectors: Overall deceleration and weakness in tradeables

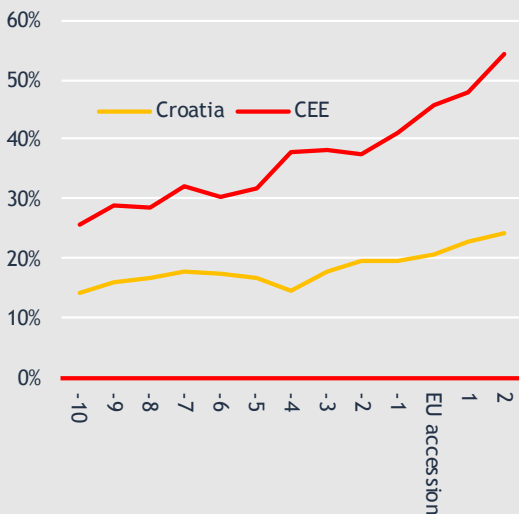
Firm level data show worsening productivity in Croatia over 2009-2014. The estimates are in line with the macro-level assessment by the European Commission (Figure 2). TFP was lagging behind peers even before the 2008 crisis and continued to worsen over the 2009-2014 period (Figure 24). All sectors in Croatia had negative TFP growth over 2012-2014, declining from before the crisis, similarly to WB and CEE countries. Croatia, however also exhibited a continuous worsening in manufacturing unlike the WB and CEE countries where the 2012-2014 period was one of strong recovery, also supporting export growth. While exports have grown in Croatia from 2012 as well, this may be more attributable to EU accession in 2013 than improving competitiveness (see Figures 25 and 26). Construction and tourism are the only sectors with ameliorating productivity over the most recent period (see Annex 1 Figure 34 and 37) but TFP remained relatively low. Financial and other services saw worsening performance over the period, although the drop in TFP was lower than in CEE4 countries (see Annex 1 Figures 38 and 39).

Figure 24
Average TFP growth - Total economy



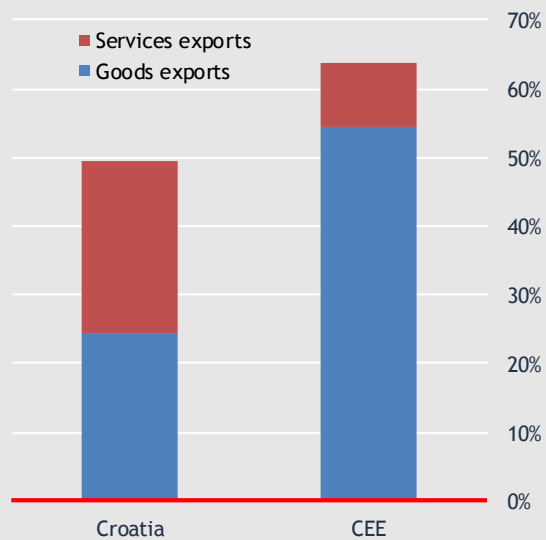
Source: Authors' calculation.

Figure 25
Goods exports (share of GDP)



Source: IMF WEO, April 2016.

Figure 26
Structure of exports in 2015 (share of GDP)



Source: IMF WEO, April 2016.

Low productivity levels and growth as well as opportunities to raise exports further highlight the need for policy action. The productive sectors in the economy have the biggest potential to drive future growth. However Croatia saw negative total factor productivity in all sectors, which limits future economic growth. Below we identify the key determinants of private sector productivity in order to identify desirable policy action.

5. Analysis of the main productivity drivers: How to boost productivity in Croatia?

The Croatian economy and several of its sectors have experienced negative productivity growth after the crisis. In this subsection, we analyse the determinants of total factor productivity over the period 2006-2014. First, we discuss the estimated sensitivity of Croatia's TFP to a number of prospective determinants. Second, we combine information on the estimated sensitivities with the evolution of these determinants to explain what was driving the declining productivity over the past decade.

NPLs, corporate leverage, business conditions, the macroeconomic environment and infrastructure quality had the strongest actual impact on productivity between 2006 and 2014. The increasing level of corporate NPLs coupled with growing private sector debt, weak business conditions and the worsening macroeconomic environment (mostly through persistent negative growth and surging public debt) had a negative impact, while improvements in the infrastructure quality had a positive contribution to TFP dynamics over the period. Contributions from other factors were negligible as changes in the underlying variables (e.g. financial market development) were minimal.

Targeted policy actions can help accelerate Croatia's productivity growth. The results from the firm-level analysis indicate that policies affecting the business environment have a strong impact on TFP (Figure 27). The strongest effect comes from the level of non-performing loans, the quality of corporate governance and business conditions. The strong effect of NPLs on productivity may make sense as defaulted companies can work less efficiently than financially healthy ones.¹⁷ The findings indicate that stepping up regulatory efforts for NPL resolution, strengthening corporate governance and reducing the administrative burden can unlock TFP growth. This is in line with findings in other papers that suggest significant growth benefits from reducing NPLs (Balgova et al, 2016). In addition, TFP is also highly sensitive to improvements in infrastructure. Measures aimed at developing capital markets and improving the macroeconomic environment will also be beneficial for productivity growth. Lastly, improvements in human capital and innovation can also support TFP, although their effect is of a smaller magnitude. On the other hand, estimates show that high leverage negatively affects TFP.

¹⁷ The effect of NPLs on TFP growth is likely to be non-linear (potentially increases with the level of NPLs). However, the unavailability of firm level data on NPLs constrains further investigation.

Box 1**Conceptual framework for the analysis of total factor productivity**

A two-step approach is applied to estimate the key determinants of total factor productivity in Croatia. As the first step, following the empirical literature on total factor productivity (see Gal 2013 for a recent survey), firm level data from ORBIS are used to estimate productivity in the following regression:

$$y_{it} = \alpha_k k_{it} + \alpha_l l_{it} + \alpha_m m_{it} + \varepsilon_{it}$$

where i and t refer to firm i and year t ; y_{it} , k_{it} , l_{it} and m_{it} represent the logarithm of a firm's output (sales) and its production inputs: capital (measured as the book value of fixed assets), labour (number of employees) and material costs, respectively. Total factor productivity (TFP) is computed as a residual. The Levinsohn-Petrin correction¹⁸ (i.e. material inputs are used as a proxy to control for unobservable productivity shocks) will address endogeneity. Sectoral price deflators are used to deflate nominal variables.

As the second step, firm-level productivity estimates from the first step and a variety of firm-specific, macroeconomic, institutional and business environment determinants are used to identify the key drivers of productivity growth (Table 5 in Annex 2). The prospective determinants are identified based on an extensive literature survey and classified according to their sensitivity to policy decisions, and the sign of their expected effect on the productivity growth (see Table 3).

Table 3
Prospective determinants of the TFP in Croatia

EXPECTED EFFECT ON THE TFP**Positive****Negative****Ambiguous****SENSITIVITY TO POLICY DECISIONS**

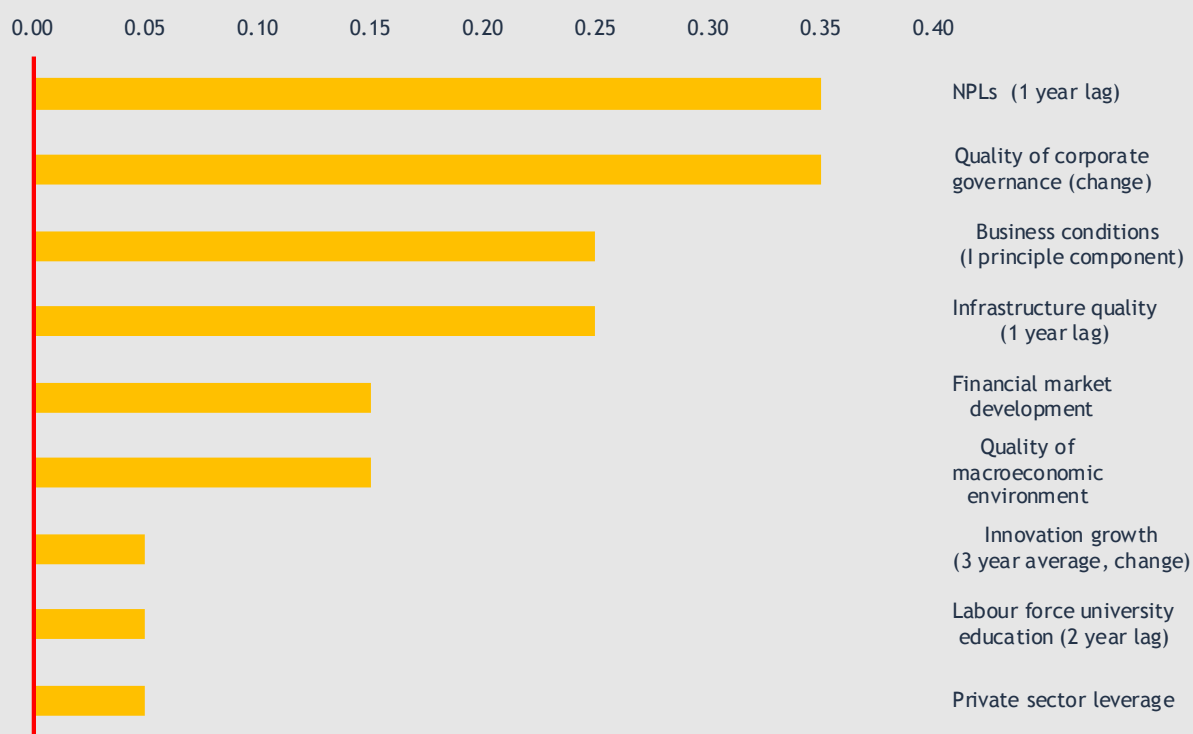
Sensitive to policy in the short run	<ul style="list-style-type: none"> • Business environment • Macroeconomic environment 		
Sensitive to policy in the medium run	<ul style="list-style-type: none"> • Macroeconomic environment • Infrastructure quality • Financial market development 	<ul style="list-style-type: none"> • Leverage • NPLs • Youth unemployment 	
Sensitive to policy in the long run	<ul style="list-style-type: none"> • Innovation • Quality of education 		

¹⁸ See Levinsohn – Petrin (2003).

Source: Authors' elaboration.

Figure 27

Standardised sensitivity of productivity on different policy variables in absolute value



Note: Standardized coefficients show the impact of a one standard deviation change in the independent variable on income growth.

Bars represent absolute values of estimated standardized coefficients grouped according to the size of the impact on TFP in four groups: 1) standardized coefficient above (below) 0.3 (-0.3) 2) standardized coefficient between 0.2 and 0.3 (-0.2 and -0.3), 3) standardized coefficient between 0.1 and 0.2 (-0.1 and -0.2) and 4) standardized coefficient between 0 and 0.1 (0 and -0.1).

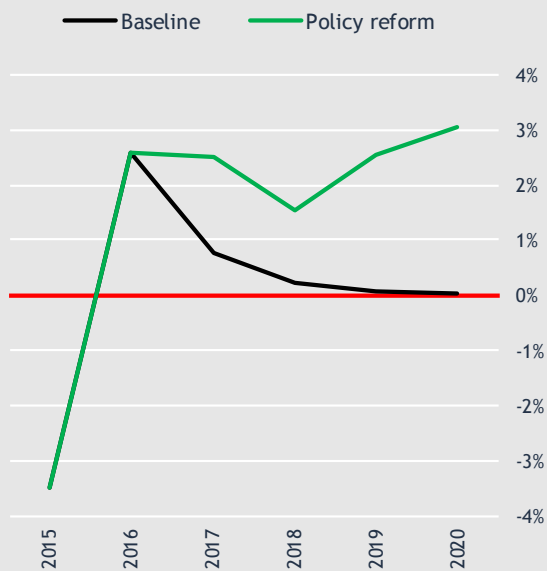
Source: Authors' calculation.

6. Analysing the effects of policy actions: Alternative scenarios for potential reforms

Policy reforms seem to be necessary and effective to speed up productivity growth in Croatia. A simple scenario analysis tool allows quantifying the potential effect of different policy measures (or a more complex reform programme) on productivity and growth. The baseline scenario, assuming no policy measures, foresees no productivity growth over the next five years due to the remaining high level of NPLs, weak corporate governance and poor business conditions. Targeted reforms however can unlock productivity growth, providing visible results already in the short-term. In particular, measures aimed at tackling high corporate NPLs and leverage, improvements in the quality of corporate governance and the business

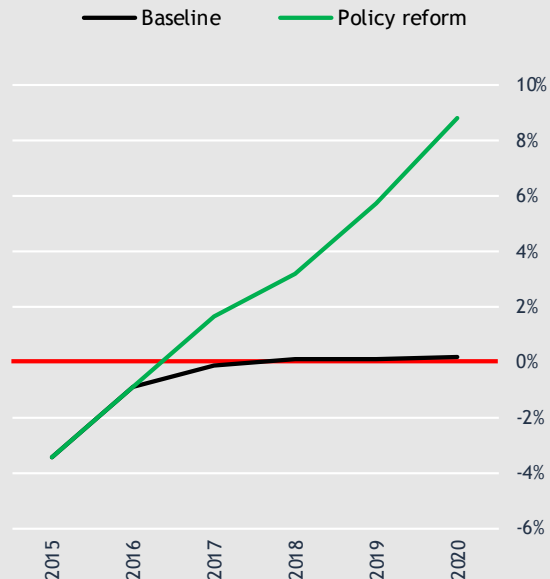
environment, financial market development, improvements in innovation capacity, and prudent macroeconomic policies (most notably achieving fiscal sustainability) would result in TFP growth in the range of 2.5-3.0 percent annually over the next five years and (*ceteris paribus*) would accelerate GDP growth by a similar rate (Figures 28 and 29).

Figure 28
TFP growth



Source: Authors' calculations

Figure 29
Cumulative TFP growth



Source: Authors' calculations

Box 2**Total factor productivity under alternative policy scenarios**

Two policy scenarios (“no policy change” and “realistic policy reform”) are generated. Table 4 shows the background assumptions.

The scenarios are generated in two steps:

1. Using: (i) the estimated coefficients from the TFP determinants analysis and (ii) the projected values of determinants; generate projections of the TFP growth.
2. Different projections of the selected variables are alternated to obtain the range of potential scenarios and assess the risk implications (see accompanying simulator in Excel).

Table 4**Assumptions used for simulating future income paths**

VARIABLES	BASELINE – NO POLICY CHANGE	REALISTIC REFORM	POLICY
NPL ratio (1 year lag)	no change	moderate decrease reflecting policy measures (1.5 pp as of 2018)	reflecting
Private sector leverage	no change	gradual reduction from 2017	
Labour force tertiary education (2 year lag)	moderate improvement	moderate improvement	
Innovation growth (3 year average, change)	no change	improvement to reach 2015 CEE4 level by 2020	
Quality of the macroeconomic environment	no change	macro risk back at 2007 level by 2020	
Financial market development	no change	improvement to reach 2015 CEE4 level by 2020	
Infrastructure quality (1 year lag)	no change	improvement due to increased investment in railway network	
Business conditions (first principle component)	no change	Cumulative improvement in business conditions reflecting push in reform agenda (15% relative to 2015-2016)	
Quality of corporate governance (change)	no change	improvement to reach 2015 CEE4 level by 2020	

Source: Authors' elaboration.

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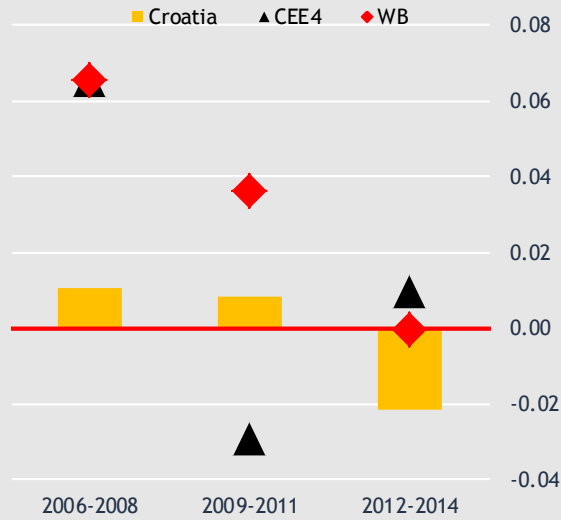
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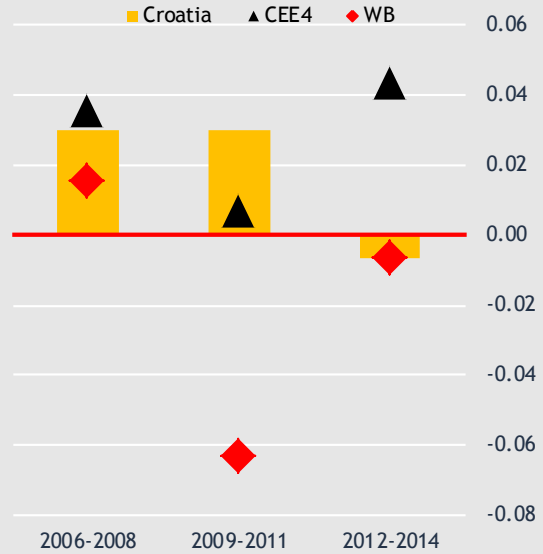
Annex 1: Sectoral TFP growth

Figure 30
Average TFP growth - Agriculture



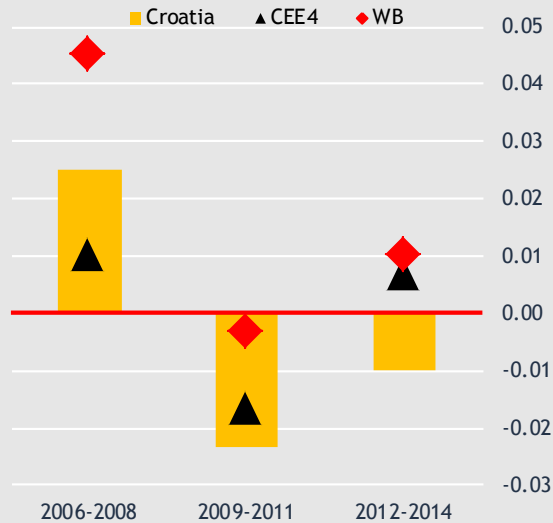
Source: Authors' calculation.

Figure 31
Average TFP growth - Energy



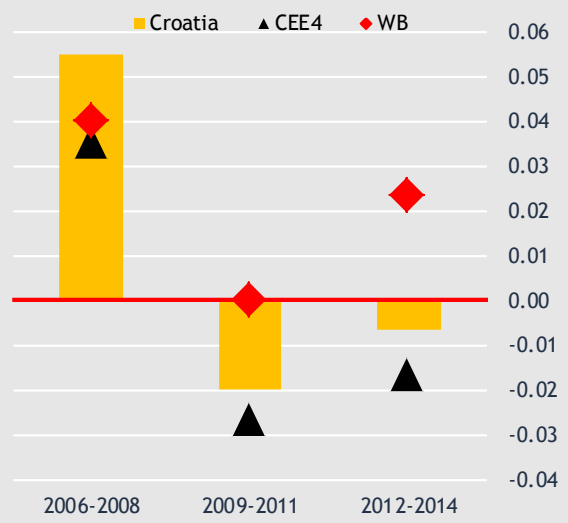
Source: Authors' calculation.

Figure 32
Average TFP growth - Manufacturing



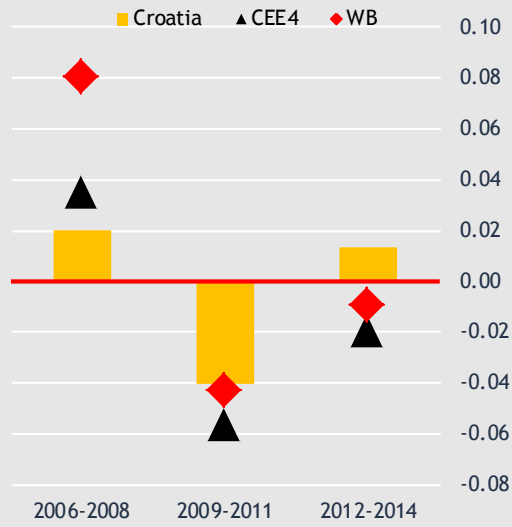
Source: Authors' calculation.

Figure 33
Average TFP growth - Utilities



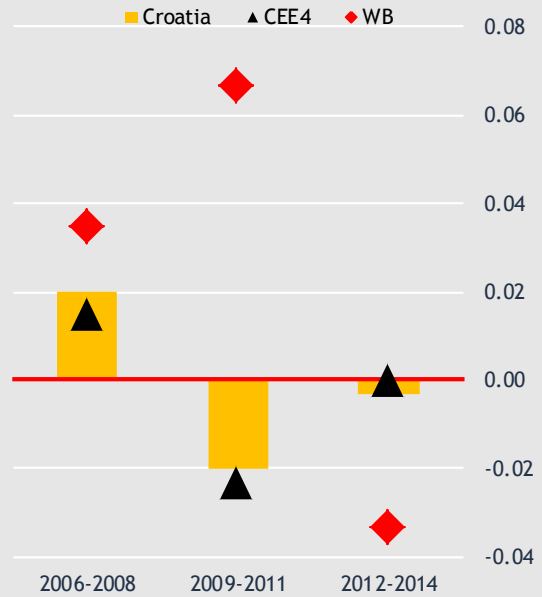
Source: Authors' calculation.

Figure 34
Average TFP growth - Construction



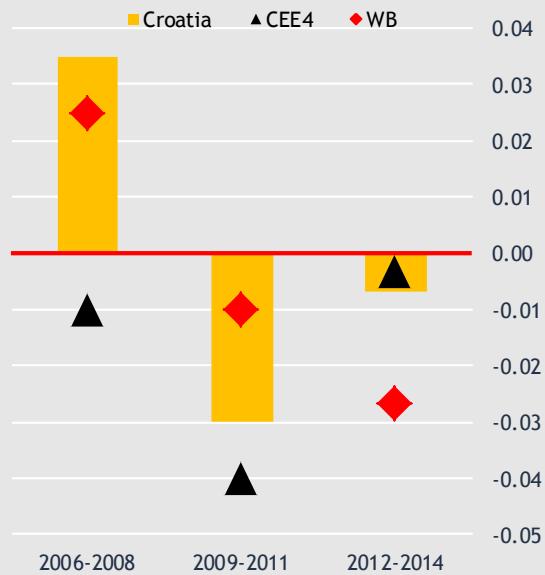
Source: Authors' calculation.

Figure 35
Average TFP growth - Trade



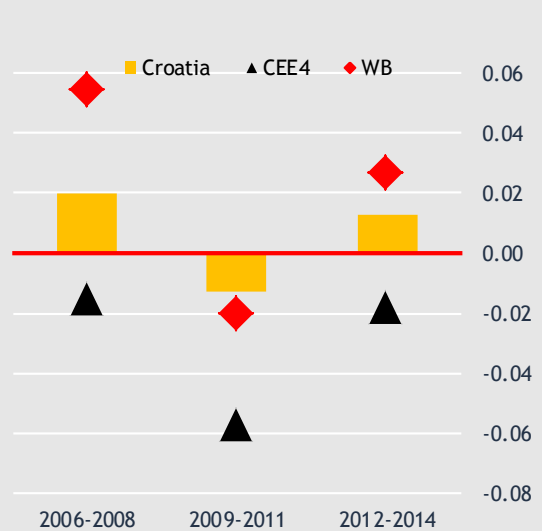
Source: Authors' calculation.

Figure 36
Average TFP growth - Transport



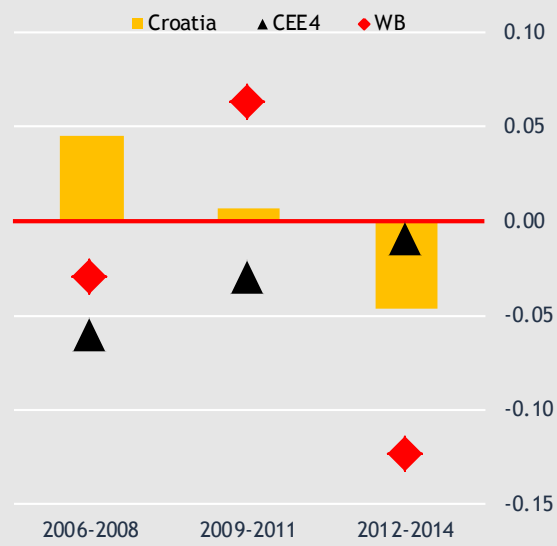
Source: Authors' calculation.

Figure 37
Average TFP growth - Tourism



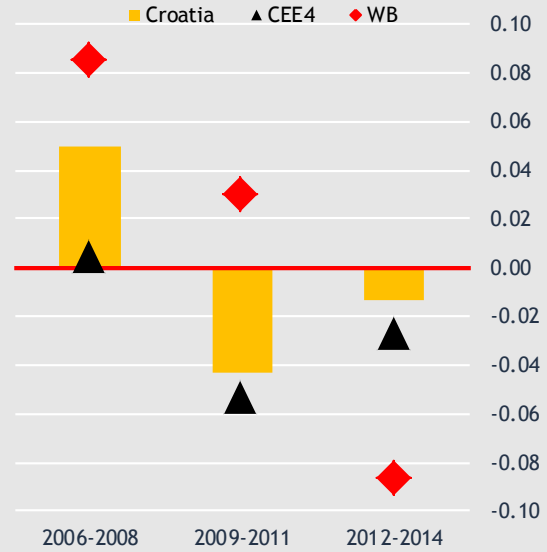
Source: Authors' calculation.

Figure 38
Average TFP growth - Financial services



Source: Authors' calculation.

Figure 39
Average TFP growth - Other services



Source: Authors' calculation.

Annex 2: Detailed estimations for the effects of productivity drivers**Table 5: Determinants of TFP**

Variable	Estimates used for TFP simulations		
	Coefficient	Standard Error	Standardized coefficient
NPLs (1-year lag)	-0.006	0.001	-1.425
Private sector leverage	-0.021	0.000	-0.065
Labour force tertiary education (2-year lag)	0.000	0.000	0.011
Innovation growth (3-year average, change)	0.015	0.001	0.026
Quality of macroeconomic environment	0.022	0.000	0.109
Financial market development	0.026	0.000	0.150
Infrastructure quality (1-year lag)	0.019	0.000	0.216
Business conditions (I principle component)	0.006	0.001	0.255
Quality of corporate governance (change)	0.050	0.001	0.312

*Standardized coefficients show the impact of a one standard deviation change in the variable on income growth.

Table 6: Description of productivity determinants

VARIABLES	DESCRIPTION	SOURCE/LINK
Non-performing loans (1-year lag)	Ratio of bank non-performing loans to total gross loans in the corporate sector, with a one-year lag	National Bank of Croatia
Private sector leverage	Debt to equity ratio where debt represents the sum of non-current liabilities and loans, while equity is defined as shareholders' funds	ORBIS
Labour force tertiary education	The share of the total labor force that attained or completed	World Bank

(2-year lag)	tertiary education as the highest level of education, with a two-year lag	
Innovation growth (3-year average, change)	Logarithmic difference (change) in the value of the World Economic Forum Global Competitiveness Index Innovation pillar that assesses the capacity for innovation through the investment in research and development, presence of high-quality scientific research institutions, collaboration in technological developments between universities and industry, protection of intellectual property	World Economic Forum - Global Competitiveness Index
Quality of macroeconomic environment	Value of the World Economic Forum Global Competitiveness Index Macroeconomic environment pillar consisting of four real sector variables (inflation, fiscal deficit, public debt and the gross national savings) as well as the country's credit rating	World Economic Forum - Global Competitiveness Index
Financial market development	Value of the World Economic Forum Global Competitiveness Index Financial Market Development	World Economic Forum - Global Competitiveness Index

	pillar, evaluating accessibility to capital for private sector investment, stock market development, and the availability of other financial products	
Infrastructure quality (1-year lag)	Value of the World Economic Forum Global Competitiveness Index Infrastructure pillar, assessing the quality of transport and telecommunication networks	World Economic Forum - Global Competitiveness Index
Business conditions	The first principal component of six indicators (Ease of doing business; Dealing with Construction Permits; Registering Property; Protecting Minority Investors; Enforcing contracts; Resolving Insolvency) from the World Bank Doing Business survey	World Bank - Doing Business survey
Quality of corporate governance (change)	Value of the World Economic Forum Global Competitiveness Index Efficient use of talent indicator in the Labor market pillar that shows reliance on professional management in the private sector	World Economic Forum - Global Competitiveness Index