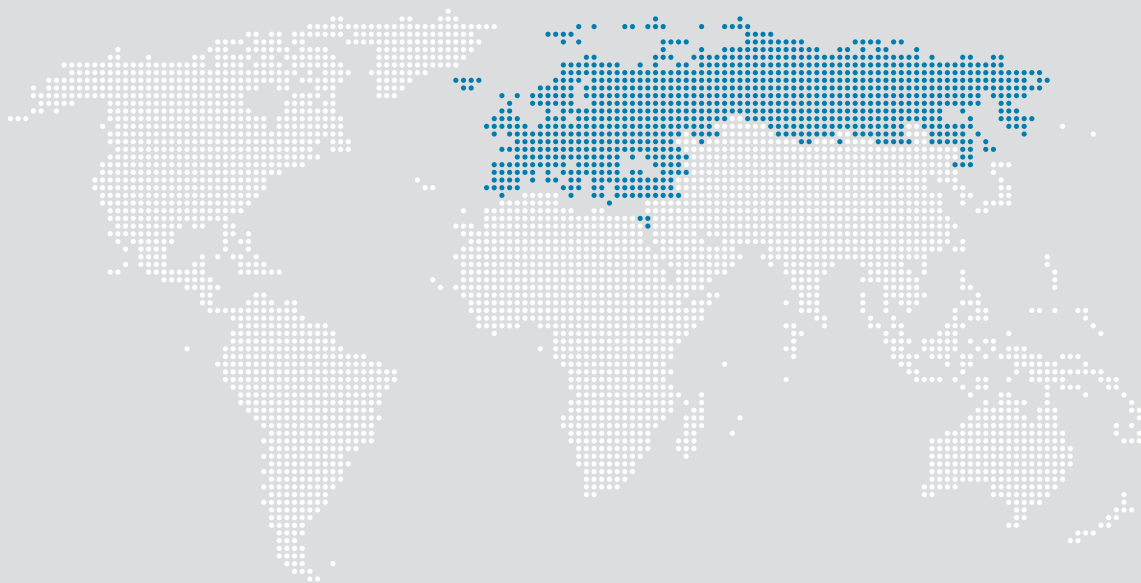# Regional Economic Issues

Central, Eastern, and Southeastern Europe

How to Get Back on the Fast Track

MAY 16

Regional Economic Issues
May 2016

Central, Eastern, and Southeastern Europe
How to Get Back on the Fast Track

Country Coverage and Codes

Central, Eastern, and Southeastern Europe (CESEE) refers to Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Turkey, and Ukraine.

The following country codes, national flag markers, and regional aggregates are used in the report:

Baltic countries (Baltics) (shown in **light blue**): Estonia (EST ⬤), Latvia (LVA ⬤), Lithuania (LTU ⬤);

Central and Eastern Europe (CEE) (shown in **blue**): Czech Republic (CZE ⬤), Hungary (HUN ⬤), Poland (POL ⬤), Slovak Republic (SVK ⬤), Slovenia (SVN ⬤);

Commonwealth of Independent States (CIS) (shown in **yellow**): Belarus (BLR ⬤), Moldova (MDA ⬤), Russian Federation (RUS ⬤, also in **red** when shown separately), Ukraine (UKR ⬤);

Southeastern European EU member states (SEE EU) (shown in **green**): Bulgaria (BGR ⬤), Croatia (HRV ⬤), Romania (ROU ⬤);

Southeastern European non-EU member states (SEE non-EU or Western Balkans) (shown in **light green**): Albania (ALB ⬤), Bosnia and Herzegovina (BIH ⬤), Kosovo (UVK ⬤), FYR Macedonia (MKD ⬤), Montenegro (MNE ⬤), Serbia (SRB ⬤);

Turkey (TUR ⬤) is shown in **black**.

Averages are weighted by the PPP GDP weights of countries in sub-groups in 2014.

CESEE: Mapping of Country Groups*
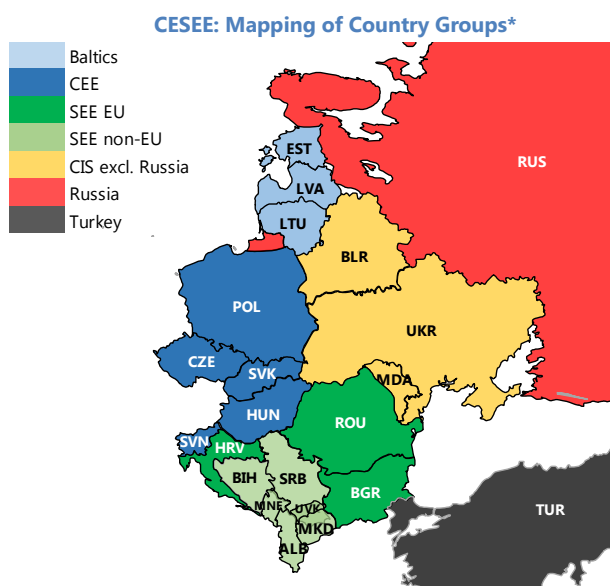
*/ The boundaries, colors, denominations, and any other information shown on the maps do not imply, on the part of the International Monetary Fund, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries. In this report, statistical data on Crimea and the City of Sevastopol are included as part of the data for the Russian Federation.

How to Get Back on the Fast Track

May 6, 2016

EXECUTIVE SUMMARY

Despite weaker external demand, most of the region outside the Commonwealth of Independent States (CIS) continues to record solid growth, with unemployment rates now approaching precrisis levels.

- Robust growth continues in most *Central and Southeastern European economies* as well as in *Turkey*. Accommodative macroeconomic policies, improving financial intermediation, and rising real wages have been behind the region's mostly consumption-driven rebound, while private investment remained subdued. In the near-term, strong domestic demand is expected to continue supporting growth amid continued low or negative inflation. In 2016, CESEE countries outside the CIS are expected to grow by around 3 to 4 percent.

- In contrast, the *Russian economy* went through a sharp contraction last year amid plunging oil prices and sanctions. Other *CIS countries* were hurt by domestic political and financial woes, as well as by weak demand from Russia. In 2016, output contraction is projected to moderate to around 1½ percent from 4¼ percent in 2015 as the shocks that hit the CIS economies gradually reverberate less and activity stabilizes.

Downside risks have increased since the fall of 2015. Although sources of downside risks remain largely unchanged, these risks have become more pronounced. Lower euro area and U.S. growth, tighter global financial conditions, and continued weakness in many emerging economies are creating headwinds. In addition, political uncertainty and instability risks have been on the rise across the region.

As CESEE is now heading into choppy waters, policies should remain supportive. In the baseline, a combination of supportive monetary policy and medium-term fiscal consolidation remains valid for many economies in the region. In the event of a negative growth shock, monetary policy should be the first line of defense, while automatic fiscal stabilizers should be allowed to operate freely, provided there is room to do so. In case of a major shock and depending on the source of the shock, fiscal policy should ease within medium-term adjustment plans that dispel concerns about sustainability. Medium-term fiscal consolidation should rely, as much as possible, on growth-friendly revenue and expenditure measures, such as improving tax compliance, introducing carbon and property taxes, better targeting of transfers and entitlement programs, while protecting productive spending on public investment.

Despite the strong cyclical rebound, growth in CESEE remains well below the precrisis level and the region is facing considerable challenges over the medium-term. If lower potential

growth turns out to be the "new normal", this would imply a much slower pace of income convergence with advanced Europe. From 1990 to 2008, CESEE countries made significant progress along the convergence path on the back of strong total factor productivity (TFP) growth and, to a lesser extent, capital accumulation. After the crisis, TFP growth slowed significantly across most advanced and emerging economies, including CESEE. Some of the factors that may have boosted TFP growth in CESEE before the crisis, such as potential growth in advanced Europe, or expansion of global trade and supply chains, appear to have stalled or gone into reverse after the crisis. In addition, CESEE countries are facing some of the worst declines in the working-age population in Europe, reflecting both unfavorable demographics and emigration—a trend that is expected to continue or worsen.

How Can CESEE Countries Get Back on the Fast Convergence Path?

With a less supportive global environment over the medium-term, greater reform efforts to increase productivity, support further capital deepening, and improve labor supply may be needed to lift growth and re-accelerate convergence. The reforms could be directed toward:

- ***Improving the labor supply***: Unfavorable demographics and emigration increase the importance of active labor market policies. The analysis in this report shows that CESEE countries have some scope to counter the decline in the working-age population by increasing participation rates (women and seniors), reducing structural unemployment and skill mismatches, and raising life expectancy. For example, increasing female labor force participation could help support growth in Southeastern Europe (SEE) and Turkey.

- ***Boosting investment***: Capital stock per capita in a typical CESEE economy is still about a third of that in advanced Europe. Investment gaps are particularly wide in infrastructure, where public investment could help, but on its own would not be enough. While investment may be held back by the crisis legacies – high debt burdens and nonperforming loans – and a highly uncertain outlook for global growth, most CESEE countries need to address deeper structural issues in order to boost private investment. In most of the region, domestic savings rates are lower than those required to sustain investment rates high enough to close the income gaps with advanced Europe within a generation or so and without hitting external debt sustainability limits. Policies should therefore focus on institutional reforms that reduce inefficiencies and increase returns on private investment and savings.

- ***Raising productivity***: In order to maintain higher TFP growth rates than in advanced Europe, CESEE countries may have to address structural and institutional obstacles that prevent efficient use of available technologies, or lead to inefficient allocation of resources. While it is hard to estimate precisely the quantitative impact of structural reforms on productivity and growth, the analysis in this report suggests the largest efficiency gains are likely to come from improving the quality of institutions (protection of property rights, legal systems, and healthcare), increasing the affordability of financial services (especially for small but productive firms), and improving government efficiency.

CONTENTS

I. RECENT DEVELOPMENTS, OUTLOOK, AND RISKS

After solid growth in 2015, the Central, Eastern and Southeastern Europe (CESEE) region is now heading into choppy waters. Lower euro area and U.S. growth, tighter global financial conditions, and continued weakness in many emerging economies are creating headwinds. Nonetheless, near-term growth is expected to remain robust in most CESEE countries outside the Commonwealth of Independent States (CIS), thanks to strong domestic demand. At the same time, output contraction is projected to moderate in the CIS, as the shocks that hit the Russian and Ukrainian economies gradually reverberate less and activity stabilizes. While downside risks are now more pronounced than in the fall of 2015, policies in most economies will need to rebuild room for maneuver.

A. Recent Developments

Most of the region outside the CIS continues to register robust growth, despite weakening external demand, particularly in emerging markets (EMs) (Figure 1.1). Accommodative macroeconomic policies, improving financial intermediation, and rising real wage growth have been behind the region's mostly consumption-driven rebound.

- Growth picked up in much of *Central and Eastern Europe* (CEE) in the second half of 2015 on account of supportive demand policies and increased absorption of EU Structural and Cohesion Funds (Figure 1.1). Similarly, most *SEE* countries saw stronger growth despite political uncertainties and financial sector spillovers from Greece in some cases. However, private investment remained subdued. In EU countries, public investment contributed strongly to growth in a race to utilize EU Funds before their expiration in 2015 (see Fall 2015 REI for details). Despite improving labor markets and lower oil prices, growth slowed in the Baltic countries, reflecting weaker demand from Russia.

- Buffeted by plunging oil prices and sanctions, the *Russian* economy went through a sharp contraction. Other *CIS* countries were hurt by domestic political and financial woes, as well as spillovers from Russia. Output contraction appears to have moderated in 2015:Q4 partly due to policy responses (Box 1.1). While exchange rate depreciation has facilitated external adjustment, this has happened mostly via import contraction. Exports of the CIS countries seem to have benefitted little given the high share of commodities, supply disruptions, still-low compliance with EU import standards, and dependence on other CIS markets.

- *Turkey* saw a strengthening of domestic demand, benefiting from a series of accommodative policy measures and the relaxation of macro-prudential regulation.

Labor markets outside the CIS have strengthened considerably in recent years (Figure 1.1). Unemployment rates have fallen significantly across all sub-regions. The most dramatic turnaround has been in the Baltic economies where rates are now in the single digits. Despite some remarkable gains, unemployment rates remain elevated in non-EU SEE countries. Empirical estimation suggests

Figure 1.1. CESEE: Growth and the Labor Market

1. Quarterly GDP Growth *(Percent, year over year)*
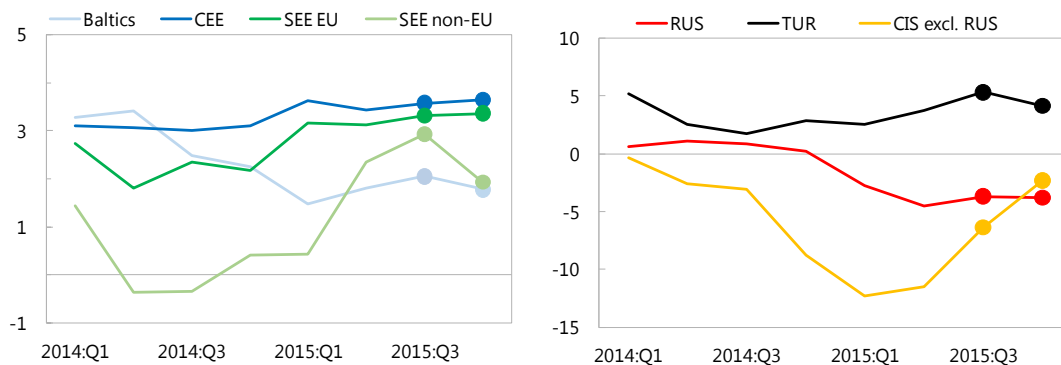
2. Contributions to Real GDP Growth *(Percent, year over year)*
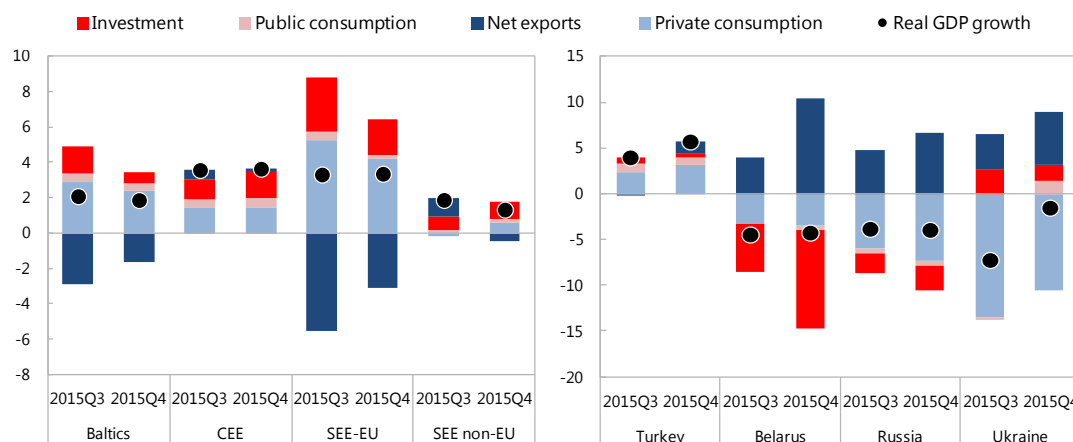
3. Unemployment and Employment Rate

Unemployment Rate
(Percent, seasonally adjusted)
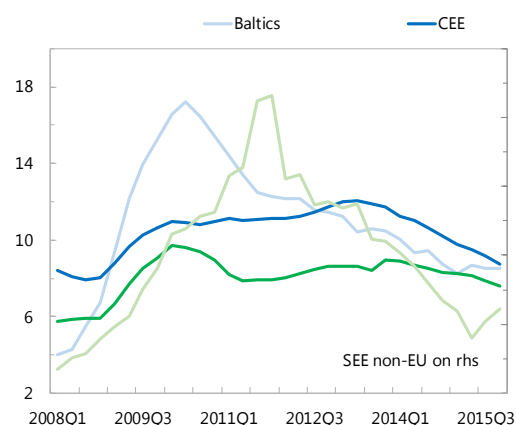
Total Employment
(Percentage points, year over year change)
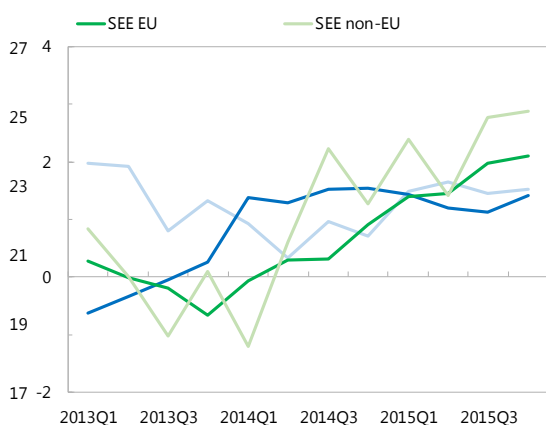
Sources: Haver Analytics; and IMF staff calculations.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe. Due to data limitations, SEE non-EU excludes Bosnia and Herzegovina. GDP growth contributions are calculated using series' that are <u>not</u> seasonally adjusted. *H* is the average of the two quarters in respective periods.
For SEE non-EU, a breakdown for GDP components is unavailable (and is estimated) for Kosovo for 2015Q4, hence there is a small difference between total growth and growth added up from the GDP components.

that, on average, a 1 percentage point increase in the GDP growth rate was associated with a decline in the unemployment rate of about 0.15 of a percentage point in the first year, and about 0.4 of a percentage point after three years. Falling unemployment has occurred in the context of improving employment and labor force participation rates in the region.

Estimates of potential output, output gaps, and actual unemployment rates suggest that cyclical recovery may be near completion outside the CIS, but there is considerable uncertainty around estimates of economic slack. Average potential output growth for the region has declined to 2 percent from over 4 percent in precrisis years. Against a backdrop of diminished potential output growth, output gaps now appear closed or positive for many countries (Figure 1.2). In the Baltics and some CEE countries, a closing of the output gap seems consistent with developments in unemployment, wage growth, and recovery of credit and housing prices as well as some price pressures on non-tradables. However, the range of estimates of potential output is quite wide (Podpiera, Raei, and Stepanyan, forthcoming) and other indicators of economic slack – such as very low headline and core inflation – point to further excess capacity.

Figure 1.2. CESEE: Estimated Output Gaps, 2015
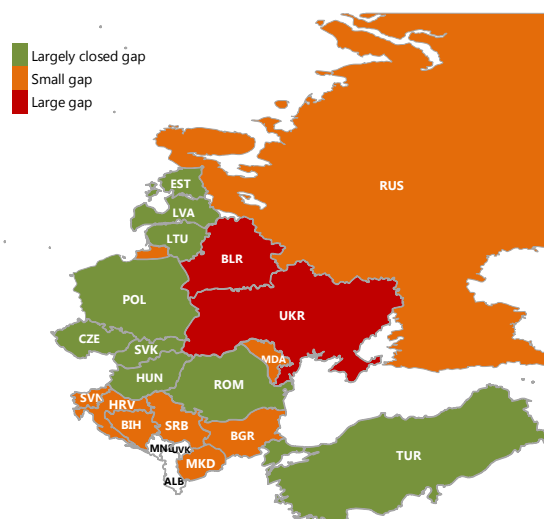
Sources: IMF World Economic Outlook database; and IMF staff calculations.
Note: Output gaps in this figure reflect IMF country desk estimates. A largely closed gap indicates an output gap narrower than –1.5 percent; a small gap is between –3 and –1.5 percent; and a large gap is wider than –3 percent. These estimates are roughly in line with various model-based estimates (the multivariate filter and production function approach) in the majority of cases. For Bulgaria, Latvia, and the Slovak Republic, the model-based estimates tend to show a positive gap.

The CESEE region saw a massive flow of refugees on the way from war-torn countries to Western Europe. Few migrants stayed and applied for asylum in CESEE, and hence the impact on growth and fiscal developments has been limited. The notable exception is Turkey that is currently hosting more than 2.5 million refugees, and where the economic impact of refugees has been quite noticeable on several fronts. Most refugees had left camps by end-2014 and started to join the labor market, exerting pressure on unskilled segments in rural areas close to the Syrian border. Following the dialogue with the EU, refugees were allowed to work legally with some limitations starting in January 2016. Some evidence suggests that refugees also brought some small-scale investments into the Turkish economy.

Headline and core inflation are very low in CEE, SEE and the Baltic countries, but still high in Turkey and the CIS (Figure 1.3). Low inflation likely reflects the lagging impact of excess capacity, including relatively flat Phillips curves, declining commodity prices (including their indirect and second-round effects) and low global inflation, notably in the euro area. In the CIS economies, inflation remains in the double-digits, with a noticeable spike in Ukraine reflecting exchange rate

depreciation. Russia saw some moderation in both headline and core inflation in 2015:H2 in response to tighter monetary policy and weak activity. Amid buoyant activity and accommodative macroeconomic policies, inflation remained elevated in Turkey.

Figure 1.3. CESEE: Inflation Developments

1. Headline Inflation *(Percent, year over year)*

2. Core Inflation *(Percent, year over year)*

3. Nominal Wage Inflation *(Percent, year over year)*
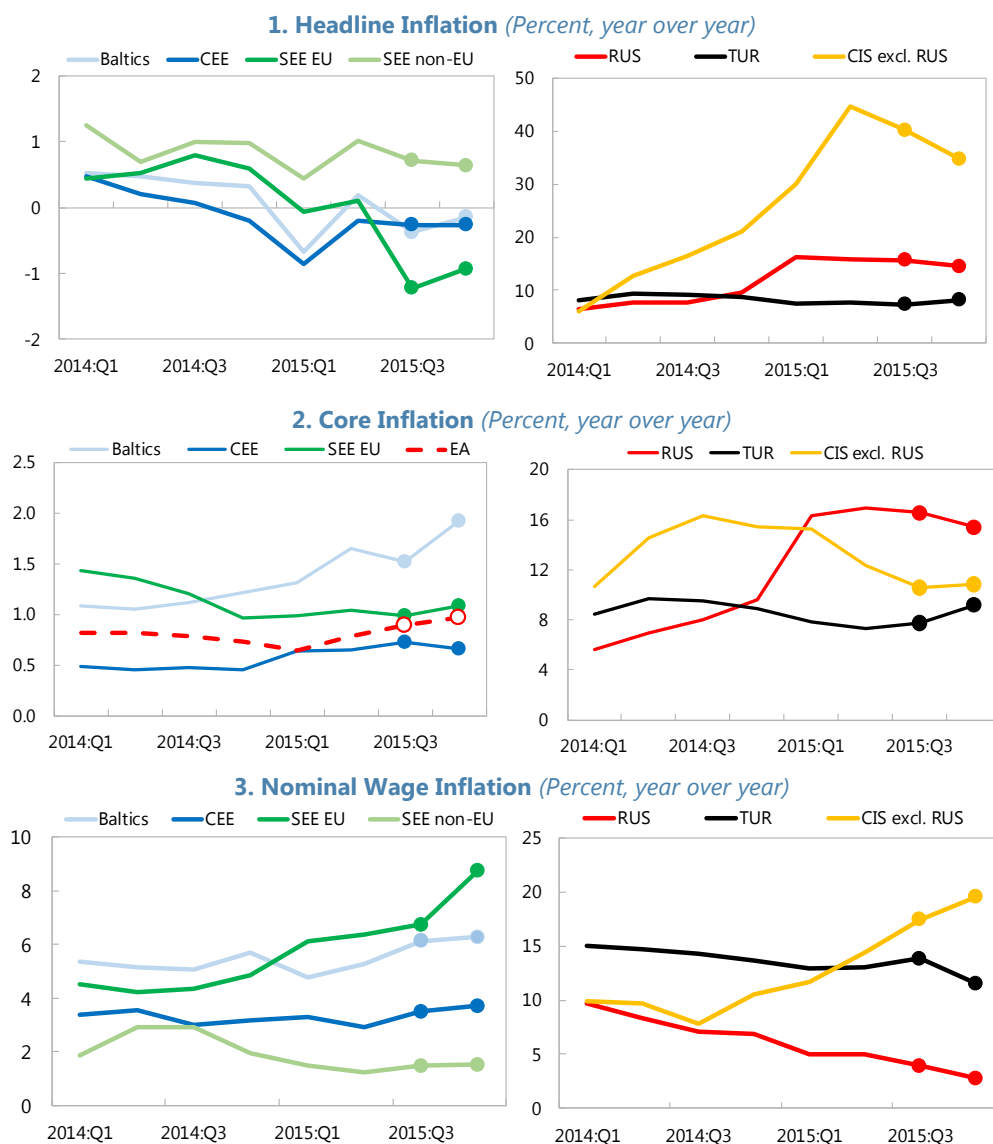
Sources: Haver Analytics; European Commission; Consensus Economics forecasts; and IMF staff calculations.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe. Core inflation excludes energy, food, alcohol and tobacco.

Like other EMs, much of the CESEE region faced net capital outflows in 2015 (Figure 1.4). In addition to continued deleveraging by Western European banks, portfolio flows came under pressure in the second half of the year. Russia and Turkey accounted for the bulk of bond outflows, though cumulative bond outflows from CESEE, excluding Russia and Turkey, since May 2013 "taper tantrum" were not as large as outflows from other EMs. More recently, portfolio flows have turned positive. At the same time, net FDI flows have remained positive outside Russia, with Turkey seeing some strengthening on account of investment in the financial sector.

Figure 1.4. CESEE: Financial Sector Developments

1. Balance of Payments Capital Inflows (*Billions of US dollars*)

■ FDI   ■ Portfolio investment   ■ Other investment   ■ Capital account balance   ● Financial account balance
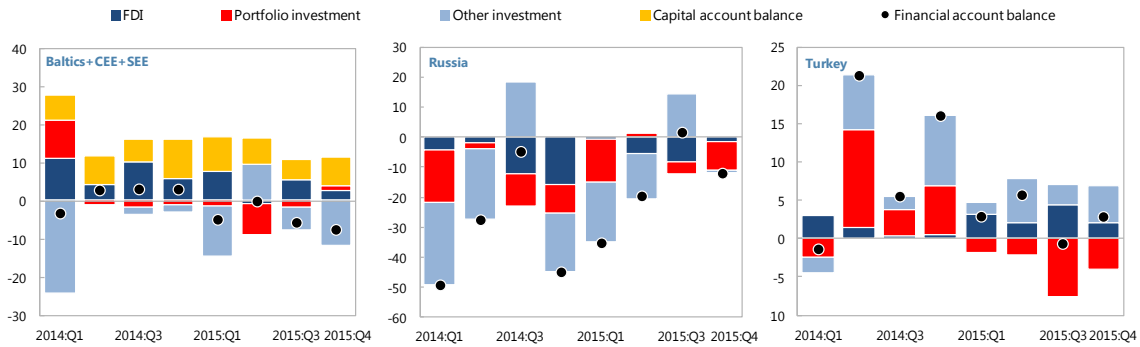
2. Cumulative EPFR Portfolio Flows
(Billions of US dollars)
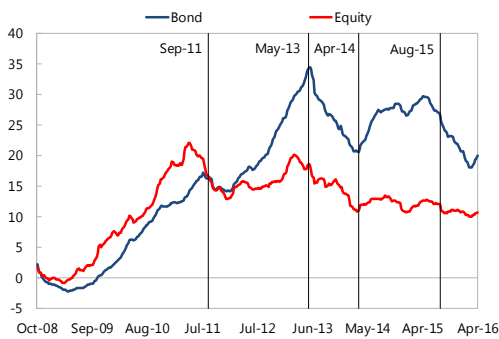
3. Cumulative EPFR Flows into Bond Funds
(May 2013 = 100)
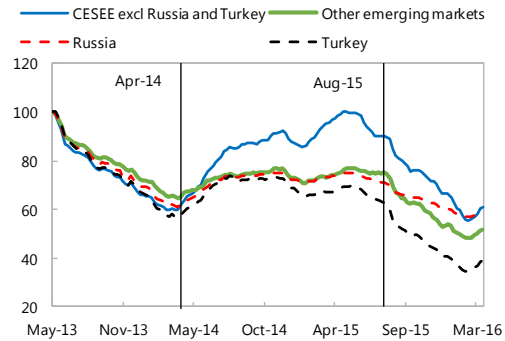
4. Equity Market Returns, EMBIG, and Credit Default Swap Spreads

Equity Market Returns
(Percent change)
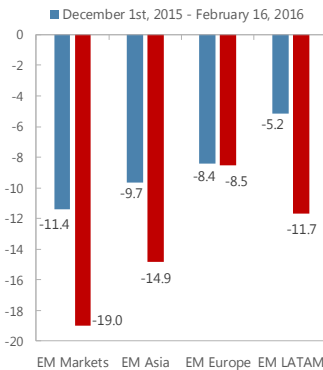
EMBIG Spreads
(Change in basis points)
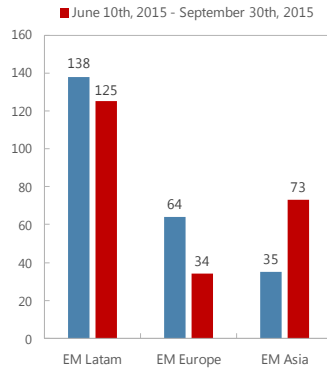
CDS Spreads
(Pair-wise correlations)[1]
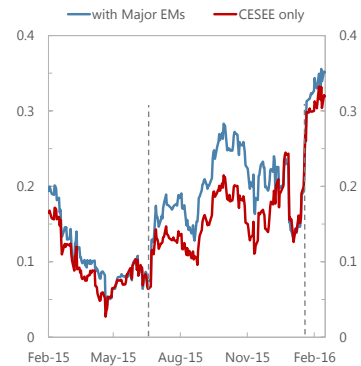
Sources: Haver Analytics; Bloomberg; and IMF staff calculations.

Note: EMBIG = Emerging Markets Bond Index Global; EPFR = Emerging Portfolio Fund Research; LATAM = Latin America.

1/ Simple average of pair-wise correlations of daily changes in CDS spreads using a rolling 30-day window.

The financial turbulence of early 2016 softened asset prices in CESEE, although less so than in other EMs. The CESEE countries saw falling equity prices and a widening in sovereign credit spreads but the moves tended to be less dramatic than in other EM regions (Figure 1.4). Also, exchange rates outside the CIS remained stable against the euro. More recently, correlations of movements in credit spreads between CESEE countries and major EMs have increased, suggesting greater scope for spillovers to the CESEE region from financial shocks elsewhere.

CESEE countries' lower susceptibility to financial market turbulence is mostly explained by improved economic fundamentals relative to precrisis years. Internal and, especially, external imbalances appear smaller than in a number of other EMs. Most countries in the CESEE region have drastically improved their current account (CA) balances, with the average CA deficit in the region at 2 percent of GDP in 2015, compared to 12 percent in 2008. Only a handful of countries still show a sizable CA deficit, notably Turkey, Belarus, and some non-EU SEE countries. Similarly, apart from Turkey and the CIS, countries are more advanced in their credit and deleveraging cycle compared to EMs outside the region (see Fall 2015 REI for details).

B. Outlook

Growth is projected to fare better in 2016 compared to 2015, mainly on account of a more moderate recession in Russia and a gradual move to a modest expansion in the rest of the CIS (Figure 1.5). The new projections are somewhat lower than those in the fall of 2015, as lower oil prices are weighing on the Russian economy, including by requiring more fiscal adjustment. Growth in other CIS countries, in turn, is revised down because of lower exports to Russia and additional fiscal adjustment. Elsewhere, weaker foreign demand is largely offset by stronger domestic demand, which is being helped by lower commodity prices. The outlook for 2016 across the region is as follows:

- In the *CEE* subregion, growth rates are projected to move sideways or ease somewhat. The key factors are weaker external demand growth and a diminishing absorption of EU Structural and Cohesion Funds.

- For most *SEE* countries, growth is projected to be broadly unchanged or to strengthen. In Romania, a cyclical upswing is underway and growth is projected to strengthen supported by wage increase, low fuel prices and VAT reduction. In Serbia, growth is expected to accelerate as the pace of fiscal policy tightening slows and structural reforms start to take effect under the IMF-supported program.

- In the *Baltics*, growth will pick up on the back of a waning drag from exports to Russia.

- In the *CIS*, output contraction is expected to moderate. Despite some tentative signs of economic stabilization, the unexpected oil price decline in mid-2015 and a correction of growing fiscal imbalances likely mean that the Russian economy will stay in recession in 2016. At the same time, Ukraine is expected to record positive growth supported by diminishing macroeconomic imbalances and a less challenging geopolitical situation.

- *Turkey* is projected to turn in another year of strong growth. A 30 percent minimum wage increase and accommodative policies mean that both growth and external imbalances will be more elevated than previously expected.

Figure 1.5. CESEE: GDP Growth Forecasts and Revisions

1. Near-term Growth Projections
(Percent, revisions are in percentage points)

	2015	2016		2017	
		Forecast	Revision	Forecast	Revision
CESEE	**-0.4**	**0.9**	**-0.4**	**2.1**	**-0.2**
Baltics	1.8	2.8	-0.1	3.2	0.0
CEE	3.6	3.1	0.0	3.1	0.0
SEE EU	3.3	3.5	0.5	3.1	0.3
SEE Non-EU	2.1	2.7	0.1	3.0	0.1
Other CIS	-8.2	0.2	-0.5	1.9	-0.7
Russia	-3.7	-1.8	-1.2	0.8	-0.2
Turkey	3.8	3.8	0.9	3.4	-0.3

2. Factors behind the 2016 Growth Revisions
(Percentage points)
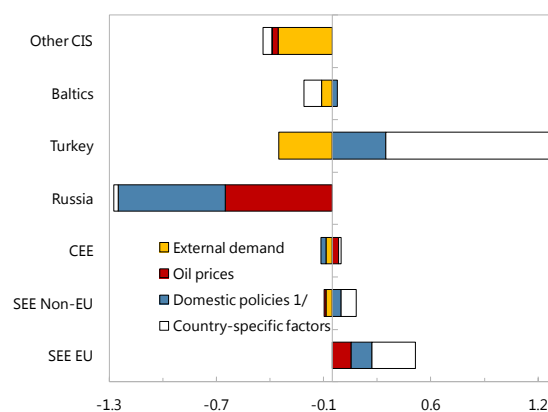
Source: IMF country team estimates.
Note: CEE = Central and Eastern Europe; CIS =Commonwealth of Independent States; EU = European Union; SEE = Southeastern Europe. Highlighted cells mark downward revisions. Panel 2 shows revisions for 2016 growth projections relative to the fall of 2015.
1/ Domestic policies include monetary policy, credit conditions, and fiscal policy (incl. EU Structural and Cohesion Funds).

Figure 1.6. CESEE: Inflation Forecasts and Revisions

1. Near-term Inflation Projections
(Percent, revisions are in percentage points)

	2015	2016		2017	
		Forecast	Revision	Forecast	Revision
CESEE	**10.3**	**6.4**	**0.1**	**5.7**	**0.1**
Baltics	-0.3	0.9	-0.8	2.0	0.1
CEE	-0.5	0.2	-1.1	1.7	-0.4
SEE EU	-0.7	-0.2	-0.4	2.4	0.4
SEE Non-EU	0.7	1.0	-1.2	2.3	-0.5
Other CIS	36.6	14.5	0.5	11.2	0.9
Russia	15.5	8.4	-0.3	6.5	-0.7
Turkey	7.7	9.8	2.8	8.8	2.3

2. Factors behind the 2016 Inflation Revisions
(Percentage points)
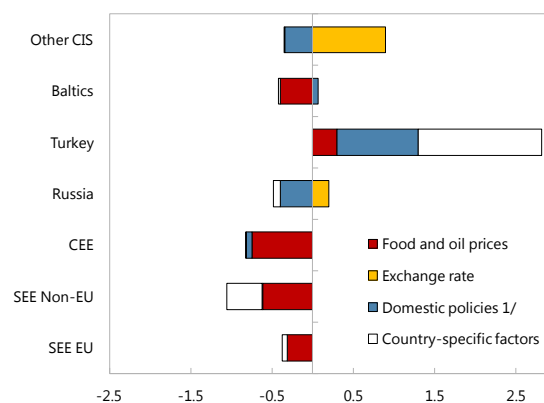
Source: IMF country team estimates.
Note: CEE = Central and Eastern Europe; EU = European Union; SEE = Southeastern Europe; CIS =Commonwealth of Independent States. Highlighted cells mark downward revisions. Panel 2 shows revisions for 2016 inflation projections.
1/ Domestic policies include output gap, changes in taxes, and inflation expectations.

Inflation is projected to gradually rise but stay low outside the CIS and Turkey and the revisions are mostly to the downside with the notable exception of Turkey (Figure 1.6). The large share of food and energy products in the consumption basket along with falling prices for

these products is dominating inflation dynamics in many countries. In 2016, several CESEE countries have experienced stronger wage growth, including large minimum wage hikes, which mostly reflect tightening labor markets. Estimates show that about a quarter of average wage growth in CESEE countries during 2012-15 was associated with minimum wage developments (Box 1.2). This could imply noticeable increases in average wages in countries where the coverage of minimum wages is high, but is not projected to fundamentally alter the inflation dynamics in the near term. For CIS countries, 2016 inflation projections are roughly unchanged as upward price pressures from exchange rate depreciations are largely countered by downward pressures from contracting domestic demand. In Turkey, inflation for 2016 has been revised up to 9.8 percent from 7.9 percent, with wage hikes and accommodative macroeconomic policies boosting excess demand.

C.   Risks

While the recovery in CESEE has taken hold, risks to the outlook have risen. Although the main sources of downside risks remain largely unchanged, these risks have become more pronounced, with a tightening in financial conditions, weaker global growth prospects and rising political risks across the region:

- **Tighter or more volatile global financial conditions**: Sovereign credit-default swap (CDS) spreads appear compressed relative to economic fundamentals and according to standard econometric models. Increased market volatility may result in rising borrowing costs and a pick-up in portfolio outflows, particularly affecting those with high fiscal financing needs (Figure 1.7). Financial volatility may rise appreciably should the British voters choose to leave the EU in June. In addition, further weakness in European bank asset prices may heighten pressures on these institutions to cut exposures to the CESEE region. While foreign banks still own three-quarters of CESEE banking systems, dependence on parent funding has dropped significantly. Because domestic lending is now largely funded by local deposits in many countries (Figure 1.7), the impact of lower foreign bank flows on the real economy is likely to be less disruptive.

Figure 1.7. CESEE: Vulnerabilities to External Financing

1. Gross Fiscal Financing Requirements, 2016 *(Percent of GDP)* **and Sovereign CDS Spread Compression** *(Basis points)*[1]
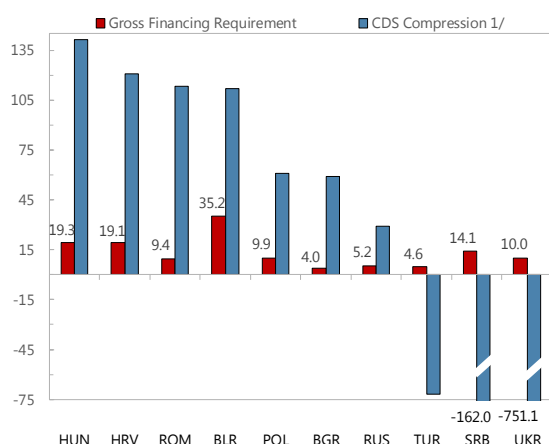
2. Latest Domestic Loan-to-Domestic-Deposit Ratios *(Percent)*
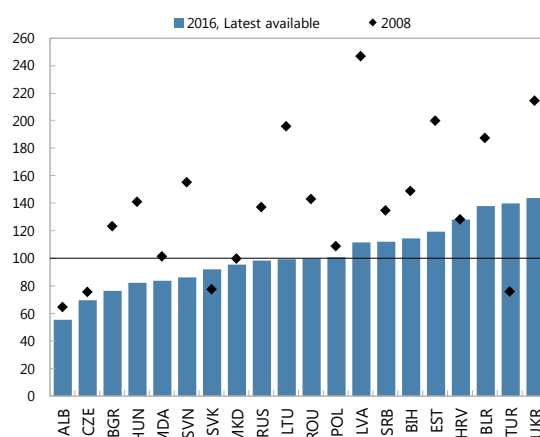
Sources: Bloomberg; and IMF staff calculations.

[1]Positive values for CDS spread compression mean that actual CDS spreads are below their model-based medium-term norms.

- **Structurally weak growth in the euro area**: A slowdown in growth in the euro area poses a significant risk for the region given the one-to-one link between euro area and CESEE growth on account of their many economic and financial linkages.

- **Significant slowdown in China**: Countries linked to the German supply chain (mostly in CEE sub-region, but some in SEE) are likely to be affected via lower exports (see Fall 2015 REI for details). In addition, there may be financial sector spillovers if the slowdown affects investor sentiment for EMs. Commodity exporters, notably Russia, are also likely to be affected via deteriorating terms of trade. However, to the extent China's slowdown reflects rebalancing from investment-led growth to a more consumption-based growth, there may be positive spillovers through higher export demand over the medium-term, especially for non-commodity exporters.

- **Sharp rise in migrant flows and related instabilities due to security dislocations in the Middle East**: While this risk may be non-trivial, the impact is likely to be limited to a few countries, particularly with the closure of the Balkan migrant route. The risk is non-negligible for Turkey, where refugee flows may increase in the near term. With the Balkan route now closed, migrants may try to search for alternative routes.

- **Rising political risks:** A number of CESEE countries have experienced political instability (notably, Ukraine, Moldova, Kosovo and FYR Macedonia) (Box 1.3). Several other countries have seen the rise of populist parties in recent elections fueled by anti-establishment sentiment that may entail some policy reversals. With a number of countries facing elections in the near-term, risks of political instability may be on the rise. Furthermore, a risk of the UK exiting from the EU could further increase support for euroskeptic parties and resistance to economic integration.

Euro area stagnation would have the largest impact on CESEE growth. According to the IMF staff's assessment, the risk of euro area stagnation, should it materialize, would likely have medium-to-high impact on over half the countries in the region (Figure 1.8). Weaker growth in major EMs could delay the recovery in commodity prices and have negative effect on Russia.

Figure 1.8. Downside Risks to Outlook: Likelihood and Impact
(Percent of all responses)
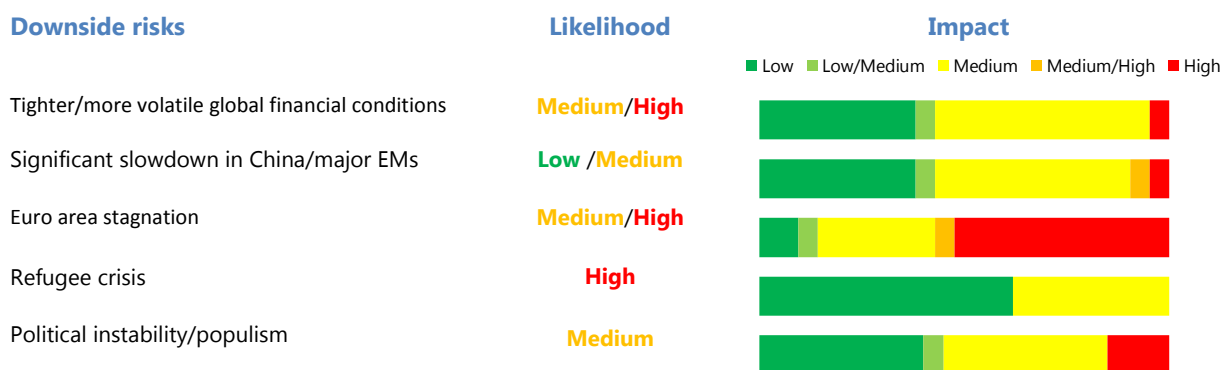
Source: IMF country team survey. Note: The relative likelihood of risks reflects IMF staff's subjective assessment of the risks surrounding the baseline. "Low" indicates a probability below 10 percent, "Medium" indicates a probability of 10 to 30 percent, and "High" indicates a probability of 30 to 50 percent. EM = emerging market. The relative impact is based on country-specific assessments; the map shows distributions across countries based on the IMF country team's assessments.

Box 1.1. CIS: Weathering Internal and External Shocks[1]

In the face of multiple shocks, the countries in the Commonwealth of Independent States (CIS) adopted a range of policies to stabilize their economies and financial systems. Since late 2014, these economies have been buffeted by declining commodity prices, geopolitical tensions and domestic political instability. Output contraction started in Ukraine in 2014, while the other countries entered into recession in 2015. Policy measures used by the CIS countries included, to varying degrees, allowing greater flexibility in the exchange rate, accompanied by an increase in the policy rate and some intervention in the foreign exchange market to prevent a free fall in the exchange rate, and generally tighter fiscal policies. In Russia, policies were also adopted to stabilize the financial sector, with temporary regulatory forbearance and liquidity support. Ukraine introduced temporary restrictions on capital flows to ease balance of payment pressures, and provided liquidity support to banks followed by comprehensive recapitalization and restructuring. Moldova closed three failed banks and also intervened occasionally in the foreign exchange market to limit excessive volatility (Table 1.1.1).

Table 1.1.1. CIS: Policy Measures to Stabilize the Economy

	Russia	Ukraine	Belarus	Moldova
Allow exchange rate flexibility	Yes	Yes	Yes	Yes
Raise policy rate	Yes	Yes	Yes, also higher reserve requirements	Yes, reserve requirements were increased.
Foreign exchange market intervention	Very limited after moving to a floating exchange rate regime	Foreign exchange sales were limited to meet central government needs and critical energy imports		Limited to smoothing volatility
Financial system support	Temporary foreign exchange liquidity provision and other support to banks. Temporary regulatory forbearance on loan classification, provisioning, and valuation accounting	Temporary liquidity support to banks followed by comprehensive recapitalization and restructuring		Provided extraordinary public support (12 percent of GDP) to three failed banks, ultimately closing them and initiating asset recovery procedures
Capital controls		Administrative measures on foreign exchange transactions were introduced, and capital controls tightened		
Fiscal policy	Limited stimulus in 2015	Fiscal deficit narrowed in 2014 and 2015	Higher headline government surplus in 2015	Lower cash deficit in 2015

Source: IMF country reports.

1/ This Box was prepared by Yan Sun.

Exchange rate depreciation has helped improve the trade balance and price competitiveness, despite an initial hit to inflation. While all CIS countries experienced large nominal depreciations, real effective exchange depreciations during 2014-2015 were sizable only in Russia and Ukraine (22 and 17 percent, respectively), but more modest in Belarus and Moldova (about 2.5 and 1.5 percent, respectively) due to very high inflation. The move to flexible exchange rates and supportive policies helped these economies rapidly reduce external imbalances mostly through import compression. Imports have declined significantly in all four countries, with non-energy imports declining by a cumulative 25-51 percent during 2014-15 (Figure 1.1.1). The large depreciations corrected most of the pre-existing exchange rate misalignments in these countries. Despite improved price competitiveness, overall exports saw limited benefits due to a high share of commodities in exports (in the case of Russia), weak demand for heavy equipment (in the case of Belarus), still low compliance with EU import standards (in the case of Moldova and Ukraine), as well as supply disruptions, trade restrictions and weak demand in other CIS markets (in the case of Ukraine) (Figure 1.1.2). Non-energy exports showed signs of stabilization or modest recovery in 2015. Even though inflation soared in the aftermath of depreciations, it stabilized in the second half of 2015 as exchange rate stability took hold.

Figure 1.1.1 CIS Non-energy Exports and Imports, 2013-2015
(Percent; four-quarter change; 2013:Q1=100)
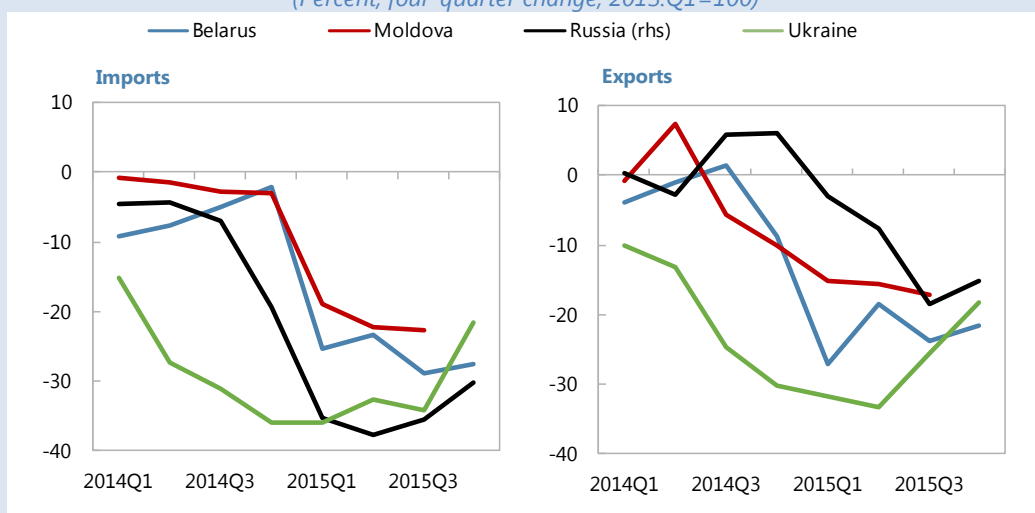
Source: Haver Analytics; and IMF Country Teams
Note: CIS=Commonwealth of Independent States

Figure 1.1.2 CIS Exports by Major Categories and Destination, 2013
(Percent of total)
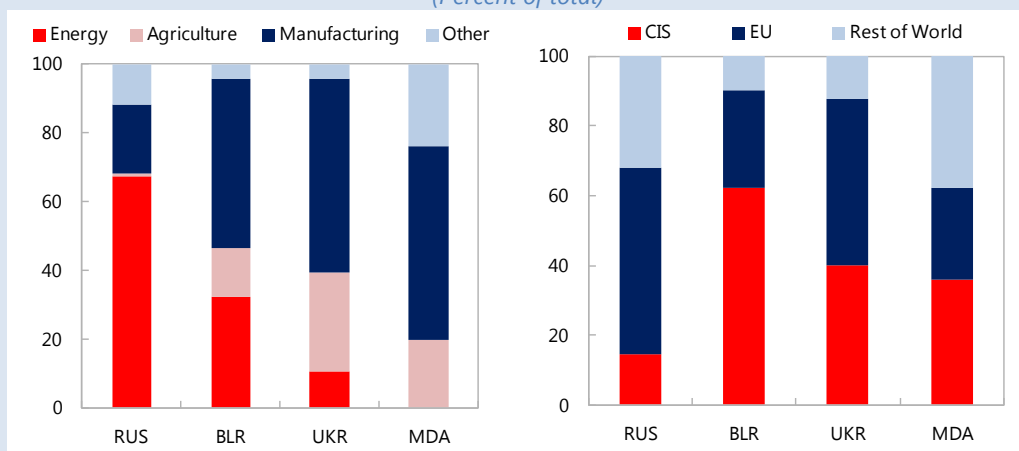
Source: Haver Analytics; and IMF Country Teams
Note: CIS=Commonwealth of Independent States

Box 1.2. Recent Minimum Wage Developments in CESEE Countries[1]

After a period of restraint during the global financial crisis, minimum wages since 2012 have been rising faster than average wages in most CESEE countries. The pace of increase has been sharp particularly in Turkey, and some Baltics and SEE-EU countries. Minimum wages are typically set by the government, sometimes in consultation with social partners. Based on limited available data, about 10-20 percent of workers earn the minimum wage in CESEE. While minimum wage policy can provide protection to low income workers and avoid abuse of company power, sharp minimum wage hikes may undermine external competitiveness and hamper job creation, particularly for low-skilled labor and in labor-intensive industries.

Figure 1.2.1. CESEE: Minimum Wages
(Percent of average wage)

Figure 1.2.2. CESEE: Minimum wage and gross wages
(Percent annual average change for 19 EU countries, 2001-13)
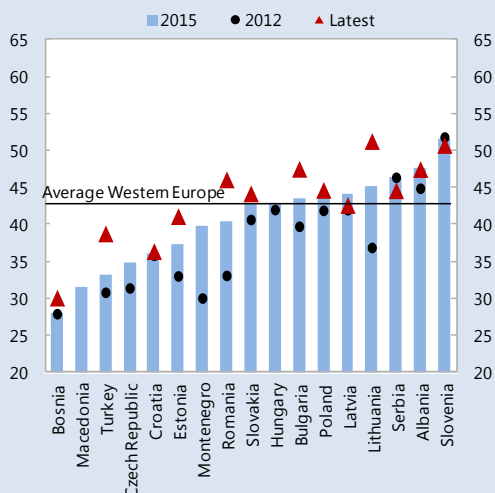
Sources: Eurostat; IMF World Economic Outlook database; national authorities; and IMF staff calculations.

Sources: Eurostat; and IMF staff calculations.

Minimum wage hikes could contribute to overall wage growth directly and indirectly through spillovers. About ¼ of average wage growth in CESEE countries over 2012-15 is associated with minimum wage developments. In particular, the elasticity of average wage to minimum wage is found to be around 10-40 percent, based on a variety of cross-country, firm level, and sector level estimates with the high impacts related to cases where coverage of minimum wage is high. The Wage Dynamics Network Survey of the European System of Central Banks also noted that about a fifth of firms in the survey reportedly would have to increase the wages of employees above the minimum wage as the minimum wage rises, thus emphasizing the spillovers of minimum wage increases on overall wages.

Some negative impact on the employment of youth and low-skilled workers can also be expected, particularly in countries with a high relative minimum wage. IMF staff analysis finds that some negative employment effects start to materialize when the minimum-to-average wage ratio exceeds 40 percent. The effects could potentially increase toward higher minimum-to-average wage ratios, reflecting their non-linear nature.

The impact on competitiveness is uncertain and worth monitoring. For the period of 2009-13, when minimum wage increases were smaller, firm level analysis reveals that tradable sector firms appear to absorb higher labor costs, and experience somewhat lower profit and employment growth, as they restrain price increase in order not to lose competitiveness. The impact of the currently larger increases of minimum wages, however, are uncertain and worth monitoring.

1/ This Box was prepared by Faezeh Raei and Piyaporn Sodsriwiboon based on the forthcoming IMF Working Paper.

Box 1.3. Political Stability Risks in CESEE[1]

Political stability risks appear to have increased across the CESEE region. In order to track political risks in CESEE, we use the Economist Intelligence Unit's (EIU) "Political Stability Risk" indices, which evaluate a "range of political factors relating to political stability and effectiveness that could affect a country's ability and/or commitment to service its debt obligations and/or cause turbulence in the foreign-exchange market." These indices take values from 0 (very low risk) to 100 (very high risk) and are constructed for all countries in the world. At present, *in almost half of all CESEE countries, the EIU political stability risk indices are above 50.* The EIU indicators suggest that political risks are particularly high in the European CIS countries, Turkey, and, to a lesser extent, in the non-EU SEE countries. In terms of *changes*, risks have increased in the past year in Poland, Turkey, Belarus, Moldova, and Montenegro and decreased in Serbia, Albania, Bulgaria, Latvia, Romania and Russia (see Figures 1.3.1 and 1.3.2).

While political stability risks in some of the *larger* CESEE countries are well known, such risks are also prominent in several *smaller* CESEE countries, such as Moldova, FYR Macedonia and Kosovo:

- *FYR Macedonia* has been in an open political crisis since the April 2014 elections when the main opposition party boycotted Parliament alleging vote rigging. In early 2015, the opposition leader released tape recordings implicating top state officials of the ruling coalition in vote rigging, large-scale government abuse of power, and corruption which led to the resignation of top officials. A political agreement brokered by the EU and the US late last summer is being implemented with elections expected later this year.

Figure 1.3.1. Economist Intelligence Unit Political Risk Score, March 2015
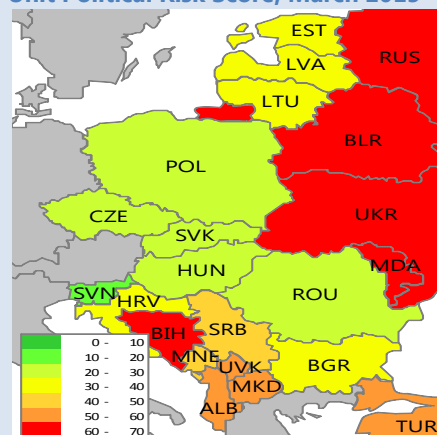
Figure 1.3.2. Economist Intelligence Unit Political Risk Score, March 2016

- *Moldova* has been in the midst of political, economic, and financial turmoil since late 2014, with three cabinet changes within one year. Political instability has been amplified by the revelation of a large-scale fraud in the financial sector. This resulted in a collapse of three large banks, with a cost to the budget of around 12 percent of GDP and a significant loss in reserves.

- In Kosovo, political tensions have been high since October 2015, when the government signed agreements brokered by the EU towards normalization of relations with Serbia. The opposition has vowed to block all parliamentary activity and to stage protests until the government resigns.

Political uncertainty and instability can have macroeconomic ramifications by dampening investors' interest and raising concerns about possible changes in economic and other policies, which can then lead to a sovereign rating downgrade. The latter channel was highlighted in January 2016, when Standard & Poor's downgraded Poland's foreign credit rating, warning that recent moves "weaken the independence and effectiveness of key institutions."

1/ This Box was prepared by Bas Bakker and Krzysztof Krogulski.

II. HOW TO GET BACK ON THE FAST TRACK?

Despite the strong cyclical rebound, growth in CESEE remains well below precrisis levels. If lower potential growth in CESEE turns out to be the "new normal," this would imply a much slower pace of income convergence with advanced Europe. This chapter explores the reasons behind the postcrisis growth slowdown by looking at labor, capital and productivity trends across the region. It also aims to identify the key gaps between CESEE and advanced Europe – with regard to capital deepening and productivity – as well as the specific institutional and structural features of CESEE economies that might explain these gaps. While there is no magic formula for fast convergence, the hope is that this chapter will provide some insights for ongoing policy discussions in the region on how to get back on a fast convergence track.

A. Historical Perspective

1. High-Speed Convergence

History shows that fast-track convergence is possible, but it still takes several decades. There are a few examples of successful and rapid catch-up with advanced economies from the starting per capita income levels that are comparable with the current levels of CESEE countries. The relatively small number of economies that have successfully converged to their advanced peers in the past century include Italy (1960-80), Spain (1980-09), Japan (1966-97), Korea (1988-10), and Taiwan (1968-08).[1]

Most of the rapid-convergence episodes share some common characteristics (Spence, 2008, Buera and Shin, 2013). First, the pace of growth typically accelerates following large-scale reforms. Second, a sizable fraction of growth is due to sustained growth of total factor productivity (TFP). Third, the investment-to-output ratio tends to increase during initial stages of growth acceleration and declines in the later stages. And finally, financial deepening occurs gradually along the transition path. Were the precrisis transition dynamics in CESEE economies any different?

2. CESEE Convergence before the Crisis

Following the dramatic economic transformation and initial period of instability, most Eastern European countries set on their convergence paths by the late 1990s. During the initial stages of transition, per capita income declined in most CESEE countries, with the notable exception of Poland. Countries that had higher starting income levels or had gone through greater political turbulence (wars, changing borders) incurred higher transition costs. In most CESEE countries, troughs in per capita GDP were reached by the mid-or late 1990s.

Compared to earlier fast-track convergence cases, CESEE economies had less favorable demographics and slower capital accumulation, which were offset by stronger TFP growth. Using the United States as a benchmark frontier economy in the post-World War II period, one can trace the evolution of relative per capita income, as well as other economic variables, during the growth acceleration episodes. Figure 2.1 shows the growth paths of CESEE countries (starting from

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[1] Other examples include mostly off-shore centers (Ireland, Iceland, Hong Kong, Singapore) and seem less relevant.

their precrisis troughs, indicated in parentheses, and ending in 2008) juxtaposed against the growth paths of the so-called "miracle economies" of the past century to match starting income levels. A comparison between these two groups yields several observations:

- The *speed of convergence* in CESEE before the global financial crisis – measured by the rate of growth of per capita GDP at PPP relative to the U.S. economy– was in many cases similar to that observed in the earlier fast-track convergence episodes.

- However, the transition dynamics of CESEE differed from that of the miracle economies in several respects: on the upside, *TFP growth* has been stronger and the pace of *financial deepening* has been much faster than during the earlier fast convergence episodes, but on the downside, CESEE economies had slow-growing or *shrinking labor force* and *slower pace of capital deepening* (measured by the growth rate of the capital-labor ratio), as well as generally lower *domestic saving and investment rates* (Table 2.1).

Figure 2.1. Convergence
(Per capita income as a share of per capita U.S. GDP at PPP)

1. Starting Income Less than 0.2 of Per Capita U.S. GDP

Korea(71), Romania(92), Belarus(00), Macedonia (98), Ukraine(00), Serbia(95), Moldova(00), BiH(92)

2. Starting Income Above 0.2, But Less than 0.3 of Per Capita U.S. GDP

Taiwan(68), Korea(82), Russia(98), Latvia(96), Lithuania(94), Estonia(96), Poland(91), Bulgaria (01), Croatia(93)

3. Starting Income Above 0.3 But Less Than 0.4 of Per Capita U.S. GDP

Spain (60), Japan(60), Taiwan(76), Korea (88), Slovak Rep.(99), Hungary (92)

4. Starting Income Above 0.4 of Per Capita U.S. GDP

Italy (60), Spain (85), Japan (66), Korea (92), Taiwan (82), Czech Rep. (00), Slovenia (92)

Source: Penn World Tables, Version 8.1.

Table 2.1. Convergence in CESEE before the Global Financial Crisis in Comparison to Previous Fast-Track Convergence Episodes

	Average Annual Growth Rates during the Initial 20 years of Transition [1]				Average Ratios, as a Share of GDP during the Initial 20 years of Transition [1]			
	Income (per capita) [2]	Labor [3]	Capital/Labor Ratio [4]	TFP [5]	Investment [6]	Domestic Savings [7]	Public Investment [8]	Credit [9]
Starting income level less than 0.2 of US GDP per capita								
Korea(71)	0.07	0.03	0.08	0.02	0.30	0.19	4.38	0.02
Romania(92)	0.04	-0.02	0.05	0.04	0.19	0.21	.	0.04
BiH(92)	0.12	0.00	0.10	.	0.23	-0.16	10.07	0.06
Serbia(95)	0.08	-0.01	0.02	0.04	0.14	0.05	2.19	0.11
Macedonia (98)	0.04	0.01	0.02	.	0.20	0.08	3.65	0.10
Belarus(00)	0.07	0.00	0.03	.	0.19	0.18	9.43	0.11
Ukraine(00)	0.09	0.01	0.00	0.06	0.16	0.18	4.01	0.26
Moldova(00)	0.07	-0.03	0.03	0.08	0.17	-0.03	5.73	0.14
Albania(92)	0.07	-0.01	0.03	.	0.20	-0.04	6.51	0.18
Starting income level above 0.2 but less than 0.3 of US GDP per capita								
Taiwan(68)	0.05	0.04	0.08	0.01	0.21	0.23	12.36	.
Korea(82)	0.05	0.02	0.08	0.02	0.38	0.31	4.96	0.03
Poland(91)	0.03	0.00	0.03	0.03	0.18	0.16	-5.81	0.05
Croatia(93)	0.04	0.01	0.03	0.03	0.23	0.18	5.67	0.05
Lithuania(94)	0.05	-0.01	0.05	0.04	0.15	0.10	3.67	0.13
Latvia(96)	0.05	0.02	0.02	0.04	0.21	0.09	3.47	0.24
Estonia(96)	0.06	0.01	0.05	0.03	0.26	0.19	4.85	0.14
Russia(98)	0.07	0.01	0.00	0.06	0.14	0.27	3.78	0.10
Bulgaria (01)	0.06	0.03	0.03	0.01	0.20	0.13	4.21	0.25
Turkey(03)	0.07	0.00	0.06	0.02	0.18	0.16	3.38	0.18
Starting income level above 0.3 but less than 0.4 of US GDP per capita								
Spain (60)	0.02	0.00	0.07	0.02	0.27	0.27	.	0.00
Japan(60)	0.04	0.01	0.10	0.02	0.28	0.26	.	0.05
Taiwan(76)	0.04	0.03	0.08	0.01	0.24	0.25	11.66	.
Korea (88)	0.04	0.02	0.07	0.01	0.39	0.35	5.19	0.04
Hungary (92)	0.02	0.00	0.03	0.02	0.20	0.15	4.13	0.05
Slovak Rep.(99)	0.05	0.01	0.02	0.04	0.23	0.16	3.50	-0.01
Starting income level above 0.4 of US GDP per capita								
Italy (60)	0.02	0.00	0.06	0.02	0.27	0.27	.	0.00
Japan (66)	0.02	0.01	0.08	0.01	0.30	0.29	8.75	0.03
Spain (85)	0.03	0.03	0.02	-0.01	0.27	0.25	.	0.04
Taiwan (82)	0.03	0.02	0.07	0.01	0.24	0.25	9.95	.
Korea (92)	0.03	0.01	0.06	0.01	0.37	0.36	5.39	0.04
Slovenia (92)	0.02	0.01	0.03	0.02	0.31	0.25	4.03	0.11
Czech Rep. (00)	0.03	0.01	0.02	0.02	0.26	0.24	4.77	0.03

Sources: Penn World Tables, Version 8.1; IMF, World Economic Outlook and International Financial Statistics databases.

Note: Shaded blue areas are values that are below the benchmark (non-CESEE) country averages.

[1] The number in parentheses refers to the first year of the latest growth spell for each country.

[2] Growth in real GDP at purchasing power parity per capita.

[3] Growth of the labor force.

[4] Growth rate of capital stock per capita.

[5] Growth of total factor productivity.

[6] Investment rate, calculated as the share of investment in output.

[7] Domestic saving rates, calculated as the share of output that is not consumed.

[8] The share of public investment in GDP. Due to data availability, public investment/GDP ratio data for Taiwan Province of China starts from 1973, for Japan from 1980, for Poland from 1995, for Lithuania from 1999, for Latvia from 2000. for Bosnia and Herzegovina from 1998, for Serbia from 1997, for Hungary from 2000, and for FYR Macedonia and Belarus from 2005.

[9] The growth rate of credit-to-GDP ratios. Credit-to-GDP ratio data for Italy start from 1963, for Spain from 1972, for Albania from 1994, for Lithuania from 1995, and for Bosnia and Herzegovina and Serbia from 1997.

Faster TFP growth and financial deepening in CESEE during 1990-2008 could, in part, be attributed to an unusually favorable global environment, characterized by a combination of high commodity prices, low interest rates, rapid expansion of global supply chains and buoyant trade. During this period, not only CESEE, but many other economies in Southern Europe, Latin America and Asia experienced an acceleration of growth (IMF, 2013). Amid easy funding conditions and given their initial low capital-labor ratios, CESEE economies would have been expected to have much higher rates of capital accumulation than what they actually had. The latter may be in part due to fast financial deepening that enabled households to boost consumption at the expense of saving in anticipation of higher incomes.

3. The Postcrisis Growth Slowdown

The global financial crisis followed by the euro area crisis led to steeper growth declines in CESEE than elsewhere. Real GDP growth in CESEE dropped to an average of 1.9 percent over 2011-15 from an average of 6.1 percent over 2002-08, showing a much sharper decline than in other emerging or advanced economies (Figure 2.2). Part of this decline was cyclical, and in fact, much of it has already reversed in the last two years outside the CIS (as discussed in Chapter I). But a large part of the growth slowdown is thought to be structural. The average potential growth in CESEE is estimated to have dropped to 2 percent, which is about half of the precrisis potential growth rate (Figure 2.3). This stands in sharp contrast, for example, to the full recovery of Korea's potential growth within three years following the Asian crisis. That said, potential growth deceleration since the global financial crisis has been a global phenomenon.

The decline in potential growth across CESEE appears to have been mainly driven by slower TFP growth but also by weaker investment. Indeed, our growth accounting analysis points to lower TFP growth and slower capital accumulation as the main reasons behind the potential growth slowdown after the crisis (Figure 2.3).[2]

At current growth rates, convergence is effectively off the fast track. **In order to get back on the fast track, CESEE countries would need to lift potential growth closer to precrisis levels.** This proposition is not new. What is new is that CESEE countries are now facing considerable headwinds from unfavorable demographics, sluggish global growth (or even secular stagnation) and likely tighter global financial conditions going forward. Against this backdrop, achieving similar growth rates as before the crisis may prove to be challenging. The rest of this chapter will explore possible future engines of growth across CESEE countries, by looking at different factors of production and how efficiently they are used.

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[2] Given that potential output is not observable and that TFP is estimated as a residual after accounting for the contributions of other factors of production, the usual caveats apply.

Figure 2.2. GDP Growth and Convergence, 2002–15

(Year-over-year growth, percent)

(PPP GDP per capita relative to the U.S., percent)
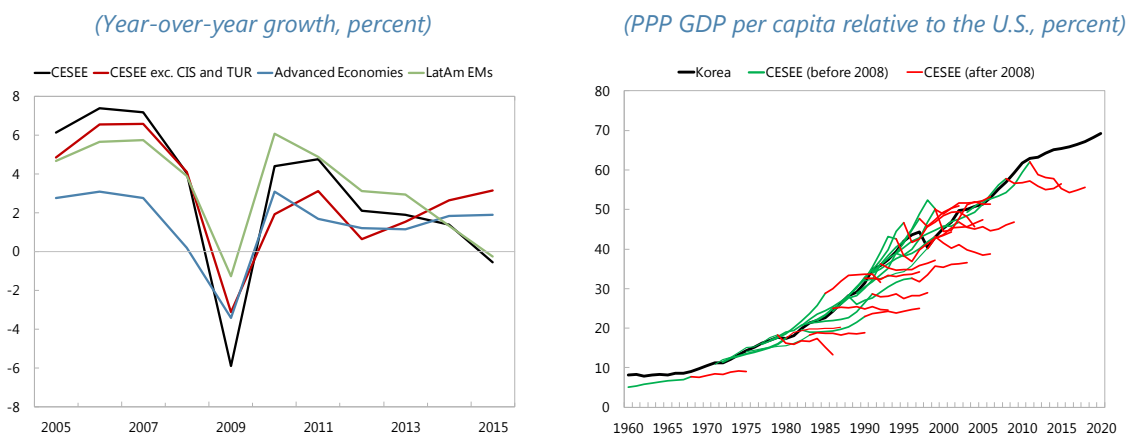
Source: IMF, World Economic Outlook database.
Note: CESEE = Central, Eastern, and Southeastern Europe; CIS =Commonwealth of Independent States; LatAM=Latin America; EMs=Emerging Markets. The per capita income growth paths of CESEE countries are juxtaposed on Korea's income growth path.

Figure 2.3. Potential Growth, 2002-2015

(Average year-over-year growth rate, percent)

1. Potential Growth during 2002-08

2. Potential Growth during 2009-12

3. Potential Growth during 2013-15

4. Change over 2013-15 versus 2002-08
(percentage points)
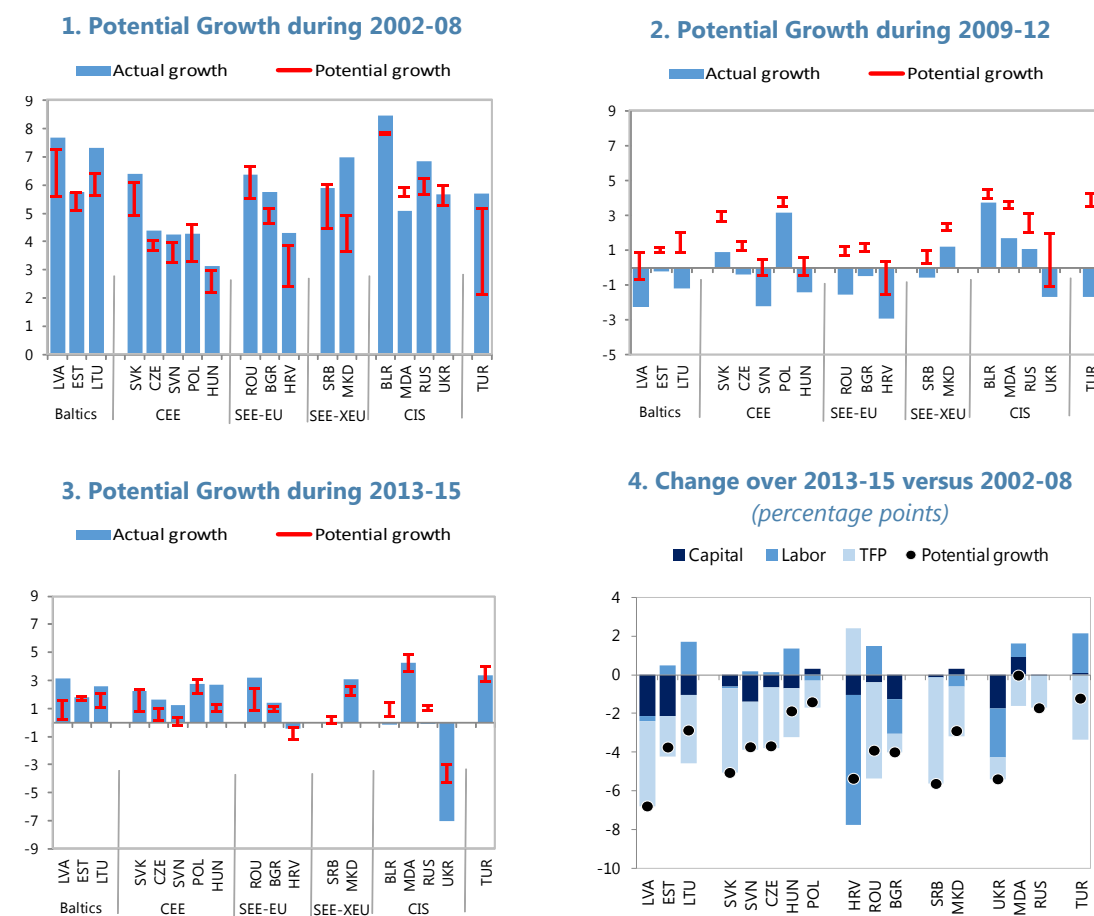
Sources: Penn World Tables, Version 8.1, Haver, and IMF staff.
Note: Potential growth is shown as a range of estimates based on three methods: a multivariate filter without financial friction, a multivariate filter with financial frictions, and the production function approach (Podpiera, Stepanyan, and Raei, forthcoming). Potential output decomposition into TFP, capital, and labor contributions is based on the production function approach. The TFP contributions include human capital. Human capital accounts for very small part of TFP change, on average close to 0.04 percentage points. Data availability limits precrisis period as follows: 2005-08 for Moldova, 2006-08 for Ukraine, 2007-08 for Russia and Macedonia.

B. Growth Drivers: Labor

While demographics in the region are generally unfavorable for economic growth prospects, CESEE countries have some scope to mitigate these negative effects by increasing participation rates, reducing structural unemployment, and raising life expectancy. Increasing the share of the workforce with tertiary education and implementing more active labor market policies could reduce skill mismatches, and thereby, contribute to faster income convergence.

1. How Does CESEE Compare to Advanced Europe?

CESEE countries are facing some of the worst declines in working-age population in Europe, reflecting both unfavorable demographics and emigration. This trend is expected to continue or worsen in some cases (Figure 2.4, and Box 2.1). CESEE countries also tend to have lower life expectancy than the EU-15, which is strongly correlated with the quality of healthcare.

Figure 2.4. Working Age Population Growth and Life Expectancy

1. Working-Age Population Growth, 2010-14
(Percent change per year)
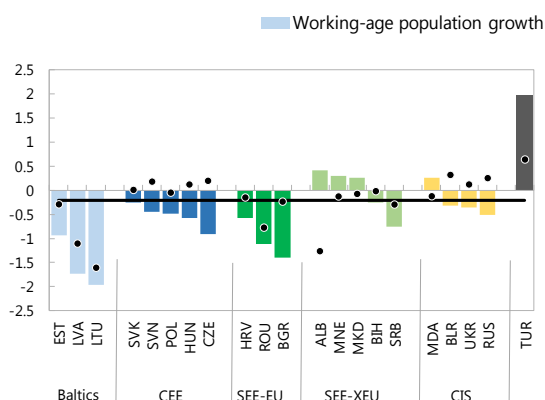
2. Working-Age Population Growth, 2015-30
(Percent change per year)
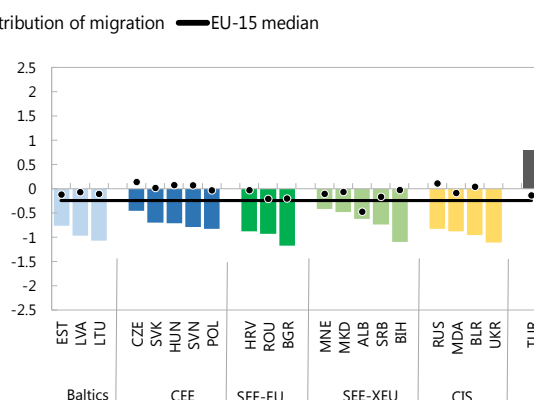
3. Life Expectancy, 2013 *(years)*
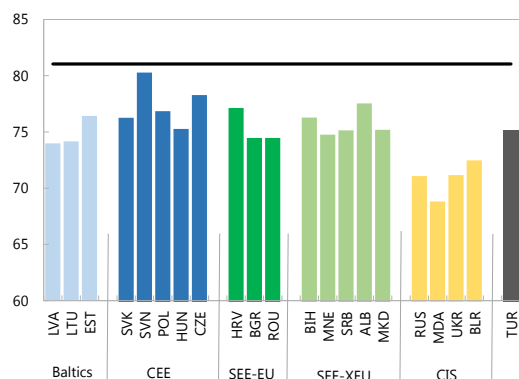
4. Life Expectancy and Quality of Healthcare
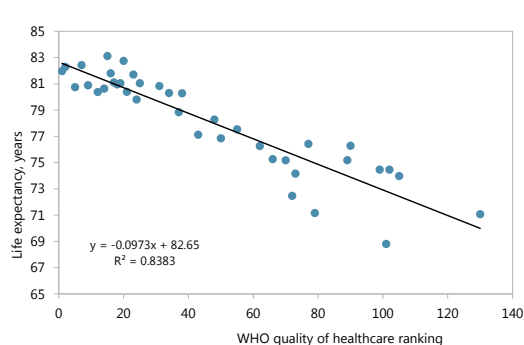
Sources: United Nations, Populations Prospects; Organization for Economic Cooperation and Development; Eurostat; IMF, World Economic Outlook database; World Health Organization; and IMF staff calculations.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside of the EU; WHO = World Health Organization.

Labor force participation rates in CESEE are comparable to those in advanced Europe, but there are pockets of underutilized labor and structural unemployment is high in some cases (Figure 2.5). Based on full-time equivalent participation rates, only a few CESEE countries (Bosnia and Herzegovina, Moldova and Turkey) are below the EU-15 average. But there are more countries (notably in SEE), where participation rates among women and seniors are much lower than elsewhere in Europe. Structural unemployment tends to be high in SEE as well. Stubbornly high unemployment rates in SEE economies are linked to the rigidity of labor market institutions and persistent outward migration (Kovtun et al, 2014; IMF, 2015c). Labor market practices in SEE countries have traditionally afforded workers high degree of protection and union coverage is also high compared to the rest of CESEE. While structural unemployment acts as a push factor for emigration (Box 2.1), it may also be exacerbated by heavy dependence on remittances, which are the flipside of emigration. Sizable remittances allow their recipients to extend periods of job search and push up reservation wages, thus reducing domestic workers' willingness to accept lower-paid jobs. Also, migration itself may reduce pressures to reform labor markets.

Figure 2.5. Labor Force Participation and Unemployment Rate *(Percent)*

1. Full-Time-Equivalent Participation Rate, 2014
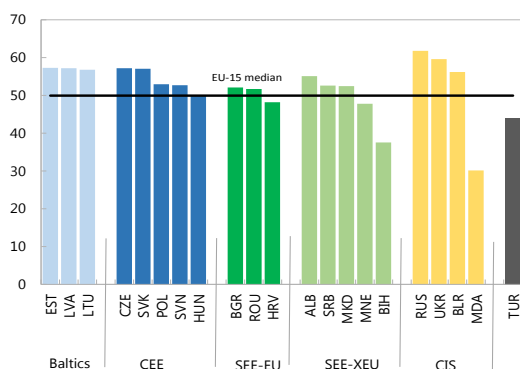
2. Female Labor Participation Rate, 2014
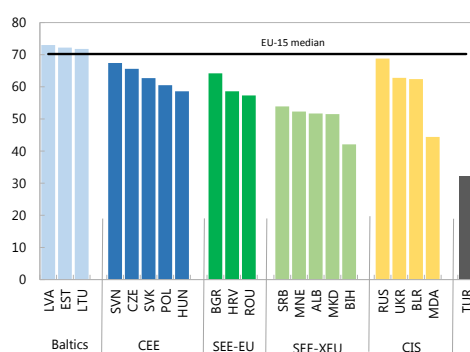
3. Senior (55-64 years old) Participation Rate, 2014
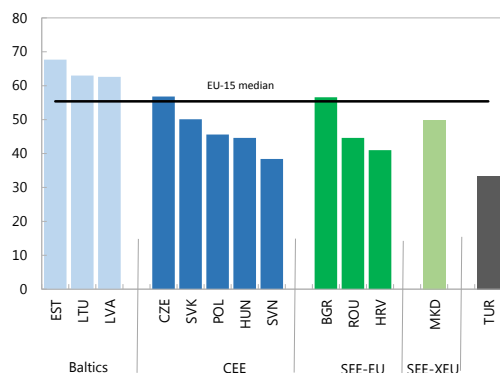
4. Average Unemployment Rate, 2000-15
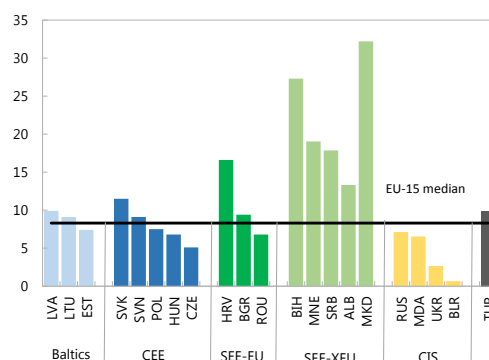
Sources: United Nations Populations Prospects; Organization for Economic Cooperation and Development; Eurostat; IMF, World Economic Outlook; and IMF staff calculations.
Note: Data for ALB, BLR, SRB, and UKR are not adjusted for part-time employment, due to lack of data. CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside of the EU.

Most CESEE economies appear to score well on the quality of human capital on aggregate, but there are some gaps (Figure 2.6). Based on the standard aggregate human capital indices, most CESEE countries compare well with advanced Europe. However, a closer look at the distribution of the labor force by education level reveals that some CESEE economies lag in the *share of the workforce with tertiary education* (SEE and Turkey). As a result, *shortages of high-skilled labor* – the difference between the share of high-skilled labor in total employment and the same share in total population – are worse in some parts of the region than in the EU-15. In the Baltics and SEE, these shortages have been exacerbated by large and persistent outflows of younger and relatively more educated people since the 1990s (Box 2.1). Furthermore, *skill mismatches* – whereby a sizable portion of available skills are not employed in relevant occupations – tend to be worse in CESEE than in advanced Europe, in part due to deficiencies in labor market policies or institutions.

Figure 2.6. Human Capital, Education and Skills

1. Human Capital Index, 2011

2. Labor Force Composition by Education Level
(Percent of total)

3. Skill Shortage Index, 2000–14

4. Skill Mismatches and Active Labor Market Policies
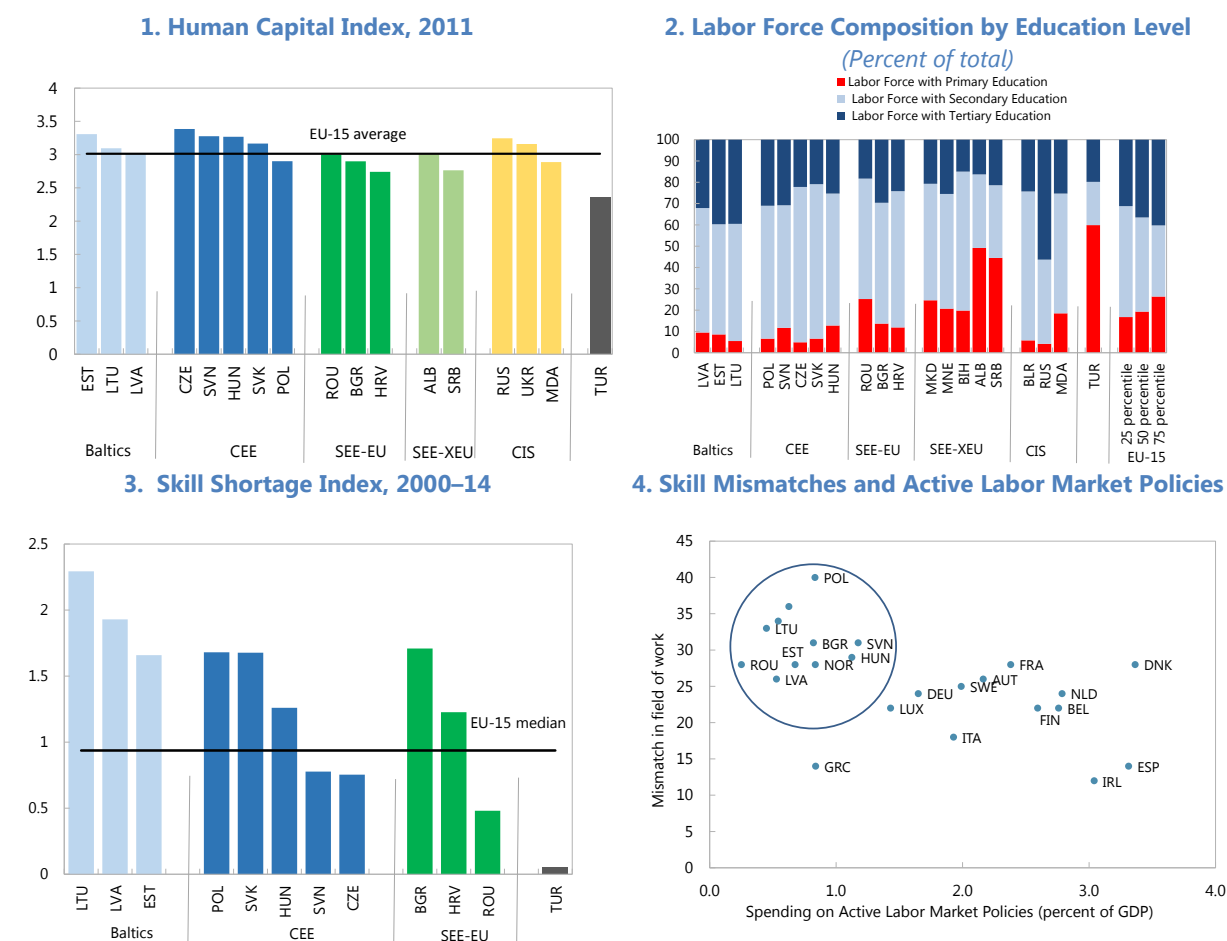
Note: Skill shortage is defined as a difference between the share of high-skilled labor in total employment and the same share in total population. The low level of skill shortage in Turkey reflects the low level of skilled jobs in total employment.

Note: The y axis shows the percent share of workers facing horizontal skill mismatch, which occurs when the worker has an education that is not the one needed for the job.

Sources: Penn World Tables, Version 8.1; World Bank, World Development Indicators; Eurostat; SEO Economic Research (2012); and IMF staff calculations. Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside of the EU.

Box 2.1. Economic Impact of Emigration on CESEE Countries

Emigration can have profound effects on economic outcomes in sending economies. Economic migration driven by individuals' choices is part of economic development and has likely led to positive outcomes for CESEE emigrants themselves and for the EU as a whole. However, emigration—through its externalities—may have also slowed growth and convergence in CESEE countries. Such externalities could arise from sizable outflows of skilled labor, which can create skill shortages, and may impair productivity growth and convergence.

Over the past 25 years, close to 20 million people have emigrated from CESEE, accounting for 6 ¼ percent of the region's working-age population. Two-thirds of CESEE countries are affected by net emigration, where it has often exacerbated adverse demographic trends and dampened working-age population growth by about 0.5-1.0 percentage points per year since 1990, and contributed to shortages of high skilled labor, especially in the Baltics. Lower average income vis-à-vis more advanced economies, but also poor institutional quality, and weak economic conditions at home are important factors behind emigration, particularly of skilled labor.

Remittances have been both a blessing and a curse. Analysis suggests that higher remittances are associated with lower labor supply incentives, and large remittance inflows may contribute to real exchange rate appreciation, and adversely affect the tradable sector. But they also appear to have supported consumption, and private investment, and facilitated financial deepening in high-remittance receiving countries.

Overall, emigration appears to have slowed growth and income convergence in CESEE. Analysis suggests that in 2012, cumulative real GDP growth could have been around 7 percentage points higher on average in CESEE in the absence of migration during 1995-2012. As a result, on average, CESEE members of the EU could have narrowed their per capita income gap with the EU average by an additional 2 percentage points. Emigration may have also created pressures on social security systems and hindered growth through increased growth-unfriendly labor taxes. Raising the labor market participation rates and better leveraging remittances to promote investment could help offset the negative impact of emigration. Improving institutions and economic policies would also encourage potential migrants to stay, promote return migration, and attract new immigrants.

1/ This Box was prepared by Faezeh Raei based on Atoyan et al (forthcoming).

Figure 2.1.1. Determinants of Bilateral Emigration of Skilled Workers *(Standardized coefficients, Sending countries: CESEE; Receiving countries: OECD)*
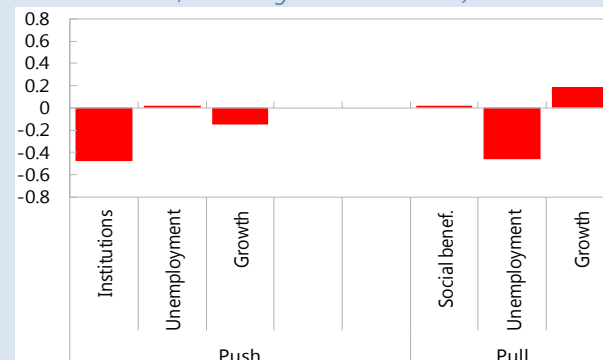
Source: IMF staff estimates.
Note: Estimates are based on a panel data gravity model of cumulative outward emigration growth over 1990 to 2010.

Figure 2.1.2. High Remittance Receiving Countries *(Percent of GDP)*
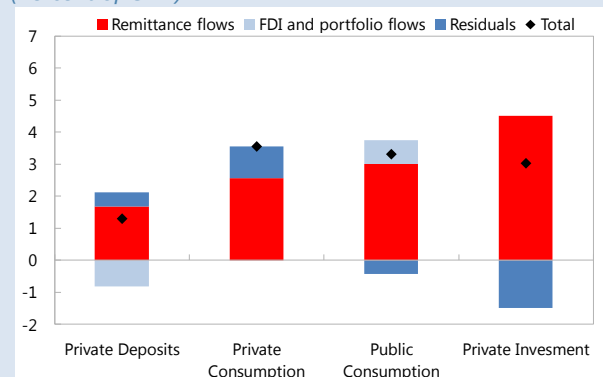
Source: IMF staff estimates.
Note: High remittance countries: ALB, BIH, KOS, MDA, MNE.

Figure 2.1.3. Per Capita Income in Purchasing Power Standard, 2014 *(Percentage points; additional reduction in per capita GDP gap with the EU28)*
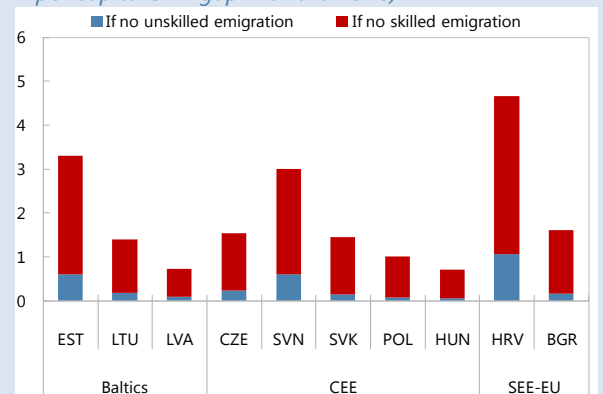
Sources: Eurostat and IMF staff calculations.
Note: Coefficients derived from regressions of value added per worker on emigration ratios and control variables are used to estimate the contribution of emigration to cumulative per capita output changes during 1995-2012.

C. Growth Drivers: Capital

Capital gaps relative to advanced Europe are still large, while investment rates are not sufficient for a rapid catch-up. Investment is partly held back by crisis legacies and subdued long-term growth prospects. Many CESEE countries would need higher domestic saving rates to sustain high enough investment rates to achieve successful convergence without hitting external sustainability limits.

1. How does CESEE Compare to Advanced Europe?

After more than 20 years of transition, there is still significant scope for capital deepening in CESEE (Figure 2.7). With the exception of Slovenia and the Czech Republic, capital stock per capita in a typical CESEE economy is about one third of that in advanced Europe. Most significant gaps are in infrastructure (buildings and civil engineering) and machinery equipment.

Figure 2.7. Capital Stocks

1. Capital Stock, Per Capita, 2014
(Percent of EU-15 average)

2. Capital Gaps, Per Capita, 2011
(Percent of U.S. capital stock per capita)
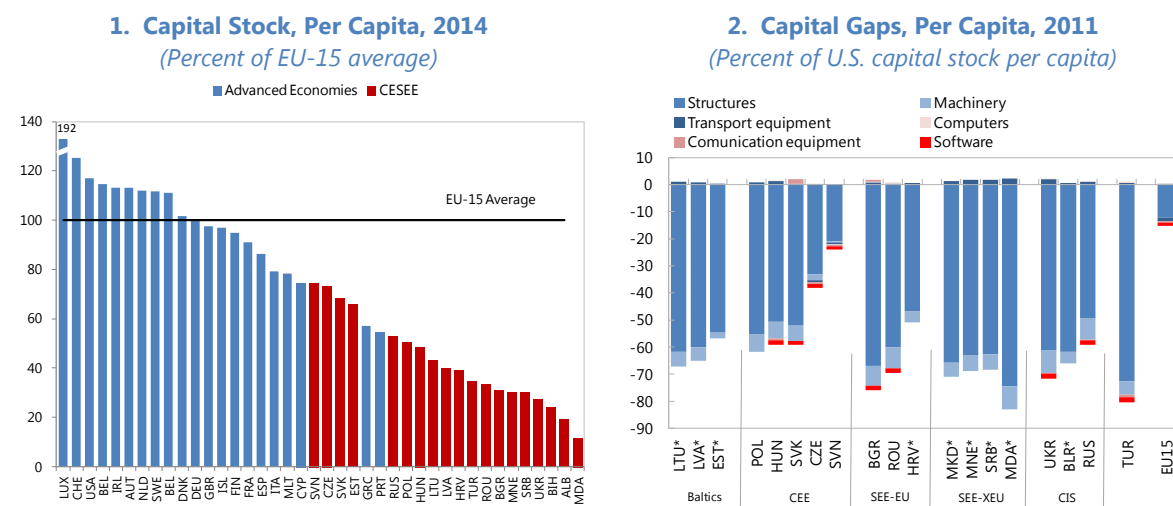
Source: Penn World Tables, Version 8.1.
Notes: Capital gap is the difference between the capital stock of country *X* and the U.S. capital stock. Asterisks denote countries that report only the basic structure of capital stock.

2. Was Capital Accumulation before the Crisis too Fast or too Slow?

Given large capital gaps, precrisis capital accumulation in CESEE was relatively slow. The relative scarcity of capital and the higher rate of return on investment would have justified investment rates higher than those observed in CESEE before the crisis. While precrisis investment rates in CESEE exceeded those in advanced Europe, the difference was fairly small. Average precrisis investment rates were relatively higher than in advanced Europe in CEE, SEE, and the Baltics, but lagged behind advanced economies in the CIS and Turkey (Figure 2.8).

After the crisis, investment rates fell across all of Europe. Investment rates declined in the Baltics, CEE, and SEE, but also in the EU-15. The declines could have been even steeper in the Baltics, CEE and SEE had it not been for the sizable boost from EU Structural and Cohesion Funds (Figure 2.8). In contrast, across in most CIS economies and Turkey, post-crisis investment rates have improved significantly and moved ahead of their CESEE peers.

Figure 2.8. Investment Rates in CESEE
(Percent of GDP)
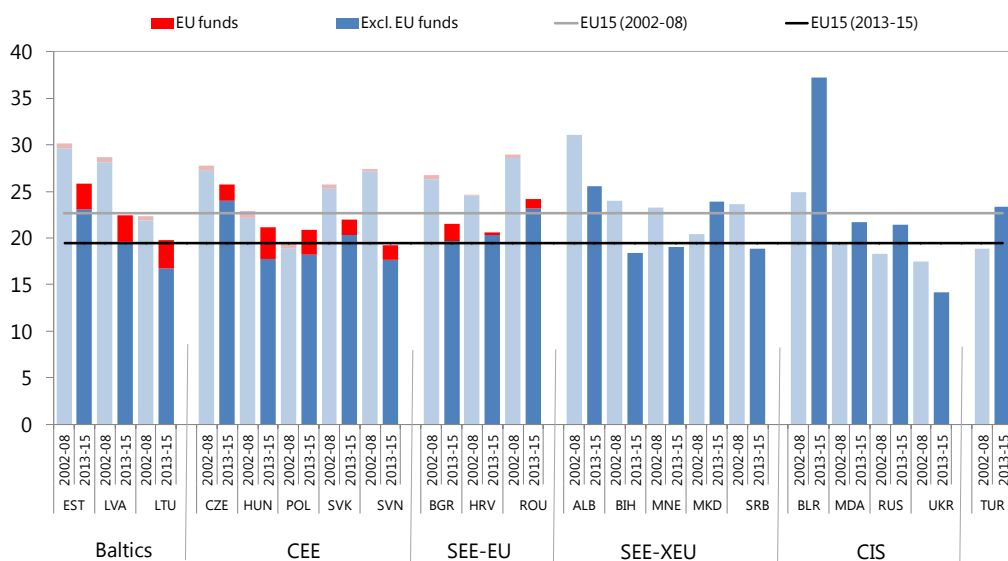
Sources: Haver Analytics; Eurostat; and Penn World Tables, Version 8.1.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States;
SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside of the EU.

How do we assess the adequacy of the speed of capital accumulation across CESEE? This is not straightforward. In what follows, we use two benchmarks: a model-based steady state investment rate ("golden rule") and an investment rate consistent with stylized transition dynamics derived from the historical experience of other European countries that have achieved convergence to present-day euro area income levels (henceforth, a "historical benchmark"). The benchmark values can be calculated for each country and each point in time, given the TFP and population growth rates, as well as the country's capital-labor ratio (Figure 2.9).

Figure 2.9. Precrisis Investment Rates and Benchmarks
(2002–08 averages, percent of GDP)
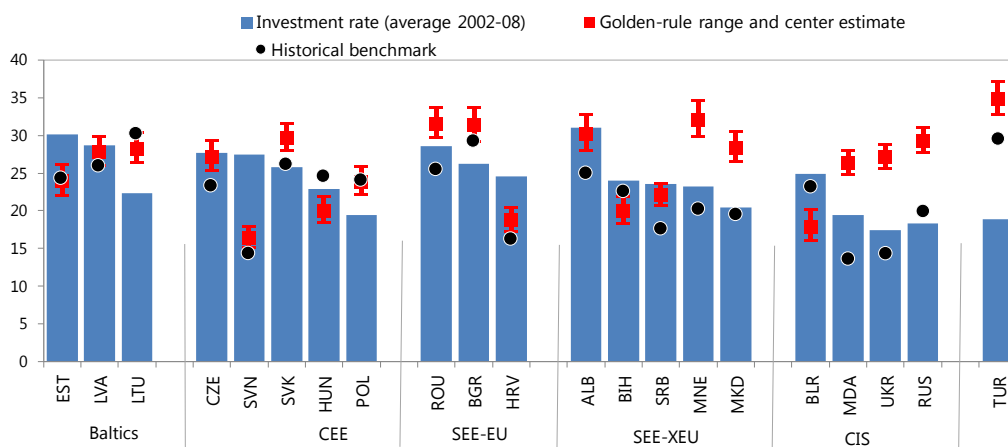
Sources: Haver Analytics; Penn World Tables, Version 8.1; Eurostat; and IMF staff calculations.
Note: The "golden rule" is estimated with the social rate of time preference set equal to the estimated euro area average (5 percent) plus/minus 1 percentage point. CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside of the EU.

How should one interpret the deviations of actual investment rates from the benchmark rates?
If a country's investment rate falls short of both benchmarks, this is likely a sign of investment *undershooting*. On the other hand, if it is above the golden rule rate, it does not necessarily imply *overshooting* (as the golden rule can be viewed as a lower bound – see Box 2.2). However, if the investment rate exceeds both benchmarks, this could be an indication that the investment rate is unsustainable.

With that interpretation in mind, the key finding is that investment rates tended to be on the low side, with some exceptions:

- *The precrisis investment rates in Turkey and most of the CIS were too low*, *with the exception of Belarus*. Investment rates in Russia and Turkey were well below both benchmarks, while investment rates in Moldova and Ukraine were sub-optimal relative to the golden rule.

- *Across the Baltics, CEE, and SEE countries, there is more variation*. The precrisis investment rates in Lithuania, the Slovak Republic, Bulgaria, and Poland also fall short of both benchmarks. In contrast, precrisis investment rates were well above both benchmarks in Croatia, Estonia, and Slovenia, suggesting possible overshooting.

Box 2.2. Golden Rule and Historical Benchmark Investment Rates

The *golden rule* can be interpreted as a lower bound to which an investment rate in a country would eventually converge as it approaches its own steady state level underpinned by its deep structural characteristics and exogenous parameters.

The neo-classical growth model modified to allow for exogenous growth of labor-augmenting productivity (Cass-Koopmans model) predicts that—for given parameters of the aggregate production function, social rate of time preference, depreciation, exogenous growth rates of the labor force and labor-augmenting productivity, and initial conditions with positive values—an economy converges to a steady-state equilibrium, in which income, consumption, and capital all grow at a fixed rate equal to the sum of the growth rates of labor force and labor-augmenting productivity.

Under typical calibration of the parameters, the model implies that the investment rate would fall monotonically as the economy converges to its steady state. As such, the closed-economy, "golden rule" saving/investment can be interpreted as a lower bound for the investment rate along the CESEE countries path of convergence to euro area income levels. The interpretation of the "golden rule" as a lower bound of the optimal investment rate also holds in the case of a similar open economy, for which the world interest rate is lower or equal to the value in the steady state of the closed economy. The main advantage of the "golden rule" approach is that it provides a benchmark that is invariant with respect to country's initial conditions (i.e., it is not sample-dependent as is the case with all regression-based approaches). The main disadvantage is that it requires knowledge of the unobservable social rate of time preference (Miranda, 1995).

The *historical benchmark* provides a yardstick investment rate (for a given K/L ratio and technology) that is consistent with capital accumulation path of selected advanced European economies during 1951-2011 that has proven to be sustainable. The main advantage of this approach is that it does not require any assumptions about the social rate of time preference and the position of the country on the saddle-path. The main disadvantage is that it assumes similarity in economic structures of CESEE countries and their advanced peers. See Annexes V and VI for details.

3.   Has Investment Growth Slowed Since the Crisis?

With the crisis, investment slumped in most CESEE economies. The global financial crisis triggered a "sudden stop" in capital flows. At the same time, incomes fell and risk premia increased, souring the outlook and making legacy debt burdens unsustainable for many borrowers (see Spring 2015 REI). The resulting push for deleveraging led to higher savings and further declines in investment, broad-based in some cases (for example, in Slovenia), but concentrated in construction in other cases (Hungary, Lithuania, and Estonia) (Figure 2.10). As a result, the net saving-investment balances improved in most countries.

The postcrisis decline in investment rates likely reflects both cyclical and structural factors, though the two are difficult to pry apart:

- *In those countries that had precrisis investment booms, investment rates have become unsustainable after the onset of the crisis, as borrowing costs rose and near-term growth prospects soured.* Indeed, investment rates tended to decline more in countries with larger precrisis investment gaps – defined as the actual investment rate minus the benchmark rate (Figure 2.10). As discussed above, the largest positive investment gaps were observed in Croatia, Estonia, and Slovenia. Precrisis investment overshooting was often associated with excessive credit growth that led to a build-up of debt. After the crisis, debt overhang and attendant high nonperforming loans became a drag on investment (see Spring 2015 REI).

- *The postcrisis investment slump may, in part, also reflect a perceived structural shift in trend growth* (Figure 2.10). The estimated golden rule and historical benchmark investment rates for CESEE countries shifted lower after the crisis. The decline in golden rule benchmarks, for example, was mainly due to lower TFP growth and, to a lesser extent, worsening demographics.[3] Thus, some of the postcrisis downward correction in investment rates may be mirroring the declines in the benchmark investment rates for CESEE countries that reflect changes in potential growth drivers after the crisis.

In most economies, investment rates are now below their estimated historical benchmark rates, though not the golden rule. While it is not clear whether postcrisis TFP growth slump will persist (this will be discussed below), if it does persist, then the steady-state investment rates for CESEE – as implied by the golden rule – may be permanently lower. However, most CESEE countries would need to have much higher investment rates – according to historical benchmark – in order to get back on the fast convergence path. This would require substantial efforts to boost TFP and, in a number of economies, higher saving rates to fund the additional investment without running into the external financing constraints. We turn to these issues in the next sections.

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[3] The declines in historical benchmarks were smaller, as they depend on both TFP growth rates and K/L ratios (which are still very low in most CESEE countries), while the golden rule rates are influenced by TFP growth rates, but not capital gaps.

Figure 2.10. The Postcrisis Investment Slump in CESEE

1. Postcrisis Investment Rate Correction
(Percent of GDP)

2. Real Investment Slump by Asset Type
(Contributions to growth, change between 2002–08 and 2013–15; percentage points)
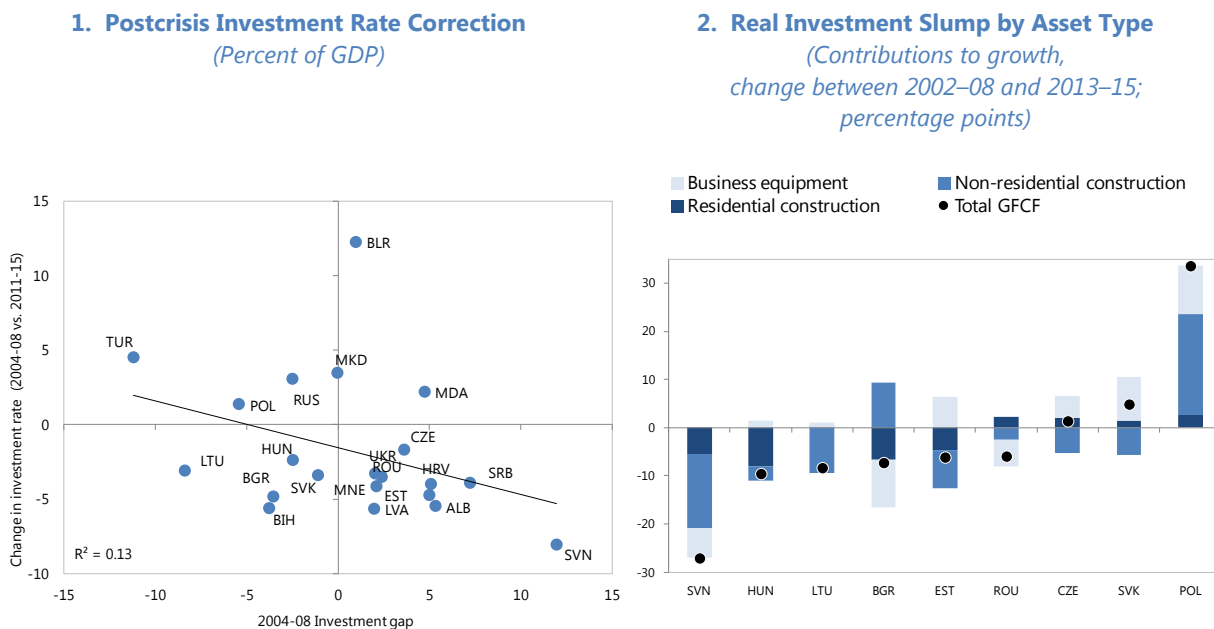
Sources: Haver Analytics; Penn World Tables, Version 8.1; and IMF staff calculations.
Note: Investment gaps calculated relative to the historical benchmark. GFCF denotes Gross Fixed Capital Formation.

3. Postcrisis Investment Rates and Benchmarks
(2013–15 averages, percent of GDP)
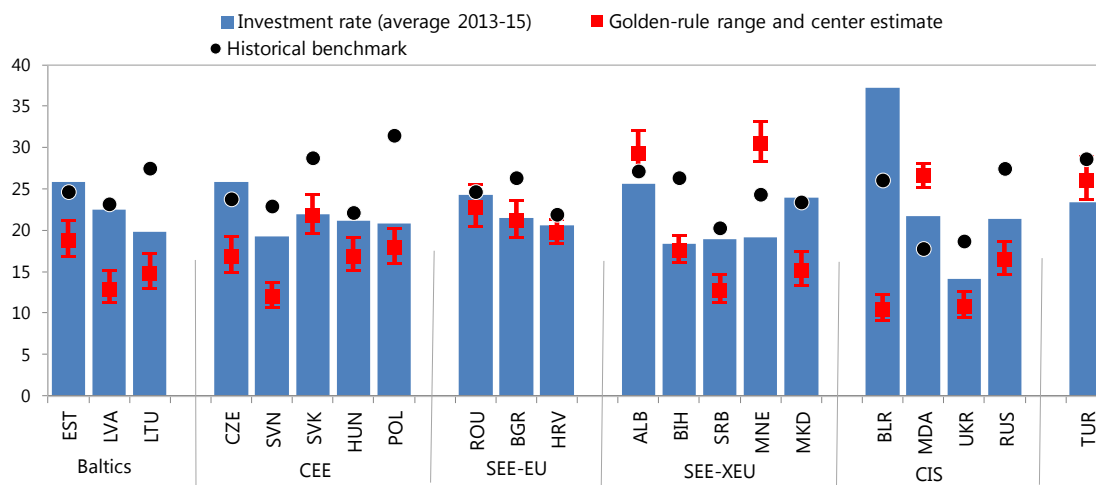
Sources: Penn World Tables, Version 8.1; Eurostat; and IMF staff calculations
Note: The golden rule is estimated with the social rate of time preference set equal to the estimated euro area average (5 percent) ± 1 percentage point. CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe, SEE-XEU = Southeastern European countries outside of the EU.

4.   What Explains Investment Undershooting in Some CESEE Countries?

So, investment rates tended to be on the low side before or also after the global financial crisis in a number of CESEE economies, as discussed in the previous sections. Was this because of low domestic saving rates, limited external borrowing space or other reasons?

Indeed, in several CESEE economies, saving rates have been and remain low in comparison with actual investment rates, optimal investment benchmark rates and earlier fast-track convergence episodes:

- *Comparing saving rates across CESEE countries*: Saving rates are particularly low in SEE non-EU, Ukraine, Moldova and Turkey (Figure 2.11). In FYR Macedonia, Moldova, and Bosnia and Herzegovina, low saving rates are partly offset by high net remittance inflows.

- *Comparing saving rates with actual investment rates* (Figure 2.11): Gross domestic saving rates were below investment rates in many countries before the crisis (the Baltics, SEE, and Moldova). After the crisis, saving rates increased and matched or exceeded the investment rates in SEE EU and the Baltics, while saving-investment gaps persisted in the SEE non-EU, Moldova, Belarus, and Turkey.

- *Comparing saving rates with optimal investment benchmark rates* (Figure 2.12): Domestic saving gaps – the difference between actual gross domestic saving rates and estimated benchmark investment rates – are large and persistent in SEE non-EU, Moldova, and Turkey.

- *Comparing CESEE saving rates with investment rates in previous fast-convergence episodes:* While average domestic saving rates in previous fast-convergence episodes were around 28 percent of GDP, the average was just 12 percent for CESEE and slightly under 20 percent in CEE (Figure 2.11). In most CESEE countries, investment and saving rates remain well below 25 percent. While 25 percent is not a magic number, the received wisdom in the growth literature is that countries should maintain such investment rate for a sufficiently long period in order to achieve successful convergence with advanced economies (Spence, 2008).

External borrowing space may have been constrained by sustainability concerns in some cases. Before the crisis, quite a few CESEE countries exceeded sustainable borrowing (the Baltics, Bulgaria, Romania, the Slovak Republic, Serbia, FYR Macedonia, Montenegro, Bosnia and Herzegovina, and Turkey). Postcrisis adjustments have dragged down consumption and investment and created external borrowing space for many CESEE countries, except Albania, Bosnia and Herzegovina, Belarus, and Turkey (Figure 2.13).

Finally, it is also possible that productivity gains may have been too slow, **thereby constraining return on capital and keeping both investment and saving rates low**. The next section will take a closer look at the composition of domestic savings across CESEE countries.

Figure 2.11. Saving-Investment Balance
(Percent of GDP)

1. National and Domestic Saving Rates, 2013–14

- Gross domestic saving rate
- National saving rate

2. Saving-Investment Balance

- 2002-08
- 2013-14
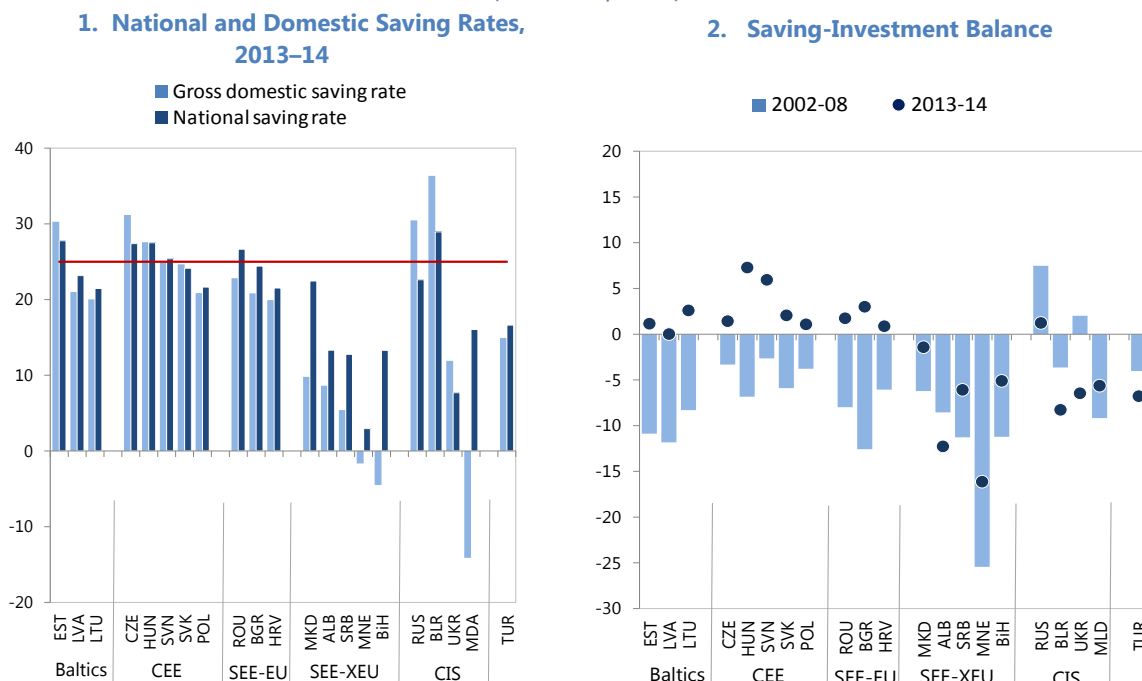
Sources: Penn World Tables, Version 8.1; and IMF staff calculations.
Note: The domestic saving rate is calculated as GDP less consumption, in percent of GDP. The national saving rate equals the sum of the balance of the current and capital accounts of the balance of payments in percent of GDP plus the investment rate. Remittances in Southeastern European countries outside of the EU and foreign direct investment profits in CEE account for the bulk of the difference between national and domestic saving rates. The saving-investment balance is calculated using national saving rates. The redline benchmark denotes a level of saving/investment rate that is consistent with fast-track convergence. CEE = Central and Eastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe, SEE-XEU = Southeastern European countries outside of the EU.

Figure 2.12. Domestic Saving Gap (Domestic Saving Less Optimal Investment)
(Percent of GDP)
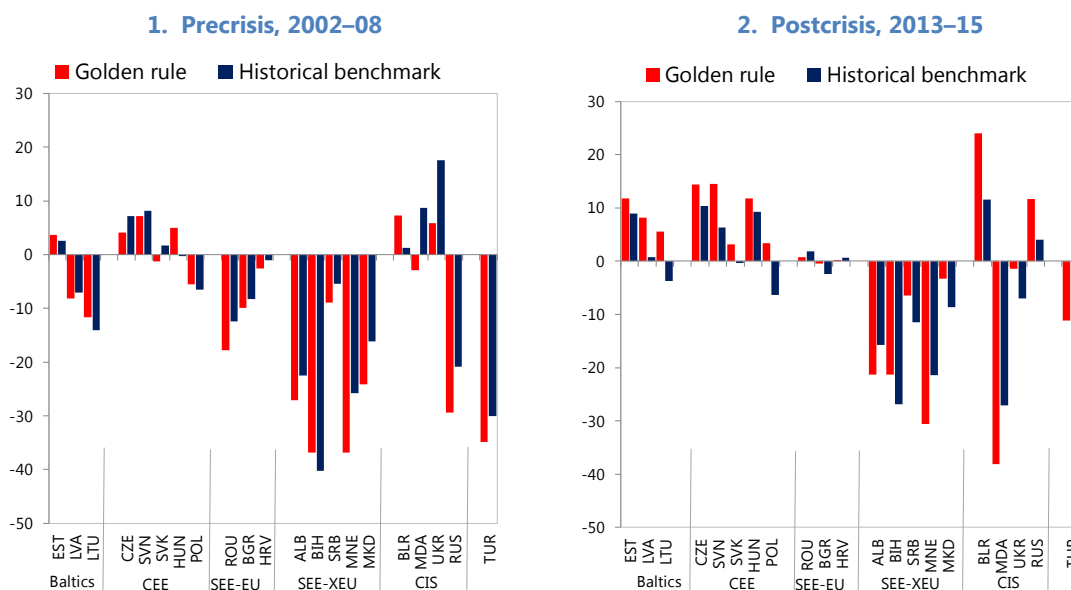
1. Precrisis, 2002–08

- Golden rule
- Historical benchmark

2. Postcrisis, 2013–15

- Golden rule
- Historical benchmark

Sources: Penn World Tables, Version 8.1; and IMF staff calculations.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside of the EU.

Figure 2.13. External Borrowing Space
(Percent of GDP)
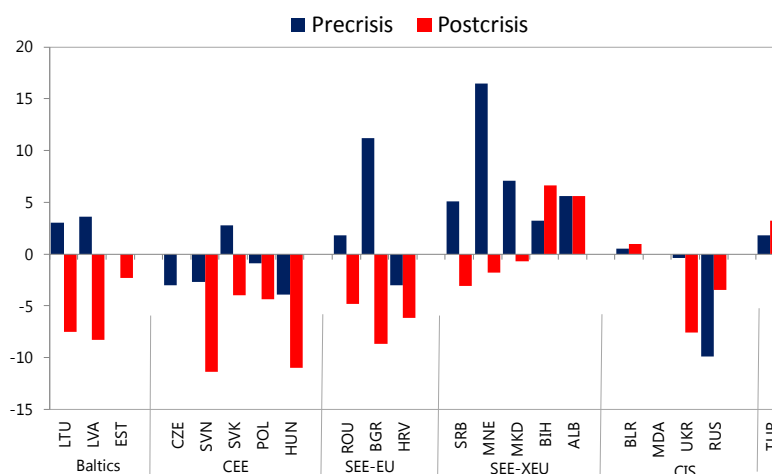
Source: IMF staff calculations.
Note: Negative values indicate available borrowing space; positive values indicate breaching borrowing limits consistent with sustainable external balance. The figure shows the gap between debt-stabilizing and actual current account primary balances. SEE-XEU = Southeastern European countries outside of the EU.

5. A Closer Look at Private Sector Saving Rates in CESEE Countries

A comparison of savings rates across EU countries reveals that household saving rates tend to be lower in CESEE EU countries than in advanced Europe, while the opposite is the case for corporate saving rates (Figure 2.14). These differences can be largely explained by differences in the structural characteristics of these economies. Specifically, households' saving rates tend to be positively correlated with GDP levels, labor share of value added, and labor force participation, but negatively related to public debt levels, remittances, tax rates and age dependency (see Annex IV). Corporate saving rates appear to be lower in countries with higher corporate debt, corporate taxes and government expenditures. Faster wage growth relative to productivity growth may have a dampening effect on corporate savings as well (Figure 2.14). Since the crisis, saving rates of CESEE firms and households have generally improved, with economy-wide saving rates now comparable across CESEE and advanced EU countries.

CESEE countries have some scope to boost corporate and household savings:

- *Corporate savings account for the bulk of total domestic savings in CESEE* (Figure 2.14). The fact that a large share of earnings are distributed rather than reinvested suggests that the return on investment may not be high enough. Thus, some additional savings could come from encouraging the reinvestment of FDI profits (CEE and Croatia) and reducing dividend payouts (Baltics) through tax incentives and productivity-enhancing reforms. In other cases (Bulgaria), improving financial affordability could help lift corporate savings as well. After the crisis, corporate saving rates were boosted by reductions in distributed profits, a shift from direct to indirect taxes, and realigning wages to productivity (Baltics and CIS). Indeed, the experience of Korea shows that a sustained positive productivity-wage growth differential would support higher corporate savings and investment.

- *Household saving rates are, in general, lower in CESEE than in other EU countries* (Figure 2.14). This reflects a higher share of autonomous consumption in household incomes and smaller labor share in national incomes in CESEE. Broad social safety nets and rapid financial deepening before the crisis may have provided additional disincentives to save. After the crisis, household saving rates improved due to lower consumption and net taxes/transfers. Further improvements may be needed, especially in Romania and Bulgaria, where domestic household saving rates continue to be negative. Given the demographic profiles, household savings can also be stimulated by greater emphasis on Pillar II and III pension schemes (Box 2.3 discusses some of these measures in the context of Turkey).

Figure 2.14. CESEE: Saving Rates and Wage-Productivity Growth

1. Wage-Productivity Growth Differential
(Percentage points)

2. Saving Rates of Households and Corporates
(Percent)
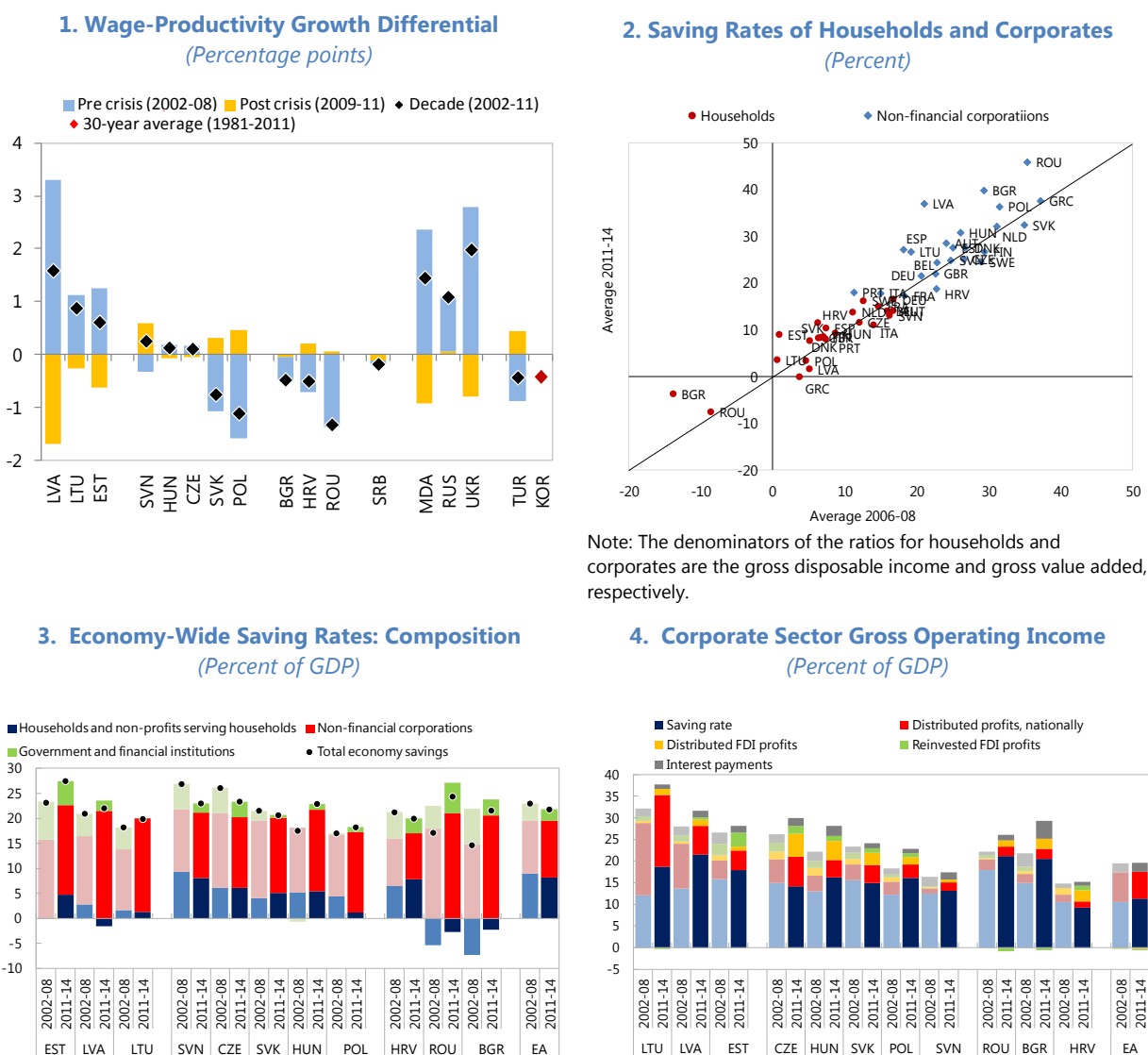
Note: The denominators of the ratios for households and corporates are the gross disposable income and gross value added, respectively.

3. Economy-Wide Saving Rates: Composition
(Percent of GDP)

4. Corporate Sector Gross Operating Income
(Percent of GDP)

Sources: Penn World Tables, Version 8.1; Eurostat; European System of National and Regional Accounts, 1995 Annual Sector Accounts; and IMF staff calculations.
Note: Interest payments include financial intermediation services indirectly measured (FISIM).

Box 2.3. Raising Domestic Savings in Turkey

Turkey has a large external imbalance, mostly due to a structurally low private saving rate. While the private sector saving rate averaged 18 percent over 1998–2003, it dropped to 9 percent in 2013 and has stayed below 13 percent since 2010. The decrease in the saving rate was particularly pronounced in the years since 2003. Meanwhile the public saving rate stands at around 3 percent, while the investment rate increased from around 17 percent in 2002 to 20 percent in 2014. Thus, domestic savings, private and public, no longer covered investment, opening up a large gap between savings and investments and hence a current account deficit, which averaged over 6½ percent of GDP between 2010 and 2015.

Figure 2.3.1. Turkey: Saving Rates
(Percent of GDP)
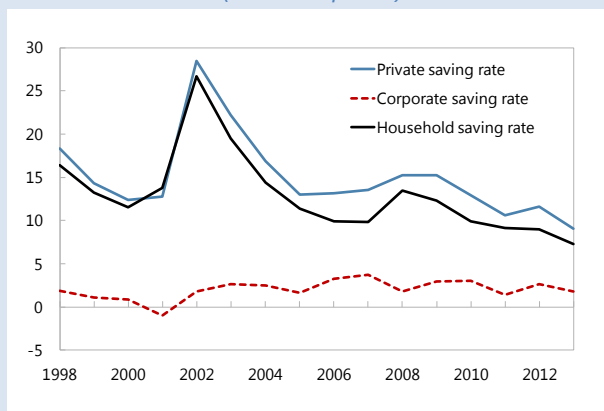
Sources: CBRT; IMF, WEO; and IMF staff calculations.

The decline in the private saving rate was mainly a consequence of economic stabilization and financial deepening. The fast drop in the saving rate in the years directly following the 2001 crisis suggests that the quick implementation of a thorough macroeconomic stabilization program may have played a large role. The more gradual, but still rapid, decline thereafter is consistent with rapid financial deepening, primarily through bank credit becoming available to a large proportion of households. Urbanization likely also played a role: it is generally thought to lower the need for precautionary savings, as better and more public services are available in urban centers, and income volatility is lower for city dwellers.

The Turkish authorities have emphasized raising the private saving rate as an important policy goal to reduce the economy's external vulnerability. To this end, they have considered various policy options. They have introduced a subsidized third pillar pension scheme, and, more recently, a savings subsidy for dowry accounts. They have also piloted an auto-enrollment funded pension scheme, and are committed to scaling up this pilot. Lastly, proposals to reform the severance pay scheme by making it a funded and transferable benefit have been put forward. The authorities have also used macro-prudential tools to limit credit growth, prompted by systemic prudential risks in the banking system that may be caused by very high credit growth.

Figure 2.3.2.Third Pillar Pensions
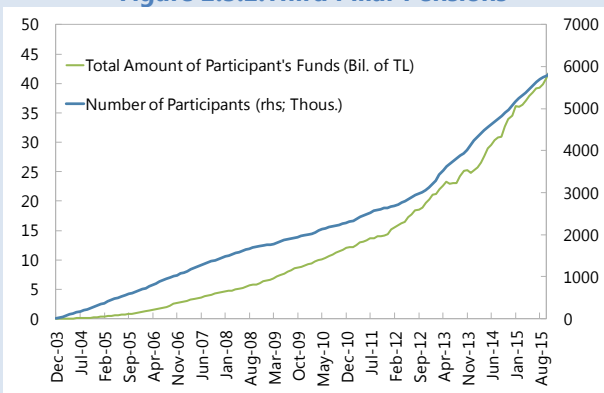
Source: Pension Monitoring Center.

Going forward, full and swift implementation of the pension and severance pay reform plans is key. Given the urgency of reducing vulnerabilities and the time lag with which new policies will affect the saving rate, efforts should begin as soon as possible. In addition, Turkey's relatively young population and declining fertility rate imply the country is enjoying a demographic dividend. This provides a window of time to increase savings in anticipation of almost inevitable population aging in the future. Macro-prudential policies limiting credit growth should also remain part of the policy mix. IMF (2016b) provides more details and background on these policy options.

1/ Prepared by Alexander Tieman, drawing on the IMF (2016b), Turkey: Selected Issues Papers.
2/ These years included major economic crises, when the saving rate fluctuating between 12.4 and 28.5 percent.

D. Growth Drivers: Productivity

Significant productivity gaps relative to advanced Europe can be largely explained by structural and institutional obstacles that limit efficient use of available technologies or efficient allocation of resources in CESEE. In the absence of favorable external tailwinds that helped to boost productivity growth before the crisis, productivity-enhancing reforms become a must for CESEE countries.

1. How Does CESEE Compare with Advanced Europe?

The TFP levels in CESEE are notably lower than in advanced Europe and the postcrisis TFP growth slowdown was much sharper (Figure 2.15). Because TFP is typically estimated as a residual after accounting for the contributions of other factors of production, it could reflect either supply side (technological) or demand side drivers.[4] Because there is no good model of TFP, it is often referred to as a "measure of ignorance". For example, the much more dramatic declines in TFP growth in CESEE compared to advanced Europe (Figure 2.16) may suggest that either CESEE were much more sensitive to some common global TFP growth drivers or that their precrisis potential growth estimates were overstated.[5] In what follows, we'll attempt to shed some light on TFP levels and growth across the CESEE region.

Figure 2.15. Total Factor Productivity Levels
(Average 2002-14, EU-15 =100)
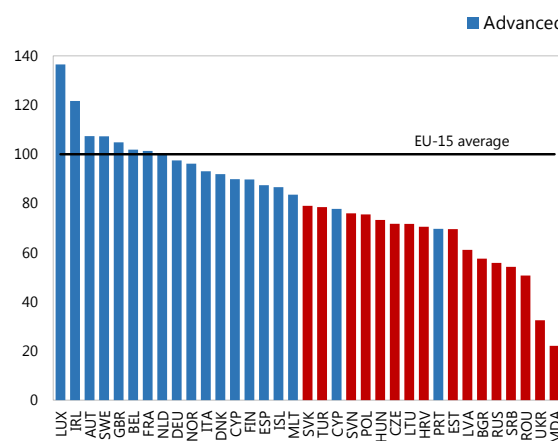
Figure 2.16. Difference Between Average TFP Growth before and after Crisis
(Percentage points)
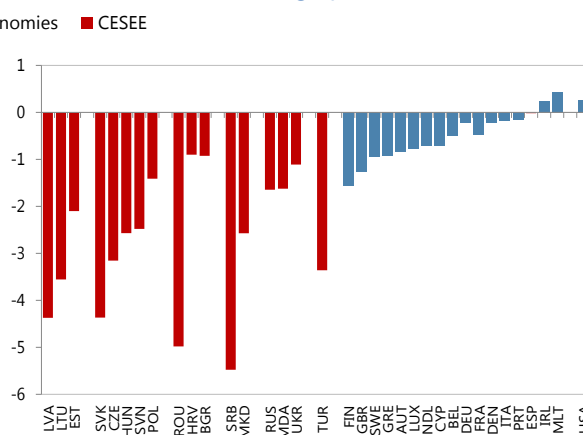
Sources: Penn World Tables, Version 8.1 and IMF staff calculations.
Note: CESEE = Central, Eastern, and Southeastern Europe.

Focusing on the supply side, aggregate productivity reflects the level of technological progress, technical efficiency, and allocative efficiency. Technical efficiency is the efficiency with which firms use available technology, while allocative efficiency is the extent to which firms with higher productivity have more resources. Next sections will explore each of these aspects in turn.

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[4] See e.g. Casellia (2005).

[5] In advanced economies, potential growth fell from slightly less than 2 percent in the precrisis period (2006–07) to about 1 percent during 2013–14. See, IMF Spring 2015 WEO for more details.

Technical Efficiency

CESEE countries appear to be less efficient users of available technologies than advanced Europe. In the stochastic frontier analysis (Annex VII), the relative technical inefficiency of a country is measured by its distance from the frontier, with the latter representing the maximum amount of output that can be obtained from given inputs. Figure 2.17 shows the estimated technological frontier and the position of CESEE and advanced European economies relative to the frontier as of 2014. Technical efficiency is estimated relative to the frontier (=100). For example, if a country's score is 60, this means that it uses available technology 40 percent less efficiently than the frontier economy.

Lower technical efficiency may be due to structural or institutional obstacles that prevent the diffusion and efficient use of available technologies. Our empirical analysis of the sample of advanced economies and CESEE identifies several determinants of the distance to the technological frontier:

- S*tructure of the economy*: A relatively low share of the service sector and, in some cases, a still-sizable share of agriculture places countries further away from the frontier.

- *Quality of institutions:* Greater judicial independence, impartial courts, and better protection of property rights reduce the incidence of corruption, and tend to be associated with higher efficiency; and so does higher *life expectancy*, which partly reflects the quality of healthcare.

- *Restrictiveness of regulation*: Lighter general business and FDI-specific regulations tend to increase efficiency as well.

In contrast, the levels of research and development (R&D) spending, infrastructure gaps and labor market flexibility do not appear to be statistically significant determinants of technical efficiency in our analysis. That said, these findings should be seen as tentative, given the limitations inherent in gauging technical efficiency with macroeconomic data, and sample specific issues[6].

Structural reforms – most notably upgrading legal systems – could bring significant efficiency gains. Figure 2.18 presents estimates of potential efficiency gains from improving structural and institutional characteristics of CESEE countries to EU-15 average level based on the stochastic frontier analysis. In the case of Croatia, for example, efficiency gains from all structural reforms shown in Figure 2.18 would allow it to close the gap with the frontier economy. But, in the case of Estonia, potential gains are limited since in many of these areas Estonia is already very close to the EU-15 average levels.

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[6] R&D spending is statistically significant in some specifications, but the relationship is not robust. The lack of statistical significance of labor market flexibility could be due to the fact that labor markets in CESEE outside SEE are fairly flexible, especially when compared to advanced Europe. The absence from our sample (due to data limitations) of several Western Balkan countries, where infrastructure gaps are large, could be one of the reasons why, in addition to measurement issues, all of the variables proxying infrastructure gaps turned out to be insignificant. See Annexes VII and XI for more details on the methodology and a complete list of variables used in the analysis.

Figure 2.17. Technological Frontier, 2014
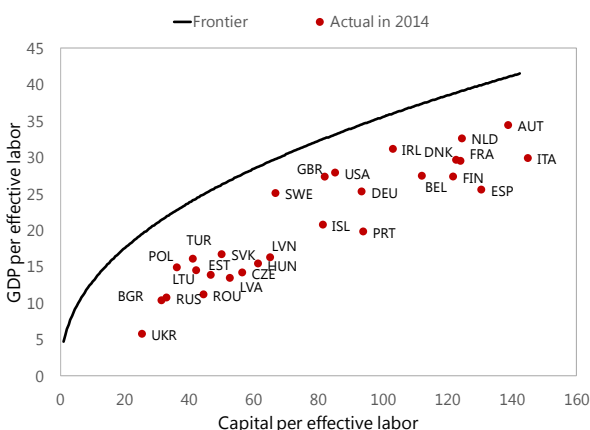
Figure 2.18. Potential Efficiency Gains From Structural Reforms *(Percent)*
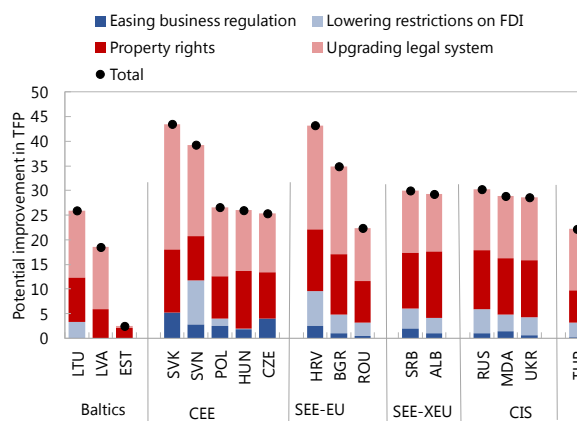
Sources: Penn World Tables, Version 8.1; and IMF staff calculations.
Note: Potential efficiency gains for Albania and Serbia are tentative estimates, since due to data limitations these countries are not included in the regression analysis. CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside the EU.

Allocative Efficiency

Aggregate productivity is influenced by the structure of the economy. Countries with a larger share of employment in low-productivity sectors, such as agriculture, tend to have lower aggregate labor productivity. As one would expect, countries where a larger share of workers moved away from agriculture had higher productivity growth over 2000-14 (Figure 2.19).

More flexible labor regulations may facilitate better allocation of resources. More flexible labor markets tend to be positively associated with aggregate productivity growth (Figure 2.20).

Figure 2.19. Structure of the Economy and Productivity
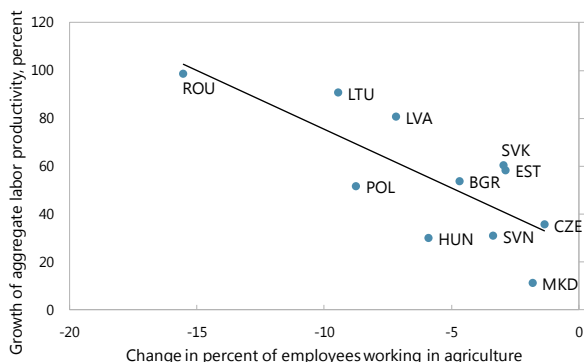
Sources: Eurostat; and IMF staff calculations.
Note: Aggregate labor productivity is the ratio of real value added in the total economy as a percentage of the number of employees.

Figure 2.20. Labor Regulation and Productivity
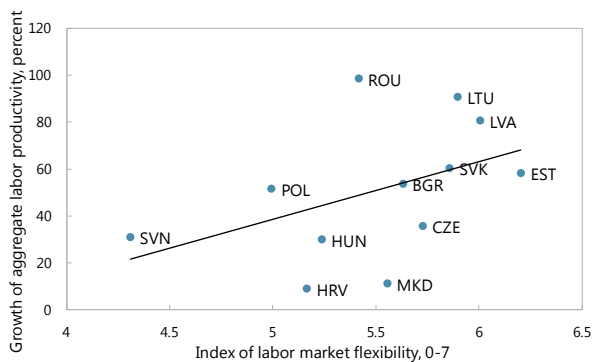
Sources: Eurostat; World Economic Forum; and IMF saff calculations.
Note: The Labor Market Flexibility Index captures hiring and firing regulations. Higher values represents more economic freedom.

The link between productivity and allocative efficiency within sectors can be analyzed using firm-level data. Aggregate productivity, defined as average firm-level productivity weighted by the number of employees, can be decomposed into two elements (Olley and Pakes, 1996): (1) underlying productivity, which is captured by the unweighted average of firms' productivity and (2) productivity stemming from more efficient resource allocation across firms, whereby firms with higher productivity have more resources. The second component—allocative efficiency—is measured by the covariance between firm's productivity and its share of employment in a given industry (Box 2.4).

Box 2.4. Assessing Allocative Efficiency Using Firm-level Data

The allocative efficiency score measures the relative productivity gain that a country enjoys owing to its actual allocation of employment across firms relative to a case where employment allocation is random. For instance, in Sweden, the country's aggregate productivity is 40 percent higher than what it would have been if resources (employment) were allocated randomly (see Figure 2.21 in the main text). Firm-level productivity is measured as the log of the ratio of a firm's turnover to the number of employees. Allocative efficiency is measured at industry level (according to NACE 2 Rev. first two digits), and then aggregated to the country level as the weighted average, weighted by each industry's labor share.

Allocative efficiency is higher when larger firms are more productive. Between two countries with a similar level of productivity among large firms (say, Poland and the Slovak Republic), a country with less productive small firms (Slovak Republic) exhibits a higher allocative efficiency score than the country with more productive small firms (Poland). This means that in Poland there is more room for further productivity gains if more resources are allocated to more productive firms.

The allocative efficiency score appears to be very sensitive to the productivity distribution by firm-size in a sample used in the analysis. For example, it measures differently depending on whether micro firms (less than 20 employees) are included or excluded from the sample, as micro firms represents 80 percent of sample firms while accounting for only 20 percent of employment and turnover. This is particularly the case in countries where the productivity of micro firms is relatively high (Poland and Russia), which implies that their inclusion brings down these countries' allocative efficiency scores significantly (see Figure 2.21 in the main text). It should be noted that further analysis may be needed here, as the unusually high productivity of micro firms may be due to mis-reporting which is linked to specific threshold-based regulations. In most CESEE countries, however, allocative efficiency appears lower when micro firms are excluded—particularly in the case of Bulgaria and Latvia, where productivity of micro firms is significantly lower. See Annex VIII for more details.

Some CESEE countries lag behind in allocative efficiency. Figure 2.21 shows that some CESEE countries, such as Serbia and Slovenia, have much room to improve their productivity through more efficient allocation of resources.

Structural reforms that help improve allocative efficiency would also help narrow the productivity gaps. We find several structural indicators to be significant determinants of allocative efficiency: (1) *quality of institutions* (government efficiency); (2) *labor regulation* (flexible wages); and (3) *financial development* (affordability of financial services). Notably, these are exactly the areas where one would expect improvements to yield the largest benefits for relatively small but productive firms. The analysis suggests that more efficient resource allocation through improvement

in government efficiency and affordability of financial services up to the level of Sweden could bring significant potential productivity gains for CESEE economies (Figure 2.22).

Figure 2.21. Allocative Efficiency Scores, 2013
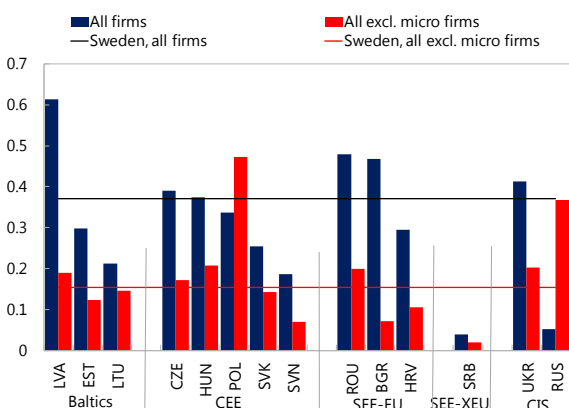
Sources: ORBIS; and IMF staff calculations.
Note: Allocative efficiency score is a correlation between firm's labor share and its productivity. CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside the EU.

Figure 2.22. Potential Productivity Gains from Improved Allocative Efficiency
(Relative labor productivity, Sweden=100)
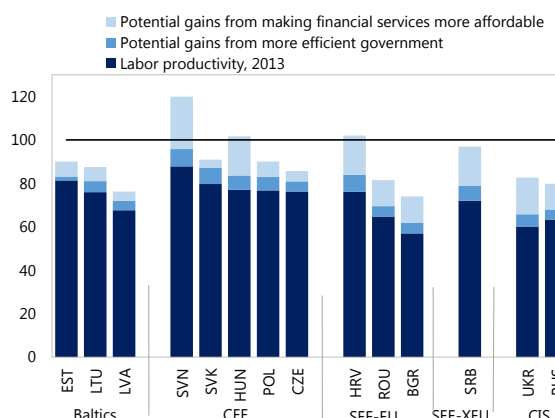
Sources: ORBIS; and IMF staff calculations.
Note: Labor productivity is calculated as average firm-level log productivity, weighted by the number of employees. The potential gains through improved allocative efficiency are calculated based on the estimates from regression analysis and the gap between structural indicators of each country and Sweden.

In sum, CESEE countries could realize sizable gains from improving both technical and allocative efficiency. In the case of technical efficiency, the biggest improvement could be achieved by upgrading institutions (legal systems), while in the case of allocative efficiency, the largest benefits would stem from greater affordability of financial services, especially for SMEs. On both fronts, more country-specific research is needed for more precise diagnostic.

2.   What Explains the TFP Growth Slowdown in CESEE After the Crisis?

The recent TFP slowdown is broad-based, suggesting an important role of common factors. Eichengreen, Park, and Shin (2015) use historical episodes of sharp and sustained decelerations in TFP growth to identify common and country-specific factors behind the TFP slumps. They argue that neither the secular stagnation hypothesis nor the middle-income trap hypothesis can explain the recent slowdown in TFP growth. Secular stagnation would have affected mostly advanced economies, while the middle-income trap would have only affected middle-income countries. Therefore, the authors argue that there are global factors in addition to country-specific ones that are behind the recent deceleration in TFP growth. They find that oil price shocks and increases in risk are among the significant global factors, while human capital, investment rates, and poor political systems are identified as country specific factors behind the TFP slowdown.

What factors – global or country-specific – have played a larger role in the postcrisis TFP growth slowdown in CESEE? We consider several hypotheses:

Hypothesis 1: *The TFP growth slowdown in CESEE has been largely driven by lower potential growth of trading partners.* Basically, we conjecture that the observed decline in TFP growth is simply a result of lower potential output and aggregate demand of the CESEE economies' main trading partners – the euro area countries. Our analysis suggests that strong TFP growth in CESEE before the crisis was indeed largely driven by common or external rather than country-specific factors (Figure 2.24). More specifically, we find that trading partners' potential growth rates, as well as policy uncertainty, expansion of global supply chains, and global trade are closely correlated with the common component of TFP growth in CESEE (Figure 2.24).[7]

Hypothesis 2: *The TFP growth slowdown in CESEE reflects slower technical progress in frontier economies,* in other words, it reflects a TFP growth slowdown in advanced economies. We find some empirical support for this hypothesis as well. Technological frontier is estimated to have been expanding by 1 percent per year before the crisis, on average, but has remained unchanged since 2007. Meanwhile most of the advanced countries that were close to the technological frontier before the crisis appear to have moved away from it since the crisis.

Hypothesis 3: *Less efficient economies suffered larger declines in TFP growth than those that were closer to the technological frontier before the crisis.* Indeed, one might expect that countries that have significant structural or institutional obstacles to efficient use of technology or resource allocation could have experienced a larger TFP growth slowdown due to their limited ability to adjust. However, we find that countries with low initial levels of technical efficiency have experienced larger subsequent improvements in efficiency (Figure 2.23), likely reflecting improvements in their structural and institutional characteristics. However, the pace of these improvements has slowed after the crisis.

Figure 2.23. Change in Technical Efficiency, 2012-14

In sum, it appears that the strong productivity growth enjoyed by CESEE before the crisis was largely associated with favorable external or common factors. This also means that CESEE countries will have to do more on their own rather than rely on external tailwinds if the current less supportive global environment becomes a "new normal".

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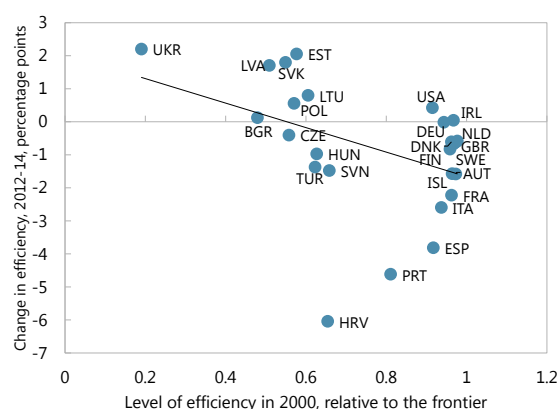
[7] We also looked at the correlations of global FDI flows and oil prices with the common component of the TFP growth for CESEE countries. The correlation between FDI and the common component of TFP growth was positive, but not strong. The correlation between oil prices and the common component of TFP growth turned out to be insignificant in our sample of countries, in contrast with the findings of Eichengreen, Park, and Shin (2015).

Figure 2.24. Common and Idiosyncratic Components of Total Factor Productivity Growth, 2001–14

1. CESEE excluding CIS and Turkey
(Deviations from the mean, percentage points)

2. CIS and Turkey
(Deviations from the mean, percentage points)

■ Idiosyncratic   ■ Trading partner's TFP growth   ■ Other common
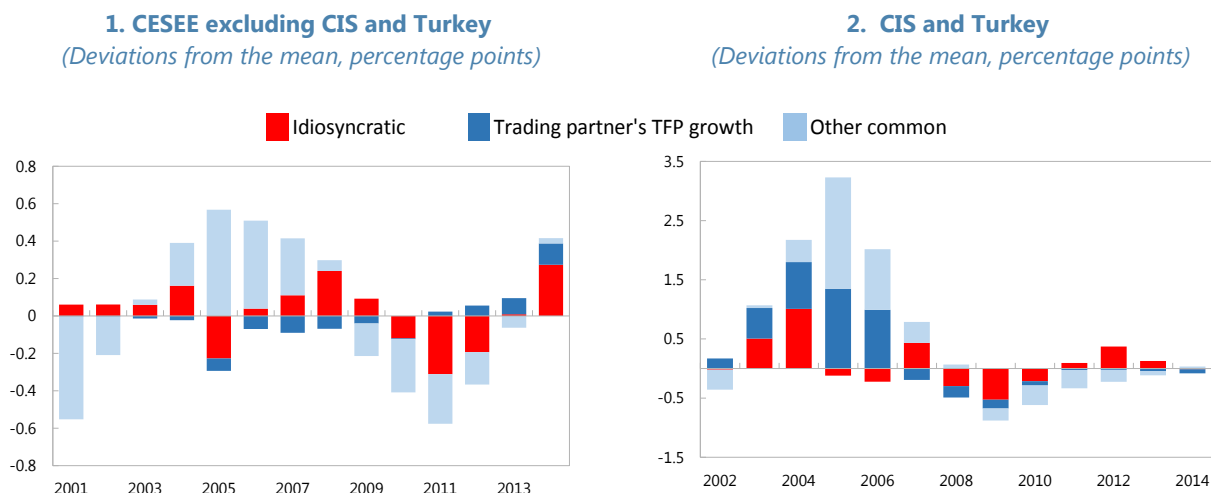
Note: The panels show median estimates across countries at each point in time.

3. Common Component of TFP Growth and Bloom's Policy Uncertainty Index

$R^2 = 0.49$
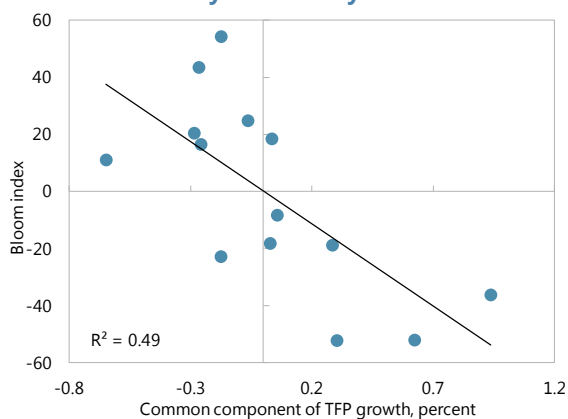
4. Common Component of TFP Growth and Trading Partners' Potential Growth

$R^2 = 0.66$
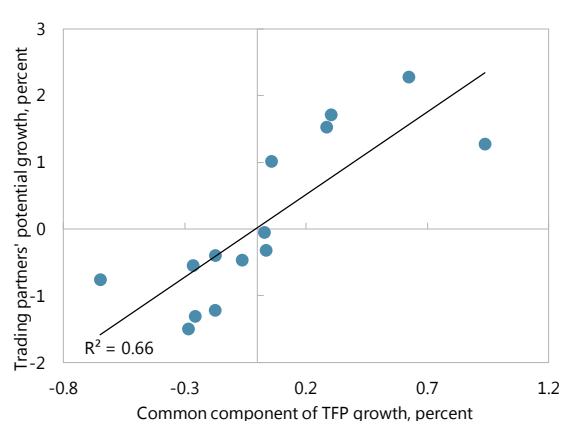
5. Common Component of TFP Growth and Global Trade to GDP

$R^2 = 0.28$
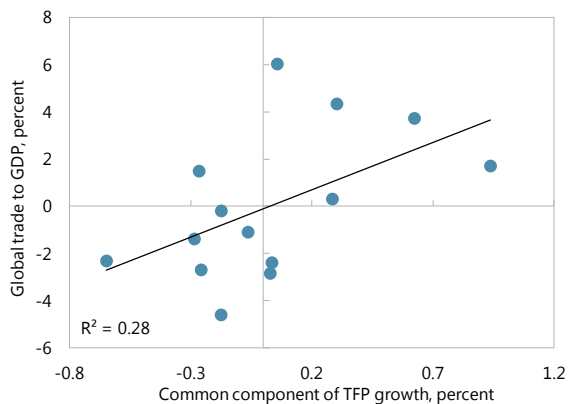
6. Common Component of TFP Growth and Value-Chain Breadth

$R^2 = 0.77$
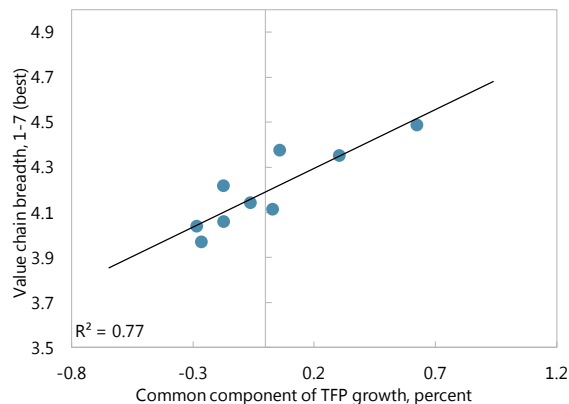
Sources: Penn World Tables, Version 8.1; World Bank, World Development Indicators; World Economic Forum; Baker, Bloom and Davis (2015); and IMF staff calculations. Note: The common component of TFP growth used in the scatter plots is the other common component obtained from the regression analysis (see Annex IX). TFP = total factor productivity.

E. Key Takeaways and Reform Priorities

CESEE may face much slower pace of convergence unless they step up reform efforts. CESEE countries made significant progress along the convergence path during 1990-2008, on the back of strong TFP growth and to a lesser extent, investment. After the crisis, TFP growth slowed significantly across most economies, raising concerns that CESEE may be entering a prolonged period of lower global growth, less trade and capital flows, and less scope for expansion of global supply chains. This also means that external financial conditions may be less supportive, implying that CESEE may have to rely more on domestic savings. Coupled with negative demographic trends, these challenges imply the need to put greater emphasis on productivity-enhancing reforms as well as on active labor market policies. For example, in the case of Korea, a strong acceleration of TFP growth after the Asian crisis was largely due to large-scale structural reforms, including corporate restructuring and upgrading corporate governance, which in addition to a more benign global environment at the time, helped it to stay on a fast convergence path.

1. What are the CESEE Economies' Strengths and Weaknesses?

Labor: In contrast to many emerging markets that have enjoyed the so-called "demographic dividend", CESEE countries have experienced some of the worst declines in the working age population due to unfavorable demographics and emigration. On the upside, the relatively high level of human capital is a plus, though sizable skill gaps and skill mismatches remain.

Capital: Capital gaps relative to advanced Europe are still large, while investment rates are not sufficient for rapid catch-up. Currently, investment is held back by crisis legacies and subdued long-term growth prospects. More generally, investment and saving rates have been fairly low across CESEE, when compared to the optimal benchmarks or to previous fast-track convergence episodes. This could be because of still low level of productivity coupled with the negative productivity-wage growth differential, which reduce returns on capital and incentives to save and invest. Furthermore, limited access to financial services may constrain the expansion opportunities for small, but productive firms. In some cases, space for external borrowing may be constrained due to already high external debt.

Productivity: Productivity gaps between CESEE and advanced Europe are significant due to both technical and allocative inefficiencies.

2. What should be the reform priorities?

CESEE countries rank below advanced Europe on a number of institutional and structural characteristics (Figure 2.25). This is well known. The colors in Figure 2.25 indicate the relative rankings for each of the characteristics in a sample of economies from CESEE and from Organization for Economic Cooperation and Development (OECD). The Baltics and some CEE countries tend to outperform other CESEE economies, but are still quite far from the frontier.

Figure 2.25. Institutional Quality: Relative Rankings of OECD and CESEE Countries
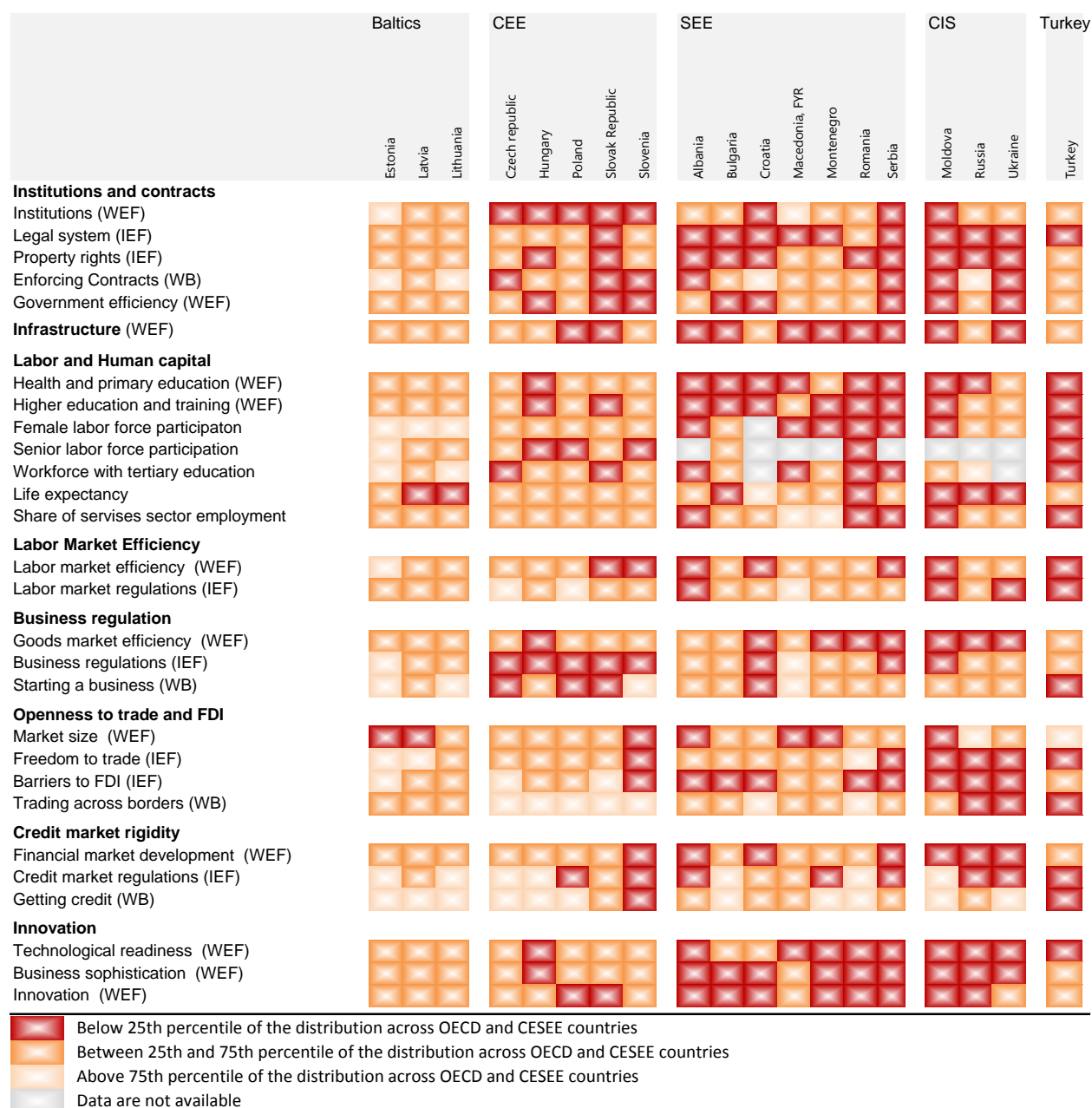
Below 25th percentile of the distribution across OECD and CESEE countries
Between 25th and 75th percentile of the distribution across OECD and CESEE countries
Above 75th percentile of the distribution across OECD and CESEE countries
Data are not available

Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside the EU. See Annex X for more details.

Which structural reforms would yield the largest growth benefits? The answer depends on the growth elasticity of different reforms and on the size of institutional gaps in a given country. Out of the host of indicators shown in Figure 2.25, Figure 2.26 includes only a subset of institutional and structural characteristics that turned out to be statistically significant and robust in our empirical analysis of productivity or the ones that directly affect the supply of production factors, such as labor and capital (infrastructure). The colors are based on the estimated potential gains (percent increase in GDP level) from improving these characteristics from their current levels to EU-15 levels. The main advantage of this approach is that potential gains from different reforms can be compared across

the entire spectrum of policy choices. So, putting it all together suggests that the largest potential growth benefits can be achieved by (1) improving protection of property rights and upgrading legal systems; (2) increasing government efficiency; (3) improving affordability of financial services (especially for small productive firms); (4) upgrading infrastructure; (5) increasing quality of healthcare (life expectancy); and (6) facilitating structural transformation of economies by increasing the share of high-productivity sectors (services) (Figure 2.25). Given the caveats discussed above, these results should be seen as indicative, providing a starting point for more detailed country-specific diagnostic of impediments to growth.

Figure 2.26. Potential Growth Benefits from Specific Policy Actions
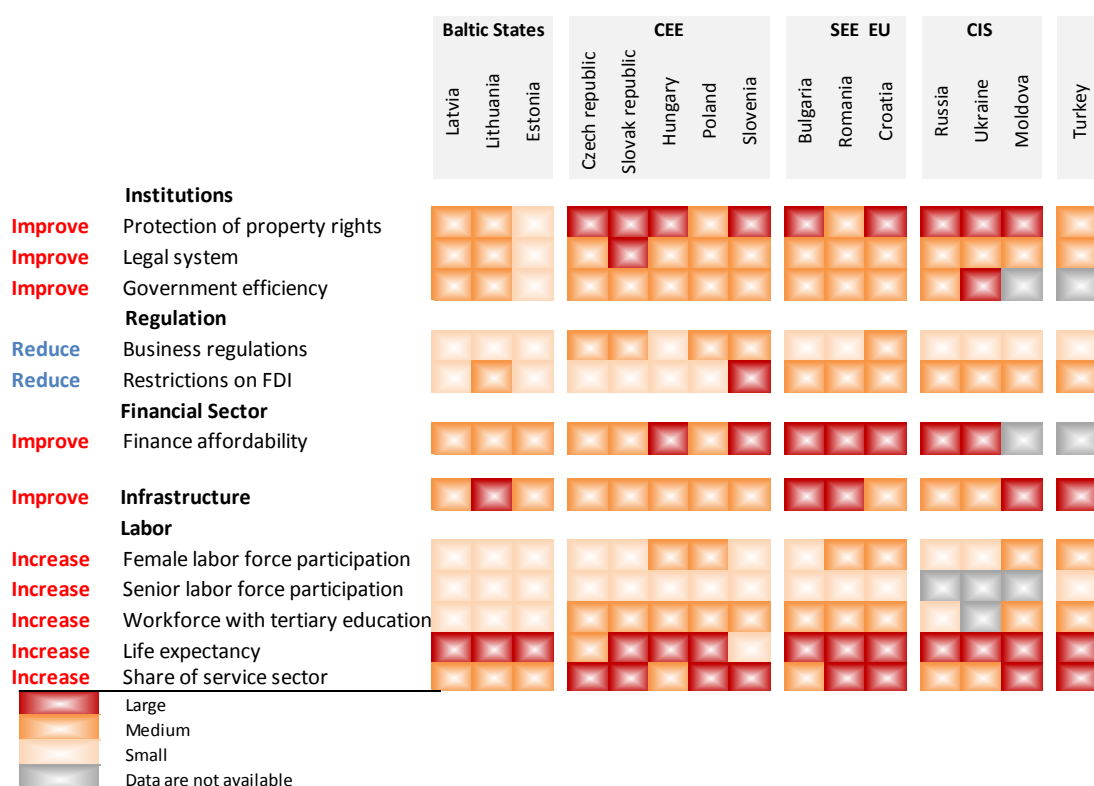
The thresholds are based on 25th (2.4 percentage points) and 75th (8.9 percentage points) percentiles of the distribution of growth impact of all policy measures across all CESEE countries. The growth impact of policy measures is calculated assuming that CESEE countries will improve their structural characteristics to the average level of EU-15. SEE-non EU countries are not included due to data limitations. The assessment of productivity-improving measures is based on our stochastic frontier and allocative efficiency analysis. Potential gains from improving labor force participation and upgrading infrastructure are based on the production function approach. Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside the EU.

Active labor market policies could help offset some of the negative effects of demographic changes and emigration. Structural reforms and the improvement of institutions not only help convergence but also encourage potential migrants to stay as well as attract skilled workers from other countries. Further efforts are also needed to reduce skill mismatches, increase labor force

participation (women and seniors), promote return migration, engage with the diaspora, better leverage remittances, and better utilize the EU Structural and Cohesion Funds.[8]

The productivity-enhancing reforms are crucial for re-accelerating convergence. CESEE countries have little prospects of converging to euro area living standards within a generation (25-year horizon), if TFP growth remains the same as in euro area, implying investment rates close to current levels (Figure 2.27). At the same time, a sustained 1 percentage point TFP growth differential against the euro area, which would raise average investment rates by 2½ percentage points a year, would lead to faster convergence for many CESEE countries. Some of the CIS and SEE-non EU countries, however, might need a much larger boost to TFP growth to achieve similar results. The analysis in this report suggests a possible menu of reforms that could help CESEE countries to achieve a necessary boost to TFP growth.

Figure 2.27. Illustrative Convergence Scenarios
(Percent of euro area GDP per capita at PPP)

1. TFP Growth Same as the Euro Area

2. A Constant Positive TFP Growth Differential with the Euro Area
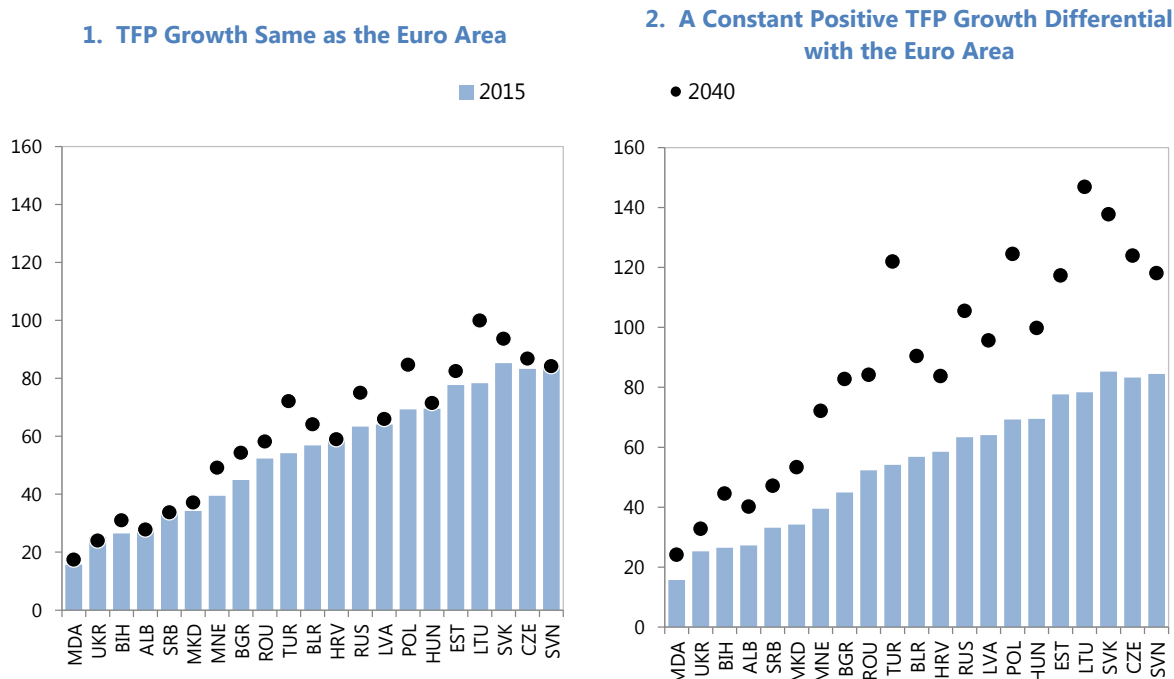
Sources: Penn World Tables, Version 8.1; and IMF staff calculations.
Note: Income projections are derived using the estimated transition dynamics in Annex 2. In combination with the current total factor productivity (TFP) and K/L ratio, the transition dynamics recursively determine the future path of investment rates, the K/L ratio, and income per capita for all CESEE and the euro area. Population stays unchanged. The first projection assumes no difference in TFP growth between CESEE and the euro area—TFP grows in all countries by 0.5 percent annually. The second projection assumes a positive TFP growth differential of 1 percentage point a year in favor of CESEE countries against the euro area (TFP growth of 0.5 percent). It is consistent with GDP growth of 1.5 percent in the euro area and on average 3.5 percent in the CESEE, approximating Barro's "iron law of convergence" (Barro 2015). Note that the more per capita income converges, the slower TFP growth is likely to become - this is not taken into account in the calculations presented in this figure.

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[8] See Atoyan et al (forthcoming) for more detailed discussion of policy recommendations.

III. POLICY PRIORITIES

In the baseline, supportive monetary policy and medium-term fiscal consolidation remain valid for many economies in the region. In the event of a negative growth shock, monetary policy should be the first line of defense, while automatic fiscal stabilizers should be allowed to play freely, provided there is enough fiscal policy room to do so. In case of a major shock and depending on the nature of the shock, fiscal policy should ease within the medium-term adjustment plans that dispel concerns about sustainability. Against the backdrop of mediocre global growth prospects, structural reforms are critical to lift potential growth and re-accelerate convergence.

In the absence of negative shocks, supportive monetary policy and medium-term fiscal consolidation is an appropriate policy mix for many CESEE economies:

- ***Monetary policy*** should stay accommodative in *low-inflation countries* with further rate cuts if inflation expectations continue to decline or interest rate differentials with the euro area widen. There are, however, many countries in the region, where conventional monetary policy space is limited: because they lack monetary policy autonomy or because inflation is above the target or the interest rate at zero bound. For *Turkey*, where inflation remains high, further tightening would be needed to address excess demand pressures and build up international reserves that are now below the IMF's metric of reserve adequacy. In *Russia*, a resumption of monetary easing to support the weak economy is only feasible once inflation expectations fall. The pace of such future easing would need to be mindful of the uncertain external outlook and the need to build the credibility of the new inflation-targeting regime. About half of the countries in the region that have some sort of *flexible exchange rate regime* can also use this tool to counter adverse external shocks. However, high foreign currency indebtedness, euroization and financial openness could limit the benefits of currency depreciations.

- ***Fiscal policy*** should continue to anchor medium-term debt sustainability and build policy buffers in most countries. Some have made progress with a noticeable decline in the structural fiscal deficit. However, with the debt-stabilizing primary gap still in the negative for several countries and public debt still high, more needs to be done to rebuild fiscal buffers in the medium term (Figure 3.1). For *Russia*, the roughly neutral fiscal stance remains appropriate, given cyclical weakness, but more consolidation is needed over the medium-run. In *Turkey*, a tightening of fiscal policy in the medium term would increase domestic savings and thereby soften excess demand pressures, while building more policy space.

- **Medium-term fiscal consolidation should rely, as much as possible, on more growth-friendly expenditure and revenue measures**, as discussed in the Fall 2015 REI. On the *expenditure side*, it is important to reduce unproductive transfers and further reform entitlement programs, including public pension systems, while protecting productive spending on public investment. Restructuring of public employment may also be called for, especially where employment levels or public sector wages are higher than in the private sector. On the *revenue side*, policymakers should consider the introduction or strengthening of carbon and property taxes, and in some cases, the improvement of tax compliance and administration.

If growth and inflation surprise on the downside, monetary policy should be the first line of defense. Also, automatic fiscal stabilizers should generally be allowed to operate freely. In case of a very adverse external demand shock, fiscal stimulus may need to be deployed by countries that still have access to international capital markets on affordable terms. For those with this option, it is recommended that they rely on measures that are easy to pull back if economic conditions improve (for example, a temporary investment tax credit) or that enhance economy's long-term growth potential (for example, targeting infrastructure). More generally, for such stimulus to

Figure 3.1. Estimated Remaining Adjustment Needs
(Percent of GDP)
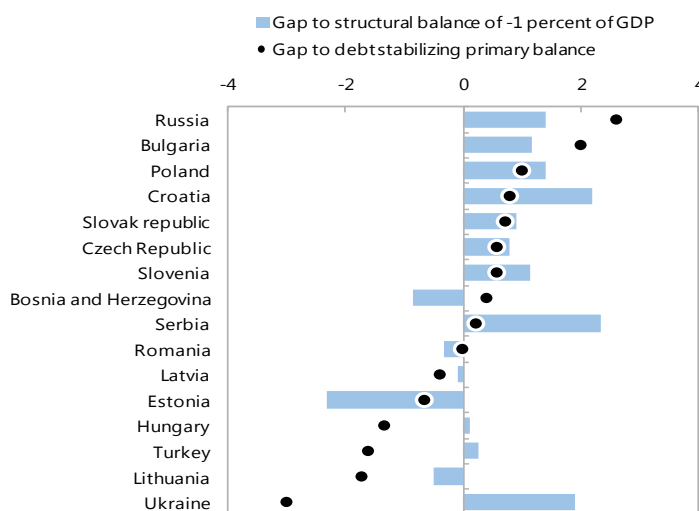
Sources: World Economic Outlook, and IMF staff calculations and projections.
Note: The remaining adjustment needs reflect values for primary balance and structural balance as of end-2015 (negative values represent no adjustment need based on that particular measure). For Ukraine data refers to 2016. -1 percent of GDP is European Commission's Medium Term Objective (MTO) for many but not all CESEE countries and actual adjustment needs based on country-specific MTO may be different. Debt-stabilizing primary balance is the ratio of primary balance to GDP that stabilizes the debt to GDP ratio at its projected 2021 value.

be effective and not raise questions about sustainability, it should be overlaid on medium-term adjustment plans that noticeably reduce public debt. Deploying the latter, together with further repair of balance sheets – as discussed in the Spring 2015 REI, is the main macroeconomic policy challenge for many CESEE economies.

Against the backdrop of mediocre global growth prospects, structural reforms are critical to lift potential growth and re-accelerate convergence. As discussed in Chapter II, efforts should focus on active labor market policies and productivity-enhancing reforms. The analysis in this report suggests that the currently significant productivity gaps with advanced Europe could be reduced by upgrading institutions (protection of property rights, legal systems, healthcare), increasing the affordability of financial services (for small and productive firms), and improving government efficiency. While the structural reform recommendations in IMF country reports are generally more comprehensive[9] and more tailored to country-specific circumstances, many of the cross-country themes are similar to the ones highlighted in this report (Figure 3.2): improving government efficiency and reducing regulatory burden on firms in most CESEE countries; strengthening governance and institutions in SEE and the CIS; and increasing labor force participation in CEE countries, while improving labor market flexibility in SEE countries. As discussed in the WEO, in cases

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[9] A comprehensive approach may indeed be critical. For example, the recent paper by Aiyar et al (2015) discusses the need for a comprehensive approach towards addressing multiple interlinked institutional obstacles to NPL resolution in Europe.

where the necessary reforms could have negative short-term impact on growth in the context of significant economic slack, these negative effects would need to be mitigated through careful phasing or demand support, if possible[10].

In countries with greater structural challenges more far-reaching reforms may be needed to speed up convergence. As discussed in IMF country reports, reforms in SEE non-EU and CIS economies should aim to strengthen governance, to lower administrative and trade barriers, increase competition in domestic markets, and improve the transparency and efficiency of public investment procedures. In *Belarus*, deep and carefully sequenced structural reforms to re-orient the economy toward more private-sector-led growth remain critical. For *Moldova*, priority should be given to strengthening institutional quality. For *Ukraine*, critical reforms include anti-corruption and judicial measures, tax administration reforms, and reforms of state-owned enterprises to improve corporate governance and reduce fiscal risks.

Figure 3.2. IMF Country Teams' Recommendations on Structural Reform Priorities

	Baltics			CEE					SEE									CIS				Turkey
	Estonia	Latvia	Lithuania	Czech Republic	Hungary	Poland	Slovak Republic	Slovenia	Bulgaria	Romania	Croatia	Albania	Bosnia and Herzegovina	Kosovo	Macedonia, FYR	Montenegro	Serbia	Belarus	Moldova	Russia	Ukraine	Turkey
Institutions																						
Control of corruption and legal system					X	X			X	X		X	X	X	X	X	X		X	X		X
Judicial independence		X				X					X	X	X	X	X	X	X		X	X		X
Government efficiency		X			X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
Regulation and Tax Regime																						
Business regulation					X	X		X	X	X			X	X	X	X	X	X		X	X	X
Taxation		X	X		X		X		X					X		X			X	X	X	X
Financial Sector													X								X	
Credit market regulations													X								X	
Infrastructure	X	X		X		X		X	X			X			X			X				
Labor market and human capital																						
Labor force participation					X	X	X	X	X		X			X					X			X
Labor market flexibility		X			X	X		X		X	X	X			X	X					X	X
Active labor market policies		X								X	X	X	X			X					X	
Health and education	X	X	X	X	X	X	X	X							X	X						
Innovation	X		X			X	X											X				
Pension reform								X						X				X			X	
Energy sector									X	X		X		X					X	X	X	

Source: Latest IMF Country Reports.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside the EU.

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[10] Chapter 3 of the Spring 2016 WEO (IMF, 2016) finds that certain labor market reforms may have further adverse effects on growth if carried out during economic downturns.

Annex I. CESEE: Growth of Real GDP, Domestic Demand, Exports, and Private Consumption

(Percent)

	Real GDP Growth				Real Domestic Demand Growth				Real Export Growth (goods and services)				Real Private Consumption Growth			
	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017
Baltics[1]	2.8	1.8	2.8	3.2	2.6	3.8	3.9	3.8	2.8	0.6	3.0	3.6	3.4	4.4	4.2	3.8
Estonia	2.9	1.1	2.2	2.8	4.1	-0.7	2.6	3.5	1.7	-1.2	3.1	3.5	3.3	4.8	3.5	3.5
Latvia	2.4	2.7	3.2	3.6	0.9	3.1	3.9	3.8	3.1	1.0	2.3	3.6	2.3	3.3	4.0	3.9
Lithuania	3.0	1.6	2.7	3.1	2.9	6.3	4.6	4.0	3.0	1.2	3.4	3.6	4.1	4.9	4.7	4.0
Central and Eastern Europe[1]	3.1	3.6	3.1	3.1	4.1	3.5	3.1	3.5	6.7	6.9	6.4	6.1	2.1	2.8	3.3	3.4
Czech Republic	2.0	4.2	2.5	2.4	2.3	4.7	2.9	2.8	8.9	7.0	6.2	5.0	1.5	2.8	3.2	2.6
Hungary	3.7	2.9	2.3	2.5	4.2	1.9	0.4	2.6	7.6	8.4	6.5	6.3	1.5	2.6	2.6	2.2
Poland	3.3	3.6	3.6	3.6	5.0	3.3	4.0	3.9	6.4	6.5	6.7	6.6	2.5	3.0	3.7	4.1
Slovak Republic	2.5	3.6	3.3	3.4	3.1	4.9	3.2	3.7	3.6	7.0	5.4	5.6	2.3	2.4	3.0	2.9
Slovenia	3.0	2.9	1.9	2.0	1.6	2.1	1.6	2.8	5.8	5.2	3.8	3.3	0.7	1.7	2.2	2.2
Southeastern Europe-EU[1]	2.2	3.3	3.5	3.1	2.3	3.8	4.6	3.7	6.5	6.0	5.9	5.9	2.9	4.3	5.4	4.1
Bulgaria	1.5	3.0	2.3	2.3	2.6	1.0	2.1	2.1	-0.1	7.6	4.1	4.2	2.7	0.8	2.5	2.5
Croatia	-0.4	1.6	1.9	2.1	-1.7	1.2	1.9	2.4	7.3	9.2	8.5	8.3	-0.7	1.2	1.7	2.0
Romania	3.0	3.7	4.2	3.6	3.1	5.3	6.0	4.5	8.6	4.7	5.9	6.0	3.8	6.1	7.1	5.1
Southeastern Europe-non-EU[1]	0.3	2.1	2.7	3.0	1.4	1.4	3.3	2.6	6.2	5.7	5.8	6.4	0.8	0.4	2.2	2.0
Albania	2.0	2.6	3.4	3.8	3.5	1.4	5.9	3.1	1.8	3.8	-0.1	4.4	2.7	-0.6	3.4	1.5
Bosnia and Herzegovina	1.1	2.8	3.0	3.2	3.2	1.9	3.5	2.9	4.6	2.1	6.8	5.0	2.3	2.4	2.3	2.5
Kosovo	1.2	3.3	3.4	4.3	1.8	3.3	2.4	5.2	16.7	6.3	6.9	7.3	4.8	2.5	2.8	3.6
Macedonia, FYR	3.5	3.7	3.6	3.6	4.3	2.8	3.8	4.1	18.2	4.6	7.2	8.1	2.1	3.2	2.8	2.8
Montenegro	1.8	4.1	4.7	2.5	2.7	4.9	10.3	2.7	-1.2	8.3	-0.2	3.5	5.0	-3.8	14.9	2.6
Serbia	-1.8	0.7	1.8	2.3	-1.1	0.4	1.5	1.8	5.7	7.8	7.7	7.6	-1.3	-0.6	0.2	1.7
European CIS countries[1]	0.2	-4.3	-1.6	0.9	0.1	-10.2	-2.7	0.5	-0.7	1.1	-0.1	2.2	1.0	-10.3	-2.2	0.7
Belarus	1.6	-3.9	-2.7	0.4	-0.7	-7.6	-3.0	0.0	7.0	-8.4	-5.5	-0.3	4.4	-4.8	-2.1	0.8
Moldova	4.8	-1.1	0.5	2.5	3.0	-8.5	-2.4	2.2	1.0	6.1	2.6	4.3	3.2	-2.3	-0.9	3.1
Russia	0.7	-3.7	-1.8	0.8	1.2	-10.1	-3.2	0.3	0.3	3.1	0.5	2.1	1.6	-9.7	-2.6	0.4
Ukraine	-6.6	-9.9	1.5	2.5	-11.4	-12.7	2.5	3.2	-14.2	-16.9	-4.1	3.6	-8.1	-20.1	2.8	3.0
Turkey	2.9	3.8	3.8	3.4	1.1	3.6	4.7	3.7	6.8	-0.1	0.1	2.0	1.4	4.4	5.4	3.9
CESEE[1,2]	1.4	-0.4	0.9	2.1	1.3	-3.5	0.6	2.0	2.9	2.5	2.0	3.4	1.5	-3.2	1.1	2.2
Emerging Europe[1,3]	1.3	-0.8	0.7	2.0	1.2	-4.2	0.3	1.9	2.6	2.3	1.7	3.3	1.4	-3.8	0.9	2.1
New EU member states[1,4]	2.8	3.4	3.2	3.1	3.6	3.6	3.5	3.5	6.4	6.3	6.0	5.9	2.4	3.3	3.9	3.6
Memorandum																
Euro Area[1]	0.9	1.6	1.5	1.6	0.9	1.8	1.7	1.7	4.1	5.0	3.4	4.1	0.8	1.7	1.6	1.6
European Union[1]	1.4	2.0	1.8	1.9	1.7	2.2	2.0	2.0	3.7	5.0	3.7	4.4	1.3	2.1	2.1	2.0

Source: IMF, World Economic Outlook database, Spring 2016 published version.

[1] Weighted averages using 2014 GDP valued at purchasing power parity.

[2] Includes Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia FYR, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Turkey, and Ukraine.

[3] CESEE excluding Czech Republic, Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia.

[4] Includes Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

Annex II. CESEE: Consumer Price Index Inflation, Current Account Balance, and External Debt

(Percent)

	CPI Inflation (Period average)				CPI Inflation (End of period)				Current Account Balance to GDP				Total External Debt to GDP			
	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017	2014	2015	2016	2017
Baltics[1]	0.4	-0.3	0.9	2.0	0.0	0.0	1.6	2.3	1.4	-1.1	-1.8	-2.0	92.8	92.3	90.4	85.7
Estonia	0.5	0.1	2.0	2.9	0.1	-0.2	2.1	2.9	1.0	1.9	1.2	0.5	94.6	93.5	86.7	79.9
Latvia	0.7	0.2	0.5	1.5	0.3	0.4	1.6	2.1	-2.0	-1.6	-2.0	-2.2	142.2	143.5	144.5	139.7
Lithuania	0.2	-0.7	0.6	1.9	-0.2	-0.3	1.4	2.3	3.6	-2.3	-3.0	-2.9	62.5	61.3	59.8	56.3
Central and Eastern Europe[1]	0.0	-0.5	0.1	1.6	-0.7	-0.2	0.8	2.0	-0.5	0.8	0.1	-0.2	74.6	78.8	78.5	75.0
Czech Republic	0.4	0.3	1.0	2.2	0.1	0.1	1.5	2.6	0.2	0.9	0.6	0.6	66.7	62.5	63.2	61.5
Hungary	-0.2	-0.1	0.5	2.4	-0.9	0.9	1.2	2.6	2.3	5.1	5.4	5.2	106.4	100.4	96.4	87.8
Poland	0.0	-0.9	-0.2	1.3	-1.0	-0.5	0.5	1.7	-2.0	-0.5	-1.8	-2.1	65.1	74.6	74.8	71.7
Slovak Republic	-0.1	-0.3	0.2	1.4	-0.1	-0.4	0.7	1.8	0.1	-1.1	-1.0	-1.0	83.3	90.9	92.7	90.9
Slovenia	0.2	-0.5	0.1	1.0	0.1	-0.4	0.7	0.8	7.0	7.3	7.6	7.1	115.3	112.5	108.6	105.0
Southeastern Europe-EU[1]	0.3	-0.7	-0.2	2.5	0.0	-0.8	1.3	2.7	0.0	0.4	-0.4	-1.1	71.4	69.7	70.7	67.3
Bulgaria	-1.6	-1.1	0.2	1.2	-2.0	-0.9	1.1	1.3	1.2	2.1	1.7	0.8	85.6	87.2	82.3	75.8
Croatia	-0.2	-0.5	0.4	1.3	-0.5	-0.2	0.8	1.5	0.7	4.4	2.7	2.1	108.4	106.7	105.5	102.0
Romania	1.1	-0.6	-0.4	3.1	0.8	-0.9	1.5	3.4	-0.5	-1.1	-1.7	-2.5	58.6	55.8	59.2	56.8
Southeastern Europe-non-EU[1]	1.0	0.8	1.1	2.3	0.8	0.8	1.8	2.6	-7.2	-6.3	-6.3	-6.4	60.8	66.1	67.5	66.2
Albania	1.6	1.9	1.9	2.5	0.7	2.0	2.2	2.7	-12.9	-11.4	-12.7	-12.6	34.2	40.6	43.0	43.1
Bosnia and Herzegovina	-0.9	-1.0	-0.7	1.1	-0.5	-1.2	-0.3	1.5	-7.8	-6.8	-5.8	-5.5	44.8	46.9	48.0	47.1
Kosovo	0.4	-0.5	0.2	1.5	-0.4	-0.1	1.2	1.7	-7.9	-8.0	-8.3	-8.9	...	...	...	...
Macedonia, FYR	-0.1	-0.2	0.5	1.5	-0.5	-0.3	1.4	1.6	-0.8	-1.4	-1.7	-2.6	65.2	66.8	70.9	68.7
Montenegro	-0.7	1.6	0.9	1.3	-0.3	1.4	1.4	1.4	-15.2	-13.2	-16.5	-17.0	154.8	152.2	154.9	161.5
Serbia	2.1	1.4	1.7	3.1	1.8	1.6	2.6	3.3	-6.0	-4.8	-4.4	-4.3	76.2	85.3	85.8	83.0
European CIS countries[1]	8.6	18.1	9.1	7.1	12.7	15.5	8.6	6.3	2.0	4.2	3.3	4.1	35.9	47.6	53.8	48.5
Belarus	18.1	13.5	13.6	12.1	16.2	12.0	14.5	11.3	-6.8	-1.9	-3.5	-3.1	54.6	72.2	85.2	78.8
Moldova	5.1	9.6	9.8	7.4	4.7	13.5	8.1	6.4	-3.7	-6.6	-4.0	-4.4	82.7	101.5	109.4	107.3
Russia	7.8	15.5	8.4	6.5	11.4	12.9	7.9	5.9	2.9	5.0	4.2	5.1	29.4	38.1	43.1	38.4
Ukraine	12.1	48.7	15.1	11.0	24.9	43.3	13.0	8.5	-4.0	-0.3	-2.6	-2.3	95.4	136.4	152.3	140.3
Turkey	8.9	7.7	9.8	8.8	8.2	8.8	10.9	6.5	-5.5	-4.4	-3.6	-4.1	50.4	56.0	57.2	56.9
CESEE[1,2]	6.0	10.1	6.2	5.7	7.7	9.3	6.6	5.1	-0.3	1.3	0.8	0.9	51.1	58.7	61.9	58.1
Emerging Europe[1,3]	6.5	11.0	6.8	6.0	8.4	10.1	7.1	5.3	-0.4	1.3	0.8	1.0	48.4	56.7	60.3	56.4
New EU member states[1,4]	0.1	-0.5	0.1	1.9	-0.5	-0.3	1.0	2.2	-0.3	0.6	-0.1	-0.5	75.0	77.5	77.4	73.8

Source: IMF, World Economic Outlook database, Spring 2016 published version.

[1] Weighted averages using 2015 GDP valued at purchasing power parity.

[2] Includes Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia FYR, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Turkey, and Ukraine.

[3] CESEE excluding Czech Republic, Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia.

[4] Includes Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

Annex III. CESEE: Evolution of Public Debt and General Government Balance
(Percent of GDP)

	General Government Balance				Public Debt			
	2014	2015	2016	2017	2014	2015	2016	2017
Baltics[2]	-0.6	-0.7	-0.8	-1.0	34.2	33.1	32.8	32.3
Estonia	0.8	0.5	0.5	0.0	10.4	10.1	9.7	9.2
Latvia[3]	-1.7	-1.5	-1.3	-1.6	38.5	34.8	34.8	34.7
Lithuania	-0.7	-0.7	-1.2	-1.0	42.5	42.5	42.1	41.4
Central and Eastern Europe[2]	-3.0	-2.6	-2.5	-2.6	54.0	54.1	54.3	54.7
Czech Republic	-1.9	-1.9	-1.6	-1.5	42.7	40.9	41.3	41.0
Hungary	-2.5	-2.2	-2.1	-2.2	76.2	75.5	74.8	74.5
Poland	-3.3	-2.9	-2.8	-3.1	50.4	51.3	52.0	52.8
Slovak Republic	-2.8	-2.7	-2.2	-2.0	53.3	52.6	52.1	51.9
Slovenia[3]	-7.1	-3.5	-3.9	-3.0	80.8	83.3	80.7	81.8
Southeastern Europe-EU[2]	-2.8	-2.1	-2.7	-2.5	43.8	43.6	44.6	45.1
Bulgaria[3]	-3.6	-2.9	-2.0	-1.4	26.4	26.9	30.2	30.6
Croatia[3]	-5.6	-4.0	-3.3	-2.8	85.1	87.7	89.0	89.0
Romania	-1.9	-1.5	-2.8	-2.8	40.5	39.4	39.7	40.2
Southeastern Europe-non-EU[2]	-5.0	-3.4	-3.2	-2.7	61.3	64.5	65.1	64.6
Albania[3]	-5.4	-4.0	-2.4	-2.5	71.7	71.9	70.4	67.8
Bosnia and Herzegovina	-3.3	-1.6	-1.6	-1.2	44.0	45.5	45.5	44.5
Kosovo[3,4]	-2.5	-1.8	-2.0	-2.3	16.7	19.2	22.6	23.5
Macedonia, FYR	-4.2	-3.7	-3.5	-3.3	38.3	38.6	38.3	39.7
Montenegro[3]	-2.6	-7.4	-9.1	-8.9	59.9	66.4	70.5	77.0
Serbia[3]	-6.6	-3.7	-3.6	-2.7	72.0	77.4	78.9	77.9
European CIS countries[2]	-1.3	-3.2	-4.4	-3.2	21.7	24.5	26.5	27.3
Belarus[3,5]	1.3	-0.9	-4.7	-6.7	40.4	59.9	69.5	68.9
Moldova[3]	-1.7	-2.3	-3.2	-3.0	31.4	42.0	44.0	45.0
Russia[3]	-1.1	-3.5	-4.4	-3.0	16.3	17.7	18.4	19.4
Ukraine[3]	-4.5	-1.2	-3.7	-3.0	70.3	80.2	92.8	92.3
Turkey[3]	-1.7	-1.5	-2.3	-1.6	33.5	32.6	30.7	29.2
CESEE[2,6]	-1.9	-2.6	-3.4	-2.7	33.5	34.7	35.5	35.7
Emerging Europe[2,7]	-1.9	-2.7	-3.5	-2.7	32.3	33.8	34.6	34.9
New EU member states[2,8]	-2.8	-2.4	-2.4	-2.4	50.3	50.2	50.6	50.9

Source: IMF, World Economic Outlook database, Spring 2016 published version.

[1] As in the WEO, general government balances reflect IMF staff's projections of a plausible baseline, and as such contain a mixture of unchanged policies and efforts under programs, convergence plans, and medium-term budget frameworks. General government overall balance where available; general government net lending/borrowing elsewhere. Public debt is general government gross debt.

[2] Weighted averages using 2015 GDP valued at purchasing power parity.

[3] Reported on a cash basis.

[4] Regarding the overall balance, this includes fiscal room for donor-financed capital projects (for 2016-2018 period), which might not be fully utilized by year-end. Public debt includes former Yougoslav debt, not yet recognized by Kosovo.

[5] General government balance: the measure reflects augmented balance, which adds to the balance of general government outlays for banks recapitalizations and is related to called guarantees of publicly-guaranteed debt.

[6] Includes Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia FYR, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Turkey, and

[7] CESEE excluding Czech Republic, Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia.

[8] Includes Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and

Annex IV. The Determinants of Saving Rates in CESEE EU Countries[11]

Table 1. Comparison of Household Saving Rate Determinants in CESEE and Advanced Europe						
Macroeconomic Determinants:	Contribution to Savings 1/	Correlations 2/	AE	High Saving CESEE	Medium Saving CESEE	Low Saving CESEE
Household Saving Rates (%)			10.8	9.6	3.1	-8.4
Macroeconomic Determinants:						
Real GDP per capita (Euros)	(+/-)	0.60	32,536	11,938	9,738	5,296
Debt to GDP (%)	(-)	0.25	170.6	77.1	88.7	78.7
Household debt to GDI (%)	(-)	0.26	122.1	42.4	55.0	28.6
Labor share of value added (%)	(+)	0.63	59.9	60.1	55.5	50.0
Remittances to GDP (%)	(-)	-0.60	0.7	1.6	3.2	3.5
Fiscal Policy:						
Government saving rates (%)	(-)	0.02	0.7	2.7	9.6	12.7
Government expenditures (%)	(-)	0.63	47.9	44.8	37.3	37.4
Tax rate (single w/o children) (%)	(-)	0.17	18.6	21.4	20.6	19.8
Social Security benefits share (%)	(-)	0.40	15.1	12.9	9.4	10.7
Demographics:						
Labor force participation (%)	(+)	0.32	71.7	67.0	72.0	64.7
Age dependency ratio	(-)	0.24	49.9	43.8	48.4	46.5
Migration share of population (%)	(-)	0.56	2.1	0.5	-3.0	-2.0
Population growth (%)	(+)	0.56	0.6	0.0	-1.0	-0.8
Other:						
Bank deposits to GDP (%)	(+)	0.35	112.2	51.9	36.1	37.3

Sources: Eurostat; World Bank; and IMF staff calculations.
Note: CESEE = Central, Eastern, and Southeastern Europe. High-saving CESEE countries (>5 percent) are Croatia, Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia. Medium-saving CESEE countries (>0 percent) are Estonia Latvia, and Lithuania. Low-saving CESEE countries (<0 percent) are Bulgaria and Romania.[1]Expected sign based on literature review. [2]Correlations between saving rates and their potential determinants in the sample of CESEE and AE EU countries.

Table 2. Comparison of Corporate Saving Rate Determinants in CESEE and Advanced Europe					
Macroeconomic Determinants:	Contribution to Savings	Correlations	AE	High Saving CESEE	Medium Saving CESEE
Corporate Saving Rates (%)			24.1	34.4	24.8
Macroeconomic Determinants:					
Real GDP per capita (Euros)	(+/-)	-0.29	32,536	11,938	9,738
Debt to GDP (%)	(-)	-0.34	170.6	77.1	88.7
Corporate debt to GDI (%)	(-)	-0.42	452.1	242.5	335.4
FDI stock share of GDP (%)	(-)	-0.02	70.2	49.2	45.3
Fiscal Policy:					
Government saving rates (%)	(-)	0.02	0.7	2.7	9.6
Government expenditures (%)	(-)	-0.27	47.9	44.8	37.3
Corporate taxes (%)	(-)	-0.32	"-"	7.6	6.1
Profitability					
Gross operating income (%)	(+)	0.26	22.9	29.8	29.0

Sources: IMF, Eurostat, World Bank. IMF staff calculations.
Note: High-saving CESEE countries (>30 percent) are Croatia, Czech Republic, Estonia, Hungary, Lithuania, and Slovenia. Medium-saving CESEE countries (>20 percent) are Bulgaria, Latvia, Poland, Romania and the Slovak Republic. FDI = foreign direct investment. [1]Expected sign based on literature review. [2]Correlations between saving rates and their potential determinants in the sample of CESEE and advanced European Union countries.

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[11] This annex was prepared by Dilyana Dimova.

Annex V. Derivation of the Golden Rule Benchmark[12]

In the neoclassical (Ramsey-Cass-Koopmans) growth model, an economy converges to its steady-state equilibrium in which consumption is maximized, the saving/investment rate is constant at its "golden-rule" value, and income, consumption, and capital all grow at a fixed rate equal to the sum of the exogenous growth rates of the labor force and labor-augmenting productivity.

In the Ramsey-Cass-Koopmans model, the "golden-rule" of capital accumulation is given by:

$$\frac{S}{Y} = \frac{I}{Y} = \frac{\alpha(\delta+n+g)}{(p+\delta+n+g)}$$

where α is the capital share of output; p is the social rate of time preference; δ is the depreciation rate; n is the growth of the labor force; and g is the rate of technical progress.

The model is calibrated for European Union (EU) countries using national accounts data, labor market surveys, and the Penn World Tables Version 8.1 (PWT). In the case of EU members, for which standardized data exist from Eurostat, the estimates of the growth of the labor force and the capital share of output are derived from labor market surveys and national accounts data, respectively. Similar to the adjustments made to the raw data in the PWT, the estimates of the labor share of output are augmented by 63 percent of self-employment income. For non-EU members, data for these variables are from the PWT. In addition, estimates of capital stocks, depreciation rates, and total factor productivity are taken from the PWT.

Under a typical calibration and with a starting value of the capital-to-labor ratio below the steady state, the model implies that the investment rate would fall monotonically toward the "golden-rule" as the economy converges to its steady state. As such, the closed-economy, golden-rule saving/investment can be interpreted as a lower bound for the investment rate along its path of convergence to euro area income levels. The social rate of time preference is constant and set equal to 5 percent for all CESEE countries. This value corresponds to the social rate of time preference in the euro area, derived from the golden rule under the assumption that the euro area has been close to its steady-state path of development on average over 2002–14.

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[12] This annex was prepared by Plamen Iossifov.

Annex VI. Derivation of the Historical Benchmark[13]

The purpose of the benchmark is to provide a proxy for a sustainable path of the investment rate during the transition to a steady state. Although neoclassical growth theory does not offer a closed-form solution for such transition dynamics, the "catch-up" is essentially driven by differences in real interest rates that affect intertemporal choices of consumption and savings (the Euler equation; see Barro and Sala-i-Martin 2003). When relative capital scarcity makes capital more productive, bearing a higher real interest rate, it stimulates saving and investment rates and leads to faster pace of capital accumulation. With a rising K/L ratio, the real return to capital declines and saving and investment rates gradually fall to their steady-state constant level. The further the economy is from its steady-state K/Y ratio, the faster it will accumulate capital. Therefore, the transition path for the investment rate I/Y may be approximated by a function of the real return to capital (given by the marginal product of capital, using Cobb-Douglas production function, where A is labor-augmenting productivity, K is capital, L is labor, and α is the capital share):

$$\frac{I_t}{Y_t} \cong f(MPK) = \alpha \left(\frac{K_t}{A_t L_t}\right)^{\alpha-1}$$

$$ln\left(\frac{I_t}{Y_t}\right) = c + \beta ln(A_t) - (1-\alpha)ln\left(\frac{K_t}{L_t}\right) + \varepsilon_t,$$

and where in the steady-state c equals $ln(\alpha)$ and β equals $(1-\alpha)$.

An economy will gradually slow capital accumulation as it approaches its steady state. In the steady state, $\Delta ln\left(\frac{I_t}{Y_t}\right) = 0$. Denoting $\Delta ln(A_t) = g$ and $\Delta ln(L_t) = n$, the expression results in: $\Delta ln(K_t) = \frac{\beta}{1-\alpha}g + n$. Using the capital accumulation equation and substituting for $\Delta ln(K_t) = \frac{I_t}{K_{t-1}} - \delta$ and β = $(1-\alpha)$, we obtain the steady-state golden rule investment rate in the Solow-Swan growth model with labor-augmenting technological progress:

$$\frac{I}{Y} = (g + \delta + n)\frac{K}{Y}$$

This suggests that our approximation of the transition path is a plausible transition dynamic, since it converges into the balanced growth path.

In order to evaluate the parameters c, α, and β, we use the historical experiences of countries in Western Europe with their capital accumulation path over 1951–2011. Fitting the above specified transition path for the investment rate on a panel for Germany, France, Italy, and Spain over 1951–2011 (R2=0.87, asterisks denote statistical significance with *** at 1 percent and ** at 5 percent), yields:

$$ln\left(\frac{I_t}{Y_t}\right) = -0.18^{**} + 0.7^{***}ln(A_t) - 0.6^{***}ln\left(\frac{K_t}{L_t}\right)$$

Using these parameters and a CESEE country-specific K/L ratio and labor-augmenting productivity, we can compute sustainable "historical benchmark" investment rate which mimics earlier transition dynamics of advanced economies.

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[13] This annex was prepared by Jiri Podpiera.

Annex VII. The Effect of Structural Factors on Total Factor Productivity[14]

Methodology

Stochastic frontier models are used to analyze the efficiency of economic agents, regions, or countries. The intuition behind the models is that frontier technology may not be exceeded by any of the economic agents and the distance from the frontier reflects the inefficiency of individual agents. The frontier represents the maximum amount of output that can be obtained from a given level of inputs. Stochastic frontier models are characterized by composite error that is composed of idiosyncratic disturbance (to capture measurement errors and other noise) and one-sided disturbance, which represents inefficiency. In this annex we use a stochastic frontier panel-data model proposed by Battese and Coelli (1995) to estimate the contributions of technological progress and country-specific technical efficiency to total factor productivity (TFP) growth.[15] Stochastic frontier models could be described by the following equations:

$$y_{i,t} = a + x_{i,t}\beta + \varepsilon_{i,t} \qquad (1)$$
$$\varepsilon_{i,t} = v_{i,t} - u_{i,t} \qquad (2)$$
$$v_{i,t} \sim N(0, \sigma_v^2) \qquad (3)$$
$$u_{i,t} = z_{i,t}\delta + w_{i,t}, \qquad (4)$$

where $y_{i,t}$-is the output of country i at time t; $x_{i,t}$ is a vector of production function inputs (in our case, capital, K, and human capital augmented labor, LHC, and the time trend representing technological change; $\varepsilon_{i,t}$ is the composed error term; $v_{i,t}$ is assumed to be iid random error, independently distributed from the $u_{i,t}$; $u_{i,t}$ is non-negative random variables associated with the technical inefficiency of production, which are assumed to be independently distributed, such that they are obtained by truncation (at zero) of the normal distribution with the mean; $z_{i,t}\delta$, and variance, σ_u^2, $z_{i,t}$ are a vector of explanatory variables associated with the technical efficiency of production of country i, at time t; δ is an (m x 1) vector of unknown coefficients; and $w_{i,t}$ is defined by the truncation of the normal distribution with zero mean and variance, σ_u^2, such that the point of truncation is $z_{i,t}\delta$ i.e., $w_{i,t} \geq z_{i,t}\delta$. These assumptions ensure non-negativity of $u_{i,t}$. Parameters of the stochastic frontier and the model for the technical inefficiency effects are simultaneously estimated with a maximum likelihood method.

Kumbakhar and Lovell (2000) demonstrate that a change in the TFP, which is defined as output growth not explained by input growth, can be expressed as:

$$\Delta TFP = \Delta TP + \Delta TE + (\epsilon - 1)\left[\frac{\epsilon_{lhc}}{\epsilon}\Delta LHC + \frac{\epsilon_k}{\epsilon}\Delta K\right], \qquad (5)$$

where, ΔTP is technological change, which is represented by the coefficient of the time trend in equation (1) of the production frontier; ΔTE is the change in technical efficiency; ϵ_{lhc} and ϵ_k are output elasticities with respect to human-capital-augmented labor and capital, respectively; and $\epsilon = \epsilon_{lhc} + \epsilon_k$ represents the return to scale. In the case of constant return to scale, $\epsilon = 1$ factor accumulation does not have any impact on TFP growth.

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[14] This annex was prepared by Ara Stepanyan.

[15] The advantage of panel-data stochastic frontier models is that they allow for considering a more realistic characterization of inefficiencies, including estimating time-variant and country-specific inefficiency.

We use stochastic frontier analysis to estimate the production frontier and technical inefficiency, and to identify structural, regulatory, and institutional factors that are associated with technical inefficiency. The analysis applies the stochastic frontier method to 30 advanced and emerging European economies and the United States for the period 1995–2014. [16] The model is estimated using purchasing power parity-adjusted annual data from the Penn World Tables (PWT) and structural variables from the World Bank's Global Competitiveness Report and from the Economic Freedom of the World Survey. [17] The production function approach is used to remove cyclical components from output and labor series (for a detailed description, see Podpiera, Raei, and Stepanyan, forthcoming). Structural variables cover the following broad areas: (1) product and labor markets, (2) institutional quality, (3) quality of infrastructure, (4) innovation and R&D, and (5) quality of labor and capital.

Regression Results

According to our estimation, technology progressed at 0.5 percent per year, on average, during 1995–2014 (Annex Table VII.1). However, before the global financial crisis the average growth rate of technological progress was higher, at about 1 percent, while after the crisis technological progress stalled. Estimated coefficients for physical capital and human-capital-augmented labor in the production function are very close to the calibrated labor and capital shares used in the literature. These results are robust to the different model specifications and different samples.

Differences in structural factors explain the variation in inefficiency across countries in our sample. The high levels of corruption and restricted business regulations, including for foreign direct investment (FDI), give rise to technical inefficiencies. The higher share of employment in the services sector and the longevity of the population are conducive to technical efficiency. The square of human capital has a positive sign on inefficiency, reflecting the diminishing return on human capital.[18]

We zoomed in to identify specific factors that influence technical inefficiency and, according to the literature, are behind corruption. We used a variety of indicators representing the legal and judicial system in lieu of corruption indicators in our analysis.[19] Data limitations prevent us from including all variables simultaneously, and therefore, we used one at a time. The results suggest that judicial independence, impartiality of the courts, and property rights play an important role in improving technical efficiency.

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[16] Countries included in the analysis are: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Ukraine, and United States.

[17] Data in the PWT are available until 2011. We used purchasing power parity (PPP) conversion factors from the World Bank's World Development Indicators for the period 2011–14 to calculate the growth rate of output and investment in PPP-adjusted terms. We extended the PWT series to 2014 using these growth rates.

[18] We considered structural indicators in the broad areas of institutions, legal framework, labor market, product market efficiency, financial market developments, innovation and R&D, quality of education, physical and human capital, and infrastructure. We found robust and significant results only for the variables presented in Annex Table 7.1. For the rest of the variables, the relationship was either not statistically significant or not robust.

[19] Some of the factors in the product market that may give rise to corruption are already included in the model through business regulation.

Implications for Structural Reform Priorities

Structural reform priorities vary across countries depending on potential relative efficiency gains (Annex Figure VII.1):

Legal system and protection of property rights: Among CESEE countries, Bulgaria, Croatia, the Slovak Republic, and Slovenia have relatively large room to increase efficiency by improving the legal system (independence of the judicial system and impartiality of courts) and protection of property rights. Turkey also has significant room to improve the independence of the judicial system. Albania, Hungary, Serbia, and the CIS countries could also benefit from improving protection of property rights. In general, the Baltic countries have institutional and structural characteristics very close to the EU-15 average. Thus, the room to gain efficiency by improving these characteristics is limited.

Business regulation: Croatia, the Czech Republic, and the Slovak Republic could gain the most among CESEE countries from easing general business regulation and restrictions for FDI.

Structural transformation: In Albania, Romania, Turkey, and, to a lesser extent, Poland, there is scope to raise productivity by shifting labor from relatively lower productivity sectors (agriculture) to higher-productivity (services) sector.

Life expectancy: the Baltic and the CIS countries have the greatest room to improve the life expectancy of the population.

Annex Table VII.1. Estimates of Production Function and Efficiency Components

Variables	Whole Sample	Before 2008	After 2008	Whole Sample	Whole Sample	Whole Sample
	Parameters	Parameters	Parameters	Parameters	Parameters	Parameters
	(1)	(2)	(3)	(4)	(4)	(4)
Production Function						
Capital	0.34***	0.33***	0.43***	0.33***	0.33***	0.33***
	(0.02)	(0.03)	(0.030)	(0.021)	(0.020)	(0.020)
Human capital augmented labor	0.69***	0.70***	0.60***	0.70***	0.70***	0.70***
	(0.02)	(0.03)	(0.031)	(0.021)	(0.020)	(0.020)
Time	0.005**	0.009***	-0.0005	0.005***	0.006***	0.004***
	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)	(0.001)
Intercept	6.18***	6.2***	5.2***	6.26***	6.27***	6.31***
	(0.23)	(0.31)	(0.35)	(0.23)	(0.23)	(0.22)
Inefficiency component						
Corruption	-0.13***	-0.12***	-0.13***			
	(0.026)	(0.044)	(0.030)			
Restrictiveness of FDI regulation	-0.04***	-0.05***	-0.03***	-0.052***	-0.05***	-0.045***
	(0.008)	(0.010)	(0.001)	(0.008)	(0.008)	(0.008)
Human capital squared	0.44***	0.53***	0.21***	0.43***	0.41***	0.44***
	(0.047)	(0.061)	(0.062)	(0.046)	(0.045)	(0.044)
Business regulation	-0.06***	-0.07***	-0.05**	-0.07***	-0.06***	-0.04***
	(0.013)	(0.018)	(0.021)	(0.013)	(0.013)	(0.013)
Employment in services	-0.012***	-0.014***	-0.005***	-0.013***	-0.014***	-0.012***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Life expectancy	-0.036***	-0.04***	-0.019***	-0.044***	-0.05***	-0.038***
	(0.004)	(0.007)	(0.006)	(0.004)	(0.004)	(0.004)
Judicial independence				-0.03**		
				(0.004)		
Impartial courts					-0.05***	
					(0.009)	
Property rights						-0.06***
						(0.010)
Intercept	4.07***	4.43***	2.4***	5.0***	5.35***	4.42***
	(0.364)	(0.560)	(0.507)	(0.261)	(0.266)	(0.279)

Standard errors are in parentheses. *** (**) (*) Denotes significance at 1% (5%) (10%) level.

Source: IMF staff estimates.

Note: FDI=Foreign direct investment.

Annex Figure VII.1. Potential Efficiency Gains from Improving Selected Structural Characteristics of CESEE Economies to the Average EU-15 Level *(Percent)*

1. Independence of Judicial System

2. Impartiality of Courts

3. Business Regulation

4. Restrictiveness of Foreign Direct Investment Regulation

5. Reallocating Labor toward Services Sector

6. Life Expectancy

Sources: World Bank; Global Competitiveness Report; Economic Freedom of World; and IMF staff calculations.
Note: CEE = Central and Eastern Europe; CESEE = Central, Eastern, and Southeastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe; SEE-XEU = Southeastern European countries outside the EU.

Annex VIII. Is There a Role for Structural Policies in Improving Allocative Efficiency? [20]

Methodology

This annex analyzes the role of structural policies in improving the efficiency of resource allocation. The evidence from Organization for Economic Cooperation and Development (OECD) countries, as shown in Andrews and Cingano (2014), suggests that policy-induced frictions in labor, product, and credit markets have an economically and statistically significant negative relationship with aggregate productivity, as they can hinder efficient resource allocation from less to more productive firms. This annex applies a similar methodology to 14 CESEE countries using firm-level data from ORBIS for the period 2010–13, and examines whether certain reforms could help close productivity gaps by facilitating more efficient resource allocation.[21]

In order to test the role of the quality of institutions and regulations in resource allocation, we estimate the following fixed-effect model with time dummies:

$$AE_{i,c,t} = \sum_m \beta^m \times R_{c,t}^m + \mu_{i\times c} + \mu_t + \varepsilon_{i,c,t},$$

where $AE_{i,c,t}$ denotes allocative efficiency, measured by the covariance between firms' labor productivity and their labor share within industry i of country c, and year t;[22, 23] $R_{c,t}^m$ denotes the country-level m-th indicator of regulation and institutional quality; μ_{ixc} denotes the fixed effects for industry and country groups; and μ_t denotes time dummies. For structural indicators, we use the World Economic Forum's Global Competitiveness Index, particularly in the areas of government efficiency, flexibility in wage determination, and affordability of financial services.[24]

Results suggest that the quality of institutions matters for allocative efficiency, and, in CESEE, the improvement in government efficiency and affordability of financial services could yield significant potential productivity gains through better resource allocation. The regression results suggest that, for instance, an increase in the affordability of financial services indicator by one notch is associated with a rise in allocative efficiency by 13 percentage points. The productivity gains from reforms in these areas (government efficiency and affordability

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[20] This annex was prepared by Jiae Yoo.

[21] The countries included are Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, and Ukraine. Within the sample years, the numbers in the sample remains relatively stable. Firms with one employee and in the top and bottom 1 percent of the productivity distribution from the sample are excluded, following the standard in literature.

[22] The measure of allocative efficiency, proposed by Olley and Pakes (1996), is based on the decomposition of the industry-level aggregate productivity index (defined as average firm-level log productivity, weighted by the firm's labor share) into the unweighted average and covariance term $P_i = \sum_{n\in i} Q_n P_n = \bar{P}_i + \sum_{n\in i}(Q_n + \bar{Q}_i)(P_n - \bar{P}_i)$, where $\bar{P}_i$ is the unweighted average of firm log-productivity, and Q denotes a firm's labor share within industry. The second term, the covariance between a firm's size and productivity, measures allocative efficiency by capturing the extent to which firms with higher productivity have greater resources (zero in random allocation and increasing with better allocation). When productivity is measured in log, the term captures how much higher and by how much of a percentage the industry productivity index is higher than in the case of random resource allocation.

[23] Industries are classified according to NACE Rev 2, first two-digit level.

[24] We considered structural indicators in the broad areas of public institutions, labor markets and financial market efficiency, and product market efficiency. We did not a find robust, consistent relation between product market efficiency and allocative efficiency (for example, burdens on starting a business, domestic and foreign competition). Within the broad areas of public institutions, labor markets, and financial market efficiency, the indicators included in the results show a more robust and significant relation with allocative efficiency than other subindicators (for example, public security, undue influence, hiring and firing practices, and trustworthiness and confidence in financial markets).

of financial services) combined to bring them up to the higher level observed in the benchmark case of Sweden can be sizable—between 10 and 20 percent depending on a country's gap from the benchmark (Annex Table VIII.1)

Annex Table VIII.1. Allocative Efficiency and Structural Indicators

Dependent Variable	Allocative Efficiency			
	(1)	(2)	(3)	(4)
Government efficiency	0.082***			0.041*
	(0.020)			(0.021)
Flexible wages		0.048*		0.063**
		(0.025)		(0.025)
Affordable finances			0.142***	0.137***
			(0.027)	(0.029)
Constant	0.010	0.028	-0.272**	-0.708***
	(0.062)	(0.132)	(0.106)	(0.176)
Observations	3,731	2,795	2,795	2,795
Number of panels	953	946	946	946

Sources: ORBIS; and IMF staff calculations.
Note: Allocative efficiency is measured as the covariance between a firm's labor share within industry and its log productivity. Robust standard errors are in parentheses. The coefficients on fixed effects and year dummies are omitted. *** coefficient significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

Data Description

The allocative efficiency analysis uses firm-level data from the ORBIS database, covering over 1.5 million firms each year for the period between 2010 and 2013 (1.8 million firms for 2013) for 14 countries. The sample excludes the self-employed (firms with one employee) and the outlier firms at the top and bottom 1 percentile in terms of their productivity. Allocative efficiency is calculated using each firm's labor productivity and labor share within industry (using a narrow classification according to NACE Rev. 2, first two-digit level). Those industries with less than 20 firms available are excluded from the sample. Annex Table VIII.2 shows the data coverage (comparing the total number of employees hired by sample firms to the aggregate-level employment data, excluding the finance and insurance sector) and the number of firms and industries for each country.

The data contain a large number of micro firms (with less than 20 employees) that accounts for only a small fraction in terms of employment and turnover—we also examined allocative efficiency based on a subsample excluding such micro firms (Annex Figure VIII.1). The table shows the size of the subsample as a share of the full sample in terms of number of observations, employment, turnover, and total assets.

Annex Table VIII.2. Number of Observations and Data Coverage by Country, 2013

Country	Coverage (percent)	Number of Firms (thousands)	Number of Industries	Number of Employees (thousands)	Subsample with 20 or More Employees (percent of all firms with more than one employee)			
					Number of firms	Number of employees	Turnover	Total assets
Bulgaria	60.0	175.1	76	2012.3	8.8	63.3	72.6	73.1
Czech Republic	63.0	204.6	77	3143.1	9.9	71.8	79.4	88.0
Estonia	47.2	22.8	74	279.1	9.4	53.8	70.5	72.0
Croatia	45.1	41.7	75	692.5	11.5	66.6	77.1	80.9
Hungary	44.5	113.5	77	1758.0	10.9	69.6	79.6	82.9
Lithuania	40.7	14.9	73	517.8	33.7	81.1	82.7	88.2
Latvia	60.2	49.6	75	524.9	8.6	54.4	70.7	70.0
Poland	4.8	14.2	76	742.0	40.7	91.6	91.2	89.8
Romania	40.7	218.9	77	3453.5	11.3	70.6	80.0	78.0
Serbia	43.6	29.4	76	748.2	15.9	74.9	79.3	84.4
Russia	49.7	749.8	77	32274.9	46.5	91.3	91.4	92.0
Slovenia	42.4	26.9	74	381.7	9.6	63.7	73.7	78.2
Slovak Republic	48.5	55.1	76	1042.2	12.2	71.3	81.0	82.5
Ukraine	31.1	182.1	77	6007.0	20.4	84.4	86.0	83.7

Sources: Eurostat; and ORBIS.
Note: Coverage is the share of total employment by sample firms to aggregate-level nonfinancial sector employment. The sample includes firms with more than one employee.

Annex Figure VIII.1. Average Firm Productivity by Firm Size
(Log of turnover-to-employment ratio, weighted by employment)
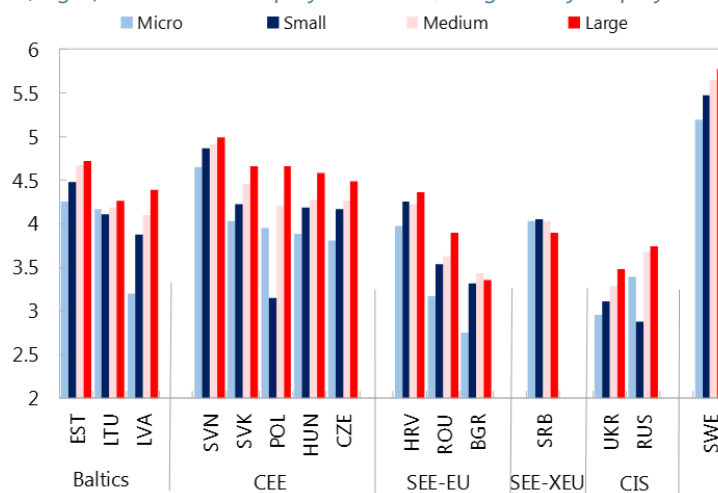
Sources: ORBIS; and IMF staff calculations.
CEE = Central and Eastern Europe; CIS = Commonwealth of Independent States; SEE = Southeastern Europe;
SEE-XEU = Southeastern European countries outside the EU.

Annex IX. Decomposing TFP Growth into Common and Idiosyncratic Components[25]

Productivity growth has slowed across countries regardless of their level of development (Eichengreen, Park, and Shin 2015). A widespread slowdown in total factor productivity (TFP) growth raises a natural question: Are common factors behind this slowdown? This annex describes the framework that we used to decompose TFP growth into common/external and country-specific/idiosyncratic factors. For this purpose we run the following regression for each CESEE country separately:

$$\Delta TFP_t = a_0 + a_1 \Delta TFP\_COM_t + a_2 \Delta TFP\_PAR_t + \varepsilon_t,$$

$$\Delta TFP\_COM_t = \frac{1}{N}\sum_{i=1}^{N} \Delta TFP_{i,t}, \qquad i = 1, \dots, N$$

where ΔTFP_t is TFP growth at time t; ΔTFP_PAR_t is weighted average TFP growth of trading partners at time t (weighted by exports); ΔTFP_COM_t is average TFP growth across countries in the sample at each point in time, which represents other common factors for TFP growth; N is the number of countries in our sample; ε_t is the country-specific component of TFP growth; and a_s are parameters that need to be estimated. Vectors of a_1 and a_2 across all countries in our sample represent common factor loading vectors. To control for country fixed and time effects, all data are de-meaned and de-trended in advance. TFP growth data for CESEE countries are from Podpiera, Raei, and Stepanyan (forthcoming). TFP growth for trading partners is calculated using the production function approach described in Podpiera, Raei, and Stepanyan (forthcoming).

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[25] This annex was prepared by Ara Stepanyan.

Annex X. Description of Variables

Variable Name	Description	Source
Human capital	Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994).	Penn World Tables; Psacharopoulos and Patrinos (2004)
Physical capital	Capital stock at PPP international dollars.	Penn World Tables
Employment	Number of persons engaged (in millions).	World Economic Outlook
GDP	Gross Domestic Product at PPP international dollars.	Penn World Tables
Average hours worked	Average number of usual weekly hours of work in main job.	Eurostat
Capacity utilization	Current level of capacity utilization (percent).	Eurostat
Domestic credit to private sector (percent of GDP)	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations. For some countries these claims include credit to public enterprises.	IFS, World Bank (WB) and OECD
Financial market development	This index covers availability of financial services, affordability of financial services, financing through local equity market, ease of access to loans, venture capital availability, soundness of banks, regulation of securities exchanges, legal rights index.	World Economic Forum (WEF); World Bank (WB) Doing Business
Availability of financial services	Based on a survey that asks the following question: In your country, to what extent does the financial sector provide a wide range of financial products and services to businesses?	World Economic Forum (WEF)
Affordability of financial services	Based on a survey that asks the following question: In your country, to what extent are financial services affordable for businesses?	World Economic Forum (WEF)
Mobile cellular subscriptions (per 100 people)	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology.	World Telecommunication/ ICT Development Report
Internet users (per 100 people)	Internet users are individuals who have used the internet (from any location) in the last 12 months. Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV.	World Telecommunication/ ICT Development Report and World Bank (WB)
ICT goods imports (percent in total goods imports)	Information and communication technology goods imports include telecommunications, audio and video, computer and related equipment; electronic components; and other information and communication technology goods.	United Nations Conference on Trade and Development's UNCTADstat database
Technological adoption	This index covers availability of latest technologies, firm-level technology absorption, FDI and technology transfer.	World Economic Forum (WEF)
ICT use	This index covers internet users, fixed-broadband internet subscriptions, internet bandwidth, mobile-broadband subscriptions.	International Telecommunication Union
Technological readiness	This is an aggregate index of technology adoption and ICT use.	World Economic Forum (WEF)
Spending on R&D (percent in GDP)	Expenditures for research and development are current and capital expenditures on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics
Researchers in R&D (per million people)	Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned.	UNESCO Institute for Statistics.

New business density	New businesses registered are the number of new limited liability corporations registered in the calendar year.	World Bank's (WB) Entrepreneurship Survey and database
Innovation	This index covers capacity for innovation, quality of scientific research institutions, company spending on R&D, university-industry collaboration in R&D, government procurement of advanced technology products, availability of scientists and engineers, PCT patent applications.	World Economic Forum (WEF); OECD, Patent Database
Infrastructure	This index is covers quality of overall infrastructure, quality of roads, quality of railroad infrastructure, quality of port infrastructure, quality of air transport infrastructure, available airline seat kilometers, quality of electricity supply, mobile-cellular telephone subscriptions, fixed-telephone lines.	World Economic Forum (WEF); International Air Transport Association; International Telecommunication Union
Stock of public capital	Public capital stock is constructed following the perpetual inventory method.	Fiscal Monitor
Road density	Road density is the ratio of the length of the country's total road network to the country's land area.	World Bank (WB) World Development Indicators
Strength of legal rights index	Strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. The index ranges from 0 to 12, with higher scores indicating that these laws are better designed to expand access to credit.	World Bank (WB) Doing Business
Institutions	The index covers physical and intellectual property rights, diversion of public funds, public trust in politicians, irregular payments and bribes, judicial independence, favoritism in decisions of government officials, wastefulness of government spending, efficiency of legal framework in settling disputes, burden of government regulation, efficiency of legal framework in challenging regulations, transparency of government policymaking, business costs of terrorism, crime, and violence, organized crime, reliability of police services, ethical behavior of firms, strength of auditing and reporting standards, efficacy of corporate boards, protection of minority shareholders' interests, strength of investor protection.	World Economic Forum (WEF)
Control of Corruption	Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	The Worldwide Governance Indicators
Government efficiency	This index covers diversion of public funds, favoritism in decisions of government officials, wastefulness of government spending, burden of government regulation.	World Economic Forum (WEF)
Judicial independence	This index is based on the following question: Is the judiciary in your country independent from political influences of members of government, citizens, or firms?	Fraser Institute Index of Economic Freedom (IEF); World Economic Forum (WEF)
Impartial courts	This index is based on the following question: the legal framework in your country for private businesses to settle disputes and challenge the legality of government actions and/or regulations is inefficient and subject to manipulation (= 1) or is efficient and follows a clear, neutral process (= 7).	Fraser Institute Index of Economic Freedom (IEF); World Economic Forum (WEF)
Protection of property rights	This index is based on the following question: Property rights, including over financial assets, are poorly defined and not protected by law (= 1) or are clearly defined and well protected by law (= 7).	Fraser Institute Index of Economic Freedom (IEF); World Economic Forum (WEF)

Integrity of the legal system	This component is based on the International Country Risk Guide Political Risk Component I for Law and Order.	Fraser Institute Index of Economic Freedom (IEF); PRS Group, International Country Risk Guide.
Legal enforcement of contracts	This component is based on the World Bank's Doing Business estimates for the time and money required to collect a debt.	Fraser Institute Index of Economic Freedom (IEF); World Banks (WB) Doing Business.
Regulatory restrictions on the sale of real property	This sub-component is based on the WB's Doing Business data on the time measured in days and monetary costs required to transfer ownership of property that includes land and a warehouse.	Fraser Institute Index of Economic Freedom (IEF); World Bank (WB) Doing Business.
Reliability of police	This index is based on the following question: to what extent can police services be relied upon to enforce law and order in your country?	Fraser Institute Index of Economic Freedom (IEF); World Economic Forum (WEF)
Business costs of crime	This index is based on the following question: to what extent does the incidence of crime and violence impose costs on businesses in your country?	Fraser Institute Index of Economic Freedom (IEF); World Economic Forum (WEF)
Pupil-teacher ratio, secondary	This is the number of pupils enrolled in secondary school divided by the number of secondary school teachers.	UNESCO Institute for Statistics.
Life expectancy at birth, total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	World Bank (WB), World Development Indicators
Labor market regulations	This is based on the following sub-components: hiring market regulations, hiring and firing regulations, hours regulations, mandated cost of worker dismissal, conscription.	World Bank (WB) Doing Business and World Economic Forum (WEF)
Quality of primary education	Based on a survey that asks the following question: in your country, how do you assess the quality of primary schools.	World Economic Forum (WEF)
Quality of the education system	Based on a survey that asks the following question: in your country, how well does the education system meet the needs of a competitive economy?	World Economic Forum (WEF)
Extent of staff training	Based on a survey that asks the following question: in your country, to what extent do companies invest in training and employee development.	World Economic Forum (WEF)
Labor market efficiency	This index covers cooperation in labor-employer relations, flexibility of wage determination, hiring and firing practices, redundancy costs, effect of taxation on incentives to work, pay and productivity, reliance on professional management, country capacity to retain and attract talent, female participation in the labor force.	World Economic Forum (WEF); ILO; and World Bank (WB), Doing Business.
Hiring and firing practices	Based on a survey that asks the following question: in your country, to what extent do regulations allow flexible hiring and firing of workers?	World Economic Forum (WEF)
Flexibility of wage determination	Based on a survey that asks the following question: in your country, how are wages generally set?	World Economic Forum (WEF)
Start-up procedures to register a business	Start-up procedures are those required to start a business, including interactions to obtain necessary permits and licenses and to complete all inscriptions, verifications, and notifications to start operations.	World Bank (WB) Doing Business

Foreign ownership/investment restrictions	This is based on the following two questions: how prevalent is foreign ownership of companies in your country? and how restrictive are regulations in your country relating to international capital flows?	World Economic Forum (WEF)
Business regulations	This is based on the following sub-components: administrative requirements, bureaucracy costs, starting a business, extra payments/bribes/favoritism, licensing restrictions, cost of tax compliance.	World Bank (WB) Doing Business and World Economic Forum (WEF)
Goods market efficiency	This index covers intensity of local competition, extent of market dominance, effectiveness of anti-monopoly policy, effect of taxation on incentives to invest, total tax rate, number of procedures required to start a business, time required to start a business, agricultural policy costs, prevalence of non-tariff barriers, trade tariffs, prevalence of foreign ownership, business impact of rules on FDI, burden of customs procedures, imports as a percentage of GDP, degree of customer orientation, buyer sophistication.	World Economic Forum; World Trade Organization; International Trade Centre; World Bank (WB) Doing Business
Tax Wedge	Tax wedge is defined as the ratio between the amount of taxes paid by an average single worker (a single person at 100% of average earnings) without children and the corresponding total labor cost for the employer.	OECD
Foreign direct investment, net inflows (percent of GDP)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor.	IMF's IFS and Balance of Payments databases, World Bank's (WB) International Debt Statistics, and OECD
Employment in services	This indicator covers the employment in the services sector, which consists of wholesale and retail trade and restaurants and hotels; transport, storage, and communications; financing, insurance, real estate, and business services; and community, social, and personal services.	International Labor Organization
Employment in agriculture	This indicator covers the employment in the agriculture sector, which consists of activities in agriculture, hunting, forestry, and fishing.	International Labor Organization
Business sophistication	This index covers local supplier quantity, local supplier quality, state of cluster development, nature of competitive advantage, value chain breadth, control of international distribution, production process sophistication, extent of marketing, willingness to delegate authority.	World Economic Forum (WEF)
Value chain breadth	This indicator is based on a survey that askes the following question: In your country, how broad is companies' presence in the value chain?	World Economic Forum (WEF)

ABBREVIATIONS

ALB	Albania			of Consumer Prices
AQR	Asset Quality Review		HRV	Croatia
AUT	Austria		HUN	Hungary
BGR	Bulgaria		ICR	Interest coverage ratio
BiH	Bosnia and Herzegovina		IMF	International Monetary Fund
BIS	Bank for International Settlements		ITA	Italy
			LTU	Lithuania
BLR	Belarus		LVA	Latvia
CEE	Central and Eastern Europe		LUX	Luxembourg
CESEE	Central, Eastern, and Southeastern Europe		MDA	Moldova
			MKD	Former Yugoslav Republic of Macedonia
CHF	Swiss franc		MNE	Montenegro
CIS	Commonwealth of Independent States		NPL	Nonperforming loan
CZE	Czech Republic		OECD	Organisation for Economic Co-operation and Development
DEU	Germany			
ECB	European Central Bank			
EIB	European Investment Bank		PMI	Purchasing Managers Index
EM	Emerging Market		POL	Poland
EMBIG	Emerging Markets Bond Index Global		REI	Regional Economic Issues
			ROU	Romania
EPFR	Emerging Portfolio Fund Research		RUS	Russia
EST	Estonia		SA	Seasonally adjusted
EU	European Union		SEE	Southeastern Europe
FIN	Finland		SRB	Serbia
FDI	Foreign direct investment		SVK	Slovak Republic
FRA	France		SVN	Slovenia
FX	Foreign exchange		TFP	Total productivity factor
GBR	United Kingdom		TUR	Turkey
GDP	Gross domestic product		UKR	Ukraine
GRC	Greece		UVK	Kosovo
HICP	Harmonised Index		WEO	World Economic Outlook

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