IMF STAFF DISCUSSION NOTE

Emigration and Its Economic Impact on Eastern Europe

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CONTENTS

EXECUTIVE SUMMARY

Emigration from Central, Eastern, and Southeastern Europe (CESEE) has been unusually large, persistent, and dominated by educated and young people. After the fall of the Iron Curtain in the early 1990s, the next quarter century featured large and persistent east-west migration flows. The Southeastern European (SEE) economies typically saw appreciably larger labor outflows than the Baltic and Central European countries. Many emigrants were well-educated and young; their exodus has sharply accentuated already adverse demographic trends in CESEE. Moreover, emigration appears to be permanent, with indications of only limited return migration so far. Against that backdrop, this paper examines the effects of emigration on private sector activity, competitiveness, public finances, and ultimately, growth in CESEE economies as well as the pace of their income convergence to Western Europe.

Emigration has led to positive outcomes for CESEE migrants themselves, and for the European Union (EU) as a whole. Economic migration driven by individual choice is part of economic development. By moving abroad, migrants seek to improve their own well-being as well as that of their families back home. Furthermore, east-west migration, especially of highly educated and skilled people, has likely benefited the main receiving countries in the European Union (EU) and, therefore, the EU as a whole. Existing research points to sizable benefits from increased cross-border labor mobility within Europe and elsewhere. Thus, migration is an indicator of success of the EU project, which sees freedom of movement as necessary for achieving greater economic integration, and ultimately, higher incomes.

But large-scale emigration—through its externalities—may also have slowed growth and income convergence in CESEE economies. The significant outflow of skilled labor has reduced the size of the labor force and productivity, adversely affecting growth in sending countries and slowing per capita income convergence. With this trend, emigration appears to have reduced competitiveness and increased the size of government, by pushing up social spending in relation to GDP, and made the budget structure less growth-friendly. These effects are particularly strong in SEE and Baltic countries. With income and institutional quality differentials between CESEE and Western Europe still wide, the push and pull factors driving emigration are likely to persist for some time. In the absence of determined and coordinated policies, there is a risk that emigration and slower income convergence may become mutually reinforcing.

This paper proposes a multi-pronged policy approach to mitigate the adverse impact of emigration on CESEE. Policies in sending countries should focus on (1) strengthening institutions and economic policies to create an environment that encourages people to stay, promotes return migration, and attracts skilled workers from other countries; (2) better utilization of the remaining workforce by increasing labor force participation and productivity; (3) better leveraging of remittances to promote investment rather than consumption; and (4) mitigating adverse fiscal impacts of emigration. EU-wide policies should consider adjusting the allocation method for the EU structural and cohesion funds to explicitly account for the negative effects of emigration on growth and convergence. This approach would also be consistent with the stated objective of these funds, which is to reduce economic and social disparities in the EU and promote sustainable development.

INTRODUCTION

1.   Migration has taken center stage in the policy debate in Europe today. The recent influx of Syrian refugees into Europe has grabbed public attention and dominated the policy debate.[1] But the past quarter century has seen a persistent and much larger wave of mostly economic migration from Central, Eastern, and Southeastern Europe (CESEE), mainly to Western Europe.[2] This emigration has benefitted individual migrants. Because of the sizable share of skilled[3] emigrants, it has likely also benefited the main receiving countries in the EU and, therefore, the EU as a whole.[4] In this respect, it is an indicator of success of the EU project, which sees freedom of movement as necessary for achieving economic integration, and thereby higher incomes for EU citizens. However, the effects of emigration on CESEE deserve more attention.

2.   The post-1990 east-west migration in Europe has been unique in many ways. First, it was unprecedented in speed, scale, and persistence compared with emigration experiences elsewhere, largely because of the *big bang* nature of reintegration of former communist countries into the global economy.[5] The low cost of moving from eastern to Western Europe likely also played a role, as many of the sending countries were geographically close and either quickly became members of the EU single market or saw improving prospects of joining EU during the 25-year period. Second, many of the CESEE emigrants were young and highly skilled, more so than in other emigration episodes. This "brain drain" coincided with population aging in many Eastern European countries, with far-reaching effects on their output and productivity. Third, CESEE emigration appears to be more permanent than migration observed elsewhere.

3.   Empirical studies tend to find a positive impact of migration on receiving countries, while the impact on sending countries is less clear-cut. Some studies that take a global viewpoint to the long-run positive welfare effects for both recipient countries—through greater product variety—and sending countries—through remittances (di Giovanni, Levchenko, and Ortega 2015). Léon-Ledesma and Piracha (2004) find positive productivity effects from return migration in CEE countries and highlight how remittances can help boost investment in the home country. However,

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[1] See the recent IMF Staff Discussion Note (Aiyar and others 2016).

[2] The following regional aggregates and country codes are used throughout the note: Baltics (blue): Estonia (EST), Latvia (LVA), Lithuania (LTU); Central Europe (CE-5, green): Czech Republic (CZE), Hungary (HUN), Poland (POL), Slovak Republic (SVK), Slovenia (SVN); CIS (purple): Belarus (BLR), Moldova (MDA), Russian Federation (RUS), Ukraine (UKR). Southeast Europe EU members (SEE-EU, red): Bulgaria (BGR), Croatia (HRV), Romania (ROU). Southeast Europe Non-EU members, or Western Balkans (SEE-XEU, orange): Albania (ALB), Bosnia and Herzegovina (BIH), Kosovo (UVK), FYR Macedonia (MKD), Montenegro (MNE), Serbia (SRB). Please note that migration statistics based on OECD data in this paper capture migration to OECD countries only.

[3] Throughout the SDN, "skilled" refers to people with at least secondary education while "high-skilled" refers to people with at least tertiary education.

[4] Aggregate effects for the EU as a whole are not the focus of this SDN. Hence, with respect to benefits for recipient countries, we largely refer to findings from other studies discussed below.

[5] According to the World Bank's Global Bilateral Migration Database, the number of persons living abroad in 2000 (the latest year for which data are available) as a share of sending country population was highest in CESEE (9 percent), significantly greater than that in the Middle East and Central Asia (5 percent), Latin America and Caribbean (4 percent), Africa (2 percent), or Emerging Asia (1 percent).

other papers point to losses for sending countries. Dustmann, Fadlon, and Weiss (2011) employ a theoretical model with learning and find output losses in the sending country, but note that the corresponding output gain in the receiving country may be larger. Barrell and others (2007) show overall output losses from emigration in many new EU member states, associated with the 2004 EU enlargement. But they also highlight positive effects in terms of GDP per capita, including in recipient countries over the long run. In a recent study on a sample of 18 Organisation for Economic Co-operation and Development (OECD) countries, Jaumotte and others (forthcoming) find that recipient advanced economies benefit from immigration in terms of GDP per capita and labor productivity in the long run (a 1 percentage point increase in the share of migrants in adult population raises GDP per capita by up to 2 percent). A meta study of the empirical literature on the effects of migration on income growth and convergence (Ozgen, Nijkamp, and Poot 2009) finds that the overall effect of net inward migration on growth in real per capita income tends to be positive. This also means that labor outflows tend to reduce the sending countries' GDP per capita, with the size of the impact depending on the persistence of emigration, as well as on the age and skill composition of migrants.

4.   Emigration can have adverse effects on per capita income growth and convergence, largely because of externalities. The neoclassical growth models suggest that emigration would reduce total output, but increase per capita income of sending countries and, therefore, would accelerate convergence. This is also similar to predictions of the factor-trade models (Heckscher and Ohlin 1991). However, the empirical findings, including those presented here, seem to be more in line with the endogenous growth theories and the new economic geography models that emphasize the benefits of agglomeration (see Ozgen, Nijkamp, and Poot 2009), which account for human capital externalities and low substitutability between skilled and unskilled workers. The work on endogenous growth suggests that welfare and productivity of those left behind may indeed decline if there are externalities associated with emigration. Specifically, emigration of high-skilled workers may lower the stock of human capital as well as the rate of return on capital and labor (Haque and Kim 1995). In the presence of human capital externalities, skilled emigration would reduce the productivity of those that stay behind, including from the negative total factor productivity (TFP) channel (Docquier, Ozden, and Peri 2014). Unlike unskilled labor, and physical and financial capital, skilled labor tends to earn higher economic returns where it is abundant—it has increasing returns to scale. Thus the emigration of such workers would confer large benefits on receiving countries, and would have disproportionately large negative impacts on productivity and economic outcomes in sending countries (World Bank 2009). Furthermore, the emigration of the young and skilled could also have non-economic externalities—it leads to the exit of those who could have been agents of change in improving the quality of institutions.

5.   This paper explores how emigration has affected economic outcomes and growth prospects in the CESEE sending economies (Figure 1), and discusses policy options. It should be noted that migration and remittances are difficult to measure at the aggregate level, as not all labor and remittance flows are recorded, and these data limitations may have implications for the results of our analysis (Annex I). With this caveat in mind, we find that (1) remittances have supported consumption and investment to some extent, but (2) the drain of the young and the skilled has

reduced private sector activity, external competitiveness and raised social spending in relation to GDP, and (3) as a consequence, emigration appears to have dampened growth in CESEE countries and slowed income convergence with advanced Europe. As emigrationpressures are likely to persist, CESEE countries will continue to face significant challenges, with some SEE and Baltic economies facing larger emigration pressures than other countries in the region. Our analysis highlights some of the issues that CESEE policymakers need to pay greater attention to so as to assess the effects of emigration on their economies. We also discuss how the EU, as a beneficiary of CESEE emigration, could support the efforts of CESEE countries in mitigating the negative effects of emigration on these countries' economic potential and convergence prospects.

Figure 1. Impact of Emigration on Sending Economy's Growth Prospects
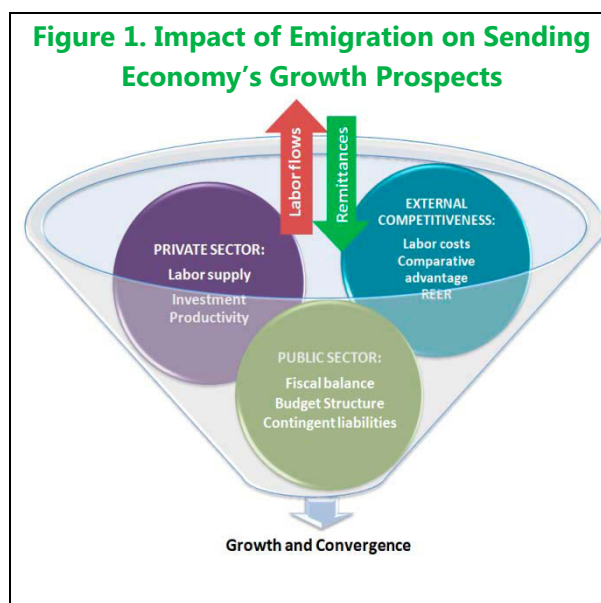
EMIGRATION FROM CESEE: LOOKING BACK

6.   **The scale of emigration from CESEE countries since the early 1990s has been staggering.** During the past 25 years, nearly 20 million people (5½ percent of the CESEE population) are estimated to have left the region (Figure 2).[6] By end 2012, Southeastern Europe (SEE) had experienced the largest outflows, amounting to about 16 percent of the early-1990s population. Emigration has also been persistent—annually, reaching as high as ½–1 percent of the 1990s population—and has tended to pick up following each new wave of EU expansion in 2004 (Estonia, Hungary, Latvia, Lithuania, Poland, Czech Republic, Slovak Republic and Slovenia), 2007 (Romania and Bulgaria), and 2013 (Croatia). The non-EU SEE (SEE-XEU) countries have seen easing access for their citizens for travel to Western Europe, and thus stay and work.[7]

7.   **Emigration significantly lowered population growth in sending countries, in some cases worsening already negative demographic trends.** Between 1990 and 2012, outward migration from SEE shaved off more than 8 percentage points from cumulative population growth. While these trends were partly offset by strong population growth in some CE-5 (CE-5 refers to the Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia) and SEE countries, emigration has aggravated already pronounced negative demographic trends in the Baltics and some Commonwealth of Independent States (CIS) countries. As a result, local populations in most countries in the region have been stagnant or shrinking.

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[6] Given data limitations, the cumulative flow of people could include instances of remigration.

[7] Owing to wars in parts of CESEE, including in the early 1990s, some people left their home countries as refugees.

Figure 2. Scale of Emigration from CESEE, 1990–2012

Sources: OECD International Migration Database, Eurostat, World Bank World Development Indicators, and IMF staff calculations.
Note: Data based on cumulative gross migration inflows from CESEE to OECD countries, including CESEE-OECD countries.
1/ Or earliest available.

8.   Western European countries have been the main destination for CESEE emigrants.
Every 8 in 10 CESEE migrants go to Western Europe, with Germany, Italy, and Spain receiving the bulk (nearly one-half) (Figure 3).[8] Outside of Europe, the United States is the main destination of CESEE emigrants, receiving about 1 in 10 emigrants.

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[8] Migration flows to Russia are likely understated given significant seasonal migration, related to harvest or construction workers, which is likely not captured.

Figure 3. The Geography of Emigration, 1990–2012

Emigrants from CESEE have mainly gone to Western Europe, with some heading east to Russia.

GNI Per Capita, 2012 1/
(Percent of euro area GNI per capita)

4 ▬▬▬▬▬ 300

Cumulative Emigration from
Sending Countries, 1999–2012 2/
(Percent of population in 1990) 2/

.31 → 11.7 ➜

RoW

Other CIS

Receiving Country	% of Total Flows
Top 5 Countries	72
Germany	41
Italy	11
USA	9
Spain	8
Austria	4
Rest of Europe	21
Rest of the World	6

Sources: Eurostat, OECD International Migration Database, World Bank World Development Indicators, and IMF staff calculations.
1/ 2010 data used for CYP, HUN, LVA, SVK, SVN; 2011 data used for SRB.
2/ Or earliest available.
Note: Arrows represent the top three destinations of bilateral emigration flows (1) from each of the top 10 (scaled by population) sending countries and (2) to Russia. Arrows are computed based on OECD migration data, except migration to Russia, which is based on Eurostat migration data. Other CIS = ARM, AZE, GEO, KAZ, KGZ, TJK, TKM, and UZB.

9.   Intra-regional migration in CESEE has been significant as well. Russia experienced sizable migrant inflows, primarily from other CIS countries, notably Ukraine (Annex II). Furthermore, some of the countries in Central Europe have attracted immigrants from the rest of CESEE even as they themselves have seen their own citizens emigrate to richer European economies over the past 25 years. Czech Republic, Hungary, and Slovenia registered positive net cumulative migration (Figure 4).[9]

10.   Differences in per capita income levels, quality of institutions, and employment prospects are among the key determinants of the direction and scale of migration. Countries with lower initial levels of per capita income experienced larger net outward migration during

Figure 4. Migration versus Income Level

Poorer countries experienced larger emigration.

Net Migration versus Income Levels

y = 11.5 ln(x) - 110
R² = 0.60

Sources: Eurostat, World Bank World Development Indicators, and IMF staff calculations.

the past 25 years. At the same time, Western European countries with higher per capita incomes attracted more migrants than their less wealthy neighbors. The analysis can be extended further by using gravity models to explore economic push and pull factors behind bilateral migration flows (Figure 5).[10] This analysis suggests that *cyclical factors*, such as differences in economic conditions and unemployment gaps (differences in unemployment rates) between receiving and sending countries, are important in explaining both skilled and unskilled migration patterns. But *structural factors* tend to influence migration flows as well. Our analysis suggests that the quality of institutions matters more for skilled migrants, whereas unskilled migrants appear to be attracted by more generous social benefits in the receiving countries.[11] Furthermore, the lifting of barriers to cross-border labor flows, as was witnessed with the 2004 and 2007 waves of EU enlargement, and the easing of visa restrictions for SEE countries, played an important role. Common language may have also played a role for intra-CIS migration. The experiences of CESEE countries have some similarities with the earlier experiences with emigration and immigration of other European countries. For example, Portugal also saw a pick-up in net labor outflows following its entry into the EU, but net flows turned positive after it started attracting migrants from other countries, including CESEE (Annex III).

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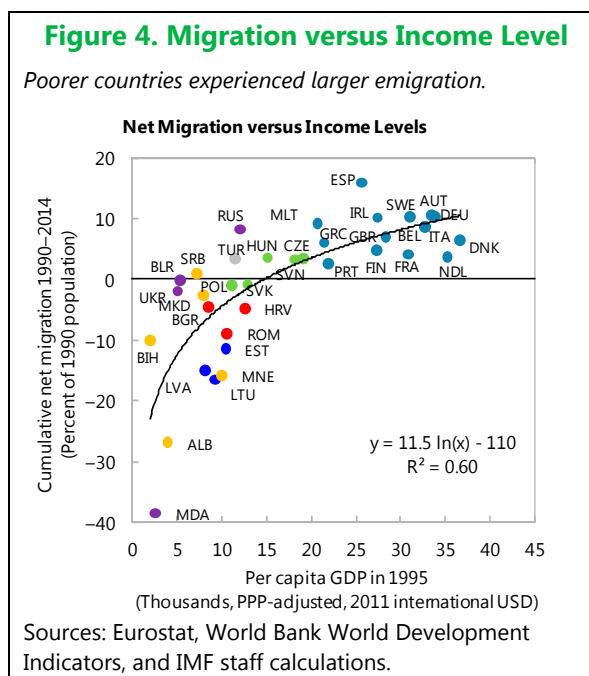
[9] It is also worth noting that there has been temporary seasonal migration in parts of CESEE, whereby migrants find seasonal employment outside their home country during the harvest and construction seasons (Piracha and Vadean 2009).

[10] Gravity models provide a useful framework to model bilateral drivers of emigration, but may not fully control for remaining endogeneity of the explanatory variables.

[11] Recent empirical studies (for example, Cooray and Schneider 2016) have also found a strong effect of weak institutions and governance on the emigration of skilled workers.

Figure 5. Migration: Push-and-Pull Factors

Both structural and cyclical factors affected emigration.

Determinants of Bilateral Emigration of Unskilled Workers
(Sending countries: CESEE; Receiving countries: OECD)

Determinants of Bilateral Emigration of Skilled Workers
(Sending countries: CESEE; Receiving countries: OECD)
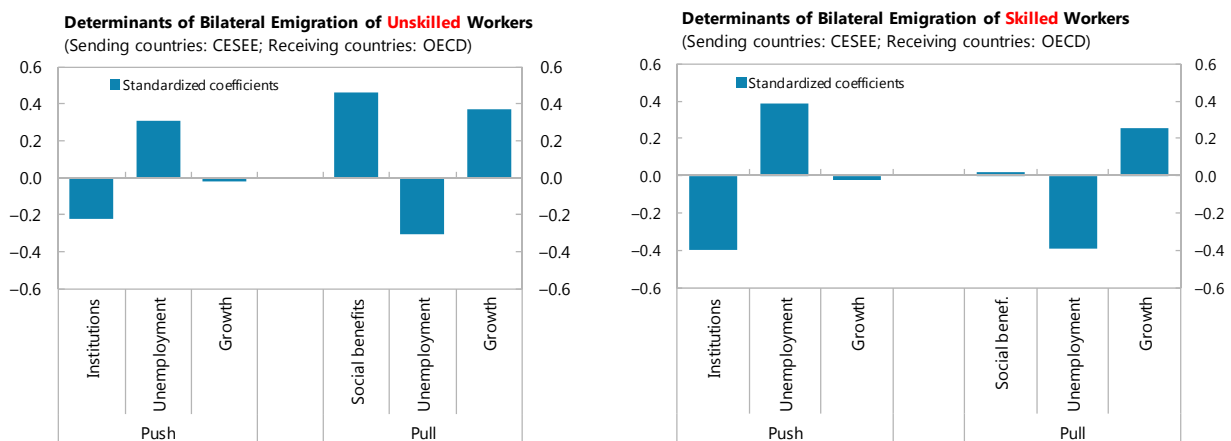
Source: IMF staff estimates.

Note: To account for differences in the range and variance of the independent variables and allow a comparison of their respective impacts, we report standardized coefficients of the statistically significant explanatory variables. The standardized coefficients are computed by multiplying the unstandardized coefficients by the ratio of the standard deviations of the independent variable and dependent variable. The interpretation of the standardized effects is straightforward: A 1 standard deviation change in X results in a # standard deviation increase in the dependent variable. The sending countries sample is restricted to CESEE countries while receiving countries are OECD. Estimates are based on panel data gravity models of low and high cumulative outward emigration growth over non-overlapping subperiods of 5 years from 1990 to 2010. Additional control variables for sending and receiving countries are: real GDP per capita, population, countries, and year fixed effects.

11. **Emigrants have generally been younger than the populations they left behind.** In 2010, about three-quarters of emigrants were of working age (15 to 64 years old)—above the share of working-age people in the CESEE population at large (Figure 6). The difference was particularly large in SEE countries, while this was not prevalent in CE-5.

Figure 6. Age and Education
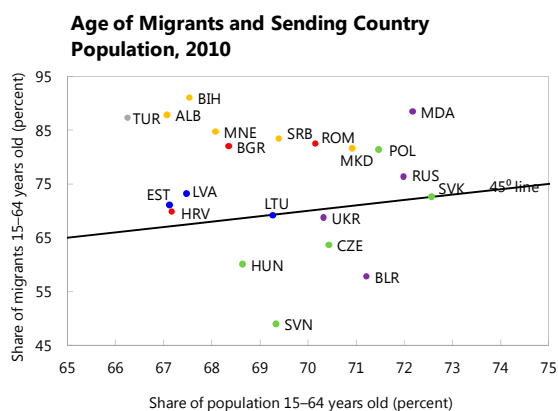
Emigrants have generally been younger...   *...and better educated than the population.*
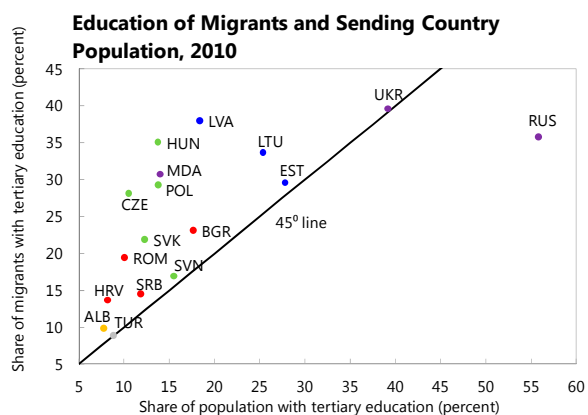
Age of Migrants and Sending Country Population, 2010

Education of Migrants and Sending Country Population, 2010

Sources: OECD Database on Immigrants in OECD Countries 2010, World Bank World Development Indicators, and IMF Staff calculations.

12.   Emigrants' education levels tended to be higher than their home country averages. As of 2010, the share of emigrants from the Czech Republic, Hungary, Latvia, and Poland with tertiary education was well above the equivalent ratio in the general population (Figure 6) and has been increasing over time (Figure 7).[12] For Croatia and Romania, which have already low shares of people with tertiary education in the population, the *brain drain* from emigration may have had particularly important implications for productivity. As discussed later, the prevalence of better-educated and working-age people among emigrants leaving CESEE countries has significantly reduced the supply of skilled labor and contributed to fiscal burdens arising from the higher dependency ratio.

Figure 7. Stock of Emigrants by Skill Level

Sources: Brücker, Capuano, and Marfouk (2013), World Bank World Development Indicators, and IMF staff calculations.
Note: Data are based on the stock of foreign-born individuals aged 25 years and older, living in 20 non-CESEE OECD countries; hence this figure captures net migration numbers (unlike Figure 2, which captures gross migration outflows to all OECD countries and, and differs from Figure 4, which is based on cumulative net migration flows as imputed from population surveys and registers).

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[12] Computed based on the stock of citizens from a given CESEE country living abroad in an OECD country.

13.   Emigration of better-educated people has been associated with weaker governance.
There seems to be a significant negative association between the stock of tertiary-educated
migrants (as a percentage of population) in 2000 and the present-day quality of governance
(Figure 8).[13] Control of corruption, voice and accountability, rule of law, and government
effectiveness indicators are currently all notably weaker in SEE countries, which also faced larger
outflows of better-educated people in earlier years than CE-5 and Baltic countries. As better
educated people are more likely to demand and drive change in societies, this is suggestive of a
negative feedback loop from permanent high-skill emigration to weaker governance that, in turn,
has likely fueled more outflows of better educated people. Weaker governance likely also
discourages the entry of foreign talent leading to an adverse balance of outflows and inflows of
talent, which undermines long-term growth prospects (Ariu and Squicciarini 2013).

**14.   Notwithstanding the staggering scale of emigration, return migration appears to have
been limited.** While no consistent data on return migration are available for CESEE countries,
estimates based on bilateral inflows of foreign citizens suggest that only a modest fraction of
emigrants have returned to their home countries, with higher-income countries registering a
somewhat larger inflow. Specifically, return migration to SEE and the Baltic countries from Western
Europe and the United States may have been less than 5 percent of total emigration from SEE and
the Baltics during 1998–2013 (assuming that the inflow of foreign citizens to CESEE countries
corresponds to return migration). That said, alternative estimates based on the U.K. data point to
larger numbers of return migrants. While return migration may have been small to date, it may be
still unfinished since many CESEE emigrants who left their home countries over the past 20 years
were young. Thus return migration may pick up in the years ahead as the emigrants get older.
Nonetheless, to the extent that migration from CESEE has largely been permanent, the transfer of
knowledge from return migrants—*brain gain*—to the local population may be limited.

**15.   Alongside the labor outflow, the inflow of remittances has become important in many
CESEE countries, particularly in low-income ones.** Bilateral remittance inflows to SEE-XEU
countries (largely from Austria, Germany, and Italy) and to CIS countries (largely from Russia) are
sizeable (Figure 9). In Moldova, remittances accounted for about 25 percent of GDP in 2012, while in
Bosnia and Herzegovina, Kosovo, and Montenegro, remittances exceeded 8 percent of GDP.
Furthermore, notwithstanding the more modest migration flows to non-European countries,
remittance flows from the rest of the world (largely from other high-income countries such as the
United States and Canada) were significant, particularly for a few countries (for example, Latvia).[14]
These differences in geography and volume of remittances are likely related to many factors,
including differences in the strength of emigrants' ties with their home countries—not least related
to whether individuals or entire families have emigrated—and the degree of their integration in
receiving countries.

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[13] This link is confirmed by a significant negative association—controlling for initial conditions—between the stock of
tertiary-educated migrants in 2000 and 2000–14 changes in governance quality indicators.

[14] Remittances to Latvia from the rest of the world include those from Australia, Canada, the United States, and New
Zealand.

Figure 8. Governance Quality

Emigration of well-educated people has been associated with weaker governance quality.

Control of Corruption

Voice and Accountability

Rule of Law

Government Effectiveness
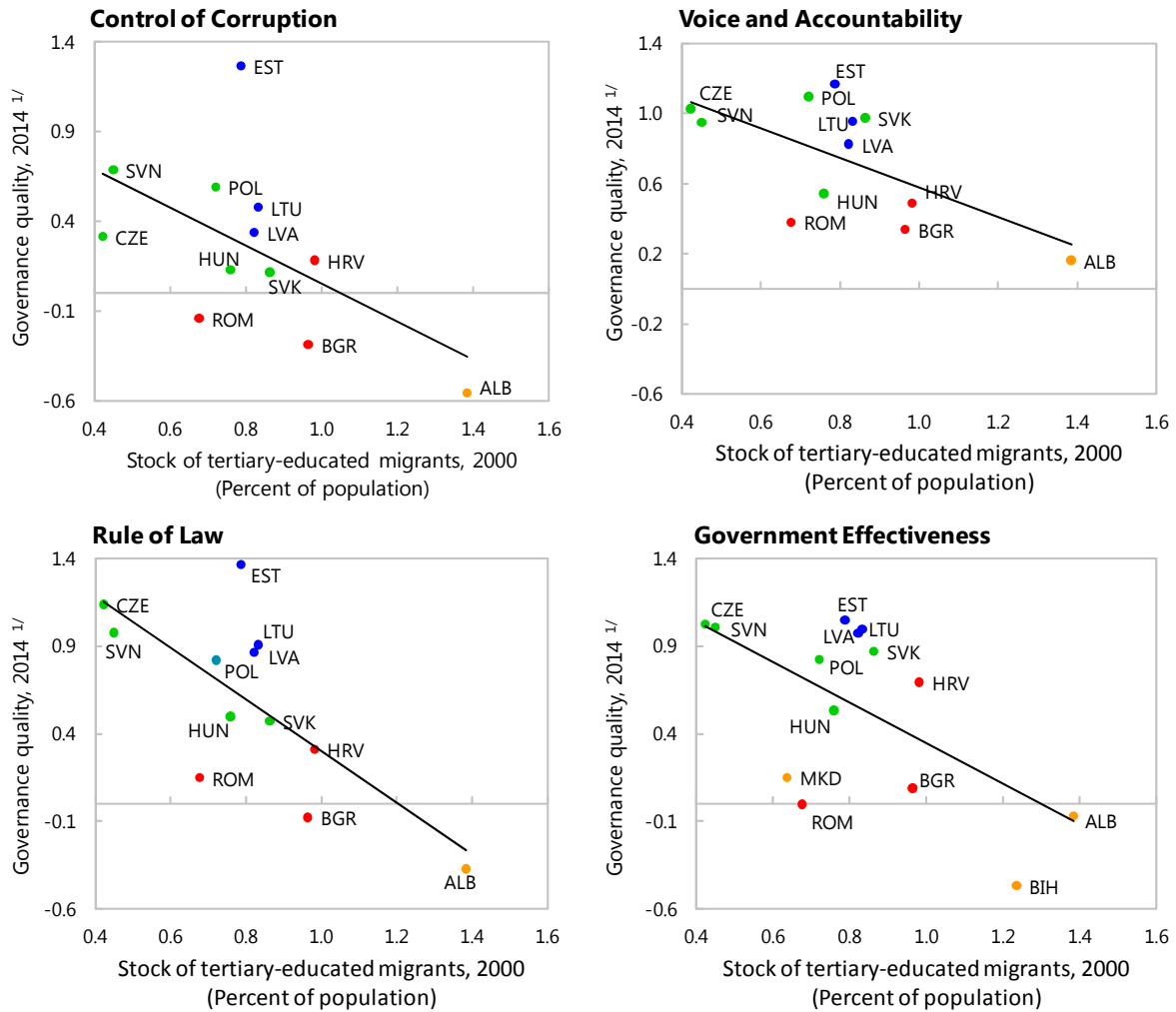
Sources: World Bank Worldwide Governance Indicators, World Bank World Development Indicators, OECD Database on Immigrants in OECD Countries 2010, IMF World Economic Outlook, and IMF staff estimates.

1/ Estimate of governance (ranges from approximately –2.5 (weak) to 2.5 (strong) governance performance).

Figure 9. The Geography of Remittances, 1990–2012

Significant inflows of remittances reflect earlier migration outflows from the region.
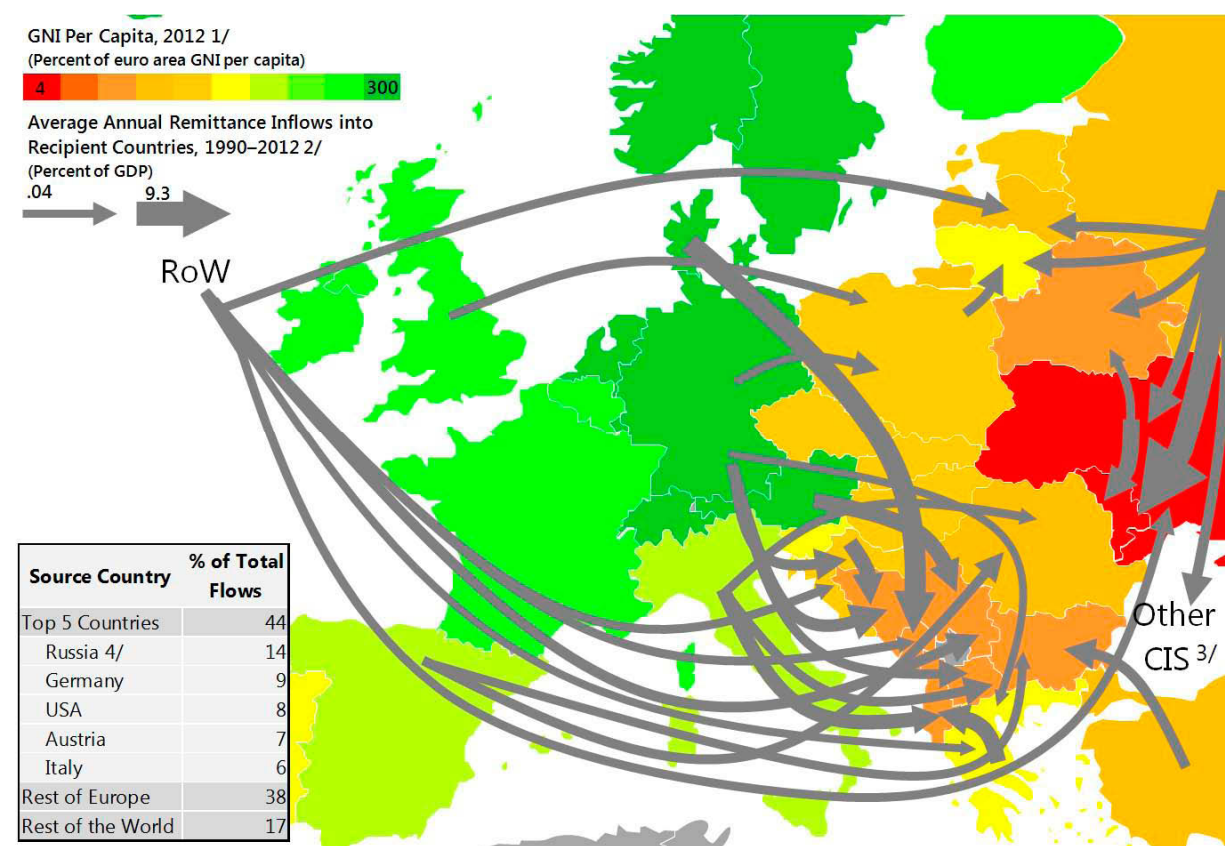
GNI Per Capita, 2012 1/
(Percent of euro area GNI per capita)

4 ▭ 300

Average Annual Remittance Inflows into
Recipient Countries, 1990–2012 2/
(Percent of GDP)
.04   9.3

RoW

Other CIS 3/

Source Country	% of Total Flows
Top 5 Countries	44
Russia 4/	14
Germany	9
USA	8
Austria	7
Italy	6
Rest of Europe	38
Rest of the World	17

Sources: OECD International Migration Database, World Bank World Development Indicators, World Bank Migration and Remittances Database, and IMF staff calculations.
Note: Arrows represent the top two sources of bilateral remittance flows (1) to each of the top 15 (scaled by GDP) remittance-receiving countries and (2) to other CIS countries from Russia.
1/ 2010 data used for CYP, HUN, LVA, SVK, SVN; 2011 data used for SRB.
2/ Or earliest available.
3/ Other CIS = ARM, AZE, GEO, KAZ, KGZ, TJK, TKM, and UZB.
4/ Russia's prominence as a source of remittances but less so as a migration destination suggests that migration flows to Russia may be understated in OECD and Eurostat data, likely reflecting a failure to account for large flows of seasonal workers from CIS countries (see Annex II).

IMPACTS ON PRIVATE SECTOR ACTIVITY, EXTERNAL COMPETITIVENESS, GROWTH AND CONVERGENCE

A. Private sector activity

16.   Emigration can have profound effects on labor and financial outcomes in sending economies. Outflow of skilled labor can result in a brain drain, thereby affecting productivity (Bhagwati 1976, Burns, and Mohapatra 2008) and remittances may reduce the supply of labor by raising reservation wages (Amuedo-Dorantes and Pozo 2006). However, remittances may help boost private investment in physical and human capital by alleviating credit constraints (Léon-Ledesma and Piracha 2004, Giuliano and Ruiz-Arranz 2009). They may also result in financial deepening and intermediation (Demirgüç-Kunt and others 2011, Aggarwal and others 2011).

17.   In CESEE, 25 years of emigration has exacerbated shortage of high-skilled labor, while remittances may have reduced the recipients' incentives to work. A panel regression analysis, which controls for the effects of demand for skills, points to a positive association since 2000 between the emigration of workers with tertiary education and the shortage of such workers in CESEE (Figure 10). In fact, emigration of workers with terti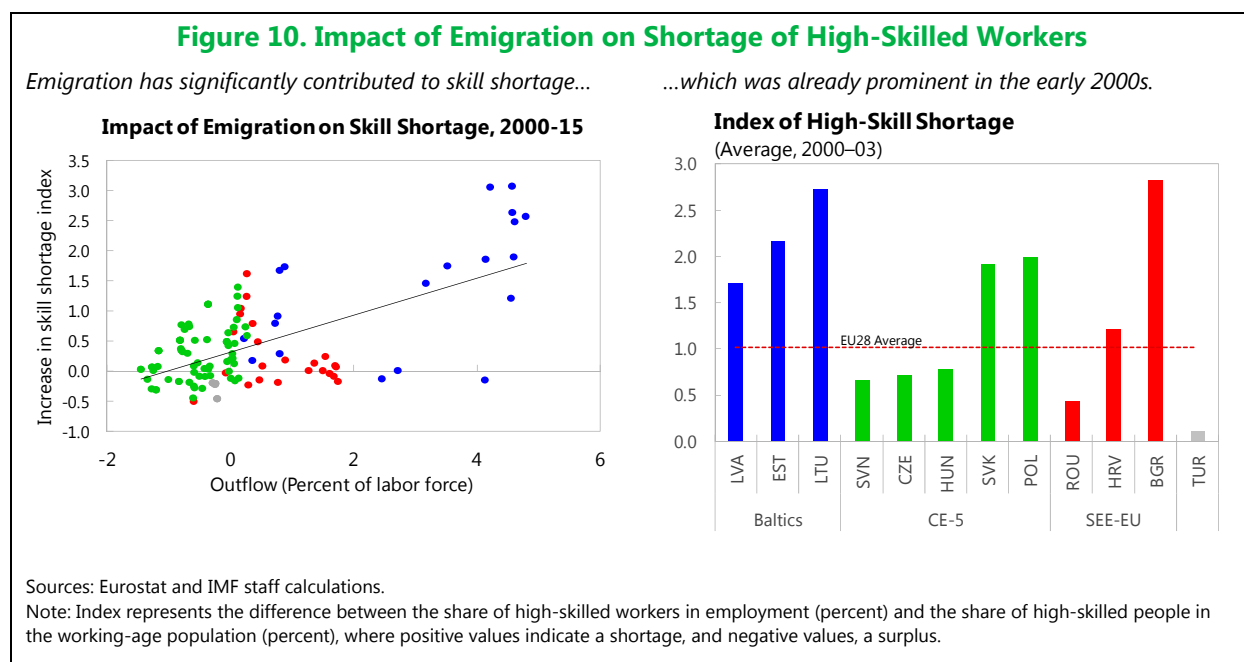ary education may have aggravated the shortage of highly-skilled labor that existed in the early 2000s.[15] The impact of high-skilled emigration on skill shortage is particularly acute in the Baltic and SEE-EU countries. Remittances may have had an important bearing on labor market transitions in CESEE, in that they may influence the decision to look for a job and accept employment. Higher remittance receipts are associated with significantly higher probability of a person deciding not to join the labor market, possibly reflecting a relaxation of the budget constraint coupled with an increase in the reservation wage. A 1 percent of GDP increase in remittance inflows is associated with about 3 percentage points and 2 percentage points increase in the economy-wide inactivity rate in SEE-XEU and CE-5, respectively (Figure 11, and Annex IV).

18.   Not surprisingly, emigration has lowered potential growth in CESEE. It has dampened average annual working-age population growth by about ½–1 percentage point since 1990—implying that the labor supply could have been 10–20 percent greater than observed (Figure 12 and Annex IV)—with particularly pronounced effects in SEE and the Baltics. An augmented growth accounting exercise, accounting for net migration, reveals that about two-thirds of CESEE countries witnessed lower GDP growth either on account of migration-induced loss of labor or worsening skill composition (though these dynamics were partially masked by other, non-migration related, shifts in the labor force). Specifically, migration shaved off 0.6–0.9 percentage points of annual growth rates in some countries in SEE (Albania, Montenegro, and Romania) and the Baltics (Latvia and Lithuania)

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[15] Skill shortage (or excess) is defined as the difference between the demand for a skill—the share of skill i in employment—and supply of that skill—the share of skill i in working-age population (Estevão and Tsounta 2011, ECB 2012).

during 1999–2014. About two-thirds of these losses can be ascribed to the direct impact of emigration on the labor supply, with the rest from skill deterioration.[16]

Figure 10. Impact of Emigration on Shortage of High-Skilled Workers

Emigration has significantly contributed to skill shortage...   *...which was already prominent in the early 2000s.*

Impact of Emigration on Skill Shortage, 2000-15

Index of High-Skill Shortage
(Average, 2000–03)

Sources: Eurostat and IMF staff calculations.
Note: Index represents the difference between the share of high-skilled workers in employment (percent) and the share of high-skilled people in the working-age population (percent), where positive values indicate a shortage, and negative values, a surplus.

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19.   On the plus side, remittances appear to have promoted investment and, in some cases, supported consumption and facilitated financial deepening. Our cross-country estimates (that control for the endogeneity of remittances, see Annex IV), suggest that in countries that depend heavily on remittances (where the remittance-to-GDP ratio exceeds 10 percent), remittances played a crucial role in financial deepening (measured as private credit or deposit in percent of GDP) as well as in supporting private sector activity (Figure 11). We also find some impact of remittances on private investment, suggesting an easing of collateral constraints and high lending costs for entrepreneurs. These positive effects of remittances may diminish in the future, however, as emigration becomes more permanent. Furthermore, while remittances have likely played an important role in reducing poverty, they may have also contributed to greater inequality and reduced incentives for governments to carry out structural reforms.

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[16] Annual economic growth in Russia and Turkey was higher by about 0.3 percentage point because of inward migration from neighboring countries. About half of the effect in Turkey was attributed to changes in skill composition. Slovenia, Hungary, and the Czech Republic have also benefitted from labor inflows, though the growth impact there was dampened by the loss of skilled emigrants.

Figure 11. Remittances and Private Sector Activity

Remittances are associated with lower employment and labor force participation...

...but less so in CE-5 countries.

SEE-XEU

CE-5

Remittances (percent of GDP)

Remittances (percent of GDP)

Employment probability   Unemploment probability   Inactivity probability
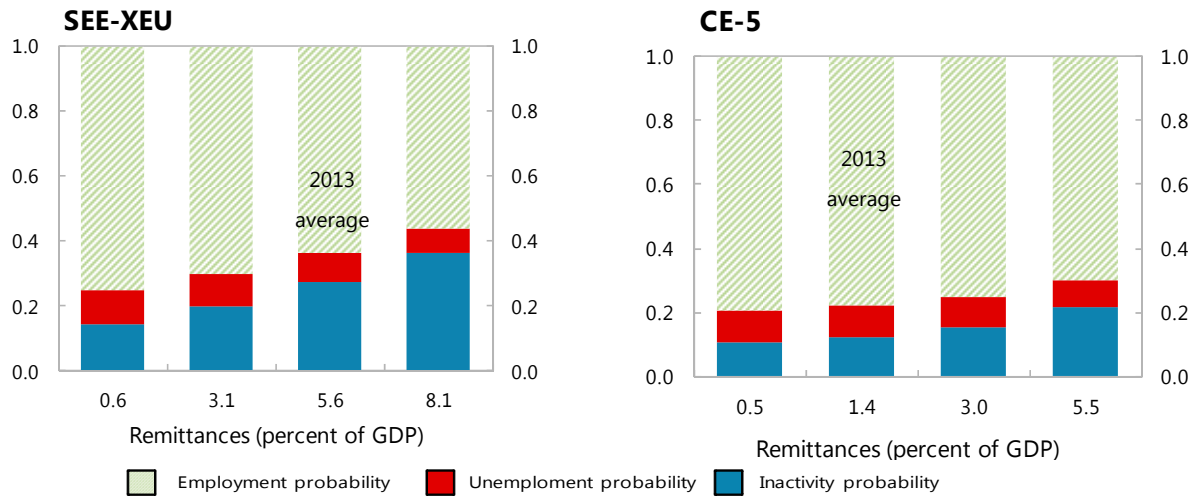
Sources: National Labor Force Surveys and IMF staff calculations.
Note: See EUR REI Special Report (March 2015) for empirical model and methodology. Probabilities are calibrated for a married person with a university degree; and with macroeconomic indicators, labor market characteristics, and EBRD transition indicators at SEE-XEU or CE-5 average levels in 2013.

Remittances support financial deepening, consumption, and investment in countries with high remittances...

...but have limited impact in the rest of the CESEE.

Contributions of Remittances, High Remittance Receiving Countries 1/
(Percent of GDP)

Contributions of Remittances, Rest of CESEE 2/
(Percent of GDP)

Private deposits   Private consumption   Private invesment

Private deposits   Private consumption   Private invesment

Residuals   FDI and portfolio flows   Remittance flows   ◆ Total
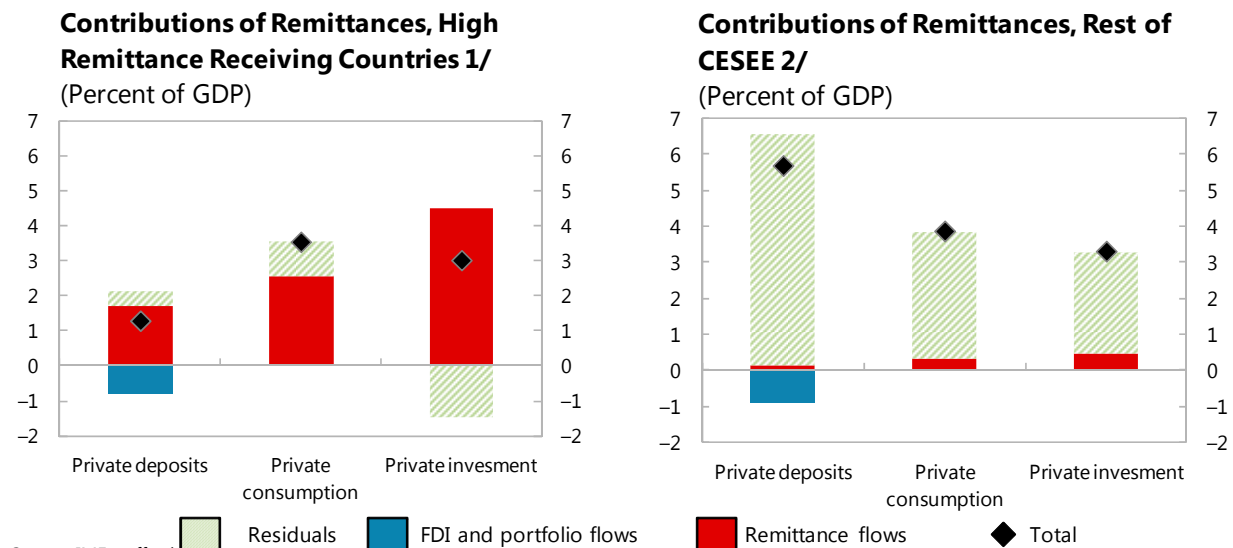
Source: IMF staff calculations.
1/ Remittances greater than 10 percent of GDP. Includes ALB, BIH, KOS, MDA, and MNE.
2/ Remittances less than 10 percent of GDP.

Figure 12. Impact of Emigration on Labor Supply and Growth

Emigration lowered the working-age population...

Contributions of Outward Migration to Working-Age Population Growth
(Average compound annual growth rate, 1990–2012 1/)

...affecting labor supply, skill composition, and growth.

Labor and Migration Contributions to GDP Growth
(Percent, average 1999–2014)

Sources: OECD Database on Immigrants in OECD Countries 2010, World Bank World Development Indicators, and IMF staff calculations.
1/ Or earliest available.

Sources: Eurostat and IMF staff calculations.

B. Competitiveness

20.   Emigration can worsen competitiveness through several channels. First, the reduction in the workforce could result in upward pressure on domestic wages (Mishra 2015) and the large outflows of skilled labor could lower productivity in the presence of human capital externalities and low degree of substitutability between skilled and unskilled workers. Second, as seen earlier, remittance inflows may increas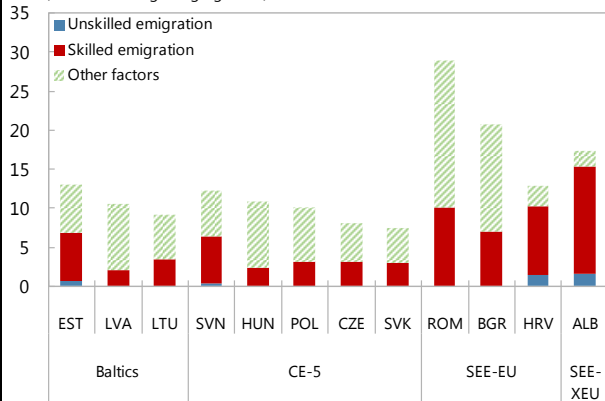e the reservation wage and reduce labor supply. Third, large remittance inflows may result in real exchange rate appreciation in the (remittances) receiving country (Chami and others 2008, Barajas and others 2011), adversely affecting the tradable sector (Acosta and others 2009, Amuedo-Dorantes and Pozo 2004). When these effects are large, emigration can reduce output growth and exacerbate incentives to emigrate.

21.   Emigration has increased wages and worsened productivity in the CESEE region. (Figure 13). Countries that have experienced significant outflows of skilled workers (the Baltics and SEE countries) have also seen greater upward pressures on domestic wages. Low substitutability between skilled emigrants and natives in the sending countries and higher reservation wages associated with remittances may have contributed to this outcome. In addition, increasing opportunities to work abroad may in the short term have strengthened workers' bargaining power in the labor market. Real labor productivity has also been negatively affected by skilled labor outflows. A counterfactual analysis indicates that cumulative real labor productivity growth in CESEE countries would have been about 6 percentage points higher in the absence of emigration during 1995–2012. The effects are particularly pronounced in SEE countries. Furthermore, emigration of skilled workers appears to have lowered TFP in sending countries, a finding that is consistent with the presence of negative externalities from the outflow of skilled labor. A counterfactual analysis indicates that cumulative TFP growth in CESEE countries would have been about 2.5 percentage points higher in the absence of skilled emigration during 1995–2012. The result is robust to the use of instrumental variables for emigration, and to controlling for other determinants of TFP growth (Annex IV).

Figure 13. Emigration and Competitiveness

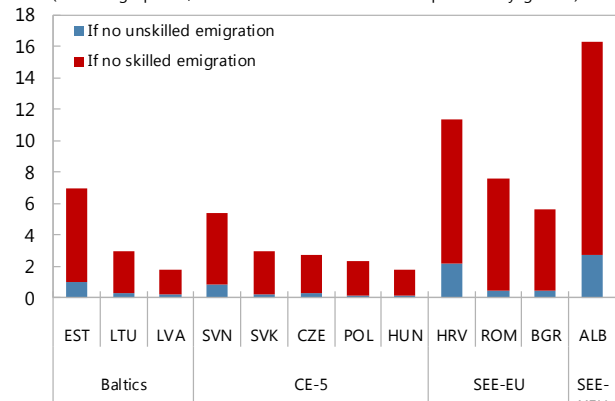*Skilled emigration has increased domestic wages....*

CESEE-EU: Contribution to Nominal Wage Growth, 1995–2012
(Percent; average wage growth)

*...and lowered labor productivity.*

Emigration and Real Labor Productivity Growth, 1995–2012
(Percentage points; additional cumulative real labor productivity growth)

Sources: International Labour Organization, Brücker and others (2013), Haver Analytics, and IMF staff calculations.
Note: The decomposition is based on an instrumental econometric model fitting the log of domestic average wages (from ILO) on the total emigration, unskilled emigration, and skilled emigration expressed in percent of total population, where skilled emigration captures emigration of people with at least secondary education. Control variables include lagged wage level, GDP growth, inflation rate, and country-fixed effects. The sample focuses on EU countries for which data are available.

Sources: International Labour Organization, WEO, Brücker and others (2013), and IMF staff calculations.
Note: The decomposition is based on an instrumental econometric model fitting real labor productivity growth on total emigration, unskilled emigration, and skilled emigration expressed in percent of total population, in which skilled emigration captures emigration of people with at least secondary education. Control variables include trade openness, FDI-to-GDP, government size, and inflation rate. The sample focuses on EU countries for which data are available.

Remittances have led to appreciation of the REER....

Remittances and REER Appreciation in CESEE
(Using data from 2000–14)
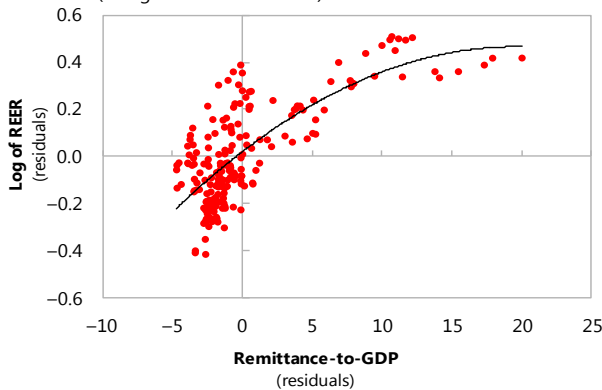
...shrinking the manufacturing sector.

Remittances and Sector Reallocation
(Percent; using data from 2000–13)
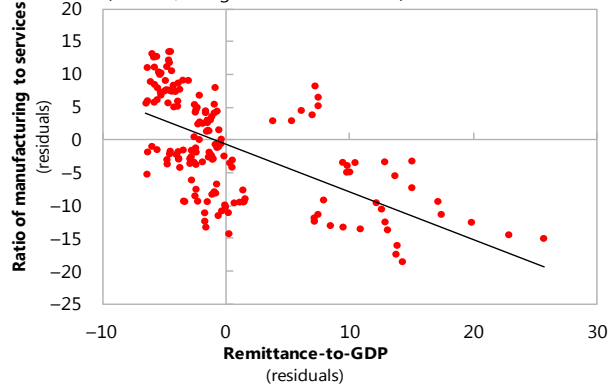
Sources: World Bank Migration and Remittances Database and IMF staff calculations.
Note: The logarithm of REER and remittance-to-GDP residuals are from panel regressions using annual data from 1995 and 2014. Controls include real per capita income, government size, FDI-to-GDP and exports-to-GDP ratios, and country fixed effects.

Sources: World Bank Migration and Remittances Database and IMF staff calculations.
Note: The manufacturing-to-service and remittance-to-GDP residuals are from panel regressions using annual data from 1980 and 2013. Controls include credit-to-GDP, terms of trade, exports-to-GDP, GDP growth, country and year dummies. Due to data limitations, the analysis does not control for the skill composition of emigrants.

22.   The worsening of the wage-productivity growth gap is consistent with several findings of the paper. First, the strong negative relationship found between the share of better-educated emigrants and subsequent domestic institutional quality development is one of the channels through which skilled emigration might be detrimental for productivity. Second, the persistent shortage of high-skilled labor combined with increased reservation wages are consistent with the

positive effect of emigration on domestic wages. Third, part of the adjustment is found to take place in the form of real effective exchange rate (REER) appreciation (see below).

23.   Remittance inflows have tended to weigh on competiveness, shrinking the tradable sector. Our empirical analysis points to a significant and positive relationship between remittance inflows and the appreciation of the real effective exchange rate, consistent with the findings in the literature (Figure 13). Specifically, a 1 percentage point increase in the remittance-to-GDP ratio is found to appreciate the real effective exchange rate by 4 percent. This has been associated with lower competitiveness in the tradable sector (proxied here by manufacturing), reducing its relative importance in sending countries.[17]

C.   Growth and income convergence

24.   Overall, emigration has lowered growth and slowed income convergence. Empirical analysis suggests that in 2012, cumulative real GDP growth would have been 7 percentage points higher on average in CESEE in the absence of emigration during 1995–2012, with skilled emigration playing a key contributing factor (Figure 14 and Annex IV)[18]. In turn, this has slowed per capita income convergence, in particular in SEE countries (Albania, Bulgaria, Croatia, and Romania), which had a high share of young and skilled emigrants in their populations. Significant effects are also observed in the Baltics (Estonia, Lithuania) and in Slovenia. On average, CESEE countries would have reduced their per capita income gap with EU28 by an additional 5 percentage points by 2014 in the absence of skilled emigration during 1995–2012. That said, inflow of labor to some CESEE countries, even if they have been of lower skill levels, has, likely, partly mitigated adverse effects of the outflow of, in particular, skilled labor.

25.   The estimated adverse impact on growth and convergence is somewhat less pronounced when a broader measure of national income is employed (one that includes remittance flows from nationals residing abroad). Analysis based on GDP, which does not include remittance inflows, could overestimate the negative impact of emigration on sending countries' welfare, since it would not fully account for the beneficial role of remittances. Indeed, analysis based on gross national income (GNI), finds marginally smaller adverse effects of emigration on growth and convergence, particularly in countries that saw large remittance inflows. The analysis suggests that in 2012, cumulative real GNI growth in CESEE would have been 5 percentage points higher on average if there had been no emigration during 1995–2012 (also because of emigration of skilled labor), compared to 7 percent higher GDP growth. Using GNI instead of GDP leads to notably smaller estimated impact of emigration for Albania and Croatia (Figure 14). Skilled emigration is also found to be associated with slower convergence in GNI per capita, but the negative impact on convergence is smaller than with GDP per capita. On average, CESEE countries would have reduced their GNI per-capita income gap with EU28 by an additional

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[17] There is evidence that large inflows of remittances have fueled surges in residential property prices in remittance-receiving countries (Stepanyan, Poghosyan, and Bibolov 2010), providing another channel through which emigration through remittances can induce resource misallocation within countries and increase financial stability risks.

[18] Results are based on the stock of foreign-born individuals aged 25 years and older, living in 20 non-CESEE OECD countries (as shown in Figure 7). Hence, these estimates may underestimate the full impact of emigration on growth.

2 percentage points by 2014 in the absence of skilled emigration during 1995–2012, compared to 5 percentage points when using per capita GDP.

IMPACT ON FISCAL OUTCOMES

26.   Emigration and associated remittances can have important implications for fiscal revenue and expenditure. Reduced economic activity from labor outflows could dampen tax revenue (Gibson and McKenzie 2012), while remittance inflows could raise consumption-based tax receipts or reduce labor tax revenue by affecting labor decisions (Ebeke 2010, Amuedo-Dorantes and Pozo 2006). The older population left behind could put pressure on pension and health spending (Clements and others 2015). At the same time, reduced cost of funds associated with remittance inflows could support higher levels of public consumption and debt (Chami and others 2008).

27.   The net impact of emigration on the overall fiscal position in CESEE has been small and likely short-lived. Empirical analysis shows that both average public debt and cyclically-adjusted budget deficits in CESEE may have worsened only slightly as a result of emigration. The magnitude of the cumulative impact during 1990–2012 appears to have been small and statistically insignificant—a higher debt-to-GDP ratio of 1.5 percent and a higher deficit-to-GDP ratio of 0.4 percent (Figure 15). Time series analysis suggests that this mild impact of emigration on the fiscal balance tapers off quickly over time. These findings also reflect the effects of countries' policy responses to emigration.

28.   However, emigration has been associated with larger governments relative to the size of affected economies and has changed the budget structure. Emigration during 1990–2012 has been linked to an average increase of overall government spending relative to GDP in CESEE by 6.2 percentage points. In line with earlier findings, our empirical analysis shows that, relative to GDP, emigration has been associated with higher spending on social benefits[19] and public consumption and higher consumption-based tax revenue, but lower income tax. Furthermore, emigration appears to be accompanied by increased social contribution revenue relative to GDP, partly reflecting the net impact of higher wages and unemployment, and higher labor tax wedge (see below) associated with emigration and remittances.

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[19] This is the estimate of the net impact of emigration on total social benefits spending relative to GDP, which takes into account the impact of emigration on both unemployment benefits spending and other types of social benefits spending such as pension spending. Unemployment benefits spending relative to GDP can be affected by emigration via several channels. Emigration of unemployed people can reduce fiscal costs related to the unemployment benefits. Remittances inflow, however, can increase reservation wage and push up unemployment rate. Additionally, the negative impact of emigration on GDP growth and productivity also plays an important role when assessing spending levels relative to GDP. Nevertheless, the net impact of emigration on unemployment benefits spending cannot be separately identified due to data limitations.

Figure 14. Emigration, Growth, and Income Convergence

Overall, skilled emigration has lowered output growth...
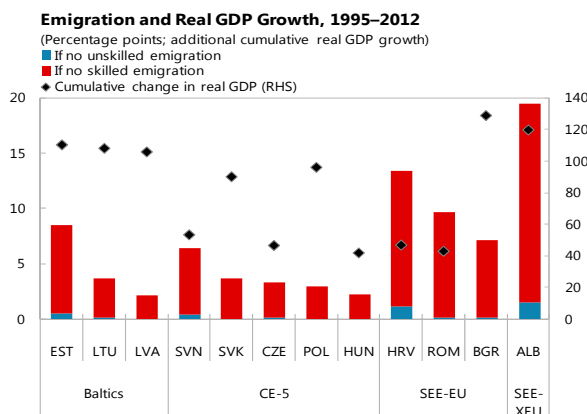
Emigration and Real GDP Growth, 1995–2012
(Percentage points; additional cumulative real GDP growth)
- If no unskilled emigration
- If no skilled emigration
- Cumulative change in real GDP (RHS)

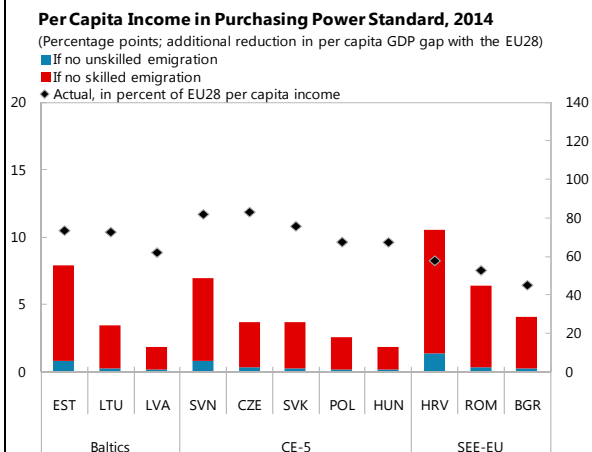*...even after accounting for net receipt of factor income.*

Emigration and Real GNI Growth, 1995–2012
(Percentage points; additional cumulative real GNI growth)
- If no unskilled emigration
- If no skilled emigration
- Cumulative change in real GNI (RHS)

Sources: World Economic Outlook, World Bank World Development Indicators, Brücker and others (2013), and IMF staff calculations.
Note: The decomposition is based on instrumental econometric models fitting real GDP growth on the total emigration, unskilled emigration, and skilled emigration expressed in percent of total population, where skilled emigration captures emigration of people with at least secondary education. Control variables include trade openness, inflation, population, and FDI-to-GDP. The sample focuses on EU countries for which data are available.
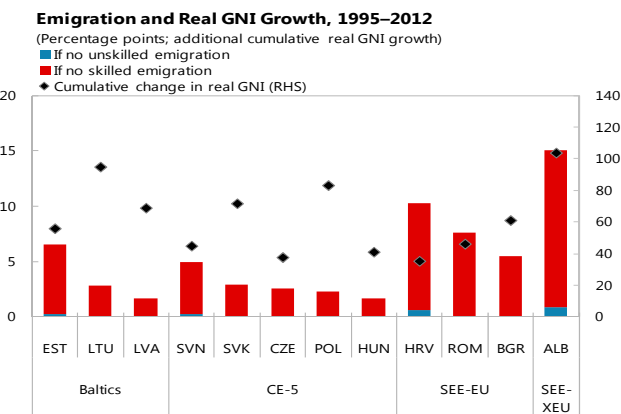
Sources: World Economic Outlook, World Bank World Development Indicators, Brücker and others (2013), and IMF staff calculations.
Note: The decomposition is based on instrumental econometric models fitting real GNI growth on the total emigration, unskilled emigration, and skilled emigration expressed in percent of total population, where skilled emigration captures emigration of people with at least secondary education. Control variables include trade openness, inflation, population, and FDI-to-GDP. The sample focuses on EU countries for which data are available.

Emigration has slowed per capita GDP convergence...

Per Capita Income in Purchasing Power Standard, 2014
(Percentage points; additional reduction in per capita GDP gap with the EU28)
- If no unskilled emigration
- If no skilled emigration
- Actual, in percent of EU28 per capita income

...and GNI per capita convergence to the EU28 average.

Per Capita GNI in Constant $US, 2014
(Percentage points; additional reduction in per capita GNI gap with the EU28)
- If no unskilled emigration
- If no skilled emigration
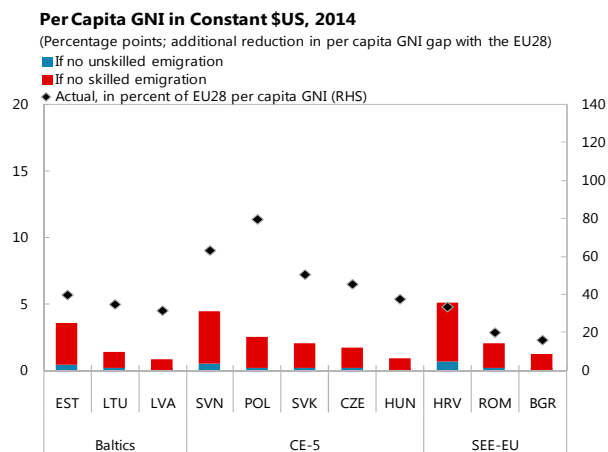- Actual, in percent of EU28 per capita GNI (RHS)

Sources: Eurostat and IMF staff calculations.
Note: The decomposition is based on instrumental econometric models fitting real GDP growth per capita on the total emigration, unskilled emigration, and skilled emigration expressed in percent of total population, where skilled emigration captures emigration of people with at least secondary education. Control variables include initial per capita income, trade openness, population, inflation, and FDI-to-GDP. The sample focuses on EU countries for which data are available. A counterfactual scenario that assumes no emigration during 1995–2012 is then constructed to estimate per capita GDP in PPS and per capita income gap in the absence of emigration, taking into account contributions of skilled and unskilled emigration. The results of the counterfactual scenario are then compared to the baseline to derive the additional reduction in per capita income gap in the absence of emigration presented by skill level.

Sources: World Bank World Development Indicators, Organization for Economic Cooperation and Development, and IMF staff calculations.
Note: The decomposition is based on instrumental econometric models fitting real GNI growth per capita on the total emigration, unskilled emigration, and skilled emigration expressed in percent of total population, where skilled emigration captures emigration of people with at least secondary education. Control variables include initial per capita income, trade openness, population, inflation, and FDI-to-GDP. The sample focuses on EU countries for which data are available. A counterfactual scenario that assumes no emigration during 1995–2012 is then constructed to estimate per capita GDP in PPS and per capita income gap in the absence of emigration, taking into account contributions of skilled and unskilled emigration. The results of the counterfactual scenario are then compared to the baseline to derive the additional reduction in per capita income gap in the absence of emigration presented by skill level.

29.   Net emigration has been associated with higher social spending in the Baltics and SEE countries in relation to GDP. The large outflow of working-age population has exacerbated the already adverse demographic trends in these countries, weakening growth performance. The rising share of the elderly in the population has pushed up dependency ratios and may have increased pressures for more generous retirement benefits.[20] As a result, pension and healthcare outlays have increased in relation to shrinking output. The negative impact of the skilled labor outflow on productivity and GDP growth has amplified these externalities for the sending countries. All in all, by 2015, social spending, largely driven by pension and health, had increased by about 2.5 percentage points relative to GDP following 25 years of emigration.[21] This increase has been driven mainly by slower GDP growth and is likely persistent.[22]

30.   To offset the growing fiscal burden of social spending pressures, governments appear to have responded by raising labor taxes, potentially leading to growth-unfriendly economic outcomes. Specifically, a 1 percentage point increase in the emigration-to-population ratio is associated with an increase in the labor tax wedge by 4.4 percent in CESEE. This helps explain the higher social contribution revenue associated with emigration as documented in Figure 15. In turn, higher taxes on labor may have raised structural unemployment and hindered growth (Kneller, Bleaney, and Gemmell 1999, Arnold 2008).

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[20] For example, many Balkan countries have generous early retirement policies. Some countries have also increased their spending on pensions through various privileged pension programs.

[21] The impact on education spending relative to GDP is likely small and dissipates quickly over time due to reduced demand associated with emigration (see Annex IV).

[22] Given the portability of pensions in the EU and the bilateral pension agreements between non-EU countries and their diasporas' residence countries, pension payments associated with return migration are unlikely to raise additional sustainability concerns.

Figure 15. Fiscal Implications of Emigration

Impact of emigration on fiscal positions has been small...

CESEE Overall Fiscal Position 1/
(Percent of GDP)

Legend: Public debt (RHS); Budget deficit
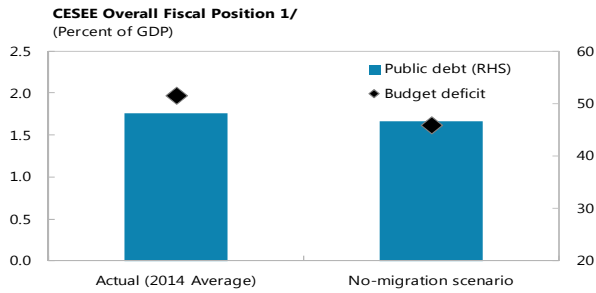
...and is likely short-lived. However, it has led to...

Government Overall Balance 2/
(Percent of GDP)

...larger government, changes to the budget structure....

CESEE Budget Structure 1/
(Percent of GDP)

Legend: Social Benefits, Wage, Taxes on G&S, Social Contributions, G & S, Investment, PIT, CIT, Other, Other

...and higher social spending.

Overall Migration Impact, 2015 3/
(Percent of GDP)

Legend: Education, Health, Pension, Total
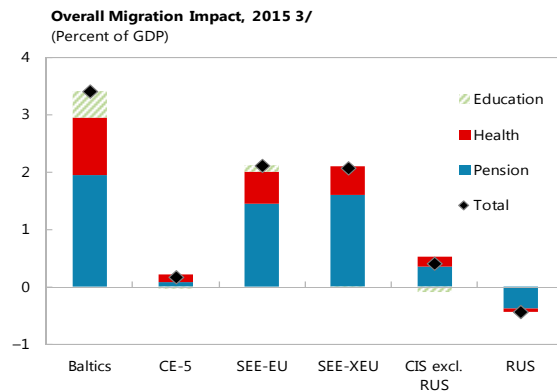
The increase in social spending is likely persistent...

Public Social Spending 2/
(Percent of GDP)
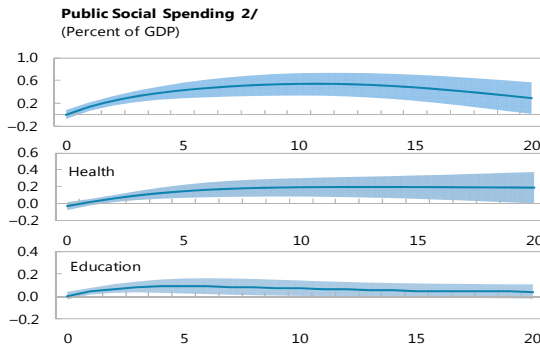
...and policy response has been to increase labor taxation.

Labor Tax Wedge and Emigration 1/
(Percent; 1990-12)
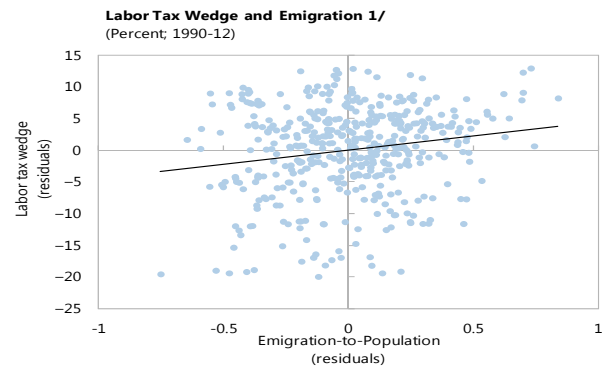
Sources: Brücker and others (2013), Organization for Economic Cooperation and Development, United Nations (2015), Eurostat, World Bank World Development Indicators, World Economic Outlook, and IMF staff calculations.
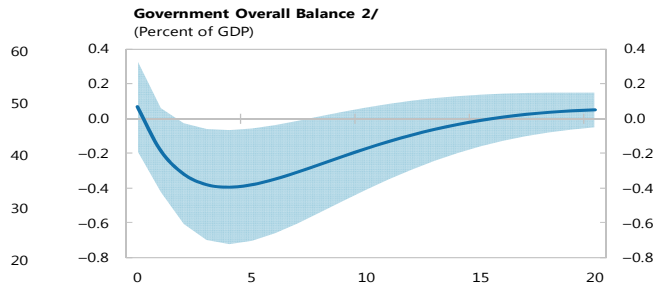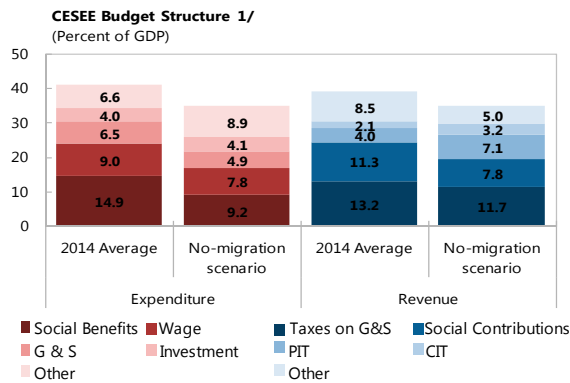
1/ To address the endogeneity concern, the impact of emigration is estimated using 2SLS regression with annual data from 1990–2012. Other controls include per capita GDP, log GDP, dependency ratio, openness, population density, and natural resource rent. All expenditure and revenue components are cyclically adjusted. Impact estimates on budget structure and labor tax wedge are statistically significant.

2/ The time dynamics are estimated based on the IRFs of one standard deviation shock of 0.6 percent to emigrants-to-population ratio from a panel VAR model using annual data from 1990 to 2014. Shaded areas represent the 95 percent confidence intervals. Other control variables include per capita GDP, dependency ratio, and openness.

3/ The model is based on Clements and others. (2015) and estimates the cumulative impact of migration on pension, health, and education spending during the period of 1990–2015. Turkey is not included in the analysis due to data limitations.

EMIGRATION AND GROWTH: LOOKING AHEAD

31.   To gauge the potential impact of continued emigration on CESEE, we conduct simulations using a multi-region global model. This semi-structural general equilibrium model, described in Andrle and others (2015), allows migration to impact the real economy through the three main channels found to be important in the empirical analysis presented in the previous sections. Specifically, labor outflows and remittance inflows affect the private sector (by lowering investment as well as consumption, which is only partly offset by remittances), external competitiveness (by increasing wages and appreciating the exchange rate), and public sector balance sheets (by inducing a policy response of raising taxes on labor).

32.   Emigration will likely continue to weigh on growth of sending CESEE countries. Model simulations show that continued net migration flows during 2015–30, consistent with Eurostat and UN projections,[23] would reduce the level of real GDP as well as GDP per capita across all net sending countries (Figure 16).[24] The cumulative output loss may be as large as close to 9 percent. In turn, GDP per capita[25] could decline by about 4 percent in some countries. Some Baltic countries would be particularly affected, followed by Bulgaria, Romania, and SEE-XEU, despite moderate positive contributions from remittances in the latter. In an adverse scenario, based on the historical pattern of migration, the cumulative output loss would be much larger, exceeding 15 percent in some countries.[26] On the upside, these migration flows result in a net output gain for the EU as a whole, consistent with positive effects on overall GDP and on per capita GDP of recipient countries found in the literature (Ortega and Peri 2009, Alesina and others 2013, Ortega and Peri 2014, Ozgen, Nijkamp, and Poot 2009, Jaumotte and others forthcoming).[27] Those CESEE countries that are

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[23] The magnitude of migration flows during 2015–30 is based on Eurostat projections for CESEE EU countries and based on UN projections for other CESEE countries. For Turkey, UN migration projections have been adjusted for the flow of refugees (given uncertainties related to the extent of their participation in the labor market) to better capture migration of the national population. In the historical (adverse) scenario, flows for each country are projected based on the most negative historical migration patterns in any of the subperiods 1990–2000, 1990–2014, 2001–14, 2001–08, and 2009–14. Other subsamples for achievement of minima have also been tested.

[24] While rapidly aging populations suggest that the potential for emigration of young people going forward may diminish, elimination of work restrictions abroad for some nationals could boost migration. A recent study at Friedrich Ebert Stiftung on SEE pointed to strong reported intentions to emigrate among young people in SEE (Taleski and Hoppe 2015). It shows that on average about 45 percent of young people in SEE intend to leave their home countries, with the number as high as 66.7 percent for Albania.

[25] In the context of the model, GDP and GNI per capita are similar.

[26] As is common to this type of model, it is sufficiently rich to study the impact of migration on GDP. However, it faces limitations when assessing income per capita and convergence. In our model simulations, this limitation is addressed by adjusting paths of TFP growth for CESEE countries to account for the impact of skilled migration. However, the full impact of the heterogeneity of skills may not be fully captured. Haque and Kim (1995) assess the impact of skilled migration by incorporating heterogeneous agents with different levels of human capital. In such models, emigration of skilled workers disproportionately hurts GDP and reduces income per capita, consistent with the empirical findings in the previous sections and our findings here.

[27] Given the focus of this paper on sending CESEE countries, we do not assess the impact of immigration on receiving countries' income per capita levels, as the precise calibration of the key channels through which immigration affects receiving countries would require a separate econometric analysis beyond the scope of this study.

projected to be net recipients of migrants over the next 15 years, such as the Czech Republic, Hungary, and Russia, would experience output gains as well.

Figure 16. Eurostat/UN Migration Scenario 1/

Labor outflows reduce real GDP...

Impact on Real GDP
(Percent change in the level of real GDP by 2030)

...including relative to the population.

Impact on GDP per Capita in CESEE
(Percent change in the level of real GDP relative to the population by 2030)

Source: IMF staff calculations.
Note: Emerging EA = Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia.
1/ Results are based on simulations in a semi-structural general equilibrium model, described in Andrle and others (2015). Simulations are based on UN migration projections (the baseline).
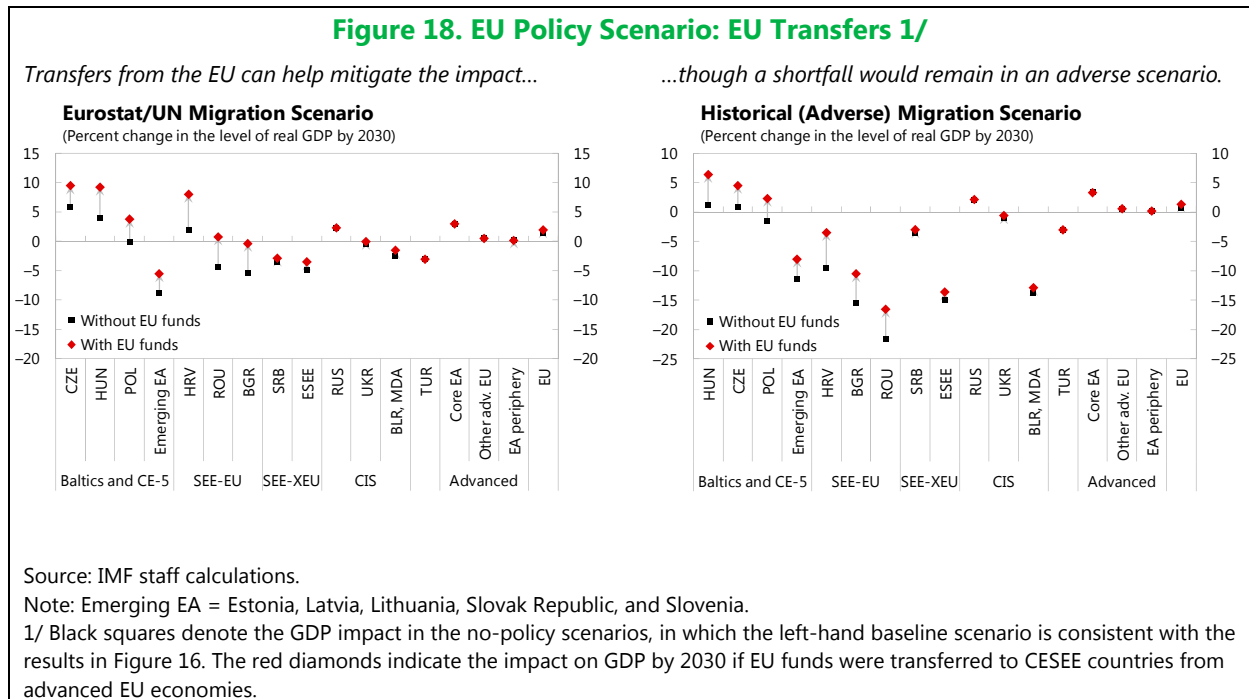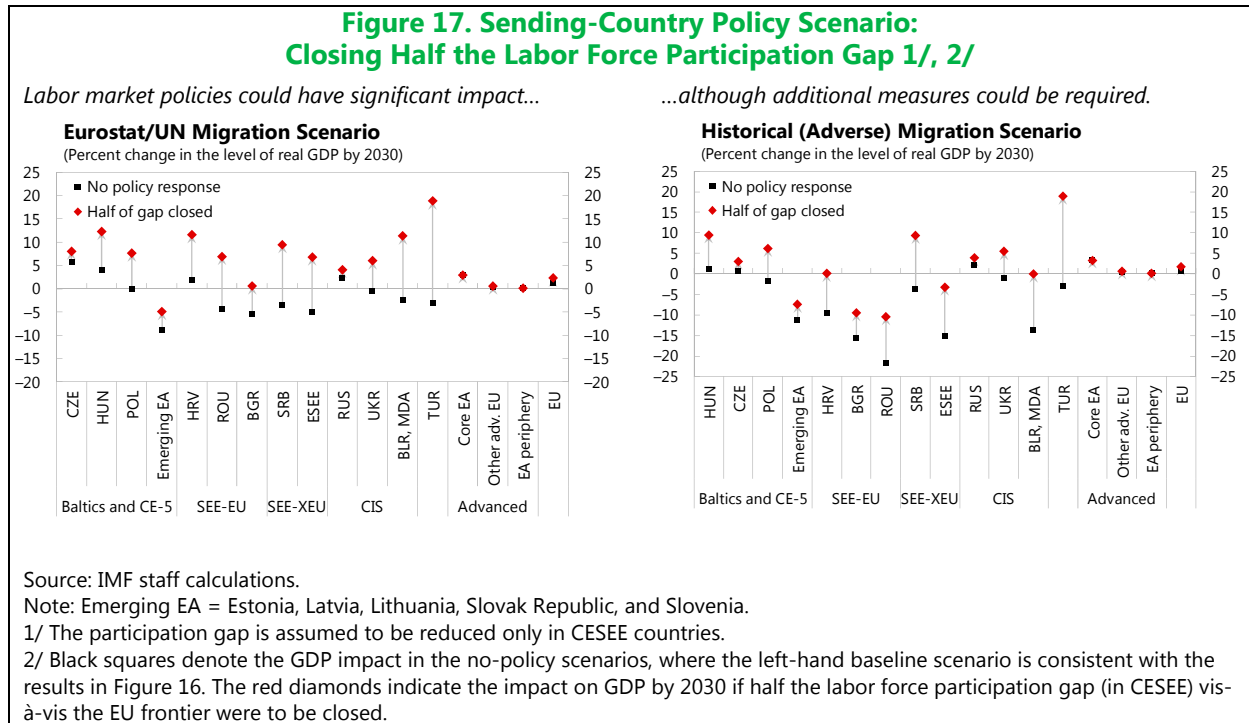
33.   In sending countries, active labor market policies could help mitigate the negative impact of emigration. Full-time equivalent labor force participation rates[28] in CESEE are well below the EU frontier,[29] with participation gaps of more than 10 percentage points in some SEE countries. This raises the possibility that closing some of the participation gap through active labor market policies may help offset the negative effect of migration on sending country GDP. Indeed, we find that closing half of the participation gap relative to selected Nordic economies could fully offset the output loss in the Eurostat/EU migration scenario for nearly all countries. However, some countries would require additional efforts in a historical (adverse) scenario (Figure 17).

34.   Targeted transfers from the EU could also help mitigate the negative impact of emigration on sending countries. With the EU as a whole expected to benefit from the inflow of economic migrants from Eastern Europe over the next 15 years, we consider whether EU-level policies could help offset the negative effect of emigration on sending countries, while still retaining the gains for the EU as a whole. Taking into account the existing transfer mechanisms under the EU structural and cohesion fund policy—intended to reduce regional disparities and accelerate convergence—as well as grants to non-EU countries (such as Pre-Accession Assistance funds), we consider the effects of such policies going forward. Indeed, if CESEE countries were to continue to receive transfers from the EU through 2030 in accordance with recent transfers, these transfers would help offset part of the output decline under the Eurostat/UN migration scenario. This would

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[28] We define full-time-equivalent labor force participation rates as the actual participation rate but assume that people working part time only participate 50 percent in the labor force.

[29] The EU frontier varies over time but generally reflects Nordic participation rates.

boost per capita GDP in CESEE countries, while making virtually no difference for real output in advanced economies.

Figure 17. Sending-Country Policy Scenario: Closing Half the Labor Force Participation Gap 1/, 2/

Labor market policies could have significant impact...   *...although additional measures could be required.*

Source: IMF staff calculations.
Note: Emerging EA = Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia.
1/ The participation gap is assumed to be reduced only in CESEE countries.
2/ Black squares denote the GDP impact in the no-policy scenarios, where the left-hand baseline scenario is consistent with the results in Figure 16. The red diamonds indicate the impact on GDP by 2030 if half the labor force participation gap (in CESEE) vis-à-vis the EU frontier were to be closed.

Figure 18. EU Policy Scenario: EU Transfers 1/

Transfers from the EU can help mitigate the impact...   *...though a shortfall would remain in an adverse scenario.*

Source: IMF staff calculations.
Note: Emerging EA = Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia.
1/ Black squares denote the GDP impact in the no-policy scenarios, in which the left-hand baseline scenario is consistent with the results in Figure 16. The red diamonds indicate the impact on GDP by 2030 if EU funds were transferred to CESEE countries from advanced EU economies.

CONCLUSIONS AND POLICY OPTIONS

35.   The scale of CESEE emigration over the past quarter century has been unusually large and, in many ways, unique. CESEE countries have witnessed a large and persistent exodus of economic migrants, mainly to Western Europe. In some ways this phenomenon is similar to that observed elsewhere in the world—migrants move in response to income differences between home and host countries; when migrants move abroad, they improve their own well-being, and the remittances they send home benefit their families. The host countries, which face population aging pressures themselves, get a much needed boost to their workforce. But in other ways CESEE emigration has been unique. Moving distances are short, and visa-free access for EU citizens means that international borders do not deter movement as they do elsewhere. Many CESEE emigrants are skilled and young, thus their exit reduces the productive labor force in sending countries at a time when many of these countries are already experiencing adverse demographic pressures. Emigration has thus been large—in fact the largest in the world in modern times as a share of sending country population. Furthermore, it has been persistent and return migration has likely been limited.

36.   This SDN shows that while CESEE emigration has likely benefited Europe as a whole, the impact on sending economies appears to have been largely negative. The drain of skilled labor has lowered productivity growth and pushed up wages, undermining competitiveness. And although remittances have supported consumption and investment, and helped deepen banking systems in some countries, they may also have reduced incentives to work. Additionally, CESEE countries have had to deal with the fiscal consequences of emigration as social spending has increased faster than GDP. Overall, emigration appears to have lowered potential growth and slowed economic convergence with the EU—with SEE and Baltic countries particularly hard-hit, since they have experienced especially large outflows of skilled workers in relation to their populations. The forward-looking model simulations in this SDN suggest that these economic trends would continue, particularly in the Baltics, Bulgaria, Romania, and SEE-XEU, where sizable labor outflows are projected to continue, according to Eurostat/UN.

37.   The profound and persistent economic effects of emigration on CESEE call for a comprehensive policy response—at the sending-country level as well as at the regional level in the EU. With income and institutional differentials between CESEE and Western Europe still wide, the push-and-pull factors driving emigration in CESEE are likely to persist for some time. And with new countries getting ready to join the EU, these trends are likely to continue. Against this backdrop, it is important to reiterate that the free movement of labor is key to improving the integration of the European economic space. But it is also critical to explore what can be done to mitigate the adverse effects of emigration on sending economies. The adverse effects of emigration on TFP growth, incentives to work, skill scarcity, and quality of institutions call for a multi-dimensional policy approach. Policies in sending countries should focus on creating an environment that encourages potential emigrants to stay; promotes return migration, engages with the diaspora, and better leverages remittances; improves utilization of the remaining workforce; and addresses the fiscal implications of emigration. Here sequencing of policies would be important—early on the focus should be on strengthening institutions and improving an overall economic environment in sending countries as prerequisite to maintaining and attracting high-quality workforce. At a regional

level, negative externalities from emigration could be mitigated through a more targeted use of EU structural funds.

- **Creating a more attractive environment:**

  o *Improving institutions*: The analysis in this paper of factors that drive emigration suggests that emigrants, particularly those with skills, appear to leave countries with weak institutions and travel to those with good ones. The findings provide an additional reason for why CESEE countries should upgrade institutions and improve government effectiveness. Such policies could help make home countries more attractive, not only for the natives, but also for potential immigrants from other countries. When it comes to the strength of institutions, most CESEE countries (except Baltics and selected CE-5 economies) fall short of the EU average on the World Bank Government Effectiveness Index (Figure 19).

  o *Maintaining stability and boosting job creation*: Policies to boost growth and job creation and maintain economic stability in the sending countries would also create a more welcoming environment for potential emigrants and immigrants alike. Furthermore, they would help attract foreign direct investment, boosting productivity through the transfer of technology and know-how.

  o *Modernizing education*: Of course, emigration may persist even if institutions at home improve. This is because many highly skilled emigrants leave for technological, scientific, or administrative "hubs," or locations where high concentration of such workers yields positive externalities, and hence high remuneration. In such cases, CESEE countries should focus on modernizing education as a means to creating a critical mass of highly-skilled workers that would substitute for those that leave. This would also encourage some potential migrants to remain at home, and induce others to return. The emergence of information technology industry in India, aided by the Indian diaspora abroad and a modern high education system, is a case in point.

- **Engaging with diaspora, promoting return migration, and immigration of skilled workers:**

  o *Return migration* can yield significant benefits by bringing back skills and contributing to the diffusion of organizational and technical knowledge acquired by emigrants abroad (World Bank 2006). Policies should focus on removing barriers to reintegration of return migrants into the workforce, including, by recognizing foreign credentials and experience, and opening access to the service sector by deregulating professions (especially in SEE countries). Some countries (for example, Ireland and Poland) have developed programs to maintain ties with diaspora abroad, which could help advertise business and investment opportunities to emigrants. For example, during 1990–2004, Ireland attracted many return emigrants. As the opening of the economy and the encouragement of foreign direct investment led to an economic boom and emergence of widespread labor shortages, the economy attracted many immigrants, with about a quarter of the gross inflow consisting of Irish emigrants returning home. These returned migrants were encouraged by the government efforts to inform the diaspora of jobs opportunities in Ireland, and by the focus of employment and training agencies on return migration (OECD 2015).

- o *Immigration* could help replenish some of the lost workforce. To facilitate immigration particularly of skilled workers, CESEE countries may need to review their immigration regimes for the non-EU nationals and ease some restrictions, if warranted.

- **Better leveraging remittances.** Enhancing the entrepreneurship environment, including by reducing the costs of starting a new business, would help attract return migrants and better leverage investment potential of remittances. Reviewing tax legislation with a view to reducing tax disincentives to financial intermediation of remittances could support a better utilization of remittance flows.

- **Better utilizing the remaining workforce.** Policies that boost labor supply can overcome the labor shrinking effects of emigration. CESEE countries should therefore make an effort to better utilize the remaining workforce by increasing labor force participation and productivity.

  - o *Increasing labor force participation*: There are significant gaps in the labor force participation of female and older workers. At 69 percent, average labor force participation in CESEE countries (excluding Turkey) is well below that in Sweden, which at 81 percent has the highest labor force participation in the EU. On average, the gap between labor force participation of women aged 15–54 (relative to the total labor force) in CESEE (excluding Turkey) and Sweden is about 4.4 percentage points (ranging from less than 1½ percentage points in Latvia, Lithuania, and Russia, to close to 9 percentage points in Macedonia—it exceeds 16 percentage points in Turkey), whereas the equivalent gap between participation of workers aged 55–64 is some 4.8 percentage points (ranging from 1.7 percentage points in Estonia to above 7 percentage points in Slovenia—it exceeds 10 percentage points in Turkey). Removing tax disincentives to work for the second earner in a family and providing access to affordable childcare services can broaden the opportunity for women to work (Christiansen and others 2016). Better aligning statutory retirement ages with improving life expectancy would encourage older workers to stay longer in the workforce, which can be further facilitated by supporting lifelong learning to maintain skills.

  - o *Increasing the quality of existing workforce*: Policies aimed at upgrading skills and reducing skill mismatches, including by better aligning education and vocational training with employers' needs and through active labor market policies, would increase overall labor productivity. The higher productivity would also help offset some of the adverse effects of emigration on wages and competitiveness. Combined with lowering labor tax wedges (which are particularly large in the Balkans and the Baltics), these policies should also help reduce high structural and youth unemployment—an important driver of emigration (Banerji and others 2014).

Figure 19. CESEE: Selected Policy and Institutional Indicators

Workforce participation gaps should be reduced...

Demographics of Labor Force Participation, 2013
(Difference in percentage points from contributions to labor force participation rates of Sweden, full-time equivalents)
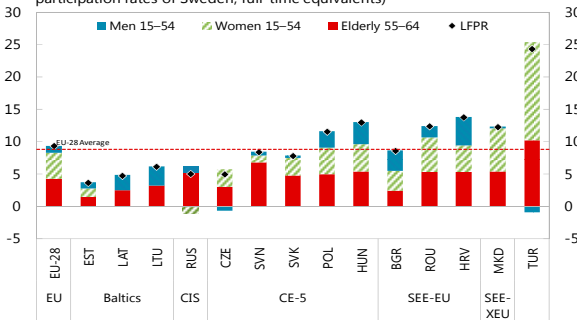

Sources: OECD Labor Force Statistics and IMF staff calculations.
Note: Full-time equivalent labor force constructed as the sum of unemployed, full-time employed, and part-time employed people, where a person working part time is considered half in the labor force and half outside of the labor force. Components are relative to the population of women and men aged 15 to 64.

Lowering regulatory barriers could encourage return migration....

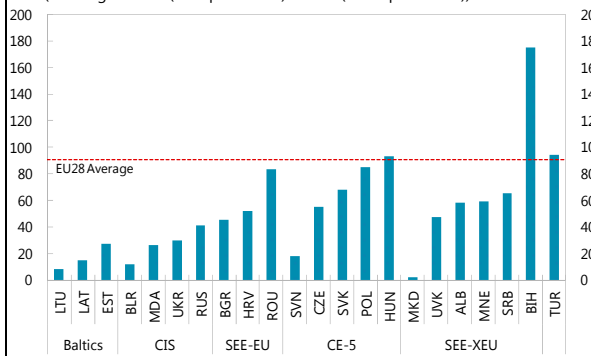**Regulated Professions, 2016**
(Number)
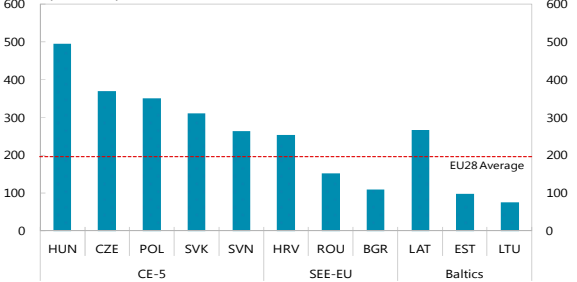
Sources: World Bank 2016 Doing Business Rankings and IMF staff calculations.

Starting a new business could be eased in some countries...

Ease of Starting a New Business, 2016
(Rankings from 1 (best performer) to 189 (worst performer))

Sources: World Bank 2016 Doing Business Rankings and IMF staff calculations.

...and long-term unemployment should be addressed.

Long-Term Unemployment
(Average of 2000-2014 1/, percent of the active population)
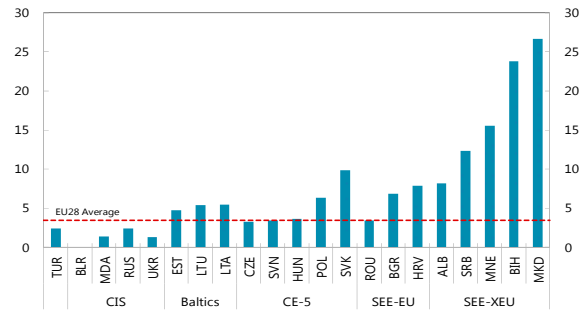
Sources: Eurostat, World Bank World Development Indicators and IMF staff calculations.
1/ Or earliest available.

....and skill mismatches could be reduced through ALM policies.

Skill Mismatch and Active Labor Market Expenditures
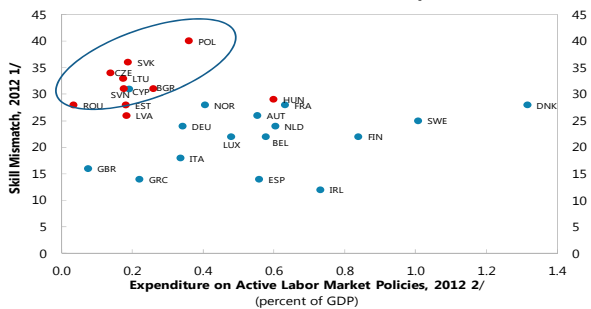
Sources: Eurostat, SEO Economic Research and Randstad (2012), and IMF staff calculations.
1/ Mismatch of skills field refers to cases where the worker's field of education (e.g. engineering) does not match the job requirements (e.g. medicine).
2/ Or latest available.

...and much of the region could benefit from stronger institutions.

Government Effectiveness, 2014
(Index from 0–1)
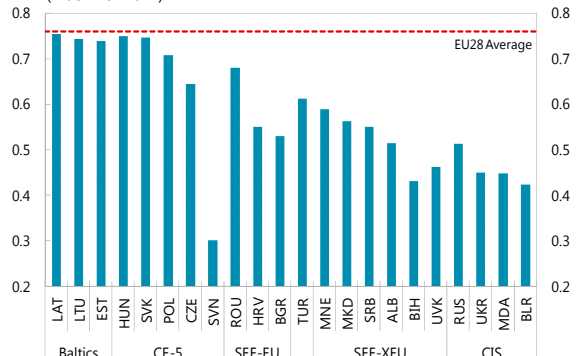
Sources: World Bank 2014 Worldwide Governance Indicators and IMF staff calculations.

- **Mitigating the adverse fiscal impact.** Remittance inflows and labor outflows expand consumption and shrink the base for labor taxes, respectively. These effects of emigration reinforce the potential benefits of shifting away from distortionary labor taxation to more growth-friendly consumption taxes. Greater taxation of consumption relative to investment would also help channel remittances into investment, and increase job growth. The higher social expenditure burden associated with emigration calls for improving the efficiency of social spending, particularly that related to healthcare, where many of the CESEE

Figure 20. Health Expenditure

Many countries fall short of the technical efficiency frontier.

Efficiency of Healthcare Expenditure
(average, 2000-2014)

Sources: World Bank World Development Indicators, and IMF staff calculations.

countries fall short of the technical efficiency frontier (Figure 20). State subsidies for higher education and training, which are common in some CESEE countries, "leak" overseas as skilled and educated workers emigrate permanently, thus resulting in a permanent loss of taxpayer resources. CESEE policymakers may want to explore ways to recover some of the costs from skilled and educated emigrants (Lucas 2008).
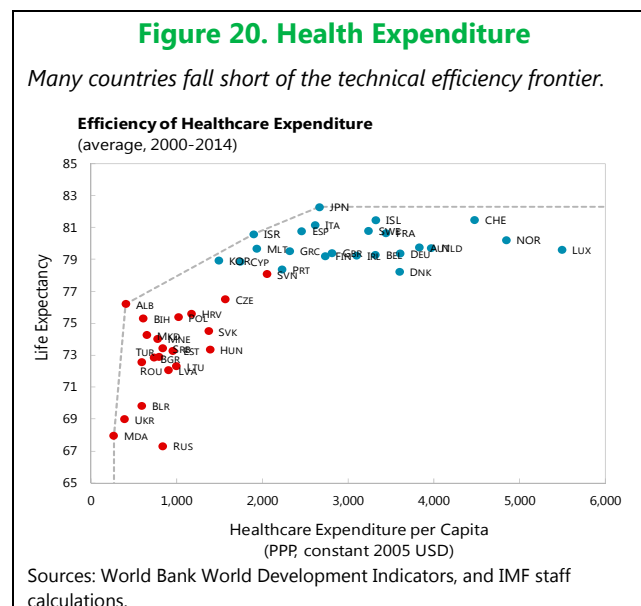
38.   **Finally, given the benefits of emigration for the EU as a whole, there might be scope for a pan-European initiative.** Our model simulations suggest that EU structural and cohesion funds can play an important role in cushioning the negative effects of emigration on growth in CESEE. Adjusting *the method for allocating these funds* to more explicitly account for the negative effects of emigration on EU-CESEE convergence could further their objective of reducing economic and social disparities in the EU and promoting sustainable development.[30] Similar consideration could be given to modifying existing funds under the Instrument for Pre-Accession Assistance to better assist EU candidate and potential candidate countries. Since these funds are primarily invested in infrastructure, human capital, and innovation, they should help promote faster productivity growth and income convergence—beyond mitigation of the negative effects of emigration—making it more attractive for CESEE citizens to stay, thus creating a virtuous circle of higher growth, lower unemployment, better institutions, and less emigration. In this regard, consideration could be given to adjusting *the composition of the EU funds*, for example, with a greater focus on productivity-boosting R&D and developing skill-intensive sectors, to help retain skilled workers.

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[30] Although the current formula for the allocation of the EU funds takes into account the income gaps (the difference between that region's GDP per capita, measured in purchasing power standards (PPS), and the EU-27 average GDP per capita (in PPS)) and the GNI per capita, this may not be granular enough to fully capture the impact of emigration on the country's long-term growth potential, as discussed in this paper. There is also scope for countries to increase absorption of the already available EU funds (particularly in SEE), as well as efficiency with which these funds are used. In this regard, recent studies suggest that stronger institutions could lead to better utilization of these funds (Janzer and Tirpák forthcoming).

Annex I. Quality of Data and Measurement Issues

The quality of migration and remittance data may have important implications for econometric results and findings.

I. Migration Data (OECD International Migration Database)

1. Estimates are based either on population registers or residence permit data. *Population registers* produce inflow and outflow data for both nationals and foreigners. To register, foreigners may have to indicate possession of an appropriate residence and/or work permit that is valid for at least as long as the minimum registration period. Emigrants are usually identified by a stated intention to leave the country, although the period of (intended) absence is not always specified. When population registers are used, departures tend to be less well recorded than arrivals, and registration criteria vary considerably across countries. In some countries, register data cover a portion of temporary migrants, in some cases including asylum seekers when they live in private households (as opposed to reception centers or hostels for immigrants) and international students.

2. Statistics on *residence permits* are generally based on the number of permits issued during a given period and depend on the types of permits used. The so-called "settlement countries" (Australia, Canada, New Zealand, and the United States) consider those persons as immigrants who have been granted the right of permanent residence. Statistics on temporary immigrants are also published in this database for these countries since the legal duration of their residence is often similar to long-term migration. In France, the permits covered are those valid for at least one year (excluding students). In Italy and Portugal, data include temporary migrants. Statistics on resident permits have some limitations: flows of migrating nationals, some flows of foreigners (holders of special permits), physical flows, or actual lengths of stay are not reported. Permit data may be influenced by the processing capacity of government agencies.

II. Remittance Data (World Bank Migration and Remittances Database)

3. World Bank data capture a broad definition of remittances, corresponding to the sum of "workers' remittances," "employee compensation," and "migrants' transfers" (under BPM5). Measurement of remittances is inherently affected by whether they are transferred through formal or informal channels. Therefore, empirical findings may be influenced by various degrees of accuracy in capturing remittance flows in balance-of-payments statistics of countries in the region and by the extent to which these flows go through formal channels.

Annex II. Migration from CIS to Russia

Compared to the east-west migration, which tended to be more permanent, migration from CIS countries to Russia has a large seasonal component and has been accompanied by significant remittance flows to home countries. The recent economic slowdown in Russia has reduced both labor and remittance flows.[1]

1.   During the past quarter century, Russia experienced significant net labor inflows from the rest of the Commonwealth of Independent States (CIS). The early waves of migration in the 1990s were driven by political changes following the dissolution of the Soviet Union as well as by economic factors. After the 1998 crisis, Russia's economic rebound drew in migrants from the rest of the CIS. In the 2000s and especially after the global financial crisis, the number of foreign citizens in Russia has been rising steadily and peaked

Foreigners in Russia

Sources: Border Control, Foreign Migration Services (FMS), and IMF staff calculations.

in 2014 at 11 million (see chart). Net entries of foreign citizens into Russia reached 3.9 million in 2009–14, nearly all of them from CIS countries. Immigrant flows from Ukraine have picked up significantly in 2014 after the outbreak of the conflict in Eastern Ukraine and the onset of economic crisis.[2] However, migration flows to Russia have reversed in 2015, as the country plunged into recession triggered by the collapse in world oil prices and western sanctions that led to steep decline in wages (in U.S. dollar terms). During 2015, Russia experienced a net outflow of foreign citizens, with the stock of valid work permits and licenses issued to foreigners falling markedly (see chart).

2.   The key drivers of migration between Russia and the rest of the CIS are similar to those behind the east-west migration. Migration flows varied according to the economic and political conditions of the country of origin, and Russia's economy and immigration policy. In 2014, the income per capita (PPP) averaged $10,497 in the CIS compared to $24,710 in Russia. Other factors—historical ties, geographical proximity, common transport infrastructure, and common language—played a role as well. By 2015, citizens from other CIS countries residing in Russia comprised 8.5 million people, of which about one-third were Ukrainians, followed by Uzbeks

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[1] Prepared by Oksana Dynnikova and Claire Gicquel.

[2] According to data from the Foreign Migration Service database, the share of Ukrainian citizens among CIS citizens staying in Russia increased from 15 percent in mid-2014 to 30 percent recently, likely reflecting both an increased number of refugees from Ukraine and a reduced number of economic migrants from other CIS countries.

(21 percent) and Tajiks (10 percent). The Tajiks, Armenians, and Moldovans in Russia today account for nearly 15 percent of their respective home countries' populations of the 1990s.
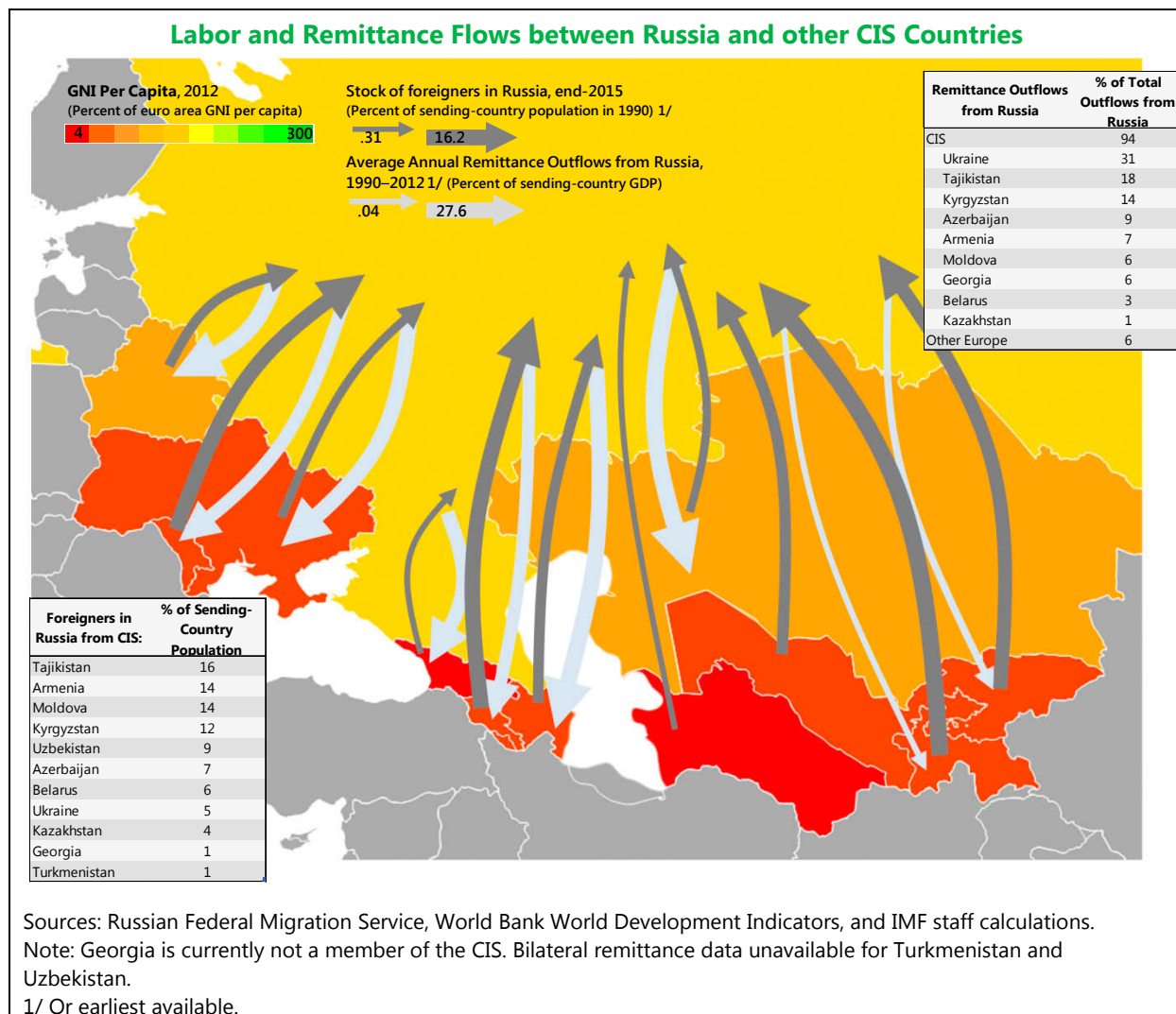
3.   Going forward, access to Russia for citizens of the Eurasian Economic Union (EEU) will increase. Citizens of Armenia and the Kyrgyz Republic—as members of the EEU—have recently obtained the right to work in Russia without a special work permit or license, the privilege which only Belarus and Kazakhstan citizens had before. For non-EEU citizens,[3] work permits were replaced by licenses, which are based on stricter requirements, including a Russian language exam and holding valid medical insurance.

4.   Unlike east-west migration, most immigrants from CIS countries in Russia are relatively low-skilled workers. About 80 percent of foreign citizens in Russia are of working age (18 to 59 years old) and are primarily engaged in seasonal jobs. Most CIS migrants work in construction and renovation, as well as in the trade and services sector.

5.   Sending countries are highly dependent on remittances from Russia and have been negatively affected by the recent economic slowdown in Russia. Remittances inflows to Armenia, the Kyrgyz Republic, Moldova, and Tajikistan—mainly from Russia—ranged from 43 percent of GDP in Tajikistan to 15 percent in Armenia in 2014. With the recent economic slowdown in Russia and a depreciation of the ruble, remittances have declined by more than 50 percent in dollar terms in Moldova in the first half of 2015. In contrast, remittance flows to the Kyrgyz Republic, where migrants tend to work in sectors that have been relatively less affected by the slowdown, such as trade and services sectors, have continued to see growth in remittances in ruble terms.

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[3] Countries with non-visa entry to Russia only; exclude Georgia (not a member of the CIS) and Turkmenistan.

Labor and Remittance Flows between Russia and other CIS Countries

GNI Per Capita, 2012
(Percent of euro area GNI per capita)

4 ▭▭▭▭▭▭ 300

Stock of foreigners in Russia, end-2015
(Percent of sending-country population in 1990) 1/

.31 ➡ 16.2 ➡

Average Annual Remittance Outflows from Russia, 1990–2012 1/ (Percent of sending-country GDP)

.04 ➡ 27.6 ➡

Remittance Outflows from Russia	% of Total Outflows from Russia
CIS	94
Ukraine	31
Tajikistan	18
Kyrgyzstan	14
Azerbaijan	9
Armenia	7
Moldova	6
Georgia	6
Belarus	3
Kazakhstan	1
Other Europe	6

Foreigners in Russia from CIS:	% of Sending-Country Population
Tajikistan	16
Armenia	14
Moldova	14
Kyrgyzstan	12
Uzbekistan	9
Azerbaijan	7
Belarus	6
Ukraine	5
Kazakhstan	4
Georgia	1
Turkmenistan	1

Sources: Russian Federal Migration Service, World Bank World Development Indicators, and IMF staff calculations.
Note: Georgia is currently not a member of the CIS. Bilateral remittance data unavailable for Turkmenistan and Uzbekistan.
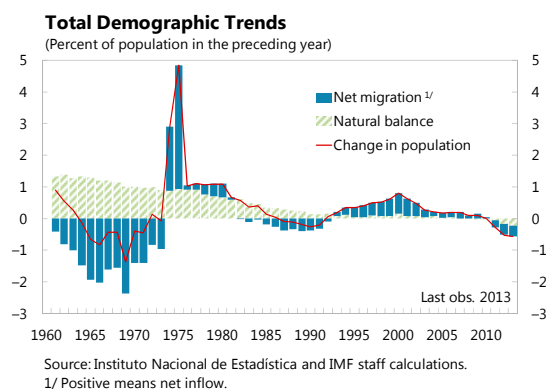1/ Or earliest available.

Annex III. Migration Trends in Portugal

Portugal has a long history of emigration. The waves of emigration from Portugal in the postwar period, and then again following the country's mid-1980 accession to the European Economic Community have many similarities with the past quarter century of CESEE emigration to Western Europe. Economic growth prospects have been the most important driver.[1]

1.   **Portugal has experienced considerable emigration for a large part of the 19th and 20th centuries.** It is estimated that nearly 2 million Portuguese left for Brazil and the United States between the mid-19th century and the early 1950s. There were also smaller but steady outflows from Portugal to its African colonies during that period. However, the pattern of emigration shifted in the late 1950s with the postwar economic boom in Western Europe. Nearly 1 million Portuguese left for France during 1960–74, and an additional 200,000 went to Germany, primarily finding employment in low-wage and low-productivity sectors. With nearly one-quarter of working-age Portuguese nationals employed outside the country by 1973, remittances became a significant source of income (Malheiros 2002).

2.   **The situation changed abruptly after 1974.** The downturn in the world economy after the global oil shock resulted in a sharp drop in demand for immigrant labor. Countries that had previously welcomed Portuguese workers adopted much more restrictive immigration policies and began to encourage foreign workers who were no longer employed to return to their home country. At the same time, the 1974 revolution and the subsequent independence of Portugal's colonies led to the return of many political exiles and of the roughly 500,000 Portuguese who had been living in Africa (Peixoto and Sabino 2009).

3.   **Portugal's accession to the European Economic Community in 1986 presented new opportunities for increased mobility across Europe.** There was net emigration in the years that immediately followed. However, this trend began to reverse as economic growth and demand for labor in Portugal began to strengthen In addition to the "traditional" immigrants from other Portuguese-speaking countries, a new wave of arrivals also came from Eastern Europe, particularly Moldova, Romania, Russia, and Ukraine (Malheiros 2002).[2]

Total Demographic Trends
(Percent of population in the preceding year)

Source: Instituto Nacional de Estadística and IMF staff calculations.
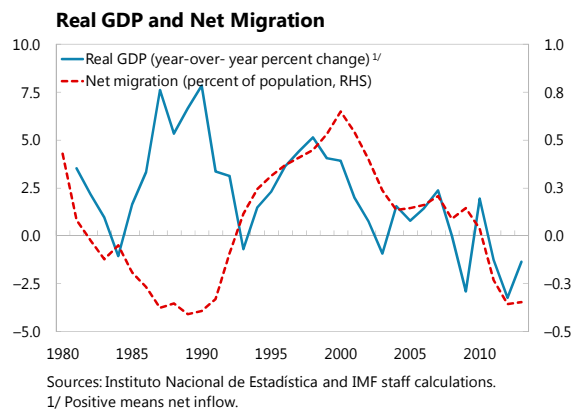1/ Positive means net inflow.

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[1] Prepared by Matthew Gaertner, Dmitry Gershenson, and Dustin Smith.

[2] Thus, between 1996 and 2001, Ukrainians moved from a relatively small presence to the third-largest group of foreigners in Portugal, immediately after Cape Verdeans and Brazilians.

**4.   Since 2000, migration patterns in Portugal
have tracked economic developments closely.**
Steady inward migration in the first decade of the
century gave way to outflows during 2011–13 in line
with the economic contraction and the accompanying
sharp increase in unemployment during the
sovereign debt crisis. Nevertheless, by 2014
immigrants constituted a sizeable (9 percent) part of
the population. They were also the better-educated
segment of the working-age population in Portugal—
as 30 percent of immigrants had completed tertiary
education compared with 20 percent for those without migratory background (NIS 2015).

Real GDP and Net Migration

Sources: Instituto Nacional de Estadística and IMF staff calculations.
1/ Positive means net inflow.

Annex IV. The Econometrics of Assessing the Effects of Emigration and Remittances

I.   Effects of Emigration

1.   Assessing the impact of emigration and conducting counterfactual analysis are challenging exercises. Standard econometric estimates of the effect of emigration on macroeconomic outcomes could be biased because of endogeneity concerns (for example, measurement error, omitted variables, or reverse causality). For instance, emigration is not necessarily an exogenous regressor—a key requirement for obtaining unbiased regression estimates—as it may itself be influenced by the dependent variable (macroeconomic outcomes). There is an additional layer of complexity in building a counterfactual scenario that removes the impact of emigration, as this entails making assumptions about what emigrants' behavior would have been had they stayed.[1] Our estimation approach thus attempts to account for these two problems to the extent possible. We are aided by the availability of rich emigration data that have bilateral country level details, skill composition, and time dynamics. A caveat is in order. While we attempt to use the appropriate econometric techniques, the reader should be aware that it is impossible to fully address the various biases in such macro-level cross-country estimations.

2.   We employ an instrumental variable (IV) strategy to identify the impact of emigration. We look for exogenous sources of variation in the key emigration-to-population regressor in the estimation of determinants of macroeconomic outcomes. We employ gravity models (using bilateral country-country migration data by skill level) to compute the *exogenous* component of emigration by skill level. Specifically, we estimate the determinants of emigrant stock by skill level from country i to country j at time t using:[2]

$$M_{ijt}^{skill} = \beta_{1t}^{skill} + \beta_{2t}^{skill} DIST_{ij} + \beta_{3t}^{skill} LANG_{ij} + \beta_{4t}^{skill} BORDER_{ij} + \beta_{5t}^{skill} POP_{it} + \beta_{6t}^{skill} POP_{jt} + \epsilon_{ijt}$$

The model controls for standard determinants, such as distance between countries i and j (*DIST*), common language (*LANG*), common border (*BORDER*), and population size (*POP*) separately for i and j (Berthélemy, Beuran, and Maurel 2009, Combes and others 2014). Our empirical specification allows coefficient estimates to vary over time and by skill level of emigration. The identification strategy then uses the predicted value of emigration from this model as the main IV for the observed emigration variable. To obtain the time-varying coefficients, we estimate, for each time period, cross-sectional gravity models for determinants of emigration (total, high-skilled, skilled, and unskilled emigration). The construction of the migration instrument starts with the bilateral (sender–host) relationship, and then aggregates up to the sending country level equation (Rajan and Subramanian 2008). For instance, let $\widehat{M_{ijt}^{skill}}$ denote the predicted level of emigrants by skill level from

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[1] A comprehensive approach would also incorporate any general equilibrium effects of the no emigration scenario.

[2] Due to data restrictions and the small sample size, regressions are performed using annual panel data. Regression results are available upon request.

country i to country j at time t. The value of the instrument variable for the emigrants by skill level from country i at time t can be expressed using $Z_{it}^{skill} = \Sigma_j \widehat{M_{ijt}^{skill}}$. We then estimate the macroeconomic impact of emigration using the two-stage least square approach as follows:

$$Y_{it} = \theta^{skill} EMIG_{it}^{skill} + \gamma^{skill} X_{it} + u_{it}$$
$$EMIG_{it}^{skill} = \psi^{skill} Z_{it}^{skill} + \phi^{skill} X_{it} + \eta_{it},$$

in which Y_{it} denotes the selected macroeconomic outcomes, $EMIG_{it}^{skill}$ is the observed emigrants-to-population ratio by skill level, and X_{it} is a set of standard control variables, including country fixed effects. The identification strategy for θ^{skill}—the marginal impact coefficient—requires the instrumental variable Z_{it}^{skill} to be uncorrelated with u_{it}.

3.   **The counterfactual analysis of no emigration during 1995–2012 uses estimates from the emigration impact model described above.** We start by assuming that in the absence of emigration the emigrant-to-population ratio would have remained unchanged during 1995–2012 ($EMIG_i^{skill,no-emigration}$). The macroeconomic "gains"—to wage growth, productivity growth, output, GNI[3], output per capita,[4] GNI per capita, productivity, and fiscal ratios—in country i from the no-emigration scenario are then computed by using the following expression:

$$Y_i^{no-emigration} - Y_i^{observed} = \theta^{skill}\left(EMIG_i^{skill,no-emigration} - EMIG_i^{skill,observed}\right)$$
$$= -\theta^{skill}\left(EMIG_{i,2012}^{skill} - EMIG_{i,1995}^{skill}\right).$$

Consider for illustration the case of Estonia. Given that the skilled emigrants-to-population ratio in that country increased by 3 percentage points during 1995–2012, the cumulative real growth rate there would have been 8 percentage points higher if the skilled emigrants had not left the country (Figure 14). Similarly, the average tax revenues (on goods and services) to GDP ratio in CESEE countries would have been lower by about 1.5 percentage points in the absence of emigration during 1990–2012. The latter estimate is obtained by multiplying the increase of the emigrants-to-population ratio—at about 3.5 percent for the CESEE countries over the period—with the marginal impact coefficient estimate of 0.45 (Figure 15). It is important to note two caveats here. The simulation results reflect *average* impact (as they apply the same regression coefficient to all countries) and the simulation is mainly derived from partial equilibrium, and so general equilibrium effects are not accounted for.

4.   **The analysis of public social expenditure under the no-migration scenario takes a different approach.** Social spending, which comprises public expenditure on pension (PE),

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[3] GNI, which includes net transfers from factors abroad, including net remittance inflows, offers a wider measure of welfare of the original sending countries' population. This variable is used in the alternative estimations.

[4] Due to data restrictions and the small sample size, regressions are performed using annual data. With this setup, controlling for the lagged dependent variable will absorb a substantial share of the variation in growth, and is less likely to capture the true convergence effect which takes place over several years but more likely to capture a mechanical negative relationship between change in income and lagged income, for example.

education (EE), and health (HE) can be decomposed into the following equations (Clements and others 2015, Nose 2015):

$$\frac{PE}{GDP} = \frac{\dfrac{PE}{pensioners}}{\dfrac{GDP}{workers}} \frac{pensioners}{pop65+} \frac{pop15-64}{workers} \frac{pop65+}{pop15-64}$$

$$\frac{HE}{GDP} = \frac{\dfrac{HE_{0-64}}{pop0-64}}{\dfrac{GDP}{workers}} \frac{pop0-64}{workers}\left(1+\sigma\frac{pop65+}{pop0-64}\right), where \quad \sigma = \frac{\dfrac{HE_{65+}}{pop65+}}{\dfrac{HE_{0-64}}{pop0-64}}$$

$$\frac{EE}{GDP} = \frac{pop_{school\;aged}}{pop} \frac{pop_{students}}{pop_{school\;aged}} \frac{\dfrac{EE}{pop_{students}}}{\dfrac{GDP}{pop}}$$

We simulate the evolution of population over time by age groups to construct the demographic variables (in blue above) under the counterfactual scenario. In addition, we incorporate the impact of migration on productivity (in red) by accounting for the skill composition of migration flows and using the estimates from the IV approach. Assuming that all other factors remain unchanged under the counterfactual scenario, these simplified models provide estimates of emigration on social spending (Figure 15).

5.   A panel VAR approach is used to assess the impact of emigration over time. Panel VARs help capture the comovements between emigration with macroeconomic outcomes, and they also capture dynamic cross-country interdependence, while employing minimal restrictions (Canova and Ciccarelli, 2013). We estimate *Impulse Response Functions* of the fiscal outcome variables (that is, government overall balance, social benefit, health, education spending) from a one standard deviation shock of emigration (Figure 15). The standard Cholesky decomposition is applied with an ordering with emigration being the most exogenous variable. Other control variables include per capita GDP, dependency ratio, and trade openness.

6.   The impact of emigration on potential growth is estimated through an augmented growth accounting framework. The production function is specified as follows:

$$\Delta \ln(Y) = \Delta \ln(A) + (1-\alpha)\Delta \ln(K) + \alpha\Delta \ln(H)$$

$$\Delta \ln(H) = \sum_{i=1}^{3} v_i\, \Delta \ln(L_i)$$

in which *H* is a function of the number of workers as well as their skills (Timmer, O'Mahony, and van Ark 2007). The term $\Delta \ln(L_i)$ represents the growth rate of labor with skill *i* (low, intermediate, and high skill), and v_i are weights given by the share of each type of labor in labor compensation. In this setup, both a change in the number of workers and a change in skill composition of labor affect growth. We decompose the GDP growth rates during 1990–2014 into contributions of total factor

productivity, capital, labor, and skill composition. Using the net flows of migrants and their skill composition, we calculate how much of the aforementioned contributions by labor and skill composition are attributed to emigration (Figure 12).

II.   Effects of Remittances

7.   We take an IV approach to estimate the impact of remittances on financial deepening and private sector activity also. Similar to the case of assessing the effects of emigration, an exercise that attempts to identify the impact of remittances would also face endogeneity concerns (particularly from reverse causality that could undermine the estimates). We use the economic conditions in remittance-sending countries (that is, unemployment rate and GDP per capita) as the instruments (Z_{it-1}) for remittance-to-GDP ratio (Aggarwal and others 2011). Additionally, we include a standard set of controls (X_{it}) that include GDP per capita, inflation, exports to GDP, foreign direct investment, and aid and portfolio inflows to GDP. The empirical model is estimated using a two-stage least square approach, as follows:

$$Y_{it+1} = \beta \, Remit_{it} + \, \psi \, X_{it} + \, \mu_{it+1}$$
$$Remit_{it} = \theta Z_{it-1} + \, \gamma X_{it} + \, v_{it},$$

in which Y_{it+1} refers to the measures of financial deepening and private sector activity. Financial deepening is measured by change in private sector bank deposits relative to GDP. We use consumption and investment relative to GDP from national accounts data as measures of private sector activity (Figure 11). The identification strategy for β requires the instrumental variables Z_{it-1} to be uncorrelated with μ_{it+1}.

8.   Impact of remittances on labor market outcomes is assessed using a micro-level study. Micro-level data are derived from labor force surveys of four Western Balkan countries (Bosnia and Herzegovina, Kosovo, FYR Macedonia, and Serbia) as well as Bulgaria, Poland, and Romania for 2006–13, thus covering periods of the precrisis boom, the crisis bust, and the postcrisis recovery for a diverse group of countries in the region. An individual's labor market decisions (that is, transitions between employment, unemployment, and dropping out of the labor force) are modeled using a micro-econometric multinomial logit model. Regressors include various individual level demographic characteristics (age, disability, education, and marital status, as well as employment status from a year ago), macroeconomic factors (overall economic growth rate, investment level, credit growth, as well as indicators of fiscal stance, public expenditures, and remittance inflows), and structural factors (indicators of institutional rigidities in the labor market and those reflecting the country's stage of transition to market economy). The estimated model (IMF 2015) is applied to establish the baseline probabilities for labor market outcomes using average values of explanatory variables for SEE-XEU and CE-5 countries in 2013. We then simulate by varying remittance values within a plausible range—while keeping all other explanatory variables at their 2013 levels—and trace the impact on predicted probabilities of labor market outcomes (Figure 11).

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