

## FOCUS ON EUROPEAN ECONOMIC INTEGRATION



This publication presents economic analyses and outlooks as well as analytical studies on macroeconomic and macrofinancial issues in Central, Eastern and Southeastern Europe.

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Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.

## Call for applications: Klaus Liebscher Economic Research Scholarship

Please e-mail applications to scholarship@oenb.at by the end of October 2020. Applicants will be notified of the jury's decision by end-November.

The Oesterreichische Nationalbank (OeNB) invites applications for the Klaus Liebscher Economic Research Scholarship. This scholarship program gives outstanding researchers the opportunity to contribute their expertise to the research activities of the OeNB's Economic Analysis and Research Department. This contribution will take the form of remunerated consultancy services.

The scholarship program targets Austrian and international experts with a proven research record in economics and finance, and postdoctoral research experience. Applicants need to be in active employment and should be interested in broadening their research experience and expanding their personal research networks. Given the OeNB's strategic research focus on Central, Eastern and Southeastern Europe, the analysis of economic developments in this region will be a key field of research in this context.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. The selected scholarship recipients will be expected to collaborate with the OeNB's research staff on a prespecified topic and are invited to participate actively in the department's internal seminars and other research activities. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. As a rule, the consultancy services under the scholarship will be provided over a period of two to three months. As far as possible, adequate accommodation for the stay in Vienna will be provided.<sup>1</sup>

Applicants must provide the following documents and information:

- a letter of motivation, including an indication of the time period envisaged for the consultancy
- a detailed consultancy proposal
- a description of current research topics and activities
- an academic curriculum vitae
- an up-to-date list of publications (or an extract therefrom)
- the names of two references that the OeNB may contact to obtain further information about the applicant
- evidence of basic income during the term of the scholarship (employment contract with the applicant's home institution)
- written confirmation by the home institution that the provision of consultancy services by the applicant is not in violation of the applicant's employment contract with the home institution

<sup>&</sup>lt;sup>1</sup> We assume that the coronavirus crisis will have abated by next year. We are also exploring alternative formats to continue research cooperation under the KLERS program for as long as we cannot resume visits due to the pandemic situation.

## Studies

## A sleeping beauty or a dead duck? The state of capital market development in CESEE EU Member States

#### Thomas Reininger, Zoltan Walko<sup>1</sup>

For quite some while, there have been high expectations that stronger capital markets could generate a broader range of financing sources and reduce the buildup of vulnerabilities for the corporate sector in European Union Member States in Central, Eastern and Southeastern Europe (CESEE). These expectations prompted various supportive measures by international institutions, national authorities and market participants over the past 10 to 15 years. However, despite these efforts, capital market developments in the region have been far from dynamic over the past decade. Capital markets continue to be substantially less developed than in the euro area and the U.S.A., judging from the balances of debt securities, listed shares and investment fund shares outstanding both in relation to GDP and as a share of total financial liabilities. Even taken together, these three types of securities account for a smaller portion of total financial liabilities than loans, with loan penetration levels (loans as a percentage of GDP) already approaching euro area and U.S. levels. Data on financial flows show narrower gaps with the euro area for funding via debt securities, but issuance is dominated by government entities. Analyzing the financial liabilities of nonfinancial corporations, we find some relevance for listed shares only in Poland and Croatia (but less of a relevance than in the euro area) and a negligible role for debt securities (with the euro being the dominant issuing currency in most non-euro area CESEE EU Member States). The predominantly bank-based nature of the financial systems of the CESEE EU Member States is also confirmed by the fact that the total assets of nonbank financial institutions are well below the level of domestic bank credit to the private sector, thus playing a relatively smaller role in financial intermediation than in the euro area and the U.S.A. In view of this evidence, we review the key factors which have so far prevented a more dynamic development, describe major efforts undertaken to overcome these detrimental factors and synthesize proposals by various institutions for future action to deepen local capital markets in the region, including in the context of the European Union's capital markets union.

JEL classification: D14, D18, D31, D63, E44, G21, G28, H81 Keywords: CESEE, capital markets, financial intermediation, European Union, capital markets union

Calls and hopes for developing local capital markets have accompanied EU Member States in Central and Eastern Europe since the early phase of transition to market economies. This is not surprising, given the extensive literature about the favorable impact of capital markets on economic development via better access to finance for the corporate sector, especially for small and medium-sized enterprises (SMEs). In CESEE, expectations soon emerged that local capital market funding could become an alternative to credit provided by the predominantly foreign-owned local banking sectors, thus making the countries less vulnerable to decisions taken at headquarters abroad. Amid substantial deleveraging by foreign banks operating in CESEE in the years following the most intense phase of the Great Financial Crisis, the relevance of more diversified financing forms may have risen further. Add to this the

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change in the banking model in the region over the past few years away from foreign-financed to domestically financed credit growth, the tightening of bank regulation and supervision, and more risk awareness on the side of banks. Thus, the volume of available credit in the region over the medium term may have become more constrained, potentially leading to (increasing) credit demand-supply gaps. Against this background, it has been estimated that "deeper capital markets in Central and Eastern Europe could unlock more than EUR 200 bn in long-term capital, deliver more than EUR 40 bn a year of extra funding for companies, and help restore rapid economic growth across the region."<sup>2</sup>

This descriptive study gives a comparative overview of the status quo of key segments of the local capital markets in CESEE EU Member States and of major developments since 2010. To complete the picture, we often distinguish between euro area members and nonmembers, and we provide comparisons with euro area and U.S. totals. We draw on a variety of data sources, such as quarterly financial balance sheets, securities statistics and securities exchange-trading statistics published by the ECB, the World Bank's Global Financial Development database, the IMF's Financial Development Index and market statistics provided by – among others – the World Federation of Exchanges and the Federation of European Securities Exchanges. Note that we did not intend to analyze in detail, e.g. econometrically, the determinants of capital market development.

In what follows, section 1 provides the big picture view using the IMF's Financial Development Index. Section 2 adds insights from financial sector accounts data into the role of securities as a financing instrument in CESEE, for the national economies as a whole and for individual sectors. Section 3 cross-checks this information with World Bank data on the role of the nonbank financial sector in financial intermediation. Section 4 discusses structural issues of capital market development in CESEE EU Member States, covering impediments to development and efforts made so far, and highlighting potential ways forward. Section 5 provides a concluding overview.

#### 1 The big picture view with the IMF's Financial Development Index

To frame the discussion, let us use the Financial Market Index computed as part of the IMF's Financial Development Index to identify development levels across three dimensions: depth (e.g. equity market capitalization, outstanding amount of debt securities), access (e.g. number of issuers) and efficiency (e.g. turnover ratio, defined as value traded as a percentage of market capitalization).<sup>3</sup> For 2017, the latest year for which observations were available, the Financial Market Index suggests that markets in the CESEE EU Member States were substantially less developed than markets in the euro area<sup>4</sup> (which itself lags far behind the U.S.A.; see chart 1 and table 1). According to the index, Hungary, Poland and Czechia had the most advanced

<sup>&</sup>lt;sup>2</sup> Wright et al. (2016). More precisely: "If each country had markets as deep as the 'best in class' (the most developed country in the EU11 in each of the 23 [financial market] sectors analysed), it would mean an extra EUR 225 bn in pensions and insurance assets to put to work in the EU11 (about 20% of GDP), and annual flows of financing for companies in the EU11 of around EUR 45 bn (4% of GDP)."

<sup>&</sup>lt;sup>3</sup> For additional details see www.imf.org/external/pubs/ft/wp/2016/wp1605.pdf and https://data.imf. org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B.

<sup>&</sup>lt;sup>4</sup> The index values for the euro area are calculated as the unweighted average of the values for the 19 euro area member states.

Chart 1



#### **IMF Financial Development Index: Financial Markets Index**

Index values range between 0 (worst) and 1 (best)

financial markets in the region in 2017.<sup>5</sup> Between 2010 and 2017, development levels decreased in the vast majority of CESEE countries and dropped markedly in Hungary and Slovenia, despite efforts by local authorities, international financial institutions and the financial industry itself. The gaps vis-à-vis the euro area narrowed modestly in this period (with the exception of Hungary and Slovenia) due to a simultaneous decline in the euro area. Progress has been mixed across countries and uneven across time, even when we go back further than 2010 (i.e. to 1995).

A more detailed analysis of the IMF's Financial Markets Index does not identify a general pattern in development across the three dimensions (see chart 2 and table 1). While market depth is most pronounced in some countries (Bulgaria, Croatia, Estonia, Lithuania and Slovakia), market access ranks first in four other countries (Hungary, Poland, Latvia and Slovenia), and market efficiency is the most advanced of the three areas in two other countries (Czechia and Romania). A more homogeneous picture arises when we compare the data with the euro area: for most CE-SEE EU Member States, the largest gaps with the euro area were observed for market depth and market access in 2017. Market efficiency levels were closer to euro area levels (with Hungary and Poland even outperforming the euro area), which is partly explained by the fact that this is the least developed dimension in the euro area (also compared to the U.S.A.).<sup>6</sup>

<sup>&</sup>lt;sup>5</sup> The low levels of financial development in the CESEE region are documented also in alternative sources, e.g. the rankings produced by the think tank New Financial (a private group of institutional members to promote bigger and better capital markets); see Panagiotis and Wright (2019).

<sup>&</sup>lt;sup>6</sup> Data on equity markets confirm Hungary and Poland as the most efficient markets among the CESEE EU Member States but show that even on these two most liquid equity markets trading activity was substantially less lively than on stock exchanges in the euro area or in the U.S.A. (see section 2.1.1).

#### Table 1

#### IMF Financial Development Index: Financial Markets Index

Financial Markets Index of which:

| Depth |      |      |      | Access |      |      | Efficiency |      |      |      |      |
|-------|------|------|------|--------|------|------|------------|------|------|------|------|
| 1995  | 2010 | 2017 | 1995 | 2010   | 2017 | 1995 | 2010       | 2017 | 1995 | 2010 | 2017 |

Values range between 0 (worst) and 1 (best)

#### Non-euro area CESEE EU Member States

| Bulgaria<br>Czechia<br>Croatia   | 0.04<br>0.19<br>0.13 | 0.07<br>0.17<br>0.12 | 0.06<br>0.19<br>0.10 | 0.03<br>0.09<br>0.03 | 0.11<br>0.14<br>0.24 | 0.10<br>0.16<br>0.23 | 0.01<br>0.17<br>0.02 | 0.03<br>0.03<br>0.05 | 0.02<br>0.09<br>0.03 | 0.08<br>0.32<br>0.36 | 0.05<br>0.35<br>0.04 | 0.05<br>0.32<br>0.02 |  |  |
|----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--|--|
| Hungary                          | 0.24                 | 0.58                 | 0.34                 | 0.04                 | 0.28                 | 0.18                 | 0.51                 | 0.53                 | 0.51                 | 0.19                 | 1.00                 | 0.35                 |  |  |
| Poland                           | 0.32                 | 0.34                 | 0.34                 | 0.03                 | 0.22                 | 0.23                 | 0.35                 | 0.42                 | 0.45                 | 0.64                 | 0.38                 | 0.36                 |  |  |
| Romania                          | 0.01                 | 0.05                 | 0.09                 | 0.00                 | 0.04                 | 0.05                 | 0.00                 | 0.01                 | 0.01                 | 0.01                 | 0.12                 | 0.21                 |  |  |
| Euro area CESEE EU Member States |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |  |  |
| Estonia                          | 0.39                 | 0.13                 | 0.11                 | 0.14                 | 0.15                 | 0.14                 | 0.09                 | 0.08                 | 0.09                 | 1.00                 | 0.14                 | 0.10                 |  |  |
| Lithuania                        | 0.05                 | 0.06                 | 0.05                 | 0.01                 | 0.08                 | 0.06                 | 0.05                 | 0.04                 | 0.04                 | 0.11                 | 0.06                 | 0.04                 |  |  |
| Latvia                           | 0.07                 | 0.08                 | 0.07                 | 0.01                 | 0.06                 | 0.06                 | 0.05                 | 0.15                 | 0.12                 | 0.17                 | 0.02                 | 0.03                 |  |  |
| Slovenia                         | 0.46                 | 0.32                 | 0.10                 | 0.02                 | 0.24                 | 0.10                 | 0.72                 | 0.66                 | 0.14                 | 0.73                 | 0.05                 | 0.06                 |  |  |
| Slovakia                         | 0.03                 | 0.06                 | 0.05                 | 0.03                 | 0.05                 | 0.08                 | 0.02                 | 0.06                 | 0.02                 | 0.04                 | 0.08                 | 0.02                 |  |  |
| EA-19                            | 0.32                 | 0.47                 | 0.44                 | 0.21                 | 0.49                 | 0.50                 | 0.37                 | 0.51                 | 0.47                 | 0.39                 | 0.41                 | 0.34                 |  |  |
| U.S.A.                           | 0.68                 | 0.91                 | 0.90                 | 0.74                 | 0.99                 | 0.99                 | 0.51                 | 0.71                 | 0.68                 | 0.79                 | 1.00                 | 1.00                 |  |  |

Source: IMF.

Chart 2

#### IMF Financial Development Index: Financial Markets Subindices (2017)



## 2 Digging into balance sheet data: the role of securities as a financing instrument

#### 2.1 The role of securities in financing the economy as a whole

For a detailed analysis, we first look at financial sector accounts data for the CESEE EU Member States, i.e. financial balance sheet information about the economies' liability structures. The financial sector accounts capture annual capital flows into the various types of financing instruments and the resulting stocks for each economy as a whole and for its individual sectors. The following discussion concentrates on the three types of securities which are mostly tradable, i.e. debt securities, listed shares and investment fund shares. Unfortunately, these statistics – as of to-day – do not contain information about the creditors/holders of securities (e.g. data indicating to which sector they belong or whether they are residents or non-residents) or about the currency of denomination, nor do they reflect whether the securities were issued on the domestic capital market or abroad.

These statistics document (1) the generally lower level of financial penetration (i.e. outstanding balances as a percentage of GDP) in the CESEE EU Member States compared to the euro area and the U.S.A. and (2) the fact that financing through loans plays a substantially more important role than financing through securities in most CESEE EU Member States – at least at the level of the total economy. As securities play a much smaller role in financing the economy than in the U.S.A., the financing structure in the CESEE EU Member States resembles at best that of the euro area.

#### 2.1.1 Securities and loans outstanding

For loans (including cross-border loans received), financial penetration levels in the CESEE EU Member States reached about 40% to 70% of the euro area level in most countries in 2018 (see chart 3). For debt securities and listed shares, these figures are significantly smaller, and they drop to less than 10% of the euro area level for investment fund shares (or about 15% in Hungary and Poland). Looking at the dynamics from 2010 to 2018, the financial penetration levels were increasing for debt securities and investment fund shares in most CESEE EU Member States,



Chart 3

while decreasing for listed shares (in part due to adverse stock price movements) and – with the exception of Czechia, Poland and Slovakia – for loans (including cross-border loans received). A similar pattern emerges for the relative levels compared to the euro area, subject to smaller increases for debt securities and investment fund shares.

If we look at the share of these four types of financing instruments in total financial liabilities, the dominant role of loans in CESEE EU Member States becomes even clearer (see chart 4). Loans are a more relevant financing instrument in the CESEE EU Member States than in the euro area and the U.S.A., while investment fund shares play a much smaller role. Taken together, the share of listed shares and debt securities in total financial liabilities has been approaching the euro area average in several CESEE EU Member States, while remaining considerably lower in Bulgaria, Estonia and Latvia. From 2010 to 2018, the combined share of debt securities, listed shares and investment fund shares in total financial liabilities tended to rise in the CESEE EU Member States, predominantly on account of debt securities and investment fund shares.

For the sake of completeness, we mention that the remaining part of total financial liabilities consists mainly of (1) nonlisted shares and other equity, (2) other accounts payable including trade credits and (3) deposits taken in by banks. Besides, a substantial part of nonlisted shares and other equity stems from foreign direct investment, particularly in the case of CESEE EU Member States.

Next, we take a closer look at total debt securities and listed shares outstanding. Concerning debt securities, a breakdown of the balances outstanding by issuing sector<sup>7</sup> reveals that these balances tend to be heavily skewed toward debt securities issued by the general government (see chart 5 and table 2): In 2018, the government sector accounted for more than 75% of overall issuance, compared to around



<sup>7</sup> We distinguish six institutional sectors in line with the European System of Accounts (ESA) 2010: (1) central bank (S.121); (2) other monetary financial institutions (other MFIs), which include deposit-taking corporations (S.122) and money market funds (S.123); (3) non-MFI financial corporations (S.124 to S.129), including e.g. insurance corporations, pension funds, investment funds that are not money market funds; (4) nonfinancial corporations (S.11); (5) general government (S.13); (6) households and nonprofit institutions serving households (NPISH) (S.14 and S.15). For simplicity, we use the term "banks" for "other MFIs" and "nonbank financial corporations" for "non-MFI financial corporations" in this article.

Chart 4

50% in the euro area and the U.S.A. Notable exceptions were Estonia (where nonfinancial corporations were the most prominent issuers of debt securities, followed by banks and nonbank financial corporations) and Czechia (where banks were important issuers beside the general government).

To complete the picture, we perform a currency breakdown of debt securities outstanding, based on the ECB's securities statistics. However, it should be noted that financial balance sheet data on financial instruments and the ECB's securities statistics are not strictly comparable, resulting in substantial differences between the published values in a few cases.<sup>8</sup> At the end of 2018, the outstanding balances of debt securities were dominated by issues in the national currencies in almost all CESEE EU Member States. The two notable exceptions were Bulgaria and Croatia.

Debt securities and listed shares by issuing sector

|           |                                  | Total economy |              | Central bank |            | Banks       |            | Nonbank<br>financial<br>corporations |      | Nonfinancial corporations |            | General<br>government |             | Households <sup>1</sup> |            |
|-----------|----------------------------------|---------------|--------------|--------------|------------|-------------|------------|--------------------------------------|------|---------------------------|------------|-----------------------|-------------|-------------------------|------------|
|           |                                  | 2010          | 2018         | 2010         | 2018       | 2010        | 2018       | 2010                                 | 2018 | 2010                      | 2018       | 2010                  | 2018        | 2010                    | 2018       |
|           |                                  | Balance       | es outstar   | nding in %   | s of GDP   |             |            |                                      |      |                           |            |                       |             |                         |            |
| Non-euro  | area CESEE EU Mei                | nber Sta      | tes          |              |            |             |            |                                      |      |                           |            |                       |             |                         |            |
| Bulgaria  | Debt securities                  | 13.0          | 22.5         | 0.0          | 0.0        | 0.4         | 0.3        | 0.7                                  | 0.7  | 1.7                       | 2.8        | 10.3                  | 18.7        | 0.0                     | 0.0        |
|           | Listed shares                    | 11.3          | 10.9         | 0.0          | 0.0        | 1.1         | 0.7        | 2.1                                  | 4.7  | 8.1                       | 5.5        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Czechia   | Debt securities                  | 49.3          | 54.1         | 0.0          | 0.0        | 6.3         | 14.9       | 0.4                                  | 0.9  | 7.1                       | 6.9        | 35.6                  | 31.4        | 0.0                     | 0.0        |
|           | Listed shares                    | 20.3          | 11.4         | 0.0          | 0.0        | 4.3         | 3.7        | 0.0                                  | 0.0  | 16.1                      | 7.6        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Croatia   | Debt securities                  | 36.3          | 59.5         | 0.0          | 0.0        | 0.1         | 0.2        | 0.0                                  | 0.0  | 3.0                       | 3.3        | 33.2                  | 55.9        | 0.0                     | 0.0        |
|           | Listed shares                    | 43.0          | 34.7         | 0.0          | 0.0        | 9.5         | 9.1        | 0.7                                  | 0.3  | 32.8                      | 25.4       | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Hungary   | Debt securities                  | 84.7          | 74.9         | 11.5         | 0.0        | 13.3        | 5.0        | 0.4                                  | 0.9  | 2.0                       | 1.1        | 57.6                  | 67.9        | 0.0                     | 0.0        |
|           | Listed shares                    | 20.4          | 18.5         | 0.0          | 0.0        | 5.3         | 7.5        | 0.2                                  | 0.1  | 14.8                      | 10.9       | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Poland    | Debt securities                  | 56.8          | 54.4         | 5.2          | 2.5        | 1.1         | 3.5        | 0.2                                  | 0.6  | 3.2                       | 5.2        | 47.1                  | 42.7        | 0.0                     | 0.0        |
|           | Listed shares                    | 35.1          | 25.8         | 0.0          | 0.0        | 10.9        | 8.2        | 3.5                                  | 2.3  | 20.7                      | 15.2       | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Romania   | Debt securities                  | 16.7          | 30.0         | 0.0          | 0.0        | 0.2         | 0.2        | 0.0                                  | 0.0  | 0.1                       | 0.1        | 16.3                  | 29.7        | 0.0                     | 0.0        |
|           | Listed shares                    | 8.0           | 8.1          | 0.0          | 0.0        | 2.0         | 1.9        | 0.0                                  | 0.0  | 6.0                       | 6.2        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Euro area | CESEE EU Member                  | States        |              |              |            |             |            |                                      |      |                           |            |                       |             |                         |            |
| Estonia   | Debt securities                  | 6.8           | 7.6          | 0.0          | 0.0        | 0.2         | 1.5        | 0.3                                  | 1.3  | 4.7                       | 4.1        | 1.6                   | 0.8         | 0.0                     | 0.0        |
|           | Listed shares                    | 11.3          | 10.4         | 0.0          | 0.0        | 0.0         | 0.0        | 0.0                                  | 1.1  | 11.3                      | 9.3        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Lithuania | Debt securities                  | 35.9          | 34.5         | 0.0          | 0.0        | 1.4         | 0.0        | 0.4                                  | 0.1  | 0.4                       | 2.4        | 33.8                  | 32.0        | 0.0                     | 0.0        |
|           | Listed shares                    | 15.2          | 7.4          | 0.0          | 0.0        | 1.5         | 0.5        | 0.5                                  | 0.1  | 13.2                      | 6.7        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Latvia    | Debt securities                  | 13.2          | 33.2         | 0.0          | 0.0        | 1.7         | 0.5        | 0.0                                  | 1.6  | 0.5                       | 0.6        | 11.0                  | 30.5        | 0.0                     | 0.0        |
|           | Listed shares                    | 1.6           | 2.6          | 0.0          | 0.0        | 0.4         | 0.0        | 0.0                                  | 0.0  | 1.3                       | 2.6        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| Slovenia  | Debt securities<br>Listed shares | 52.5<br>19.3  | 71.3<br>13.9 | 0.0<br>0.0   | 0.0<br>0.0 | 14.0<br>1.7 | 0.3<br>2.7 | 0.1<br>2.1                           | 0.2  | 2.3<br>15.5               | 2.1<br>8.5 | 36.1<br>0.0           | 68.6<br>0.0 | 0.0                     | 0.0<br>0.0 |
| Slovakia  | Debt securities                  | 43.1          | 66.6         | 0.0          | 0.0        | 5.4         | 7.6        | 0.2                                  | 4.8  | 0.1                       | 5.8        | 37.4                  | 48.3        | 0.0                     | 0.0        |
|           | Listed shares                    | 0.9           | 1.8          | 0.0          | 0.0        | 0.4         | 1.0        | 0.0                                  | 0.0  | 0.6                       | 0.8        | 0.0                   | 0.0         | 0.0                     | 0.0        |
| EA-19     | Debt securities                  | 164.7         | 156.9        | 0.0          | 0.0        | 54.4        | 35.2       | 30.8                                 | 31.9 | 9.5                       | 11.9       | 70.1                  | 77.8        | 0.0                     | 0.0        |
|           | Listed shares                    | 48.7          | 60.7         | 0.0          | 0.1        | 4.8         | 4.0        | 6.0                                  | 9.3  | 37.9                      | 47.3       | 0.0                   | 0.0         | 0.0                     | 0.0        |
| U.S.A.    | Debt securities                  | 212.6         | 202.7        | 0.0          | 0.0        | 4.5         | 1.4        | 88.4                                 | 68.1 | 26.4                      | 30.6       | 91.5                  | 101.6       | 1.8                     | 1.1        |
|           | Listed shares                    | 111.0         | 148.0        | 0.0          | 0.0        | 4.2         | 5.3        | 22.7                                 | 37.1 | 84.1                      | 105.6      | 0.0                   | 0.0         | 0.0                     | 0.0        |

Source: ECB, Eurostat, OECD, authors' calculations.

<sup>1</sup> Including nonprofit institutions serving households

Differences between these two statistics can stem from the different treatment of (1) short-term repurchase agreements involving central bank bills (included in other deposits in financial balance sheets vs. classified as debt securities issued by the central bank in securities statistics), and (2) nonnegotiable debt securities (included in debt securities in financial balance sheets vs. not included in securities statistics).

Table 2



#### Debt securities outstanding by issuing sector

In Bulgaria, the overwhelming majority of debt securities issued was denominated in euro (which is not surprising given the euro-based currency board operated in that country), while in Croatia nearly half of the outstanding volume was denominated in euro (possibly encouraged by the tight peg of the kuna to the euro) and about a quarter in other foreign currencies. In other non-euro area CESEE EU Member States, debt securities denominated in euro accounted for up to a third of the outstanding balances, and up to around 10% were denominated in other foreign currencies. Clearly, foreign currency issuance was less widespread among the CESEE EU Member States participating in the euro area, except for Lithuania.

For listed shares, a breakdown by issuing sector also finds evidence of substantial concentration, with nonfinancial corporations accounting for the bulk of the balances outstanding in the CESEE EU Member States, same as in the euro area and the U.S.A. Unlike in the euro area and the U.S.A., a significant portion of total listed shares outstanding was also attributable to banks, partly even (subsidiaries of) foreign parent banks, in 2018 (see table 2). The only exception are the Baltics and Bulgaria, with Bulgaria moreover being the only country in which nonbank financial corporations accounted for a notable portion of the outstanding amount in 2018.

On the currency structure of listed shares outstanding, the ECB's securities statistics indicate that listed shares are almost exclusively denominated in the national currencies.

More generally, the ECB's securities statistics on listed shares confirm the picture painted by the financial balance sheet data by showing that equity market capitalization<sup>9</sup> decreased in the majority of CESEE EU Member States<sup>10</sup> from 2010 to 2018 (see table 3). To some extent, this decrease reflected declines in equity prices. However, in half of the CESEE EU Member States we also observe a drop in market capitalization deflated by the respective main equity index. Moreover, the number of listed companies fell in most of the countries in the sample from 2010 to 2018. This may not necessarily have been a significant phenomenon,

<sup>&</sup>lt;sup>9</sup> The volume of listed shares in the ECB's securities database almost completely correlates with stock exchange data, as derived from the Federation of European Securities Exchanges or the World Federation of Exchanges.

<sup>&</sup>lt;sup>10</sup> In this section the three Baltic countries are not discussed due to the unavailability of comparable data.

| Equity market size and trading activity                        |   |   |                                     |                                     |  |   |  |  |  |  |  |  |  |  |
|--|---|---|-------------------------------------|-------------------------------------|--|---|--|--|--|--|--|--|--|--|
|  | Equity marke<br>tion in % of (              | et capitaliza-<br>GDP                       | Number of c<br>with listed sh       | companies<br>ares                   | Equity market<br>capitalization in<br>% of GDP | Value traded<br>in % of GDP             | Turnover<br>velocity                   |  |  |  |  |  |  |  |
|  | 2010  | 2018  | 2010                                | 2018                                | 2010–2018                                      | 0–2018                                  |  |  |  |  |  |  |  |  |
| Non-euro area CESEE EU Member States                           |   |   |                                     |                                     |  |   |  |  |  |  |  |  |  |  |
| Bulgaria<br>Czechia<br>Croatia<br>Hungary<br>Poland<br>Romania | 14.5<br>20.4<br>42.3<br>20.8<br>39.3<br>7.8 | 24.4<br>11.4<br>34.9<br>18.9<br>28.2<br>8.9 | 390<br>27<br>240<br>52<br>585<br>69 | 274<br>54<br>127<br>43<br>851<br>87 | 15.2<br>14.9<br>38.3<br>16.7<br>33.0<br>10.0   | 1.3<br>4.9<br>0.9<br>9.1<br>13.8<br>1.4 | 0.1<br>0.3<br>0.0<br>0.5<br>0.4<br>0.1 |  |  |  |  |  |  |  |
| Euro area CES  | SEE EU Memb                                 | er States                                   |                                     |                                     |  |   |  |  |  |  |  |  |  |  |
| Slovenia<br>Slovakia   | 19.3<br>5.0                                 | 13.9<br>6.2                                 | 72<br>165                           | 31<br>58                            | 14.3<br>6.0                                    | 1.0<br>0.1                              | 0.1<br>0.0                             |  |  |  |  |  |  |  |
| Euronext<br>U.S.A.   | 68.7<br>115.3                               | 86.0<br>148.5                               | 1.135<br>                           | 1.208<br>                           | 80.0<br>137.3                                  | 72.9<br>214.0                           | 0.9<br>1.6                             |  |  |  |  |  |  |  |

Table 3

Source: ECB, Eurostat, Federation of European Securities Exchanges, World Bank (WDI), World Federation of Exchanges, authors' calculations.

though, in so far as it reflects merely the delisting of companies which were hardly ever traded or otherwise active in the stock exchange.

The size of stock markets (measured as equity market capitalization as a percentage of GDP) does not necessarily correlate with trading activity. In terms of size, the Zagreb Stock Exchange (Croatia) led the league among the CESEE EU Member States both in 2018 and on average in the 2010–2018 period. However, equity trading activity in the Zagreb Stock Exchange was comparatively low, being the third-lowest in the region in 2018 and the second-lowest over the 2010–2018 period (see table 3). Trading activity in this sample of countries was highest in the stock exchanges in Warsaw, Budapest, Prague and Bucharest, expressed both as trading volumes in percent of GDP and as turnover velocity (i.e. as a ratio of market capitalization). However, even in the two most liquid equity markets in the CESEE EU Member States, namely Hungary and Poland, trading activity was substantially lower than in Euronext<sup>11</sup> or the U.S.A.

#### 2.1.2 Volume of transactions in financing instruments

Now, we look at financial transactions, i.e. the net incurrence of liabilities via the various types of financing instruments, particularly the three types of securities which are mostly tradable, i.e. debt securities, listed shares and investment fund shares. At the level of the total economy, the prevalence of debt securities among these three types of securities is apparent in all CESEE EU Member States, when measured as a percentage of GDP in the period from 2010 to 2018. Listed shares and investment fund shares played a negligible role as a financing instrument also based on financial transactions. In five countries, the net incurrence of liabilities in debt securities even surpassed the net incurrence of loan liabilities (same pattern

<sup>&</sup>lt;sup>11</sup> Euronext is a pan-European exchange group giving access to regulated markets in Amsterdam, Brussels, Dublin, Lisbon and Paris. For the calculation of GDP ratios on Euronext, the combined GDP data for Belgium, France, the Netherlands and Portugal was used, since Ireland was integrated into data reported to the Federation of European Securities Exchanges only in 2019.

as in the U.S.A., different from the euro area). These were Croatia and Romania as well as three countries with a negative net incurrence of loan liabilities, namely Hungary, Latvia and Slovenia (see chart 6).

However, net issuance of debt securities eased in almost all CESEE EU countries over the past few years, as the net incurrence of liabilities in debt securities as a percentage of GDP was lower during 2016–2018 than in the longer period of 2010–2018. In several CESEE EU Member States, this development reflects the lower issuance volume of government debt securities as a result of fiscal consolidation. The declining net issuance of debt securities contrasted with a rising net incurrence of loan liabilities in most countries of the region.

Based on financial flows, the CESEE EU economies compare better with the euro area than on the basis of outstanding volumes.<sup>12</sup> Financial transactions in debt securities were larger as a percentage of GDP in nearly half of the CESEE countries than in the euro area – both during 2010–2018 and 2016–2018 – yet still reaching only a tenth of the U.S. level. (Similarly, transactions in loan liabilities as a percentage of GDP surpassed the euro area average in five CESEE EU countries in the 2016–2018 period.)

For completeness, we note that in the 2010–2018 period funding from sources other than those discussed here – including unlisted shares, trade credit and deposits – was far more important on balance in almost all countries, including the euro area and the U.S.A., reaching a share in total funding substantially above 50%. The only exceptions were Slovakia and Slovenia where the share of these other funding sources was about 45% and 20%, respectively.



Note: Financial transactions are defined as the net incurrence of liabilities for each type of financial instrument Source: Eurostat, OECD, authors' calculations.

<sup>12</sup> This may not come as a complete surprise given that outstanding amounts of an instrument represent the accrual of annual net transactions over time. Given that the accrual period in the CESEE region has been much shorter than in the countries of the euro area (some 25 years versus 70 years), the gap in outstanding amounts diminishes only slowly even if annual net transactions are of comparable size. For more details on this issue, see Arpa et al. (2005).

Chart 6

Chart 7



#### Financial transactions in debt securities by issuing sector

Next, we look at the structure of new net funding via debt securities by issuing sector. Like outstanding volumes, the net incurrence of debt securities liabilities was concentrated on debt securities issued by general government entities in the CESEE EU Member States as well as in the euro area and the U.S.A. (see chart 7). The two most notable exemptions were Czechia (where banks and nonfinancial corporations issued above all debt securities to raise funds during the past few years) and Slovakia (where nonbank financial corporations accounted for most of debt securities net issuance during 2016–2018).

#### 2.2 The role of securities in financing individual economic sectors

The financing structure at the level of the whole economy masks important sectoral differences. However, looking at the outstanding stocks of financing instruments issued by each sector, a common feature of the segments of the private sectors of the economy – banks, nonbank financial corporations and nonfinancial corporations – is that debt securities, listed shares and investment fund shares together play a lesser role in financing in the CESEE EU Member States than in the euro area or the U.S.A.

#### 2.2.1 Securities issued by banks

In the financing portfolio of banks, listed shares, including shares issued by (subsidiaries of) foreign parent banks play a significantly more important role in the non-euro area CESEE EU Member States (except for Bulgaria) than for euro area members (except for Slovenia; see chart 8 and table 4). By contrast, the share of debt securities in banks' total financial liabilities is significantly lower in all CESEE EU Member States than in the euro area; it exceeds the level of 5 % only in Czechia, Slovakia and Hungary. Investment fund shares have lost relevance for banks in the region since 2010 and in 2018 played a relevant role for financing only in Croatia and Hungary.

Table 4

| Share of securities in total financial liabili |
|--|
|--|

|              |                      | Banks      |  | Nonbank<br>corporat | < financial<br>tions | Nonfinar<br>corporat | ncial<br>ions | General<br>government |      |  |
|--------------|----------------------|------------|--|---------------------|----------------------|----------------------|---------------|-----------------------|------|--|
|              |                      | 2010       | 2018   | 2010                | 2018                 | 2010                 | 2018          | 2010                  | 2018 |  |
|              |                      | % of total | % of total financial liabilities of issuing sector |                     |                      |                      |               |                       |      |  |
| Non-euro ar  | ea CESEE EU Member   | States     |  |                     |                      |                      |               |                       |      |  |
| Bulgaria De  | ebt securities       | 0.4        | 0.3  | 2.8                 | 1.5                  | 0.5                  | 0.9           | 41.1                  | 57.6 |  |
| Lis          | sted shares          | 1.1        | 0.7  | 8.3                 | 10.6                 | 2.3                  | 1.8           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.1        | 0.0  | 2.3                 | 3.3                  | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Czechia De   | ebt securities       | 6.1        | 10.3   | 1.0                 | 1.4                  | 3.4                  | 3.7           | 71.8                  | 69.1 |  |
| Lis          | sted shares          | 4.1        | 2.6  | 0.0                 | 0.0                  | 7.8                  | 4.1           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 1.1        | 0.1  | 8.1                 | 13.5                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Croatia De   | ebt securities       | 0.1        | 0.2  | 0.0                 | 0.0                  | 1.0                  | 1.2           | 28.5                  | 40.9 |  |
| Lis          | sted shares          | 7.7        | 8.2  | 1.7                 | 0.5                  | 11.5                 | 9.1           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 1.6        | 1.6  | 6.9                 | 7.7                  | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Hungary De   | ebt securities       | 10.4       | 5.4  | 0.2                 | 0.8                  | 0.8                  | 0.4           | 65.3                  | 73.3 |  |
| Lis          | sted shares          | 4.2        | 8.0  | 0.1                 | 0.1                  | 5.7                  | 4.3           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 4.0        | 0.9  | 5.4                 | 13.7                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Poland De    | ebt securities       | 1.3        | 3.9  | 0.5                 | 1.2                  | 2.0                  | 3.3           | 72.6                  | 58.9 |  |
| Lis          | sted shares          | 12.8       | 9.3  | 7.7                 | 4.9                  | 13.3                 | 9.8           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.1        | 0.0  | 17.8                | 27.9                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Romania De   | ebt securities       | 0.3        | 0.4  | 0.1                 | 0.0                  | 0.0                  | 0.1           | 36.9                  | 59.6 |  |
| Lis          | sted shares          | 3.0        | 4.0  | 0.2                 | 0.1                  | 3.1                  | 3.9           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.9        | 0.0  | 13.3                | 22.0                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Euro area CE | ESEE EU Member State | es         |  |                     |                      |                      |               |                       |      |  |
| Estonia De   | ebt securities       | 0.2        | 1.5  | 0.7                 | 1.7                  | 1.6                  | 1.4           | 7.7                   | 3.7  |  |
| Lis          | sted shares          | 0.0        | 0.0  | 0.0                 | 1.4                  | 3.8                  | 3.1           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.0        | 0.0  | 8.9                 | 5.1                  | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Lithuania De | ebt securities       | 1.5        | 0.1  | 2.1                 | 0.5                  | 0.2                  | 1.3           | 63.0                  | 76.0 |  |
| Lis          | sted shares          | 1.6        | 0.8  | 2.8                 | 0.5                  | 7.1                  | 3.8           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.1        | 0.0  | 3.0                 | 7.2                  | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Latvia De    | ebt securities       | 1.1        | 0.6  | 0.0                 | 2.9                  | 0.2                  | 0.3           | 16.3                  | 54.3 |  |
| Lis          | sted shares          | 0.2        | 0.0  | 0.0                 | 0.0                  | 0.6                  | 1.4           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.4        | 0.0  | 3.1                 | 2.2                  | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Slovenia De  | ebt securities       | 10.1       | 0.4  | 0.3                 | 0.6                  | 0.9                  | 1.1           | 62.1                  | 73.8 |  |
| Lis          | sted shares          | 1.2        | 3.2  | 4.4                 | 6.9                  | 6.3                  | 4.5           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 0.0        | 0.2  | 12.7                | 13.0                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| Slovakia De  | ebt securities       | 6.7        | 8.3  | 0.8                 | 12.4                 | 0.1                  | 3.9           | 56.6                  | 53.0 |  |
| Lis          | sted shares          | 0.4        | 1.1  | 0.0                 | 0.0                  | 0.4                  | 0.5           | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 3.2        | 0.0  | 12.1                | 19.8                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| EA-19 De     | ebt securities       | 16.9       | 13.4   | 11.4                | 8.7                  | 3.4                  | 3.8           | 69.6                  | 69.3 |  |
| Lis          | sted shares          | 1.5        | 1.5  | 2.2                 | 2.5                  | 13.8                 | 14.9          | 0.0                   | 0.0  |  |
| Inv          | vestment fund shares | 3.6        | 3.8  | 22.6                | 25.7                 | 0.0                  | 0.0           | 0.0                   | 0.0  |  |
| U.S.A. De    | alat aggunitiga      | 39         | 1.2  | 24.8                | 19.1                 | 9.2                  | 8.7           | 70.3                  | 72.7 |  |
| 1.1          | edi securities       | 5.7        |  |                     |                      |                      |               |                       |      |  |
| LIS          | sted shares          | 3.7        | 4.5  | 6.4                 | 10.4                 | 29.4                 | 30.0          | 0.0                   | 0.0  |  |

Source: Eurostat, OECD, authors' calculations.

Chart 8



#### Share of securities in banks' total financial liabilities

The issuance of debt securities in euro (beside the given national currency) was common among banks in non-euro area CESEE EU Member States. By contrast, banks in euro area CESEE EU Member States rather avoided debt securities issuance in foreign currencies, with the exception of Latvia (see chart 9 and table 5).



Table 5

|           |                           | Banks     |             | Nonban<br>corporat | k financial<br>tions | Nonfina<br>corporat | ncial<br>tions | General<br>governm | nent    |
|-----------|---------------------------|-----------|-------------|--------------------|----------------------|---------------------|----------------|--------------------|---------|
|           |                           | 2010      | 2018        | 2010               | 2018                 | 2010                | 2018           | 2010               | 2018    |
|           |                           | % of tota | l debt secu | rities issuec      | l by sector          |                     | 1              | 1                  | 1       |
| Non-euro  | area CESEE EU Member S    | tates     |             |                    |                      |                     |                |                    |         |
| Bulgaria  | National currency         | 12.1      | 12.7        | 12.2               | 17.8                 | 3.7                 | 9.8            | 37.5               | 22.7    |
|           | Euro                      | 87.9      | 87.3        | 87.8               | 79.4                 | 96.3                | 90.1           | 38.5               | 77.3    |
|           | Other foreign currencies  | 0.0       | 0.0         | 0.0                | 2.7                  | 0.0                 | 0.1            | 23.9               | 0.1     |
| Czechia   | National currency         | 81.2      | 70.4        | 90.5               | 32.5                 | 11.7                | 33.2           | 81.5               | 89.7    |
|           | Euro                      | 15.5      | 29.5        | 9.5                | 67.5                 | 79.0                | 52.8           | 17.1               | 9.9     |
|           | Other foreign currencies  | 3.3       | 0.1         | 0.0                | 0.0                  | 9.3                 | 14.0           | 1.3                | 0.4     |
| Croatia   | National currency         | 43.1      | 42.2        | 100.0              | 18.5                 | 10.4                | 23.1           | 29.9               | 33.0    |
|           | Euro                      | 56.9      | 57.8        | 0.0                | 81.5                 | 66.7                | 44.1           | 38.2               | 44.2    |
|           | Other foreign currencies  | 0.0       | 0.0         | 0.0                | 0.0                  | 23.0                | 32.9           | 31.9               | 22.9    |
| Hungary   | National currency         | 49.0      | 64.2        | 100.0              | 96.7                 | 11.6                | 32.1           | 66.7               | 79.8    |
|           | Euro                      | 50.4      | 20.6        | 0.0                | 2.4                  | 83.1                | 65.5           | 20.2               | 6.9     |
|           | Other foreign currencies  | 0.6       | 15.2        | 0.0                | 1.0                  | 5.3                 | 2.4            | 13.1               | 13.4    |
| Poland    | National currency         | 85.7      | 59.6        | 100.0              | 96.9                 | 72.8                | 79.8           | 76.8               | 76.6    |
|           | Euro                      | 7.4       | 37.9        | 0.0                | 2.0                  | 23.2                | 19.9           | 15.1               | 15.9    |
|           | Other foreign currencies  | 6.9       | 2.5         | 0.0                | 1.1                  | 4.0                 | 0.3            | 8.1                | 7.4     |
| Romania   | National currency         | 85.0      | 93.7        | 0.0                | 100.0                | 0.0                 | 53.0           | 64.4               | 54.9    |
|           | Euro                      | 15.0      | 6.3         | 0.0                | 0.0                  | 0.0                 | 47.0           | 35.6               | 35.1    |
|           | Other foreign currencies  | 0.0       | 0.0         | 0.0                | 0.0                  | 0.0                 | 0.0            | 0.0                | 10.0    |
| Euro area | CESEE EU Member States    |           |             |                    |                      |                     |                |                    |         |
| Estonia   | National currency         | 100.0     | 100.0       | 100.0              | 98.0                 | 94.7                | 99.5           | 100.0              | 98.5    |
|           | Euro                      | 0.0       |             | 0.0                |                      | 0.0                 |                | 0.0                |         |
|           | Other foreign currencies  | 0.0       | 0.0         | 0.0                | 2.0                  | 5.3                 | 0.5            | 0.0                | 1.5     |
| Lithuania | National currency         | 62.5      | 100.0       | 100.0              | 100.0                | 14.0                | 100.0          | 10.0               | 69.4    |
|           | Euro                      | 32.1      |             | 0.0                |                      | 86.0                |                | 53.2               |         |
|           | Other foreign currencies  | 5.4       | 0.0         | 0.0                | 0.0                  | 0.0                 | 0.0            | 36.7               | 30.6    |
| Latvia    | National currency         | 6.7       | 75.9        | 0.0                | 70.4                 | 62.8                | 100.0          | 58.6               | 88.7    |
|           | Euro                      | 79.7      |             | 0.0                |                      | 37.2                |                | 41.4               |         |
|           | Other foreign currencies  | 13.6      | 24.1        | 0.0                | 29.6                 | 0.0                 | 0.0            | 0.0                | 11.3    |
| Slovenia  | National currency<br>Furo | 100.0     | 100.0       | 100.0              | 100.0                | 100.0               | 100.0          | 100.0              | 90.4    |
|           | Other foreign currencies  | 0.0       | 0.0         | 0.0                | 0.0                  | 0.0                 | 0.0            | 0.0                | 9.6     |
| Slovakia  | National currency         | 97.2      | 98.7        | 100.0              | 96.7                 | 100.0               | 98.9           | 100.0              | 93.9    |
| ororaida  | Furo                      |           | ,           |                    | ,                    | 10010               | ,              |                    | / 51/   |
|           | Other foreign currencies  | 2.8       | 1.3         | 0.0                | 3.3                  | <br>0.0             | <br>1.1        | 0.0                | <br>6.1 |
| EA-19     | National currency         | 82.2      | 74.6        | 83.7               | 70.9                 | 81.5                | 82.9           | 97.6               | 97.8    |
|           | Euro                      |           |             |                    |                      |                     |                |                    |         |
|           | Other foreign currencies  | 17.8      | 25.4        | 16.3               | 29.1                 | 18.5                | 17.1           | 2.4                | 2.2     |
|           | 5                         |           |             |                    |                      |                     |                |                    |         |

#### **Currency structure of debt securities**

Source: ECB, authors' calculations.

#### 2.2.2 Securities issued by nonbank financial corporations

In the financing portfolio, investment fund shares are rather important in several CESEE EU Member States, though not as important as in the euro area with the exception of Poland and Romania (see table 4). Across countries, the share of this instrument in nonbank financial corporations' financial liabilities is strongly correlated with differences in the institutional composition of the sector. Accordingly, we find a relatively small role of investment fund shares other than money market funds (MMFs) in those countries where this sector is particularly underdeveloped (Bulgaria, Estonia, Latvia) and a relatively large role for countries where non-MMF

investment funds were more prevalent (Poland, Romania and Slovakia). The role of debt securities for nonbank financial corporations is negligible across the region apart from Slovakia, while financing through listed shares was notable (and even larger than in the euro area) in Bulgaria, Poland and Slovenia in 2018. Remarkably, Poland's combined share of these three types of securities in total financial liabilities of nonbank financial corporations almost reached the euro area level in 2018.

Debt securities issuance in euro (beside the national currency) was very common among nonbank financial corporations in some non-euro area CESEE EU Member States (Bulgaria, Czechia and Croatia) but negligible in others (Hungary, Poland and Romania; see table 5). Like in the case of banks, nonbank financial corporations in euro area CESEE EU Member States rather avoided issuance in foreign currencies, again except for Latvia.

#### 2.2.3 Securities issued by nonfinancial corporations

Nonfinancial corporations in the CESEE EU Member States raised even less financing than banks or nonbank financial corporations with debt securities, listed shares and investment fund shares taken together (see chart 10 and table 4). Even in Poland and Croatia, where securities had a somewhat bigger relevance in 2018, the figures fell short of those for the euro area and, by a big margin, of those for the U.S.A. In most countries of the region, listed shares accounted for the bulk of liabilities in these three types of securities, while the role of debt securities was negligible, like in the euro area.

Nonfinancial corporations in most non-euro area CESEE EU Member States preferred debt securities issuance in euro (in Croatia also in other foreign currencies) to issuing debt in their national currency (see chart 11 and table 5). Only in Romania and Poland was the share of foreign currency-denominated debt securities below 50%, at about 45% and 20%, respectively. In the euro area CESEE EU Member States, almost all debt securities issued by nonfinancial corporations and outstanding at end-2018 were denominated in euro, reflecting the avoidance of



## Share of securities in nonfinancial corporations' total financial liabilities

Chart 10



#### Currency structure of debt securities issued by nonfinancial corporations

issuance in foreign currency like in the case of banks and nonbank financial corporations.

#### 2.2.4 Securities issued by general government entities

Among general government financial liabilities, debt securities made up a broadly comparable large portion across the CESEE EU Member States in 2018, like in the euro area and the U.S.A. (see table 4). The two most notable exceptions were Estonia and Croatia, probably due to the classification of some special institutions into the general government sector. In Estonia, the general government had substantial financial liabilities in the form of deposits, and the share of loans and other accounts payable lay also well above that in other CESEE EU Member States. Moreover, the Estonian authorities may not have sought to develop a market for government debt securities due to concerns about market liquidity, given the small size of general government debt. Croatia's general government entities showed a substantial share of other equity liabilities (i.e. equity liabilities other than listed and nonlisted shares).

The currency structure of general government debt securities (see chart 12 and table 5) strongly resembles that of the total economy, which is not surprising, given that the total outstanding volume of debt securities was dominated by general government debt instruments.

Chart 12



#### Currency structure of debt securities issued general government entities

## **3** Cross-checks with World Bank data: the role of the nonbank financial sector in financial intermediation

The view of capital markets by type of capital market instrument (i.e. debt securities, listed shares, investment fund shares) can be complemented by an institutional perspective to assess the role of capital markets in the overall domestic financial system and financial intermediation.

Data collected by the World Bank (Global Financial Development database) indicate that the nonbank financial institution sector – such as mutual funds, insurance companies and pension funds; corresponding roughly to the sector of nonbank financial corporations discussed above – is much less developed in the CESEE EU Member States than in the euro area, which itself looks less developed than the U.S. market. Moreover, in contrast to the euro area and the U.S.A., the total assets of nonbank financial institutions are smaller – in many countries markedly smaller – than domestic bank credit to the private sector (see chart 13), corroborating evidence from financial balance sheets about the predominantly bank-based nature of the CESEE EU Member States' financial systems.

Within the nonbank financial institution sector, mutual funds account for the smallest portion of this sector's total assets in most CESEE EU Member States. Also, the gap of mutual funds in the assets-to-GDP ratio vis-à-vis the euro area is substantial and larger than in the case of insurance companies or pension funds. The only exception is Hungary, where mutual fund assets as a percentage of GDP are much larger than elsewhere in the region and are also closer to the euro area, despite a still substantial gap. Mutual fund assets as a percentage of GDP expanded between 2010 and 2016 (latest available data) across the region, but due to the substantial rise in the corresponding euro area ratio, the gaps widened further.



#### The role of nonbank financial institutions

Insurance corporations' assets as a percentage of GDP were also substantially smaller in CESEE EU Member States than in the euro area in 2016, although, as mentioned above, the gaps were much smaller than for mutual funds. The gaps with the euro area narrowed from 2010 to 2016, mostly due to the decrease of the assets-to-GDP ratio in the euro area, while the corresponding ratios roughly stagnated or rose modestly in the CESEE EU Member States.

Pension funds' assets-to-GDP ratio rose markedly in most CESEE EU Member States (except for Poland and Hungary) from 2010 to 2016, thus coming closer to euro area levels. Differences in the size and development of this sector across the region have reflected policy choices affecting the pension systems. Specifically, pension fund assets expanded most dynamically in those countries which operate mandatory second-pillar funded pension schemes or have recently started operating such schemes. The expansion was less pronounced in countries where second-pillar pension funds are not mandatory (e.g. Czechia, Lithuania, Slovenia or Slovakia). Pension fund assets even decreased substantially as a percentage of GDP in Hungary and Poland, where pension reforms were reversed, and pension fund assets were nationalized partially (Poland in 2014) or almost completely (Hungary in 2011) a few years ago.

Alternative financial sources are also substantially less widespread in the CESEE EU Member States than elsewhere in the EU. Gross private equity investments reached an aggregated amount of at most 0.2% of GDP in the region over the period from 2007 to 2018, compared to the European average of nearly 0.4%. The biggest annual average inflows (as a percentage of GDP) were registered in Czechia, Estonia, Poland, Serbia and Hungary. Considering also annual divestments by private equity firms, cumulative net private equity investments were highest in Estonia and Serbia (0.14% of GDP), followed by Poland and Latvia (0.11% of GDP), but still falling short of the European average (0.15%). Other forms of early stage financing are even less common in the CESEE EU Member States. For instance, business angel investments reached 0.05% of GDP in the region in 2017. The online alternative finance market (such as peer-to-peer lending, crowdfunding, minibonds, profit-sharing, etc.) is also generally rather small (up to 0.03% of GDP in 2017), with the notable exception of the three Baltic countries (0.15%–0.34% of GDP).

#### 4 Structural issues of capital market development in CESEE EU Member States

#### 4.1 Impediments to capital market development

Following mixed developments over the past two decades, capital markets in the CESEE EU Member States are still below their presumed potential. Various factors can be held responsible for this, with the list below being neither exhaustive nor applying equally to all countries or all times.

First, there are historical reasons and legacy issues.<sup>13</sup> The first issue in this context has its roots in the period of socialism, when nonfinancial companies that were state-owned and administratively linked to the government had a comparatively strong debtor position, while banks were formed for their benefit and partly even by them. Thus, loan decisions were not the result of banks' assessment of creditworthiness. Rather, they reflected the arrangement of companies and government authorities using financing entities. These practices contributed to the legacy of a culture of informality and lack of transparency and openness in society with respect to financing decisions. Companies have thus been hesitant to expose themselves to constant disclosure requirements and investor control following a stock exchange listing. Hence, for instance, in some countries, firms were listed initially in line with legal requirements but then delisted as soon as legal requirements allowed it. However, one might argue that this legacy would not inhibit the emergence of stronger private equity markets.

Hence, it is important to recall the following second legacy issue that stems from the final stage of the centrally planned system and the years of transformation: a low level of trust, particularly on the side of investors. People's financial confidence was eroded by very high inflation coupled with (initially suppressed) currency crises and then banking crises. Add to this disappointing experiences with problematic forms of (coupon) privatizations and financial fraud like e.g. pyramidal schemes in the early 1990s. In the banking sector, the entrance of foreign-owned banks decisively contributed to stabilization and the stepwise buildup of confidence in many countries, luring "mattress money" in foreign currency into foreign currency deposits and, finally, local currency deposits. Following partly clearly excessive and imprudent foreign currency lending before the Great Financial Crisis, the avoidance of a severe banking crisis, thanks to public support in parent banks' home countries and ample liquidity provision by the ECB, strengthened public confidence further, implying a large increase of domestic local currency deposits. By contrast, following the problems in the 1990s, there was no comprehensive "quick fix" for the capital markets like that for the banking sector in most countries. However, in some countries, capital markets got some boost from the establishment of pension funds in the context of systemic pension reforms. Then, during the Great Financial Crisis, stock market investors, mostly foreign and domestic institutional investors, but also some domestic retail investors, were badly hit. Moreover, in some countries, systemic pension reforms were reversed, mostly due to fiscal policy considerations considering the European Union's fiscal framework, which supported funded pension schemes only partially and temporarily. These reversals implied a substantial downsizing of pension funds

<sup>&</sup>lt;sup>13</sup> We are thankful to an anonymous referee who highlighted some of these issues to us.

and a weakening of capital market liquidity. Above all, it did not encourage trust in capital market investments in the private sector as an alternative to bank deposits.

Second, building capital markets takes time. It is now only around 20–25 years that CESEE countries started to implement the legal framework for effective capital markets. Despite substantial progress, for example, in the area of insolvency regulation, key indicators such as the length of insolvency procedures or recovery rates still lag behind the EU average in the majority of CESEE EU Member States. In the same vein, the protection of minority investors and corporate transparency are comparably worse in some countries than in the EU on average. The same applies to the regulation of securities exchanges, at least according to data from 2017 when the World Economic Forum last included this indicator in its Global Competitiveness database.

Third, levels of capital market development correlate positively with levels of economic development. On the demand side, more advanced economies tend to have more companies that reach the critical size or have sufficiently large growth potential in order to be interesting candidates for local stock markets or bond issuance. On the supply side, higher levels of disposable income allow bigger capacities to save and accumulate a larger proportion of those savings in the form of more sophisticated financial assets. Moreover, in the early phase of transition, which was characterized by high inflation and high exchange rate volatility or episodes of sudden large devaluation/depreciation, economic agents in CESEE countries suffered from the "original sin," i.e. the lacking opportunity to borrow abroad in their domestic currency, or from the unavailability of long-term borrowing, even domestically. This was detrimental for the development of capital markets and caused delays and setbacks.

Fourth, size matters. Small economies and small populations reduce economies-of-scale effects, meaning higher relative costs for establishing capital market infrastructure and related regulatory and legal system development. Moreover, with euro adoption being a strategic economic policy target for most CESEE EU Member States,<sup>14</sup> the prospective future participation in the common capital markets of the euro area may have discouraged a proactive development of local markets for only a "transitional period."

Small markets also tend to suffer from the lack of liquidity (as suggested by the comparably low stock market turnover velocity rates), which remains a significant disincentive both for potential issuers and investors in the CESEE region. There is a vicious circle in that insufficient liquidity levels prevent investors from entering the market, which in turn prevents liquidity from rising. Insufficient liquidity and the lack of a sufficiently large local investor base may drive companies to foreign capital markets, although there is a substantial domestic bias in equity and debt issuance (owing to e.g. language barriers, documentation requirements), or more often to bank loans.

Fifth, the demand for capital has been driven by specific characteristics. Thus, the involvement of foreign companies has been crucial in the transformation of the

<sup>&</sup>lt;sup>14</sup> EU Member States are – with the exception of Denmark – obliged to introduce the euro at some point in time, provided they fulfil the criteria for euro adoption.

economies in the CESEE region into market economies. Consequently, FDI-related capital plays an important role as a form of financing of (especially larger) non-financial corporations in the region. Financing needs can often be met with FDI equity or intercompany lending from foreign parent companies. Moreover, in foreign-owned companies financing decisions are often taken and implemented at the group level by the foreign headquarters, thus making local financing unnecessary. In addition, as pointed out above, the local banking sectors in CESEE are predominantly foreign-owned, so that banks can rely on parent bank financing (both in form of capital injections and parent bank credit) to complement the local deposit base.

By contrast, SMEs, which account for a substantial portion of value added and employment in the CESEE EU Member States (generally a bigger portion than in the EU as a whole), rather shy away from capital markets due to the complexity of information and cost requirements, covering their external financing needs predominantly by bank loans. Obviously, for individual companies, listing equities on stock exchanges or publicly issuing bonds and complying with related legal requirements, involve substantial costs. These costs may be prohibitive especially for smaller companies, keeping them away from capital markets altogether. Correspondingly, according to a great majority of SMEs in the CESEE region, the costs and regulatory constraints of being listed outweigh potential benefits, particularly in an environment where domestic bank loans are available in abundance.

In recent years, the environment of high liquidity and low interest rates may have fueled search-for-yield attitudes among capital investors willing to supply capital, but it provided also rather easy access to bank financing for nonfinancial corporations and hence reduced their incentive to venture into the corporate bond market to gain some interest advantage. However, this may change in the wake of the COVID-19 crisis in as far as banks could tighten their lending standards in view of the uncertainties, the economic recession and probably rising provisions for nonperforming loans.

Sixth, capital market development has also been impeded by specific supply-side characteristics. Thus, investor preferences may also play a role in the relatively slow development of capital markets in the CESEE EU Member States. Institutional investors in several countries in the region have a preference for domestic sovereign bond holdings while households hold a larger share of their financial assets in cash and bank deposits than in the EU as a whole. This issue may be in part related to the fact that financial literacy levels tend to be lower in the CESEE EU Member States than in more advanced EU Member States with deeper capital markets. In addition, given higher owner-occupancy rates in the CESEE EU Member States than in the EU average, presumably a bigger part of households' overall wealth is locked up in real estate (rather than in financial assets) in the CESEE EU Member States than elsewhere in the EU. Finally, foreign portfolio investors may prefer the shares of a foreign parent company to the domestically listed shares of a subsidiary.

To sum it up, let us quote from a member survey conducted by the CFA Institute, an independent global association for investment management professionals, in early 2018 among 263 investment professionals (portfolio managers, risk managers, consultants, analysts, senior executives) from eight CESEE countries.<sup>15</sup> The survey sought to identify the main factors preventing growth of capital markets and identify possible solutions to foster deeper and more integrated markets in the region. Above all, the respondents shone a light on the scarce supply of listed shares and debt securities, low retail investor demand and administrative burdens that discourage companies from seeking public listings. Further down the list ranked low institutional investor demand, the low level of investor protection and uncertainty about the impact of certain EU regulations and directives. Low levels of investor confidence were another factor considered to restrain financial market development in CESEE, with only 38% of respondents having trust in their local market. Nevertheless, respondents did note an improvement in investor protection standards and transparency in their local capital markets compared to the situation five years earlier.

#### 4.2 Efforts already taken to alleviate hindrances

To overcome or at least weaken these impediments, national authorities, international institutions and the financial industry itself have taken various measures to promote capital markets, as set out for instance in the report released by the Vienna Initiative in March 2018 and as summarized in the non-exhaustive list below:

#### 4.2.1 EBRD activities

Among international financial institutions, the European Bank for Reconstruction and Development (EBRD) has been at the vanguard of attempts to boost local capital markets in the CESEE region, developed particularly in the context of the Vienna Initiative. Its so-called Local Currency (LC) and Local Capital Markets (LCM) Initiative, in short LC2 Initiative, launched in 2010, set the following priority issues: improving the legal and regulatory framework, developing financial market infrastructure, supporting institutional investors, promoting better transaction efficiency and expanding the product range.

According to an internal assessment of the initiative prepared in 2017, the EBRD has indeed dedicated considerable effort and skill to delivering specific transactions and technical cooperation projects, resulting in discrete accomplishments in numerous cases. For example, the EBRD contributed to legislative and regulatory improvements through policy dialogue and technical assistance, helped develop benchmark indices, invested in corporate bonds, listed equities and stock exchanges in the region, issued bonds denominated in local currencies on local and international markets and sponsored SEE Link, a regional infrastructure platform for trading securities listed on stock exchanges in six CESEE countries.<sup>16</sup> At the same time, the assessment came to the rather critical conclusion that there "appears to be a significant disconnect between, on the one hand, the Bank's high but undefined strategic ambitions for the complex task of transforming LCMs and, on the other, its limited actual capacity to accomplish this given choices it has made about resourcing, prioritization, organization and collaboration with other institutions."

Therefore, drawing on these lessons, in late 2018 the EBRD's Board of Directors approved an adapted LC2 Strategy for 2019–2024, setting out in detail how

<sup>&</sup>lt;sup>15</sup> Bulgaria, Cyprus, Czechia, Greece, Hungary, Poland, Romania and Slovenia.

<sup>&</sup>lt;sup>16</sup> Bulgaria, Bosnia and Herzegovina, Croatia, North Macedonia, Serbia and Slovenia.

the EBRD would support local currency and capital markets development in its countries of operation. It has been envisaged that LC2 will, for one, facilitate the transition from policy dialogue to investments by the EBRD to support the local currency and capital market development process. Furthermore, efforts will be concentrated on increasing the share of EBRD investments in local currencies and on identifying and supporting sequenced reforms in local capital markets based on four defined priority areas (upgrading the capital markets policy framework, enhancing the legal and regulatory environment, improving capital market infrastructure, and expanding the product range and the investor base).

#### 4.2.2 National authorities' strategies

Several countries in the region (e.g. Bulgaria, Czechia, Hungary, Lithuania, Poland) have already adopted national capital market strategies, and others are expected to follow suit. These strategies provide general policy directions, identify challenges to be addressed and define priority actions (e.g. legislative, institutional) to be taken within a certain time period in order to foster local capital market developments. The strategies are mostly agreed on at a governmental level, but also incorporate the views of public authorities and private players.

National governments – alone or in cooperation with stock exchanges – have also been developing financial and investor education programs to raise awareness of the potential benefits of capital markets and increase financial literacy (e.g. in Latvia, Lithuania, Hungary, Croatia, Czechia, Slovakia). Most CESEE countries have also embarked on pension reforms, introducing second and third pillar-funded pension systems with often mandatory participation (at least in the second pillar). Reforms of the insolvency regimes to reduce complexity and time to resolve insolvencies and raise recovery rates have likewise been beneficial to capital market developments. Also, some countries (e.g. Poland, Hungary) have started public schemes to offer financial support for SMEs in preparing their initial public offerings. Some CESEE countries have introduced public support and a favorable regulatory regime to improve the availability of venture capital, which is especially important for financing start-ups and innovative companies. In some cases, tax legislation has been modified to create incentives for issuers and investors. In Hungary, the central bank bought a majority stake in the Budapest stock exchange (BSE) in 2015, with the explicit aim of implementing a variety of strategic innovations and providing issuers and investors proper incentives.

However, beyond the generally supportive activities for capital market development over the past two decades, national authorities have taken also measures that have weakened or may weaken capital market development. In Poland and Hungary, the reversal of previous systemic pension reforms, leading to the partial (Poland) or almost complete (Hungary) nationalization of the assets of mandatory second-pillar pension funds, has weakened the institutional investor base. Also, deliberate measures to make government securities more attractive for retail investors (e.g. by preferential above-market interest rates, tax exemption for interest income, broad marketing channels – like in Hungary since mid-2019) may create undue competition for other, "nonprivileged" forms of investment (like corporate bonds, equity or investment fund shares).

#### 4.2.3 Market participants' initiatives

Several stock exchanges in the CESEE EU Member States have undertaken efforts to overcome the issues arising from the small market size. For more than a decade, the Vienna Stock Exchange bundled ownership stakes acquired in various stock exchanges in Eastern Europe (Budapest, Ljubljana, Prague) in a regional holding company (CEESEG AG), which was responsible for the strategic and financial running of the subsidiaries. However, in 2015 CEESEG AG sold its stakes in the Budapest and Ljubljana stock exchanges to the Hungarian central bank and the Zagreb Stock Exchange, respectively. Instead, it has since then focused on regional cooperation in the areas of data vending, index licensing and IT services (via a shared trading system) with around a dozen stock exchanges in Central and Eastern Europe. Similarly, regional cooperation has taken place in the Baltic countries, with Nasdaq Baltic operating a single trading, clearing and settlement system with harmonized trading rules, market practices and indices, offering investors access to all listed financial instruments in Estonia, Latvia and Lithuania through any of the member exchanges. In Southeastern Europe, SEE Link represents the integration of seven stock exchanges in six countries to create a regional infrastructure to facilitate easier trading of securities on the participating exchanges. Other markets in the region (e.g. Warsaw, Budapest, Bratislava and Bucharest) are not part of any regional alliance but have entered cooperation arrangements with other exchanges (e.g. for trading, clearing, regional equity index).

Furthermore, in order to improve the supply of tradable instruments for investors and to ease access to the capital market for smaller companies, stock exchanges in several countries of the CESEE region have launched dedicated stock market segments for SMEs and bond markets for smaller issuers. These offer lighter listing requirements and lower compliance costs and listing fees, to improve the access of smaller companies to capital markets.

#### 4.3 Potential ways forward

Despite the efforts undertaken so far, it is evident that more remains to be done if one wants to increase the contribution of capital markets to financing domestic investment in the CESEE region. Over the past few years, several institutions have evaluated capital market developments in the region and have come up with proposals for their deepening. This section synthetizes the most common proposals, without implying the endorsement of any specific policy measure.<sup>17</sup>

- Continue to develop national capital market strategies.
- Foster a friendly business environment, e.g. stable legal and judiciary system and efficient administration. Ensure the rule of law for all market participants. Continue to improve insolvency frameworks to give viable companies a second chance to restructure and offer investors more certainty.
- Establish a sound and harmonized regulatory and supervisory environment for financial markets with strong institutions (eventually through the establishment of a common EU regulatory body). The introduction of common standards would reduce investment costs, boost cross-border investments, improve the level of transparency and enhance investor protection. Common rules across markets would also help narrowing differences in market liquidity.

<sup>&</sup>lt;sup>17</sup> See for example Wright et al. (2016), Silvestri (2019), European Commission (2018a), Vienna Initiative (2018).

- Support the implementation of EU-wide regulatory requirements. In view of ongoing regulatory changes affecting the banking sector (e.g. modified minimum requirements for own funds and eligible liabilities (MREL)), there are concerns that local bond markets in several CESEE EU Member States are not sufficiently deep and liquid to allow for the smooth absorption of required issuance volumes. Moreover, there are concerns that increased bond issuance by banks established in the CESEE region to raise bail-in-able funds may counteract efforts to develop local bond markets for nonfinancial corporations by crowding out nonfinancial corporations' bond issuance in so far as investor demand does not strengthen sufficiently. As a result, support by international financial institutions in the placement of such bank bonds has been called for. In this vein, the EBRD actively participated in the placement of such bank bonds in Romania in December 2019, by acting as an investor itself and by mobilizing other investors.
- Ease investment regulations of local institutional investors to allow them to invest in a wider range of asset classes (e.g. venture capital, unlisted securities, real estate funds, etc.).
- Strengthen financial literacy among investors, particularly retail investors, so that they better understand capital markets and become aware of potential benefits as well as risks involved by diversifying away from bank deposits and loans. Enhance financial literacy also among (potential) issuers, particularly in the SME segment.
- Develop a local base of issuers. Encourage state-owned enterprises to raise funds through the local capital market by issuing bonds or listing equity. Privatize state-owned enterprises through the local stock exchange.
- Offer targeted assistance to SMEs in their access and participation in the capital market to compensate for excessive costs to prepare initial public offerings and comply with capital market-related administrative and legal requirements (e.g. prospectus, regular public financial reporting, analytical research reports).
- Promote alternative financing for SMEs via instruments like venture capital, private equity, private placements, minibonds or equity crowdfunding.
- Start-ups and high-tech companies, which are essential for economic development beyond the "middle-income trap," are said to have rather low asset turnover (due to, for instance, long research and development phases) and have quite often had difficulties getting bank loans. Fostering private equity funds and venture capital would support these companies and thus strengthen economic development. During the recovery after the corona crisis, the low interest rate environment will probably prevail for longer and policymakers should make use of the tide from safe-haven flows toward a renewed search for yields, thus benefiting these alternative forms of investment as well.
- Meet the growing demand for green finance. In the coming years, policymakers could use the increased demand for green finance to channel funds into ecologically advanced companies through programs that incentivize, screen and rate such companies.
- Adopt supportive tax measures. Simplify the tax system, including with respect to capital gains and withholding tax. Consider tax incentives for investors in order to attract savings to capital markets, and for certain capital market vehicles for funding to SMEs (e.g. venture capital, private equity). Implement favorable tax treatment and easier tax procedures for companies going public to offset high

costs that listed companies and to-be-listed companies must incur in relation to higher transparency and regulatory requirements.

- Increase economies of scale by enhanced regional cooperation among governments, market participants and market infrastructure providers, e.g. by expanding existing geographical alliances to non-allied markets and deepening their integration. Create new stock market segments dedicated to listing and trading foreign equities in order to broaden the scope of instruments available to local investors. Facilitate listing on other EU markets for local issuers. Develop cross-border cooperations of national central security depositories to support cross-border trading by simplified clearing and settlement procedures.
- Tackle the impact of COVID-19 on banks' balance sheets rather sooner than later. The corona-induced recession will probably leave banks with higher volumes of nonperforming loans (NPLs). In the years of NPL work-out following the Great Financial Crisis, capital investors specialized in NPL investments have already penetrated the CESEE region. Often, these are foreign-based, e.g. London-based, investors that focus on specific industries across countries. In cooperation with these investors, NPL trading platforms could be used as a loan price determination tool that should be more efficient than outright sales to single investors.

Several of these proposals in recent years were formulated in the context of the European Union's project to build a capital markets union, a key priority of the European Commission under President Juncker (Nov. 2014 to Nov. 2019). The capital markets union is seen as necessary to complement the banking union, to strengthen the Economic and Monetary Union and to enhance the international role of the euro and the EU's global attractiveness as a destination for foreign investments. As a Single Market project, it aims at increasing the access of firms (as issuers) and citizens (as investors) to capital markets, especially in smaller countries and irrespective of where one is physically located in the Single Market. A more level playing field and better use of economies of scale may be considered as further aspects of this project. According to the European Commission, boosting local capital markets is a major goal of the capital markets union, as these markets particularly benefit medium-sized companies that are large enough to tap local capital markets, but too small to look for capital across borders. Geographical proximity is seen as lowering transaction costs and helping investors understand the businesses that they are financially supporting, thus increasing the scope for productively using local savings. In its Communication on the capital markets union of March 2019, the European Commission (2019) assesses that it has already delivered the legislative and nonlegislative measures it committed to in order to put in place the building blocks of the capital markets union. At the same time, it stresses, first, the importance that the co-legislators remain committed to ensuring that all pending legislation is adopted as soon as possible, and second, that in any case it will take some time for the full impact to be felt on the ground.

#### **5** Conclusions

This note reviews the state of capital markets in CESEE EU Member States and their development over the past decade. It also touches upon the most important factors which have so far prevented a more dynamic development, describes major efforts undertaken by international institutions, national authorities and market players to overcome these detrimental factors and synthesizes proposals made by various institutions for future action to deepen local capital markets in the region, including in the context of the European Union's efforts toward a capital markets union.

Three decades after the start of economic transition, capital markets in the CESEE EU Member States continue to be substantially less developed than in the euro area and the U.S.A., judging from the balances of debt securities, listed shares and investment fund shares outstanding. In the case of listed shares outstanding, the volume-to-GDP ratio even declined in most countries of the region over the past few years. Progress has been just as mixed across countries and uneven across time using a longer horizon of 25 years. However, based on financial flows, funding via debt securities in the CESEE EU Member States compares considerably better with the euro area than based on stock data. Nevertheless, this result stems almost exclusively from the issuance of government debt securities.

Looking at the financial liabilities of the total economy as a percentage of GDP, the comparably limited role of debt securities and even more so of listed shares and investment fund shares is apparent. By contrast, loan penetration levels already come closer to the euro area and the U.S.A. Concerning the structure of liabilities, the dominant role of loans in CESEE EU Member States becomes even clearer: loans in the CESEE EU Member States account for a larger portion of total financial liabilities than debt securities, listed shares and investment fund shares taken together, while in the euro area (and even more so in the U.S.A.) loans play a less important role than these securities together. In sharp contrast to the euro area and the U.S.A., debt securities outstanding in the CESEE EU Member States are dominated by general government papers. Concerning listed shares, nonfinancial corporations account for the bulk of issuance in all three regions. Listed shares issued by financial corporations are dominated by banks, often subsidiaries of foreign parent banks, in the CESEE EU Member States and by nonbank financial institutions in the euro area and the U.S.A. With respect to listed shares, CESEE EU Member States lag behind more developed countries not only in terms of market depth but also market efficiency and liquidity, as suggested by substantially lower turnover velocity.

Looking at the financial liabilities of nonfinancial corporations only, listed shares had some relevance in this sector's funding structure only in Poland and Croatia, but still falling short of their role in the euro area. The role of debt securities issued by nonfinancial corporations was negligible (like in the euro area), with the euro being the currency of denomination of choice in most non-euro area CESEE EU Member States.

Finally, development gaps are also substantial with respect to the role of nonbank financial institutions, such as mutual funds, insurance companies and pension funds in financial intermediation, while the market size of alternative financing sources (e.g. private equity, business angels, online alternative financing) is negligible. Moreover, in contrast to the euro area and the U.S.A., the total assets of nonbank financial institutions are smaller – in many countries substantially smaller – than domestic bank credit to the private sector, confirming the predominantly bank-based nature of the CESEE EU Member States' financial systems.

Further to the overall finding of gaps between the CESEE countries and the euro area, we also found substantial heterogeneity across the CESEE region with respect to the overall development of capital markets, the role of securities in the financing of both the total economy and individual institutional sectors and the currency structure of debt securities.

Expecting that the development of capital markets could generate substantial additional financing opportunities for the corporate sector, international institutions, national authorities and market participants have taken various supportive measures over the past 10 to 15 years. These have included the launch of national capital market strategies, measures to promote financial literacy, support for SMEs in going public, new market segments on stock exchanges with lighter regulatory requirements designed specifically for smaller companies, regional cooperation of stock exchanges, etc. We discussed several historical and structural reasons why capital markets in CESEE continue to play a rather marginal role in financing the private sector. Among these figure inter alia the legacy of informality, the disappointment with certain privatization procedures, the small size of most CESEE economies, the dominance of FDI, higher owner-occupancy rates locking a larger part of household wealth in real estate, the stock market bust during the Great Financial Crisis discouraging retail equity investors and also national measures that weakened capital markets development, such as for example the dismantling or partial dismantling of private pension funds in Hungary and Poland in line with new fiscal rules and policy considerations. Assessing or estimating the effects of the various measures to promote capital markets in the individual CESEE countries and gauging to what extent this might explain the heterogeneity within the region would go beyond the scope of this overview and remains a challenge for other authors.

The still fairly limited state of development of CESEE capital markets suggests that more remains to be done if one wants to increase the contribution of capital markets to financing domestic investment. In recent years, various institutions have suggested a wide range of measures to prop up capital markets in the region. These proposals include the launch of additional national capital market strategies, improvements in the business environment (e.g. judiciary, government administration, rule of law), enhancements to the regulatory and supervisory frameworks (including at the regional level) and support for the implementation of EU-wide regulatory requirements (e.g. related to MREL). Moreover, the strengthening of financial literacy among (retail) investors, and also among potential (SME) issuers, the development of the local investor and issuer base, including by tax incentives and targeted assistance especially for SMEs, start-ups and high-tech companies, as well as the regional cooperation of national governments and stock exchanges to increase economies of scale rank prominently among the suggestions. Taking the opportunities of green finance proactively and tackling the impact of COVID-19 on banks' balance sheets via NPL trading platforms linked to specialized capital investors remain current challenges. Such measures, if decided and implemented, could possibly prevent the sleeping beauty from turning into a dead duck.

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# How financially literate is CESEE? Insights from the OeNB Euro Survey

#### Sarah Reiter, Elisabeth Beckmann<sup>1</sup>

Drawing on data from the OeNB Euro Survey, we document financial literacy across ten countries in Central, Eastern and Southeastern Europe (CESEE-10) between 2012 and 2018. We analyze people's understanding of the "big three" concepts of financial literacy: interest rates, inflation and risk diversification. We show that financial literacy differs across and within countries. On average, just one in five adults can be considered financially literate. Our results show that low financial literacy levels are more common among older and less educated individuals and that self-employment is only weakly related to higher literacy. In line with previous research, females show lower levels of financial literacy than their male counterparts. However, the gender gap observed in the CESEE-10 (countries with a communist legacy) is small compared to the gap in countries that do not have a communist legacy. Individuals who experienced economic turbulence during transition from planned to market economies tend to be more financially literate regarding inflation. While indicators of economic and financial development are correlated with higher financial literacy at the country level, interactions are more complex at the intracountry level.

#### JEL classification: D14, D83, D91, G53

Keywords: financial literacy, interest rates, inflation, risk diversification, gender gap, CESEE

The number of adults with access to bank accounts and credit has been increasing steadily since 2011 (see *Global Findex Database*<sup>2</sup>), and the range and complexity of financial products offered to households has risen significantly as well (Célérier and Vallée, 2017). At the same time, more responsibility has been shifted to households with regard to their financial decisions, for example by pension systems moving from defined-benefit to defined-contribution plans (Barr and Diamond, 2006; OECD, 2019a). Taking these developments into account, it is clear that financial literacy is becoming more and more important (Lusardi and Mitchell, 2014; OECD, 2006).

From previous research, financially literate individuals are known to be (1) more successful at job planning and saving for retirement (Behrman et al., 2012); (2) more likely to participate in the stock market (Almenberg and Dreber, 2015; van Rooij et al., 2011); and (3) more likely to diversify their savings (Hastings et al., 2013). In contrast, individuals who lack financial literacy are more prone to take high-cost loans and become overindebted (Lusardi and Tufano, 2015) and to encounter repayment difficulties (Gerardi et al., 2013).

To remedy this situation, many countries have implemented national strategies for financial education seeking to improve "financial literacy with a view to promoting healthier financial behaviors and improving financial well-being" (OECD, 2015). In this context, the OECD argues that "policymakers, educators and researchers need high-quality data on levels of financial literacy in order to inform

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<sup>&</sup>lt;sup>2</sup> https://globalfindex.worldbank.org/.

financial education strategies" (OECD, 2013). Indeed, the number of surveys undertaken to gain a better understanding of financial literacy is steadily increasing. However, some of these surveys are not appropriate for comparisons across countries as they vary regarding the sociodemographic groups that are surveyed. For instance, some studies consider only young or only old people whereas others consider adults in general. Moreover, the studies also differ in the way they define and measure financial literacy.<sup>3</sup>

To deal with this shortcoming, numerous efforts have been made to come up with harmonized definitions and measures of financial literacy, allowing for cross-country comparisons. One of the most prominent of these projects was initiated by the OECD International Network on Financial Education (OECD/INFE), which provides harmonized data on financial literacy for 30 countries (Atkinson and Messy, 2012; OECD, 2016). Furthermore, the World Bank has developed financial capability surveys and is actively involved in developing financial education strategies (World Bank, 2014). Another well-known initiative is the so-called *Financial Literacy around the World (FLat World)*<sup>4</sup> project, which collects answers to three standard financial literacy questions on *interest rates, inflation* and *risk diversification* (Lusardi and Mitchell, 2008). In the literature, these questions have come to be known as the "big three" (see, for example, Barboza et al., 2016).

In this paper, we present unique survey evidence on individuals' understanding of the "big three" concepts of financial literacy for ten Central, Eastern and Southeastern European (CESEE-10) countries for the period from 2012 to 2018. One distinct advantage of our data is that the wording of the financial literacy questions put to respondents (always the adult population) and the survey mode were exactly the same in all ten countries. We contribute to the literature by presenting evidence for countries with a rather short history of developed financial systems and consumer finance. To the best of our knowledge, this is the first paper that analyzes evidence for the three standard financial literacy questions over a period of more than five years using a dataset that has sufficient observations to dig into intracountry heterogeneities. Moreover, we add to the FLat World project by providing comparable statistics on financial literacy for countries that have not yet been covered by the project. We present evidence of how financial literacy varies across sociodemographic groups and, by comparing our results to those from other surveys, we show that in the CESEE-10 (all countries with a communist legacy) the gender gap in financial literacy is smaller than in countries that do not have a communist legacy (similar findings were made by Cupák et al., 2018). For each of the ten CESEE countries under study, the *online annex* of our paper provides indicators of financial literacy for different sociodemographic groups and regions. This evidence can be used as input for policy work and further research.

The rest of this paper is organized as follows: Section 2 describes the data; section 3 presents details on the "big three" financial literacy questions and discusses the strengths and weaknesses of these questions. Section 4 presents the corresponding results, describing the variation in financial literacy across countries.<sup>5</sup>

<sup>&</sup>lt;sup>3</sup> For an overview of the various definitions of financial literacy, see annex A1. In this article, we use the terms "financial literacy" and "financial knowledge" as synonyms, i.e., we use a very narrow definition of the financial literacy concept (see World Bank, 2014).

<sup>&</sup>lt;sup>4</sup> https://gflec.org/initiatives/flat-world/.

<sup>&</sup>lt;sup>5</sup> For the variation of financial literacy over time, see the online annex.
We also compare our financial literacy results with those of other surveys that have been conducted in the CESEE-10. Section 5 analyzes intracountry variation of financial literacy and its correlates. Section 6 discusses the variation in financial literacy across sociodemographic groups, section 7 describes how the transition experience is related to literacy and section 8 provides concluding remarks.

#### 1 Data: the OeNB Euro Survey

The main source of data for our analysis is the *OeNB Euro Survey* – a survey carried out by Austria's central bank among individuals, aged 15 or older, in ten Central, Eastern and Southeastern European countries: six EU Member States that are not part of the euro area (Bulgaria, Croatia, Czechia, Hungary, Poland and Romania) and four EU candidates and potential candidates (Albania, Bosnia and Herzegovina, North Macedonia and Serbia).

The Euro Survey has been conducted on a regular basis since 2007 as a repeated cross-sectional face-to-face survey. In each country and in each survey wave, a sample (based on multistage random sampling procedures) of around 1,000 individuals is interviewed. Each sample reflects a country's population characteristics in terms of age, gender, region and ethnicity.

When interpreting the results presented in this paper, the following issues should be taken into account: Nonresponse varies across countries and across survey waves. The gross sample size ranges approximately from 1,500 to 3,000 across countries and waves. The number of interrupted interviews is zero in some countries and up to 200 in other countries. In the absence of information on the number of individuals who refused to participate in the survey, we cannot construct nonresponse weights. Regarding unit nonresponse, we do not impute missing values but assume that nonresponse is random, which is arguably a strong assumption. However, for the central questions of interest – the questions on financial literacy – the share of "no answer" responses is below 3% in all countries and waves.

Weights are calibrated on census population statistics for age, gender, region, and, where available, on education and ethnicity. Weights are calibrated separately for each wave and country. For the majority of countries, population statistics relate to the year 2011; more recent census data were available only for some countries.<sup>6</sup>

All in all, we use data from six Euro Survey waves between 2012 and 2018,<sup>7</sup> meaning that our dataset covers a total of around 60,000 observations.<sup>8</sup> The central variables of our analyses are derived from the three questions on financial literacy referred to above. Beyond that, the survey questionnaire elicits a rich set of information on socioeconomic characteristics, indicators of wealth and household finances, individual beliefs, expectations and trust.

The survey also contains the addresses (at the street level) of the primary sampling units (PSUs), i.e. of the units that are selected in the first stage of the multistage random sampling process, which is ultimately aimed at selecting individual elements. Put simply, these are the points where the interviewer starts walking to

<sup>&</sup>lt;sup>6</sup> Strictly speaking, the weighted descriptive statistics in this paper, therefore, do not represent the "current population" but an "average population" that never existed precisely like that.

<sup>&</sup>lt;sup>7</sup> We do not use data from the 2017 wave as this wave included only two of the three financial literacy questions.

<sup>&</sup>lt;sup>8</sup> Using the estimated variance based on survey results and allowing for a 5% margin of error to calculate "optimal sample size," we find that our sample size is adequate for analyses at the NUTS-2 level for larger countries (e.g. Poland) and at the NUTS-3 level for smaller countries (e.g. Albania).

select specific addresses, and ultimately individuals, to participate in the survey. Depending on the country, there are between 100 and 300 PSUs per country. The maximum number of interviews conducted around one PSU is 25. We geocode the PSU addresses and calculate the area around the PSU points at different radii (5km, 10km, 20km). For each area, we compute (1) indicators of urbanicity and (2) proxies for local economic activity such as average stable night light following Henderson et al. (2012). We merge the survey data with these indicators at the area level. Both indicators have been shown to be associated with financial literacy at the country level (Klapper and Lusardi, 2019).

#### **3 Measurement of financial literacy**

Lusardi and Mitchell (2008, 2011a) came up with a short list of questions to measure financial literacy with regard to three aspects: *interest rates, inflation* and *risk diversification*. The questions were designed taking into account four principles: *simplicity, relevance, brevity* and *capacity to differentiate*. Originally included in the U.S. Health and Retirement Study, the "big three" were later adopted as a measure of financial literacy for the FLat World project – a project that aims at comparing financial literacy and its effect on economic decision making (such as retirement planning) across countries (Lusardi and Mitchell, 2011c). The financial literacy measure that we use in this article is solely derived from these three questions. This is admittedly a shortcoming of our article as the scope of this measure is obviously limited. A more comprehensive measure of financial literacy has been developed by the World Bank (see, for instance, Bolaji-Adio et al., 2013) and the OECD/INFE (see, for instance, OECD, 2018).

The three financial literacy questions as put to Euro Survey respondents are shown in table 1. The questions on interest rates and inflation use the original wording. With regard to the question on risk diversification, which originally referred to *stock mutual funds*, various surveys have used a different wording, as stock mutual funds are not commonly known in all countries; see for example the S&P Global Finlit Survey (Klapper and Lusardi, 2019).<sup>9</sup> The Euro Survey follows this approach: respondents are asked whether they think that the risk of losing money when spread among different assets *increases, decreases* or *stays the same*, rather than whether they consider a *single company stock* to provide a safer return than a *stock mutual fund*.<sup>10</sup>

Based on the three questions, previous research commonly defines three binary variables where the correct answer is coded as 1, wrong answers and "do not know" responses are coded as 0, and "refuse to answer" responses are coded as "missing." The three binary variables are then aggregated to a financial literacy score, defined as the number of correct answers (see, for example, Bucher-Koenen and Lusardi, 2011; and Bucher-Koenen and Ziegelmeyer, 2013). In our paper, we follow this approach and define (1) three separate binary variables for each of the three financial literacy questions and (2) a financial literacy score taking on integer values between 0 and 3.

<sup>&</sup>lt;sup>9</sup> https://gflec.org/initiatives/sp-global-finlit-survey/.

<sup>&</sup>lt;sup>10</sup> The wording of the original risk diversification question as designed by Lusardi and Mitchell (2011a) is as follows: Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund." True; False; I do not know; I refuse to answer.

#### Table 1

| Concept                             | Question   |
|-------------------------------------|--|
| Interest rate                       | Suppose you had 100 [local currency] in a savings account and the interest rate was 2% per year. Disregarding any bank fees, how much do you think you would have in the account after 5 years if you left the money to grow:<br>(i) More than 102 [local currency]*<br>(ii) Exactly 102 [local currency]<br>(iii) Less than 102 [local currency]<br>(iv) Do not know<br>(v) No answer |
| Inflation                           | Suppose that the interest rate on your savings account was 4% per year and inflation<br>was 5% per year. Again disregarding any bank fees – after 1 year, would you be able to<br>buy more than, exactly the same as, or less than today with the money in this account?<br>(i) More<br>(ii) Exactly the same<br>(iii) Less*<br>(iv) Do not know<br>(v) No answer                      |
| Risk diversification                | When an investor spreads his money among different assets, does the risk of losing money<br>(i) Increase<br>(ii) Decrease*<br>(iii) Stay the same<br>(iv) Do not know<br>(v) No answer   |
| Source: OeNB Euro Survey.           |  |
| Note: Correct answers are marked wi | th an asterisk.  |

#### The big three financial literacy questions included in the OeNB Euro Survey

As Lusardi and Mitchell (2014) point out, any given set of financial literacy measures can "only proxy for what individuals need to know to optimize their behavior in intertemporal models of financial decision making."

Indeed, for the specific sample of countries we cover, the concept of risk diversification is probably less important than in the U.S.A. and other high-income countries where these questions were initially developed and implemented. For example, stock market capitalization to GDP is 152% in the U.S.A., compared to 32% in Croatia (the Euro Survey country with the highest percentage). Further indicators, such as life insurance premiums to GDP, pension fund assets to GDP and mutual fund assets to GDP provide a similar picture.<sup>11</sup> It is, therefore, not surprising that saving instruments such as life insurance, pension funds, bonds, stocks and mutual funds are not widespread in the countries we analyze. Instead, for the countries covered by the OeNB Euro Survey, for example, understanding of exchange rate risk may be much more relevant in terms of optimizing household financial decisions (Beckmann and Stix, 2015). Nevertheless, we will stick to the "big three" and follow the concept of the FLat World project as this is the only way to allow comparison with results from countries not covered by the OeNB Euro Survey.

<sup>&</sup>lt;sup>11</sup> Of course, comparing CESEE-10 with countries that have similar GDP per capita shows that CESEE-10 capital market development is on a similar level or higher. For example, Turkey, whose GDP per capita is similar to Croatia's, has a lower stock market capitalization at 22%. Similarly, Poland has a similar level of GDP per capita to Oman, and stock market capitalization is also very similar at 33% and 32%, respectively. See the Global Financial Development database for details: www.worldbank.org/en/publication/gfdr/data/global-financial-de/ velopment-database.

Compared to the OECD Toolkit for Measuring Financial Literacy (OECD, 2018), the "big three" questions have the advantage that they can be integrated into existing surveys at low cost. At the same time, this limits the measure to three concepts and gives rise to two general concerns that may be particularly relevant for this limited number of questions: (1) Are responses to the questions affected by measurement error? (2) Do the questions provide a comprehensive measure of financial knowledge?

With regard to the first concern, Crossley et al. (2017) provide an in-depth discussion of measurement error related to financial literacy. They point out that, in contrast to many other survey questions, financial literacy questions test respondents' knowledge (instead of, say, their opinion), and so the interviewers, who presumably know the correct answers, would be able to help respondents. Crossley et al. (2017) indeed find that interviewer effects are larger for financial literacy questions than for other survey questions. Interviewer variation does not seem to drive the "do not know" responses but is more complex. Guessing the correct answer when being asked a financial knowledge question might also lead to measurement error. Analyzing the framing of financial knowledge questions, van Rooij et al. (2011) find that correctly guessed answers might be mistaken for true financial knowledge.

With regard to the second concern, it has been argued that although the "big three" provide a narrow measure of financial literacy, the three concepts covered by the questions are most relevant to saving and investment decisions (Bucher-Koenen et al., 2017). Furthermore, compared to research using more complex measures of financial literacy, research based on the "big three" finds similar sociodemographic patterns with regard to lack of financial literacy. For example, a growing body of research on gender and financial literacy documents a gender gap irrespective of the survey measure of financial literacy: Cupák et al. (2018) use the OECD surveys; Driva et al. (2016) use the "big three" plus additional questions on financial literacy; Bucher-Koenen et al. (2017) use the "big three"; and Klapper and Lusardi (2019) use the S&P Global Finlit Survey. Irrespective of the financial literacy measure used, robust patterns have been identified also with respect to other sociodemographic characteristics such as age, employment status and education.

In this paper, we address the above-mentioned concerns in the following way: We compare our results to evidence from other surveys conducted in the ten CESEE countries covered by the OeNB Euro Survey.<sup>12</sup> As can be seen in the next section, the relative levels in financial knowledge among countries remain more or less the same no matter what measure of financial knowledge is used.

<sup>&</sup>lt;sup>12</sup> Annex A2 provides a list of these surveys.

#### 4 Financial literacy: variation across countries

Table 2 shows the answers to the three financial literacy questions for the full sample, and separately for the six EU Member States and the four EU candidates and potential candidates. It shows that financial literacy is highest when it comes to interest rates, followed by inflation. Financial literacy is lowest with regard to risk diversification, where also the share of "do not know" responses is the highest. These results are in line with the growing number of studies collected under the FLat World project (Agnew et al., 2013; Alessie et al., 2011; Almenberg and Säve-Söderbergh, 2011; Arrondel et al., 2013; Beckmann, 2013; Boisclair et al. 2017; Brown and Graf, 2013; Bucher-Koenen and Lusardi, 2011; Crossan et al., 2011; Fornero and Monticone, 2011; Kalmi and Ruuskanen, 2018; Klapper and Lusardi, 2019; Klapper and Panos, 2011; Lusardi and Mitchell, 2011b; Sekita, 2011).<sup>13</sup>

In line with the common approach in the above-mentioned studies, we compute indicators of cross-question consistency. On average, across all countries, 19% of respondents answer all three questions correctly whereas 22% fail to answer any of the three questions correctly. The percentage of respondents who answer both the inflation and interest rate questions correctly is significantly higher at 33%. Overall, the six CESEE EU countries perform better than the four CESEE non-EU countries. In the online annex, we also provide a detailed overview of how financial literacy evolved over time between 2012 and 2018.

In table 3, we compare the financial literacy results for the CESEE-10 countries with those of other countries participating in the FLat World project.<sup>14</sup>

With a share of 38.6% of respondents correctly answering all three financial literacy questions, Czechia ranks among the best-performing countries. However, most of the other CESEE countries under study are at the lower end of the ranking. The countries differ considerably in terms of economic and financial development. Hence, cross-country comparisons between the CESEE-10 countries and the other FLat World countries should be taken with caution. GDP per capita is in general low in the CESEE-10 countries when compared to the other FLat World countries. The only FLat World country with GDP per capita figures in the range of most CESEE-10 countries is Chile, which also exhibits low financial literacy rates. Italy and Czechia are comparable in terms of GDP per capita, but less so in terms of overall financial literacy. In general, table 3 also shows that literacy does not steadily increase with GDP per capita.

Table 3 also suggests that the gender gap in financial literacy increases with overall financial literacy. See section 6 for a discussion of this aspect.

<sup>&</sup>lt;sup>13</sup> For an overview of the studies of the FLat World project, see Lusardi and Mitchell (2014).

<sup>&</sup>lt;sup>14</sup> Note that the comparison is purely descriptive; ideally, a cross-country analysis would aggregate data to the country-time level and conduct panel analyses. However, given the still relatively limited cross-sectional and time dimension available to us we do not currently pursue this approach.

Table 2

|  | Full sample                                   | CESEE EU                                      | CESEE non-EU                                  |
|--|---|---|---|
|  | %   |   |   |
| Interest rate  |   |   |   |
| More than 102*<br>Exactly 102<br>Less than 102<br>Do not know<br>No answer<br>N  | 51.7<br>16.3<br>11.7<br>18.1<br>2.3<br>61,564 | 51.5<br>16.0<br>12.3<br>18.3<br>1.9<br>36,777 | 52.7<br>18.2<br>8.1<br>16.8<br>4.2<br>24,787  |
| Inflation  |   |   |   |
| More<br>Exactly the same<br>Less*<br>Do not know<br>No answer<br>N   | 11.3<br>17.8<br>48.5<br>19.9<br>2.5<br>61,564 | 10.9<br>17.2<br>49.6<br>20.2<br>2.0<br>36,777 | 13.2<br>21.3<br>42.4<br>18.1<br>5.1<br>24,787 |
| Risk diversification   |   |   |   |
| Increase<br>Decrease*<br>Stay the same<br>Do not know<br>No answer<br>N  | 19.7<br>39.8<br>16.3<br>21.7<br>2.6<br>61,564 | 18.3<br>41.4<br>16.4<br>21.8<br>2.2<br>36,777 | 27.5<br>30.6<br>16.2<br>20.9<br>4.8<br>24,787 |
| Cross-question consistency   |   |   |   |
| Correct answers for interest rate and inflation<br>All answers correct<br>None of the answers correct<br>"Do not know" selected at least once<br>"Do not know" selected for all answers<br>N | 32.6<br>18.6<br>21.7<br>33.2<br>9.5<br>58,732 | 32.9<br>19.7<br>21.6<br>33.6<br>9.5<br>35,573 | 31.0<br>12.1<br>22.5<br>30.6<br>9.6<br>23,159 |

#### Summary statistics on the big three financial literacy questions

Source: OeNB Euro Survey, 2012–2016 and 2018.

Note: The statistics are based on weighted data. Correct answers are marked with an asterisk. N = number of observations. The "cross-question consistency" panel covers only those respondents who gave an answer to all three questions.

To test the robustness of our financial literacy measure, we provide an overview in table 4 comparing our results with those from other studies on financial literacy conducted in the CESEE-10: Klapper et al. (2015) analyze people's financial knowledge in more than 140 economies including all CESEE-10. With its International Network on Financial Education, the OECD analyzes financial knowledge, financial behavior and financial attitudes in various countries, including four of the ten CESEE countries in their first study (Atkinson and Messy, 2012) and five of them in their second study (OECD, 2016).<sup>15</sup> Subject to the constraint that the studies differ in their definition of financial literacy and that the financial literacy measures are based on a different range of questions (ranging from three to eight), we find that the relative position of the ten CESEE countries with respect to financial knowledge is robust across the different surveys. Across all surveys, Czechia and Hungary consistently show the highest levels of financial knowledge within the

<sup>&</sup>lt;sup>15</sup> For a comprehensive list of all the financial literacy studies conducted in the CESEE-10, see annex A2.

#### Financial literacy in the FLat World and OeNB Euro Survey countries

| Country                | All corre | ect    | Gender |        |                 |      |        |                         |                                   |                   |
|------------------------|-----------|--------|--------|--------|-----------------|------|--------|-------------------------|-----------------------------------|-------------------|
|                        | Rank      | Result | Male   | Female | Differ-<br>ence | Rank | N      | Data<br>collec-<br>tion | Source                            | GDP per<br>capita |
|                        |           | %      | %      |        | рр.             |      |        |                         |                                   |                   |
| Germany                | 1         | 53.2   | 59.6   | 47.5   | 12.1            | 11   | 1,059  | 2009                    | Bucher-Koenen and Lusardi (2011)  | 46,988            |
| Switzerland            | 2         | 50.1   | 62.0   | 39.3   | 22.7            | 1    | 1,500  | 2011                    | Brown and Graf (2013)             | 77,452            |
| Austria                | 3         | 48.8   | 55.0   | 43.0   | 12.0            | 12   | 1,342  | 2019                    | Fessler et al. (2020)             | 49,190            |
| Netherlands            | 4         | 44.8   | 55.1   | 35.0   | 20.1            | 2    | 1,665  | 2010                    | Alessie et al. (2011)             | 53,920            |
| Australia              | 5         | 42.7   | 52.0   | 34.0   | 18.0            | 4    | 1,024  | 2012                    | Agnew et al. (2013)               | 56,229            |
| Canada                 | 6         | 42.5   | 51.4   | 32.9   | 18.5            | 3    | 6,805  | 2012                    | Boisclair et al. (2017)           | 51,126            |
| Czechia                | 7         | 38.6   | 41.2   | 36.2   | 5.0             | 15   | 6,109  | ×                       | Own analysis                      | 22,755            |
| Finland                | 8         | 35.6   | 44.0   | 27.1   | 16.9            | 5    | 1,477  | 2014                    | Kalmi and Ruuskanen (2018)        | 47,559            |
| France                 | 9         | 30.9   | 36.3   | 26.0   | 10.3            | 13   | 3,616  | 2011                    | Arrondel et al. (2013)            | 43,002            |
| U.S.A.                 | 10        | 30.2   | 38.3   | 22.5   | 15.8            | 7    | 1,488  | 2009                    | Lusardi and Mitchell (2011b)      | 53,356            |
| Japan                  | 11        | 27.0   | 34.3   | 20.6   | 13.7            | 9    | 5,268  | 2010                    | Sekita (2011)                     | 48,439            |
| Hungary                | 12        | 25.1   | 25.7   | 24.6   | 1.1             | 24   | 5,912  | ×                       | Own analysis                      | 15,696            |
| Italy                  | 13        | 24.9   | 29.5   | 17.0   | 12.5            | 10   | 3,992  | 2007                    | Fornero and Monticone (2011)      | 35,029            |
| New Zealand            | 14        | 24.0   | 32.0   | 16.0   | 16.0            | 6    | 850    | 2009                    | Crossan et al. (2011)             | 37,678            |
| Bulgaria               | 15        | 22.8   | 24.5   | 21.2   | 3.3             | 16   | 5,850  | х                       | Own analysis                      | 8,331             |
| Sweden                 | 16        | 21.4   | 29.3   | 13.6   | 15.7            | 8    | 1,302  | 2010                    | Almenberg, Säve-Söderbergh (2011) | 56,611            |
| Poland                 | 17        | 19.6   | 20.5   | 18.8   | 1.7             | 22   | 5,800  | х                       | Own analysis                      | 15,826            |
| Croatia                | 18        | 19.1   | 22.0   | 16.6   | 5.4             | 14   | 5,885  | х                       | Own analysis                      | 15,332            |
| Serbia                 | 19        | 14.7   | 16.2   | 13.2   | 3.0             | 17   | 5,597  | х                       | Own analysis                      | 6,560             |
| North Macedonia        | 20        | 10.9   | 12.0   | 9.9    | 2.1             | 20   | 5,835  | ×                       | Own analysis                      | 5,257             |
| Bosnia and Herzegovina | 21        | 10.2   | 11.6   | 8.9    | 2.7             | 18   | 5,706  | х                       | Own analysis                      | 5,828             |
| Albania                | 22        | 9.5    | 10.8   | 8.2    | 2.6             | 19   | 6,021  | ×                       | Own analysis                      | 4,868             |
| Romania                | 23        | 7.5    | 8.6    | 6.5    | 2.1             | 21   | 6,017  | ×                       | Own analysis                      | 11,017            |
| Chile                  | 24        | 7.7    | n.a.   | n.a.   | n.a.            | n.a. | 14,463 | 2009                    | Garabato Moure (2016)             | 14,749            |
| Russia                 | 25        | 3.1    | 3.8    | 2.5    | 1.3             | 23   | 1,366  | 2009                    | Klapper and Panos (2011)          | 11,470            |

Source: FLat World project and OeNB Euro Survey; World Bank (Global Financial Development).

Note: For the ten OeNB Euro Survey countries ("own analysis"), the statistics are based on weighted data; x indicates waves from 2012–2016 and 2018. For Romania, also see Beckmann (2013). For Austria, the statistics are not based on the big three questions, but on a survey that uses the OECD toolkit for measuring financial literacy. n.a. stands for "not available" and N refers to the number of observations. GDP per capita refers to 2017 and is expressed in constant 2005 USD.

Table 4

#### Financial knowledge in the CESEE-10: a comparison across different studies

|                        | OeNB          | Euro S | urvey |      | Klappe        | er et al. ( | (2015) |      | Atkinson and Messy (2012) |      |       |      | OECD/INFE (2016) |      |       |      |
|------------------------|---------------|--------|-------|------|---------------|-------------|--------|------|---------------------------|------|-------|------|------------------|------|-------|------|
| Country                | 3 out<br>of 3 | Rank   | Ν     | Year | 3 out<br>of 4 | Rank        | Ν      | Year | 6 out<br>of 8             | Rank | Ν     | Year | 5 out<br>of 7    | Rank | Ν     | Year |
|                        | %             |        |       |      | %             |             |        |      | %                         |      |       |      | %                |      |       |      |
| Bulgaria               | 22.8          | 3      | 5,850 | ×    | 35            | 6           | n.a.   | 2014 | n.a.                      | n.a. | n.a.  | n.a. | n.a.             | n.a. | n.a.  | n.a. |
| Croatia                | 19.1          | 5      | 5,885 | ×    | 44            | 3           | n.a.   | 2014 | n.a.                      | n.a. | n.a.  | n.a. | 46               | 4    | 1,049 | 2015 |
| Czechia                | 38.6          | 1      | 6,109 | ×    | 58            | 1           | n.a.   | 2014 | 57                        | 2    | 1,005 | 2010 | 52               | 3    | 1,000 | 2015 |
| Hungary                | 25.1          | 2      | 5,912 | ×    | 54            | 2           | n.a.   | 2014 | 69                        | 1    | 998   | 2010 | 60               | 1    | 1,000 | 2015 |
| Poland                 | 19.6          | 4      | 5,800 | ×    | 42            | 4           | n.a.   | 2014 | 49                        | 3    | 1,008 | 2010 | 55               | 2    | 1,000 | 2015 |
| Romania                | 7.5           | 10     | 6,017 | ×    | 22            | 8           | n.a.   | 2014 | n.a.                      | n.a. | n.a.  | n.a. | n.a.             | n.a. | n.a.  | n.a. |
| Albania                | 9.5           | 9      | 6,021 | ×    | 14            | 10          | n.a.   | 2014 | 45                        | 4    | 1,000 | 2011 | 43               | 5    | 1,000 | 2015 |
| Bosnia and Herzegovina | 10.2          | 8      | 5,706 | ×    | 27            | 7           | n.a.   | 2014 | n.a.                      | n.a. | n.a.  | n.a. | n.a.             | n.a. | n.a.  | n.a. |
| North Macedonia        | 10.9          | 7      | 5,835 | ×    | 21            | 9           | n.a.   | 2014 | n.a.                      | n.a. | n.a.  | n.a. | n.a.             | n.a. | n.a.  | n.a. |
| Serbia                 | 14.7          | 6      | 5,597 | ×    | 38            | 5           | n.a.   | 2014 | n.a.                      | n.a. | n.a.  | n.a. | n.a.             | n.a. | n.a.  | n.a. |

Source: OeNB Euro Survey (2012–2016; 2018), Klapper et al. (2015), Atkinson and Messy (2012) and OECD/INFE (2016).

Note: The definition of "being financially knowledgeable" varies across studies: to qualify as financially knowledgeable, respondents must answer 3 out of 3 questions correctly (OeNB Euro Survey); 3 out of 4 questions (Klapper et al., 2015); 6 out of 8 questions (Atkinson and Messy, 2012); or 5 out of 7 questions OECD/INFE, 2016). x indicates the survey waves from 2012–2016 and 2018; n.a. stands for "not available"; and N refers to the number of observations.

Chart 1

CESEE-10. In contrast, the four CESEE non-EU countries generally show low levels of financial knowledge when compared to the other six CESEE EU countries.

#### 5 Financial literacy: regional variation

An asset of our dataset is the large number of observations that allows analyzing financial literacy scores at a disaggregate level. Chart 1 illustrates intracountry variation in financial literacy and illiteracy. The maps show that for some countries (e.g. Poland) intracountry variation in literacy is as large as variation across countries. In other countries (e.g. Romania and Croatia), financial literacy levels are homogeneous. When comparing panel (a) and panel (b) of chart 1, we see that the level of financial *illiteracy* (i.e. the share of respondents who answer none of the three questions correctly) varies less across regions than the level of financial *literacy* (i.e. the share of respondents correctly).



Source: OeNB Euro Survey, 2012–2016 and 2018.

Note: This chart compares the percentage of respondents with correct answers to all three financial literacy questions (map on the left) with the percentage of respondents who answered none of the three questions correctly (map on the right). The financial literacy results are shown at the NUTS-2 level except for Bosnia and Herzegovina, for which the data are based on the OeNB's regional classification scheme. The sample consists of respondents who provided answers to all three financial literacy questions. The statistics are based on weighted data. For underlying values, see the online annex. Klapper and Lusardi (2019) analyze economic and financial factors that drive variation in financial literacy across countries. They find a significant positive correlation between literacy and GDP per capita as well as between literacy and consumer protection laws. Indicators of financial development and financial stability are significantly correlated with literacy levels in developed countries only. As our sample covers only ten countries, we do not analyze what determines differences in literacy levels across these ten countries. However, we take the analysis of Klapper and Lusardi (2019) to the intracountry level, examining which factors might explain the observed regional variation in financial literacy in the CESEE-10.

Table 5 shows correlations at the PSU level between financial literacy (computed as the average literacy score ranging from 0 to 3) and various indicators of local economic and financial development.<sup>16</sup> Following Henderson et al. (2012), we use average stable night lights as an indicator of economic development. Our results show that the positive correlation of financial literacy and economic development only holds in some countries. For others, such as Bulgaria, Hungary, Poland and North Macedonia, we find that more economically developed areas have lower levels of financial literacy. It is important to note, however, that these correlations do not control for other factors and that night light is, for example, highly correlated with indicators of urbanization (see column 2 of table 5, which shows the same negative/positive correlation pattern as column 1).

Unlike Klapper and Lusardi (2019), we find a significant correlation between financial literacy levels and indicators of financial development.<sup>17</sup> Again, bearing in mind that these correlations do not control for other factors, our results indicate that literacy levels increase with bank proximity and density in most countries. While higher bank concentration is associated with lower literacy levels in Croatia, Hungary and Serbia, the opposite is the case in Bulgaria, Czechia, Poland and North Macedonia. To investigate whether the local banking environment is merely a proxy for the development of the local infrastructure, we also look at correlations with local road density (see the final column of table 5). The positive and significant correlation of road density and literacy for Croatia, Czechia and Serbia coincides with the positive and significant correlation of bank proximity and literacy. Taken together, these results suggest that it is worth investigating in depth the determinants of intracountry heterogeneity in financial literacy in future research. In particular, it would be informative for policymakers to investigate to what extent intracountry heterogeneities are related to heterogeneities in economic activity alone or to what extent institutions and factors that may be influenced by concrete policy measures are relevant.

<sup>&</sup>lt;sup>16</sup> Since we are interested in the PSU level, we restrict our measure of financial development to local banking market indicators; it is therefore less comprehensive than the one used by Klapper and Lusardi (2019).

<sup>&</sup>lt;sup>17</sup> See Beckmann et al. (2018) for details on how the indicators of bank proximity, density and concentration were collected and computed.

#### Table 5

## Intracountry correlation of financial literacy and indicators of economic and financial development

|                        | Night light | Urban fabric | km to next<br>bank branch | Number of<br>banks within<br>5 km | Bank<br>concentration | Road density |
|------------------------|-------------|--------------|---------------------------|-----------------------------------|-----------------------|--------------|
| Bulgaria               | -0.0520***  | -0.0582***   | -0.0631***                | 0.0402***                         | 0.0359***             | 0.005        |
| Croatia                | 0.0703***   | 0.0786***    | -0.0610***                | 0.0808***                         | -0.0772***            | 0.0717***    |
| Czechia                | 0.2017***   | 0.1905***    | -0.3132***                | 0.2049***                         | 0.1052***             | 0.1545***    |
| Hungary                | -0.0372***  | -0.0371***   | -0.025                    | 0.0626***                         | -0.0708***            | -0.012       |
| Poland                 | -0.0344***  | -0.0619***   | 0.008                     | -0.0508***                        | 0.0621***             | -0.0596***   |
| Romania                | 0.0407***   | 0.0783***    | -0.0801***                | 0.0452***                         | 0.002                 | 0.030        |
| Albania                | 0.023       | 0.031        | -0.0358***                | 0.0396***                         | -0.001                | -0.016       |
| Bosnia and Herzegovina | 0.02        | 0.010        | -0.029                    | 0.026                             | 0.029                 | 0.0376***    |
| North Macedonia        | -0.0663***  | -0.1133***   | -0.1296***                | 0.0877***                         | 0.0372***             | -0.017       |
| Serbia                 | 0.1153***   | 0.1249***    | -0.0995***                | 0.1345***                         | -0.0852***            | 0.1411***    |

#### Source: OeNB Euro Survey, 2012-2016 and 2018.

Note: The table shows the "Pearson product-moment correlation coefficcient" between average financial literacy and different economic and financial development indicators measured at the level of the primary sampling unit (PSU). The OeNB Euro Survey data are combined with non-survey data by collecting the geographic coordinates of the PSUs and computing indicators of economic and financial development for different perimeters around the PSUs. \*\*\* indicates significance at the 1% level (not adjusted for sampling design). "Night light" is obtained from the National Oceanic and Atmospheric Administration (NOAA) and represents average stable night lights based on the VIIRS Nighttime light series for a radius of 20km around the PSUs. "Urban fabric" is obtained from the CORINE Land Cover database and represents the area covered by continuous and discontinuous urban fabric for a radius of 20km around the PSUs. Indicators of bank proximity (km to next bank branch from the PSUs), density (number of banks within 5km around the PSUs) and concentration (Herfindahl index of bank concentration calculated based on the number of banks branches within 5km around the PSUs) are derived by combining data from the OeNB Euro Survey with bank branch data as described in Beckmann et al. (2018). "Road density" is obtained from the Global Road Inventory Dataset Project and represents road infrastructure for a radius of 5km around the PSUs.

## 6 Financial literacy: variation across sociodemographic groups with a focus on gender gaps

Differences in financial literacy are not only observed at the country and regional level; a high level of heterogeneity has also been established across sociodemographic groups. The countries analyzed so far in the FLat World project show the following patterns (Lusardi and Mitchell, 2011c): (1) Regarding age, financial literacy follows an inverted U-shape, meaning that younger and older age groups perform worse than the middle age groups. (2) Men achieve better financial literacy results than women. (3) Higher educated people are more financially literate than lower educated people. (4) Working people perform better than nonworking people.

In this section, we investigate whether these patterns are also prevalent across the ten Euro Survey countries and whether differences in financial literacy among certain sociodemographic groups (e.g. between men and women) are more pronounced in some countries than in others. We do so by aggregating results for the six EU Member States and the four EU candidates and potential candidates.<sup>18</sup> To maintain comparability with the other studies in the FLat World project, we stick to the structure of the tables in the related publications and especially to the definitions of the sociodemographic categories.

<sup>&</sup>lt;sup>18</sup> For a detailed analysis of financial literacy and its variation across sociodemographic groups on the country level, see section 4 in the online annex.

We find that financial literacy is lowest among adults aged 65+ both in CESEE EU countries (see table 6) and in CESEE non-EU countries (see table 7). This is the case for all three aspects of financial literacy. This finding is in line with results from previous empirical research (e.g. Klapper and Lusardi, 2019) and with theoretical models, where financial literacy is defined as a choice in the context of life-cycle models (Lusardi et al., 2015). Learning by doing would suggest that financial literacy is also lower for the youngest (Frijns et al., 2014). In line with empirical research for developed countries, table 6 shows an inverted U-shaped relationship between literacy and age (with the exception of literacy regarding interest rates). Results in table 7, however, are more in line with empirical evidence for emerging markets (Klapper and Lusardi, 2019): While literacy levels are not highest among the youngest, they are higher than among those aged 50+.

As expected – and corroborating previous research (for example, Christelis et al., 2010) – financial literacy is strongly correlated with education. The share of "do not know" responses for financial literacy is lowest among respondents with tertiary education.

Regarding respondents' labor market status, tables 6 and 7 show that financial literacy is higher for those who are working. In the six EU Member States, it is highest for self-employed respondents. In the CESEE non-EU countries, the literacy score for inflation and interest rates, and also the overall level of financial literacy, is highest for non-self-employed working respondents; risk literacy is highest for self-employed respondents. These results hold also when controlling for age and gender in a multivariate analysis.

Empirical evidence on financial literacy has shown large and persistent gender differences. The "gender gap" in financial literacy is also present in the CESEE-10 – with regard to all three concepts of financial literacy and overall literacy. Furthermore, we confirm a gender gap in the share of "do not know" responses. Previous research has sought to explain these differences by studying, for example, whether differences are due to life experience (Driva et al., 2016) or household decisionmaking (Fonseca et al., 2012), or whether they are present only for more complex questions (Bucher-Koenen et al., 2017). More recently, Cupák et al. (2018) provide a cross-country analysis of the gender gap using a measure of financial literacy that goes beyond the "big three." They argue that while some of the gender gap can be explained by personal characteristics, the rest may be due to an individual's economic and social environment. Their analysis shows that the gender gap in financial literacy is particularly small in Eastern European countries. They hypothesize that the "more equal financial literacy scores may be related to social and economic norms left over from times of communism."

Table 6

| i manciai neerae  | y in CLSL                                    |                                      | intries: un                          | lerences                             | across soc                           | loueniogi                            | apine gro                            | ups                                  |                                      |
|---|--|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|   | Sample                                       | Interest rate                        |                                      | Inflation                            |                                      | Risk diversifi                       | cation                               | Overall                              |                                      |
|   |  | Correct                              | Do not<br>know                       | Correct                              | Do not<br>know                       | Correct                              | Do not<br>know                       | All correct                          | None<br>correct                      |
|   | %  |                                      |                                      |                                      |                                      |                                      |                                      |                                      |                                      |
| Age   |  |                                      |                                      |                                      |                                      |                                      |                                      |                                      |                                      |
| 35 and younger<br>36–50<br>51–65<br>Older than 65<br>N                  | 32.6<br>25.9<br>24.2<br>17.4<br>35,573       | 56.1<br>54.8<br>52.8<br>43.9         | 16.3<br>14.3<br>17.2<br>29.6         | 49.6<br>52.8<br>53.9<br>45.7         | 18.6<br>16.7<br>19.2<br>30.7         | 43.5<br>45.6<br>42.8<br>36.8         | 19.5<br>18.2<br>21.8<br>32.2         | 19.7<br>21.2<br>20.5<br>16.1         | 20.0<br>18.6<br>20.2<br>30.9         |
| Gender  |  |                                      |                                      |                                      |                                      |                                      |                                      |                                      |                                      |
| Male<br>Female<br>N   | 47.9<br>52.1<br>35,573                       | 54.7<br>51.2                         | 16.1<br>20.3                         | 53.0<br>48.8                         | 18.2<br>22.4                         | 44.7<br>40.8                         | 19.1<br>24.6                         | 20.9<br>18.5                         | 19.4<br>23.5                         |
| Education   |  |                                      |                                      |                                      |                                      |                                      |                                      |                                      |                                      |
| Low<br>Medium<br>High<br>N  | 16.3<br>65.9<br>17.7<br>35,488               | 43.7<br>53.4<br>59.5                 | 31.5<br>16.8<br>11.7                 | 38.3<br>52.3<br>56.9                 | 33.0<br>18.7<br>14.9                 | 35.3<br>43.3<br>47.6                 | 33.4<br>20.7<br>15.9                 | 13.1<br>20.0<br>24.8                 | 32.8<br>20.5<br>15.1                 |
| Employment  |  |                                      |                                      |                                      |                                      |                                      |                                      |                                      |                                      |
| Retired<br>Student<br>Unemployed/other<br>Working<br>Self-employed<br>N | 25.5<br>6.4<br>10.1<br>50.9<br>7.2<br>35,276 | 45.2<br>56.1<br>49.4<br>55.9<br>61.1 | 27.3<br>18.2<br>23.7<br>13.6<br>11.7 | 47.2<br>49.5<br>45.3<br>53.2<br>57.0 | 28.3<br>20.9<br>24.9<br>16.2<br>13.6 | 35.7<br>43.4<br>34.0<br>46.7<br>52.6 | 30.4<br>21.2<br>26.7<br>17.4<br>15.8 | 15.1<br>19.1<br>14.0<br>22.0<br>28.6 | 28.8<br>20.9<br>25.9<br>18.0<br>14.6 |

#### Financial literacy in CESEE EU countries: differences across sociodemographic groups

Source: OeNB Euro Survey, 2012-2016 and 2018.

Note: The table shows descriptive statistics of the "big three" financial literacy questions for different sociodemographic groups in six CESEE EU Member States. The statistics are based on weighted data. N indicates the number of observations. The sample consists of those respondents who provide answers to all three financial literacy questions and for whom information on sociodemographic characteristics is available.

Chart 2 provides a striking confirmation of this finding, bringing together descriptive results from all FLat World studies.<sup>19</sup> The chart illustrates that the gender gap in financial literacy is comparatively lower in transition economies. However, it is important to bear in mind that the overall level of literacy is lower in most of these countries as well, as illustrated in chart 3. The gender gap in financial literacy can be expressed in absolute terms (the share of men with correct answers to all three questions minus the share of women with correct answers to all three questions) or in relative terms (absolute gender gap as a percentage of the overall literacy level). Both measures are of interest: The absolute gender gap illustrates how much "catching up" is necessary so that women's financial literacy becomes equal to that of men within one country. The relative gender gap lends itself to cross-country comparisons. Such a comparison shows, for example, that Russia is on a similar level with the Netherlands in terms of relative gender differences in literacy.

<sup>&</sup>lt;sup>19</sup> For an overview of the studies of the FLat World project, see Lusardi and Mitchell (2014). A similar cross-country comparison of gender gaps – focusing on interest rate knowledge – is provided by Hung et al. (2012), who take into account countries that participated in the FLat World project or in the OECD/INFE Pilot Study.

|   | ·  |                                      |                                      |                                      |                                      | 0101                                 |                                      |                                     |                                      |  |  |
|---|--|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--|--|
|   | Sample                                       | Interest rate                        |                                      | Inflation                            |                                      | Risk diversifi                       | cation                               | Overall                             |                                      |  |  |
|   |  | Correct                              | Do not<br>know                       | Correct                              | Do not<br>know                       | Correct Do not<br>know               |                                      | All correct                         | None<br>correct                      |  |  |
|   | %  |                                      |                                      |                                      |                                      |                                      |                                      |                                     |                                      |  |  |
| Age   |  |                                      |                                      |                                      |                                      |                                      |                                      |                                     |                                      |  |  |
| 35 and younger<br>36–50<br>51–65<br>Older than 65<br>N                  | 35.6<br>26.8<br>26.0<br>11.6<br>23,159       | 57.9<br>58.4<br>52.3<br>46.7         | 14.5<br>12.5<br>19.5<br>28.5         | 44.6<br>47.8<br>44.2<br>39.4         | 16.7<br>14.0<br>20.4<br>30.7         | 35.1<br>34.6<br>30.3<br>25.2         | 18.0<br>16.0<br>24.9<br>34.1         | 12.7<br>13.8<br>11.3<br>8.1         | 19.9<br>19.0<br>25.1<br>32.8         |  |  |
| Gender  |  |                                      |                                      |                                      |                                      |                                      |                                      |                                     |                                      |  |  |
| Male<br>Female<br>N   | 48.6<br>51.4<br>23,159                       | 58.1<br>52.6                         | 13.8<br>19.8                         | 46.9<br>42.7                         | 15.8<br>21.2                         | 34.7<br>30.5                         | 17.8<br>24.3                         | 13.5<br>10.8                        | 20.1<br>24.8                         |  |  |
| Education   |  |                                      |                                      |                                      |                                      |                                      |                                      |                                     |                                      |  |  |
| Low<br>Medium<br>High<br>N  | 27.5<br>57.0<br>15.5<br>23,151               | 46.3<br>57.7<br>62.4                 | 27.3<br>14.0<br>8.9                  | 37.3<br>46.9<br>50.1                 | 28.5<br>15.8<br>11.1                 | 28.0<br>33.3<br>38.2                 | 31.6<br>18.3<br>13.0                 | 8.5<br>12.7<br>16.3                 | 32.0<br>19.8<br>15.9                 |  |  |
| Employment  |  |                                      |                                      |                                      |                                      |                                      |                                      |                                     |                                      |  |  |
| Retired<br>Student<br>Unemployed/other<br>Working<br>Self-employed<br>N | 19.9<br>9.8<br>27.1<br>36.8<br>6.4<br>22,839 | 48.1<br>58.8<br>50.7<br>61.5<br>56.2 | 24.7<br>16.1<br>20.8<br>10.7<br>11.6 | 41.3<br>44.4<br>42.1<br>49.4<br>43.5 | 26.2<br>17.9<br>21.9<br>12.7<br>13.2 | 25.9<br>36.3<br>30.9<br>35.3<br>39.4 | 31.9<br>20.4<br>22.8<br>15.0<br>15.3 | 8.7<br>14.8<br>10.0<br>14.8<br>12.7 | 29.8<br>20.2<br>26.1<br>16.9<br>19.1 |  |  |

#### Financial literacy in CESEE non-EU countries: differences across sociodemographic groups

Source: OeNB Euro Survey, 2012-2016 and 2018.

Note: The table shows descriptive statistics of the "big three" financial literacy questions for different sociodemographic groups in four CESEE EU candidates or potential candidates. The statistics are based on weighted data. N indicates the number of observations. The sample consists of those respondents who provide answers to all three financial literacy questions and for whom information on sociodemographic characteristics is available.

However, these countries are not comparable in terms of GDP per capita, and their overall levels of literacy differ substantially. A comparison of Czechia and Italy, which have similar levels of GDP per capita, shows that the overall level of literacy is higher in Czechia and that the gender gap is larger in Italy, both in absolute and relative terms.

Hungary, Poland and Chile have roughly similar GDP per capita levels. Unfortunately, the FLat World study for Chile does not contain information on the percentage of men and women that answered *all* questions correctly (Garabato Moure, 2016). However, the data allow us to compute a gender gap for the individual financial literacy questions and to compare the results with Hungary and Poland (see tables 8 and 9 in the online annex).

This comparison yields the following results: For the interest rate question, a gender gap of 7.8 percentage points for Chile, of 0.8 percentage points for Hungary, and of 3.2 percentage points for Poland. For the inflation question, a gender gap of 4.1 percentage points for Chile, of 2.8 percentage points for Hungary, and of 4.2 percentage points for Poland. For the risk diversification question, a gender gap of 5.4 percentage points for Chile, of 2.7 percentage points for Hungary, and of 4.3

Table 7

Chart 2

percentage points for Poland. Thus, with the exception of inflation literacy, the gender gap is generally lower in the two countries with a communist legacy than in the country without such a legacy. Providing an in-depth analysis of the low gender gap in Eastern Europe, Beckmann and Reiter (mimeo) argue that the experience of communism alone does not suffice to explain the lower gender gap. The gender gap has decreased even further among cohorts born shortly before or after 1989.



A cross-country comparison of the gender gap in financial literacy

Note: The chart shows the share of men with correct answers to all three financial literacy questions minus the share of women with correct answers to all three questions. Orange bars indicate countries with a communist legacy. For the underlying data, see table 3.

Chart 3

#### Relationship between gender gap and overall financial literacy



Source: OeNB Euro Survey, 2012–2016 and 2018; FLat World project.

Note: The chart shows the relationship between the gender gap (vertical axis) and overall financial literacy (horizontal axis). The orange dots indicate countries with a communist legacy. For the underlying data, see table 3.

## 7 Financial literacy and the experience of economic turbulence during transition

During transition from planned to market economies, the CESEE-10 countries experienced hyperinflation and banking crises. Malmendier and Nagel (2011) find that households are less risk-tolerant when they experienced macroeconomic downturns and argue that this implies a willingness to learn from life-time experience. Beckmann and Stix (2015) illustrate that individuals who remember periods of high inflation are more literate regarding exchange rate risk. Beckmann (2013) shows that in Romania interest and inflation literacy is higher among those who remember previous economic crises.

By 2012, the first year of our analysis, at least a decade (and mostly a decade and a half or more) had passed since inflation had been in the 20% range or beyond in any of the CESEE-10 countries (see table 8). We could have combined the information on the final high-inflation year with the information on respondents' age in order to analyze whether older respondents are more literate with regard to inflation than younger respondents. However, the OeNB Euro Survey contains a question whether respondents "remember periods of high inflation during which the value of the local currency dropped sharply," which provides a more specific measure of personal experience. When comparing the financial literacy measures of those who have memories of high inflation with the literacy of those who do not, we find that the percentage of inflation-literate individuals is higher among those who remember high inflation than among those who do not. For interest and risk diversification literacy, there is no such clear pattern. In fact, the percentage of risk diversification-literate individuals is on average higher among those who do not remember previous economic crises.

Table 8

## Transition experience and financial literacy

|  | Last period of annual<br>average inflation of 20%<br>or higher | Interest rate                                | e  | Inflation                                    |  | Risk diversification                         |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  | Correct                                      |  | Correct                                      |  | Correct                                      |  |  |  |
|  | Year   | %  |  |  |  |  |  |  |  |
| Memory of<br>high inflation*   |  | yes  | no   | yes  | no   | yes  | no   |  |  |
| Bulgaria<br>Croatia<br>Czechia<br>Hungary<br>Poland<br>Romania<br>Albania<br>Bosnia and<br>Herzegovina | 1998<br>1994<br>1993<br>1996<br>1995<br>2002<br>1998           | 51<br>66<br>67<br>59<br>56<br>41<br>41<br>41 | 50<br>66<br>65<br>50<br>55<br>42<br>36<br>46 | 75<br>64<br>70<br>64<br>49<br>52<br>33<br>42 | 69<br>62<br>67<br>54<br>40<br>44<br>28<br>41 | 46<br>37<br>61<br>52<br>50<br>27<br>45<br>34 | 42<br>39<br>61<br>50<br>48<br>29<br>46<br>34 |  |  |
| North Mace-<br>Jonia   | 1994   | 60   | 64   | 46   | 40   | 30   | 35   |  |  |
| Serbia   | 2002   | 63   | 65   | 57   | 54   | 27   | 37   |  |  |

Source: OeNB Euro Survey and wiiw database.

Note: \* Memory of high inflation is derived from the survey question "Please tell me on a scale from 1 to 6 whether you agree or disagree with the following statement: "I remember periods of high inflation during which the value of the [LOCAL CURRENCY] dropped sharply." Answers from 1 to 3 are coded as "yes" while answers from 4 to 6 are coded as "no."

#### 8 Conclusion

This paper presents financial literacy insights for ten Central, Eastern and Southeastern European countries (CESEE-10). It uses unique evidence from the OeNB Euro Survey covering six years up to 2018 and a total of 60,000 observations on people's grasp of interest rates, inflation and risk diversification – the concepts measured by the so-called "big three" financial literacy questions.

At least one of the "big three" questions is answered correctly by 80% of adults in CESEE-10, but correct answers to all three questions are provided by barely one in five adults, and the share of correct answers is generally lowest for risk diversification. These figures vary substantially across and within countries. Our results show that financial literacy varies within countries across sociodemographic groups: In line with previous research, financial literacy is highest among welleducated and employed individuals, and it is lowest among older and female individuals. Those who experienced economic turbulence during transition from planned to market economies have a higher level of inflation literacy, but overall literacy does not differ.

While previous research has found that higher GDP levels are correlated with higher financial literacy, we show that – within countries – lower economic development is not necessarily associated with lower financial literacy levels. We also find that the development of local financial markets is associated with higher financial literacy levels.

Our findings are relevant both for policymakers and for future research. In this context, it is important to note that explicit mandates to conduct financial education policies are lacking in many countries; and if a mandate has been established, different institutions are in charge in different countries. Therefore, this article does not in any way aim to assess the success of various policy measures that have been carried out in different countries to address – and perhaps already successfully narrow – the financial literacy gaps we describe. Furthermore, we cannot contribute to the discussion to what extent any gaps in financial literacy could perhaps be addressed by financial education efforts in the private sector. Nevertheless, the OECD has shown that in order for financial education to be effective it should target specific segments of the population (OECD, 2019b). Our paper provides some evidence to identify the segments of the population that would benefit most from financial education programs; or put differently, that currently have lower levels of financial literacy. We show that such segments can be identified both in sociodemographic terms and regionally.

The OECD argues that financial literacy can be enhanced by financial education, and that financial education and literacy make a difference with regard to financial and economic inclusion (OECD, 2013). With both financial literacy and financial development being low in some regions, our results imply a possible potential for financial education programs to enhance not only literacy but financial inclusion as well. However, more research is needed to investigate these indicative results in more depth.

Thus, our paper points out several lines for future research that are relevant for policymakers: Some of the countries we investigate still have a significant share of individuals who do not have a bank account. Do these arguably financially excluded individuals benefit from a developed financial market in terms of improved literacy? Are financially literate individuals more likely to be financially included? More generally,

how does financial literacy affect economic outcomes? Finally, there are potential research questions that are particularly relevant for the countries covered by the OeNB Euro Survey, which includes a number of countries that will adopt the euro at some point in the future. How does financial literacy affect expectations regarding the development of inflation and the exchange rate? How does financial literacy affect expectations regarding adoption of the euro as legal tender? While some of these questions can only be analyzed based on microdata, for other questions our detailed online annex of descriptive statistics for individual countries will provide a useful reference.

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#### Annex

### A1 Definitions of financial literacy

Huston (2010), who analyzed more than seventy studies, concluded that the existing definitions of financial literacy can be categorized roughly into four categories:

- 1. Definitions that focus on knowledge;
- 2. Definitions that focus on ability;
- 3. Definitions that focus both on knowledge and ability, and
- 4. Definitions that focus both on knowledge and ability and, in addition, specify an outcome to which financial literacy should finally lead.

With new and even more comprehensive definitions of financial literacy having come up more recently, we add an additional category:

5. Definitions that cover additional dimensions, including people's actual financial behavior.

Based on these five categories, table A1 provides a list of different definitions of financial literacy.  $^{\rm 20}$ 

<sup>&</sup>lt;sup>20</sup> Table A1 also stresses that researchers have a different understanding of the terms financial knowledge, financial literacy and financial capability. While in many studies, the terms financial knowledge and financial literacy are used synonymously (see, for instance, Zottel et al., 2013; World Bank, 2014), others make a clear distinction, claiming that financial literacy goes beyond financial knowledge (see, for instance, Atkinson and Messy, 2012).

**Definitions of financial literacy** 

Table A1

|  | Source   |
|--|--|
| Focus on knowledge   |  |
| 1 "Financial literacy is a basic knowledge that people need in order to survive in a modern society."  | Kim (2001) (as cited in Huston, 2010:<br>p. 311)                     |
| Focus on ability   |  |
| 2 "Financial literacy is the ability to make informed judgements and to take effective decisions regarding the use and management of money."   | Noctor et al. (1992) (as cited in Huston, 2010: p. 311)              |
| 3 Financial literacy is the "ability to evaluate the new and complex financial instruments and make informed judgements in both choice of instruments and extent of use that would be in their own best long-run interests."   | Mandell (2008): pp. 163f   |
| 4 "Personal financial literacy is the ability to read, analyze, manage and communicate about the personal financial conditions that affect material well-being. It includes the ability to discern financial choices, discuss money and financial issues without (or despite) discomfort, plan for the future and respond competently to life events that affect everyday financial decisions, including events in the general economy." | Vitt et al. (2000): p. 2   |
| Focus on knowledge and ability to apply knowledge  |  |
| 5 "Financial literacy could be defined as measuring how well an individual can understand and use personal finance-related information."   | Huston (2010): p. 144  |
| 6 "Financial literacy refers to a person's ability to understand and make use of financial concepts."  | Servon and Kaestner (2008): p. 273                                   |
| 7 "Individuals are considered financially literate if they are competent and can demonstrate they have used knowledge they have learned. Financial literacy cannot be measured directly so proxies must be used. Literacy is obtained through practical experience and active integration of knowledge."   | Moore (2003): p. 29  |
| Focus on knowledge, ability to apply knowledge, and outcome  |  |
| 8 "Financial literacy is the ability to use knowledge and skills to manage one's financial resources effectively for a lifetime of financial security."  | Jump\$tart Coalition for Personal<br>Financial Literacy (2015): p. 1 |
| 9 Financial literacy is the "knowledge of basic economic and financial concepts, as well as the ability to use that knowledge and other financial skills to manage financial resources effectively for a lifetime of financial well-being."  | Hung et al. (2009)   |
| 10 "Financial literacy represents the level of aptitude in understanding personal finance. It often refers to awareness and knowledge of key financial concepts required for managing personal finances and is generally used as a narrower term than financial capability."   | World Bank (2014): p. 1  |
| Definitions that cover additional dimensions, including people's actual financial behavior   |  |
| 11 Financial literacy is "a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing."   | Atkinson and Messy (2012): p. 3                                      |
| 12 "Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation<br>and confidence to apply such knowledge and understanding in order to make effective decisions across a<br>range of financial contexts, to improve the financial well-being of individuals and society, and to enable<br>participation in economic life"   | OECD (2013): p. 144  |

Source: Authors' compilation.

Note: The table should not be seen as an exhaustive list of all the existing financial literacy definitions. The definitions selected are grouped according to the findings of Huston (2010).

#### A2 Overview of financial literacy surveys in CESEE-10

Table A2

| Overview of finance    | clainceracy suveys in CESEE-10                         |      |
|------------------------|--|------|
| Country                | Survey   | Year |
| Bulgaria               | Financial Literacy Suvey, prepared for the World Bank§ | 2010 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
| Croatia                | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
|                        | OECD/INFE Survey of Financial Literacy Competencies**  | 2016 |
| Czechia                | OECD/INFE Pilot Study***                               | 2012 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
|                        | OECD/INFE Survey of Financial Literacy Competencies**  | 2016 |
| Hungary                | OECD/INFE Pilot Study***                               | 2012 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
|                        | OECD/INFE Survey of Financial Literacy Competencies**  | 2016 |
| Poland                 | OECD/INFE Pilot Study***                               | 2012 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
|                        | OECD/INFE Survey of Financial Literacy Competencies**  | 2016 |
| Romania                | Financial Literacy and Financial Services Survey±      | 2010 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
| Albania                | OECD/INFE Pilot Study***                               | 2012 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
|                        | OECD/INFE Survey of Financial Literacy Competencies**  | 2016 |
| Bosnia and Herzegovina | Financial Literacy Survey, prepared for World Bank~    | 2011 |
|                        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
| North Macedonia        | Standard and Poor's Global Financial Literacy Survey*  | 2014 |
|                        | Adult Financial Literacy Competencies in Macedonia^    | 2018 |
| Serbia                 | Standard and Poor's Global Financial Literacy Survey*  | 2014 |

#### Overview of financial literacy suveys in CESEE-10

Source: \* https://gflec.org/wp-content/uploads/2015/11/3313-Finlit\_Report\_FINAL-5.11.16.pdf?x66755 \*\* https://www.oecd.org/finance/oecd-infe-survey-adult-financial-literacy-competencies.htm \*\*\* https://www.oecd-ilibrary.org/finance-and-investment/measuring-financial-literacy\_5k9csfs90fr4-en § https://microdata.worldbank.org/index.php/catalog/1026/study-description ± https://datacatalog.worldbank.org/dataset/romania-financial-literacy-and-financial-services-survey-2010 ~ http://documents.worldbank.org/curated/en/116701483501101366/Financial-literacy-in-Bosnia-and-Herzegovina ^ https://www.efse.lu/fileadmin/user\_upload/User\_upload/Financial\_Literacy\_Report\_Final.pdf

# Typology of multinationals in Austria: CESEE focus and foreign control as distinct features

#### Thomas Cernohous, Tomáš Slačík<sup>1</sup>

Multinational enterprises (multinationals) play an important role in every economy as they tend to be larger, more capital- and R&D-intensive, more productive and more integrated in global value chains than domestic enterprises. Focusing on multinationals active in Austria, this paper discusses essentially two research questions: Can we categorize Austrian units of multinationals in consistent groups? And can these groups be characterized by meaningful variables? To address these questions, we undertake a microdata-linking exercise to build a comprehensive dataset of multinationals in Austria and use adequate clustering techniques to identify homogeneous and distinct groups without imposing any prior knowledge regarding the number of such groups or their features. This approach enables us to characterize more than 2,500 multinationals in Austria and meaningfully identify eight types of multinationals, the main grouping factors being (1) foreign or Austrian control, (2) special purpose entity versus other form of company, (3) the share of outward investment in Central, Eastern and South-eastern Europe (CESEE) and (4) the degree of trade openness. With this basic research work, we open up a wide range of questions that may serve as the basis for future (applied) analytical work.

JEL classification: C49, F13, F14, F15, F21, F36, F41 Keywords: multinational enterprises, cluster analysis, globalization, partitioning around medoids, typology

"Multinational enterprises (MNEs) are a key channel of globalisation. They serve as the backbone of many global value chains by linking and organizing production across countries and are an important channel for exchanging capital, goods and services, and knowledge across countries. Foreign direct investment (FDI) is necessary for the creation of an MNE." (OECD, 2015)

Today, multinationals account for a third of world output and two-thirds of international trade (De Backer et al., 2019). Since 2000, the global output of multinational enterprises has more than tripled (OECD, 2018). With this degree of economic power, multinationals have become a veritable political force (Kim and Milner, 2019).

Most multinational enterprises are classified in the nonfinancial corporate sector, whose fast-growing role is evident from international investment statistics (see chart 1 with data for Austria).

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Chart 1



#### External assets and liabilities in Austria by domestic sector

This paper sheds some light on the relevance and role of multinational enterprises active in Austria. After all, a better understanding will enable better informed and more targeted decision-making and thus more efficient and effective policymaking on issues like regional development, employment or taxes. Our approach is to first identify those Austrian companies that satisfy the OECD definition of multinational enterprises with a view to compiling a dataset covering all Austrian companies that are on the giving or receiving end of foreign direct investment (FDI). For every company with a direct investment relationship, i.e. with a cross-border equity participation of at least 10%, we then identify further Austrian companies that are part of the same multinational group and assign them to the initial enterprise. Hence, we build a dataset of so-called "truncated enterprise groups"<sup>2</sup> of multinationals in Austria, for which we use the term "multinationals" in this paper for the sake of readability. To populate the database further, we link a set of variables, both numerical and categorical, from different statistical areas and sources to the individual enterprises and calculate aggregated values for each multinational.

In a second step, we partition this dataset into homogeneous and distinct groups. Rather than imposing prior knowledge about the number of such groups or their features, we want to "let the data speak" and suggest meaningful subsets of the dataset. We do this by breaking the dataset into clusters using the "partitioning

<sup>&</sup>lt;sup>2</sup> As defined in Regulation (EC) No. 177/2008 of the European Parliament and of the Council of 20 February 2008 establishing a common framework for business registers for statistical purposes, Article 2(e).

around medoids" algorithm, which is a rather robust and well-designed method for clustering mixed datasets (see annex).<sup>3</sup>

The resulting dataset contains more than 2,500 multinationals consisting of 3.6 enterprises on average. The clustering algorithm allows us to meaningfully identify eight types of multinationals, with the key grouping factors being foreign or Austrian control; special-purpose entity (SPE) versus other company forms; the share of outward investment in Central, Eastern or Southeastern Europe (CESEE); and the degree of trade openness.

The remainder of the paper is structured as follows. In section 1, we describe how we set up the dataset and which data sources we used. In section 2, we explain the clustering algorithm and our choice of key input parameters. Following analysis of the results in section 3, we interpret the results and suggest further avenues of research in section 4. Section 5 concludes.

#### **1** Data sources

To build a viable dataset, we used 2017 data on different aspects of globalization to (1) identify any multinational enterprises operating in Austria, (2) link these data with appropriate microdata and (3) calculate input variables *t* for the clustering algorithm. Generally speaking, we combined foreign direct investment (FDI) statistics<sup>4</sup> with foreign affiliates statistics (FATS), as FDI statistics typically cover only financial items and employment data for *direct* investment relationships whereas FATS statistics also cover *indirect* controlled companies. In addition, we used the Austrian business register data as well as international trade, balance of payments and international investment statistics data.

#### 1.1 Identifying multinationals in Austria

Identifying the population of multinationals in Austria<sup>5</sup> meant that we were looking for

- any domestic companies with at least one direct investment relationship to another economy; or
- any groups of domestic companies controlled by a domestic group head, of which at least one unit maintains an FDI relationship with another economy.

We compiled this information from the OeNB's annual survey on inward and/or outward FDI<sup>6</sup> and from the Austrian business register. The OeNB's annual FDI survey, which is the main building block of FDI statistics in Austria, identifies the "entry points"<sup>7</sup> of foreign investors in Austria and serves as a starting point for

<sup>4</sup> Compiled in Austria since 1968. Direct investment relationships have deepening economic effects on involved economies.

<sup>5</sup> Technically speaking "truncated enterprise groups."

- <sup>6</sup> For details, see the handbook on the balance of payments and the international investment position according to BPM6 rules published by the OeNB at www.oenb.at/dam/jcr:b46b2770-83c9-4281-9f20-bcb73d86c8e8/ ZABIL-Handbuch\_V1.0.pdf (so far available in German only, English version scheduled for August 2020).
- <sup>7</sup> For example: A German investor has a 100% subsidiary in Austria. This entity has 100% stakes in two further domestic companies on its own, which are hence indirectly controlled by the German group head. The Austrian company in the middle of this participation chain is defined as "entry point" in Austria, since the two indirectly controlled entities can only be identified if this "entry point" is known.

<sup>&</sup>lt;sup>3</sup> The term medoid refers to an object within a cluster for which average dissimilarity between it and all the other the members of the cluster is minimal. It corresponds to the most centrally located point in the cluster. These objects (one per cluster) can be considered as a representative example of the members of that cluster. www.datanovia.com/en/lessons/k-medoids-in-r-algorithm-and-practical-examples/

identifying connected group members in Austria. The survey pools answers from approximately 3,000 respondents, either inward FDI respondents or domestic companies<sup>8</sup> that hold outward FDI. The defining element for selection of companies into our database of multinationals in Austria was a controlling participation chain (50%+ of voting rights on each step in the chain) back to the Austrian group head. In a second step, we relied on the Austrian business register to identify domestic relationships between companies. Based on end-2017 data, we thus identified 2,555 multinational groups operating in Austria with a total of 9,096 companies, which yields an average group size of 3.6 enterprises.

#### 1.2 Using microdata-linking to enrich the database

In a next round, we were able to enrich the multinationals database with microdata from other statistics, using the business register number and an identifier issued and managed by the OeNB as the connecting link. Specifically, we added selected variables from the following sources:

- Annual FDI survey
- Business register
- Structural business statistics
- Foreign trade statistics
- Services according to the balance of payments
- External statistics compilation system

The OeNB's annual FDI survey served to provide structural information and enabled us to source data on direct investment itself, especially regional breakdown details and data on intracompany loans. From the business register we extracted variables on economic activity and age. Structural business statistics provided figures on employment and turnover. Foreign trade statistics provided us with microdata on exports and imports of goods (global values, no regional breakdown). Services according to the balance of payments were available on a more granular level, allowing us to form the following service groups: technological services, financial and insurance services, and other services. Finally, the OeNB's external statistics compilation system offers the opportunity to calculate assets and liabilities for "other investment" and to some extent "portfolio investment" and "financial derivates" at the company level.<sup>9</sup>

#### 2 Data clustering with partitioning-around-medoids (PAM) algorithm

#### 2.1 Selection and weighting of input variables

For reasons detailed in the annex, we picked the "partitioning around medoids" (PAM) algorithm from the cluster analysis toolbox to divide our dataset into meaningful clusters. Intuitively,<sup>10</sup> the PAM algorithm proceeds in the following iterations:

1. The starting point are a set of k random observations in the dataset. These observations, called medoids, represent centers of k clusters which, at this point, consist of single observations.

<sup>&</sup>lt;sup>8</sup> Some Austrian-controlled multinationals may also include individuals (as the respective group's head).

<sup>&</sup>lt;sup>9</sup> For portfolio investment assets, the use of microdata was limited: only banks' own holdings were available.

<sup>&</sup>lt;sup>10</sup> For a more detailed technical description of the PAM method which would go beyond the scope of this paper, see e.g. Kaufman and Rousseeuw (1987).

- 2. All observations are (re-)assigned to their closest medoid.
- 3. In each of the clusters thus built, the algorithm finds the observation that would yield the lowest average distance to its cluster members. If this is a different observation than the one in step 1, this observation becomes the new medoid.
- 4. If at least one out of *k* medoids has changed, the algorithm goes back to step 2; otherwise the process ends.

The variables to be entered into the algorithm need to be selected with caution to avoid the presence of noisy noninformative and/or redundant, correlated variables, which may produce multicollinearity (Fraiman et al., 2009). Unlike in regression analyses where multicollinearity spoils the beta coefficients, in clustering multicollinearity implies that some variables get a higher weight than others. As Sambandam (2003) puts it: "If two variables are perfectly correlated, they effectively represent the same concept. But that concept is now represented twice in the data and hence gets twice the weight of all the other variables. The final solution is likely to be skewed in the direction of that concept."

Hence, it is crucial to strike a balance between including all major variables that are of interest in clustering the data, and not choosing too many<sup>11</sup> and/or highly correlated variables. Table A1 in the annex displays and describes the 20 variables that we carefully selected as input for the PAM algorithm. While the focus lay on numerical characteristics, three binary attributes were assessed by expert judgment to be crucial for grouping multinationals, namely "SPE" (special purpose entity), "FOREIGN\_CONTROL" (multinationals controlled by non-residents) and "BANK" (one of the units is classified as a bank). In other words, we created a mixed-type dataset consisting of numerical and categorical data. In addition, while not being part of the clustering procedure, other nominal scaled attributes were important for the ensuing analysis and interpretation of results. In particular, the variables economic activity<sup>12</sup> and controlling region<sup>13</sup> were of high explanatory value.

In weighting the variables, we basically followed the concept of equal weights, assigning each variable a weight of 100% divided by the number of variables. Exceptions were made only for the numerous balance of payments/international investment position variables<sup>14</sup> because of their high correlation to each other (see chart 7 in the annex), and the fact that they cover similar aspects (external funding). To avoid the excessive influence issues described above, these attributes were assigned only one-quarter of the weight other variables have.

<sup>12</sup> Predominant economic activity of multinationals in Austria.

<sup>13</sup> World region of a multinational's ultimate controlling unit.

<sup>14</sup> ODI, IDI, OI\_A, OI\_P, FININS\_EXP, FININS\_IMP, TECH\_EXP, TECH\_IMP, OtherS\_EXP, Others\_IMP.

<sup>&</sup>lt;sup>11</sup> The variable space can be reduced by dimension reduction techniques such as the principal component analysis (PCA) (Fraiman et al., 2009). However, after some experiments we decided not to go that way for two reasons. First, principal components (i.e. linear combinations of variables) that result from the PCA are difficult to interpret, which is impractical if our aim is to identify and describe types of multinationals. Second, and more importantly, dimensions which explain the maximum variation in the data and are thus retained by the PCA need not necessarily be the same dimensions that are decisive for clustering the data.

#### 2.2 Choice of key input parameters

For the PAM function, some key parameters need to be defined as inputs, in particular a distance metric and the number of clusters. For the distance matrix, feeding the algorithm with the data matrix and some gauge of dissimilarity would have sufficed if we had worked with numerical data alone. As we used mixed data, we had to provide a dissimilarity matrix directly. In line with common practice, we used the so-called Gower distance matrix (see annex for details).



Regarding the number of clusters k to be defined, a large number of methods and indices has been proposed in the literature for identifying the optimal number of clusters (Mirkin, 2011). Yet, most of these indices and evaluation methods are not applicable to mixed data. For this reason, we picked one of the few indicators available also for mixed data, the popular silhouette plot, which indicates the so-called silhouette width for a given number of clusters. The silhouette width is a normalized ratio between the average dissimilarity within clusters relative to the nearest neighboring cluster. It is normalized to a range between -1 and 1, with values closer to 1 suggesting good clustering. The purpose of the silhouette plot is to find the relative maximum silhouette width for a reasonable range of possible numbers of k.<sup>15</sup> In our case, the silhouette plot shown in chart 2 suggested either eight or - with an even slightly better value - twelve as the optimal number of clusters.<sup>16</sup> While we had a close look at both suggestions, we considered eight clusters to be the more reasonable choice, since interpreting and comparing four more clusters bears the risk of losing focus.

#### **3** Results

#### 3.1 Clustering multinationals in Austria

The statistical methods to determine the optimal number of clusters mentioned above typically consider just one cluster at a time. An alternative or rather complementary perspective is to look at how samples move as the number of clusters increases, to gain insights into how homogeneous and (un)stable the clusters are. In the clustering tree shown in chart 3, each line represents the clustering results of the algorithm we applied with a given number of clusters (k). The size of the dots reflects the size of each group, while the arrows indicate relevant movements of multinationals to other clusters at the next resolution level. So, at the first node we see the original sample split into cluster 1 consisting of 651 multinationals (yellow arrow) and cluster 2 with 1,904 multinationals (blue arrow). The darker the color of the arrow, the higher the absolute number of observations that move, and vice versa. The degree of transparency of the arrow visualizes the relative

<sup>&</sup>lt;sup>15</sup> For details see e.g. Rousseeuw (1987).

<sup>&</sup>lt;sup>16</sup> The highest value is actually at k2, but for analytical reasons a mere two clusters do not provide for adequate granularity.



Clustering tree at different resolutions of the PAM algorithm

importance of observation movements, i.e. the share of group members that move to another group. No transparency indicates that all cluster members move to the group to which the arrow points (e.g. cluster 7 at k = 9and cluster 7 at k = 10).<sup>17</sup>

On initial eyeballing, we see one major observation that we can take away from chart 3: as the resolution level k increases, the typical pattern is that a cluster splits up into two. The number of elements moving to the newly built groups from other clusters is fairly limited; or put differently, the remaining clusters stay relatively stable as k rises. This implies that the clustering algorithm is rather robust; otherwise we would see a lot more reshuffling among clusters at each k.

While it has to be borne in mind that the PAM algorithm does not proceed in the iterative, hierarchical way suggested by the clustering tree in chart 3, this tree may, nonetheless, be interpreted as a dynamic decision tree. At each node, we can identify

the variable(s) that cause(s) a cluster to split off. How do we do that? At each splitting node, we compute for each variable the standardized difference between the average values of the respective variable in the two subsequent clusters:

$$Diff_{v} = \frac{\bar{v}_{kC_{x}}}{SD_{v}} - \frac{v_{kC_{y}}}{SD_{v}}$$

Chart 3

where  $\bar{v}_{kC_x}$  and  $\bar{v}_{kC_y}$  denote the average value of variable v at the clustering level k for, respectively, clusters  $C_x$  and  $C_y$ , which are the two clusters descending from the same parent cluster at the previous clustering level k - I. Furthermore,  $SD_v$  denotes the standard deviation of variable v for the entire dataset. The variable for which  $Diff_v$  is highest at a given clustering level k is the variable that causes a new cluster to branch off.

See table 1 for the results and the table rows for the key variables triggering the split, highlighted with the darkest color. For example, when we look at table 1 in combination with chart 3, we see that at clustering level 2 (i.e. k = 2), for the split into the two resulting clusters 1 and 2, it is the variable FOREIGN\_CONTROL that makes the biggest difference. At the next level (k = 3), cluster 1 splits up into

<sup>17</sup> The order of the clusters was randomly assigned by the PAM algorithm rather than following specific criteria.

Table 1

|        |          |            | AW    | AX                    | ΑZ                    | BA                    | BD            | 0     | AU    | BC                | BB          | С     | D    | G      | Н      | Р             | Y            | Ζ            | AA         | AB         |
|--------|----------|------------|-------|-----------------------|-----------------------|-----------------------|---------------|-------|-------|-------------------|-------------|-------|------|--------|--------|---------------|--------------|--------------|------------|------------|
| k      | Сх       | Су         | Δ SPE | A FOREIGN_<br>CONTROL | A CESEE_SHARE_<br>ODI | A CESEE_SHARE_<br>IDI | <b>A BANK</b> | Δ EMP | Δ AGE | <b>ΔIMP_QUOTA</b> | Δ EXP_QUOTA | A ODI | ΔIDI | ∆ OI_A | ∆ OI_L | <b>A</b> TURN | Δ FININS_EXP | ∆ FININS_IMP | A TECH_EXP | Δ TECH_IMP |
| 2      | 1        | 2          | 0.2   | 2.3                   | 0.7                   | 0.1                   | 0.1           | 0.2   | 0.3   | 0.4               | 0.0         | 0.1   | 0.1  | 0.1    | 0.1    | 0.2           | 0.1          | 0.0          | 0.0        | 0.1        |
| 3      | 1        | 2          | 0.3   | 0.2                   | 0.1                   | 0.1                   | 0.2           | 0.1   | 0.2   | 1.0               | 1.9         | 0.1   | 0.1  | 0.0    | 0.0    | 0.1           | 0.0          | 0.0          | 0.3        | 0.2        |
| 4      | 2        | 4          | 0.4   | 0.0                   | 0.0                   | 0.2                   | 0.2           | 0.0   | 0.4   | 1.9               | 0.3         | 0.1   | 0.2  | 0.1    | 0.1    | 0.0           | 0.1          | 0.1          | 0.0        | 0.1        |
| 5      | 3        | 5          | 0.0   | 0.2                   | 2.7                   | 0.1                   | 0.2           | 0.2   | 0.5   | 0.3               | 0.1         | 0.0   | 0.0  | 0.3    | 0.2    | 0.3           | 0.0          | 0.0          | 0.0        | 0.0        |
| 6      | 4        | 5          | 0.0   | 0.0                   | 0.5                   | 0.2                   | 0.2           | 0.3   | 0.4   | 1.2               | 2.0         | 0.1   | 0.0  | 0.0    | 0.0    | 0.5           | 0.2          | 0.0          | 0.2        | 0.1        |
| 7      | 1        | 7          | 0.1   | 0.0                   | 2.9                   | 0.1                   | 0.3           | 0.4   | 0.4   | 0.4               | 1.5         | 0.1   | 0.1  | 0.0    | 0.1    | 0.2           | 0.0          | 0.1          | 0.0        | 0.0        |
| 8      | 2        | 8          | 7.1   | 0.0                   | 0.1                   | 0.3                   | 0.2           | 0.1   | 0.9   | 0.2               | 0.1         | 0.8   | 0.7  | 0.1    | 0.1    | 0.1           | 0.1          | 0.1          | 0.0        | 0.1        |
| 9      | 1        | 3          | 0.0   | 0.0                   | 0.1                   | 0.0                   | 0.0           | 0.0   | 0.2   | 0.8               | 1.2         | 0.0   | 0.1  | 0.0    | 0.0    | 0.1           | 0.0          | 0.2          | 0.0        | 0.1        |
| 10     | 2        | 9          | 0.0   | 0.1                   | 0.1                   | 6.0                   | 0.1           | 0.1   | 0.5   | 0.3               | 0.2         | 0.4   | 0.5  | 0.0    | 0.1    | 0.0           | 0.1          | 0.0          | 0.1        | 0.1        |
| 11     | 1        | 4          | 0.0   | 0.0                   | 0.2                   | 0.2                   | 0.0           | 0.1   | 0.1   | 1.9               | 0.2         | 0.0   | 0.0  | 0.0    | 0.0    | 0.2           | 0.0          | 0.0          | 0.0        | 0.1        |
| 12     | 6        | 10         | 0.0   | 0.0                   | 2.1                   | 0.0                   | 0.0           | 0.1   | 0.4   | 0.2               | 0.4         | 0.1   | 0.0  | 0.0    | 0.1    | 0.2           | 0.1          | 0.0          | 0.1        | 0.0        |
| Source | Authors' | calculatio | ns    |                       |                       |                       |               |       |       |                   |             |       |      |        |        |               |              |              |            |            |

#### Standardized mean value difference between new clusters at subsequent clustering levels

cluster 1 and 2, with the split essentially being driven by the variable EXP\_ QUOTA (export of goods as a share of turnover). Next (k = 4), variable IMP\_QUOTA prompts the division of cluster 2 into clusters 2 and 4. At k = 5a subset of enterprises with significant foreign investment activities in CESEE (variable CESEE\_SHARE\_ODI) spins off from the cluster of Austrian-controlled multinationals. The export share and CESEE investment focus are the main clustering drivers also at the next two levels. Finally, at k = 8, the variable SPE triggers the split of cluster 2 into clusters 2 and 8.

Chart 4 summarizes the key driving variables at each node by translating the clustering tree into a decision tree where the "branches" represent crucial dimensions for characterizing the different multinationals groups while the "leaves" visualize the clusters. Of the eight identified clusters, three are controlled by domestic companies while five are dominated by entities outside Austria. Due to their key characteristics, which will become more apparent in the detailed

Chart 4 **Cluster decision tree** Multinationals in Austria Foreign control? Export focus? no Import focus? yes Retail 5 multinationals **CESEE** focus? no yes no Export focus? Austrian 6 CESEE experts CESEE focus? Austrian 4 Austrian 3 export champions nonmanufacturers no ves Austrian links in global value chains **CESEE** hubs SPE? nó yes SPEs 8 Small foreign-controlled service providers Name 1 Number of cluster, randomly assigned of cluster Source: Authors' calculations.

analysis below, we label the eight clusters as follows: (C1) Austrian links in global value chains, (C2) small foreign-controlled services providers, (C3) Austrian nonmanufacturers, (C4) Austrian export champions, (C5) retail multinationals, (C6) Austrian (-controlled) CESEE experts in contrast to (C7) (foreign-controlled) CESEE hubs and (C8) SPEs. The decision tree shows that the most relevant variables for the partitioning algorithm were SPE, FOREIGN\_CONTROL, CESEE\_SHARE\_ODI, IMP\_QUOTA and EXP\_QUOTA.

By way of example, we can demonstrate the important role that the variables IMP\_QUOTA and EXP\_QUOTA played for cluster-building, yet from another perspective. The scatter plot (chart 5), which plots import against export shares for the eight clusters, shows a clear concentration of multinationals in the upper half of the quadrant (i.e. high EXP\_QUOTA) for the clusters labeled "Austrian links in global value chains" (C1) and "Austrian export champions" (C4). In line with the decision tree, the only definite concentration of high IMPORT\_QUOTA values was calculated for "retail multinationals" (C5). The multinational groups "small foreign-controlled service providers" (C2), "Austrian nonmanufacturers" (C3) and "SPEs" (C8) show small or no values for IMP\_QUOTA and EXP\_QUOTA. The clusters "Austrian CESEE experts" (C6) and "CESEE hubs" (C7) do not exhibit a clear pattern of distribution. The reason for this random distribution is that the multinationals clustered into these groups are to a high degree defined by other variables (especially FOREIGN\_CONTROL and CESEE\_SHARE\_ODI).

Chart 5

1.00

1.00

1.00

1.00



#### Import and export shares by cluster and foreign control

To deepen the picture of how the clusters of multinationals differ from each other, we look at the main underlying economic activity<sup>18</sup> (chart 6) and find that the identified clusters are rather homogeneous with respect to the industry breakdown (as represented by MNE\_NACE, which was *no* input variable for the cluster analysis). Two clusters stand out with manufacturing as the predominant economic activity: "Austrian links in global value chains" (59%) and "Austrian export champions" (73%). The other economic sectors of these two clusters show a similar distribution, the main distinguishing feature being foreign vs. domestic control. In the "trade multinationals" cluster, 80% of the group members are classified as trade companies. In the "SPEs" cluster, activities like manufacturing and trade are absent almost by definition ("up to five employees" in the IMF's definition of SPEs), leaving the vast majority of SPEs to be classified in the service sector or as financial companies. The other clusters show no clear indication of a dominating economic activity within a cluster.

<sup>18</sup> Variable MNE\_NACE: For details concerning grouping and calculation, see section 1.

Chart 6

### Economic activity by cluster

#### Austrian CESEE experts

1 square = 1 multinational enterprise



#### Austrian links in global value chains

1 square = 1 multinational enterprise



#### **CESEE** hubs

1 square = 1 multinational enterprise



Small foreign-controlled service providers

1 square = 1 multinational enterprise



#### Austrian export champions

1 square = 1 multinational enterprise



#### Austrian nonmanufacturers

1 square = 1 multinational enterprise



#### Retail multinationals

1 square = 1 multinational enterprise



#### SPEs

1 square = 1 multinational enterprise



#### 3.2 Cluster results in detail

In lieu of a descriptive summary, see chart 7 for an at-a-glance overview.

#### 3.2.1 "Austrian links in global value chains"

Consisting of 455 members, this comparatively large group is characterized by an export ratio of 78%. Since all companies are under foreign control, it can be assumed that investors clustered into this group above all seek to benefit from Austria's high levels of productivity, enabled by a highly skilled workforce, good infrastructure and a favorable geographical location. The average import ratio (44%) indicates that a significant part of the value added is produced in Austria. Examples of major companies (in terms of employment) in this group are household names such as BMW, MAGNA, FACC, BOSCH and NOVARTIS.

While the median number of employees (113) is neither exceptionally high nor low compared to other clusters, the median age (23) indicates a comparatively young set of multinationals. The median turnover (EUR 38 million) is also in the mid range of the total population. These figures are well in line with the large share of medium-sized<sup>19</sup> enterprises (58%) in this cluster. Other distinguishing features include the comparatively high share of external trade in services (service exports: 75%, service imports: 72%). The dominant economic activity is manufacturing (59%), followed by trade (18%) and services (14%). SPEs aside, this is the most globalized group in terms of the location of ultimate investors: 26% of

| Cluster overview                               |                       |                      |            |                 |                          |            |                             |
|--|-----------------------|----------------------|------------|-----------------|--------------------------|------------|-----------------------------|
| C1: Austrian links in global value chains      |                       |                      |            | J               | >                        |            |                             |
| C2: Small foreign-controlled service providers |                       |                      |            | <i>*</i>        |                          |            |                             |
| C3: Austrian<br>nonmanufacturers               |                       |                      |            | , <b>r</b>      | *                        |            |                             |
| C4: Austrian export<br>champions               |                       |                      |            | 3               | >                        |            |                             |
| C5: Retail multinationals                      |                       |                      |            |                 | )                        |            |                             |
| C6: Austrian CESEE experts                     |                       |                      |            | •               | •                        |            |                             |
| C7: CESEE hubs                                 |                       |                      |            |                 | 1                        |            |                             |
| C8: SPEs                                       |                       |                      |            |                 |                          |            |                             |
| Control Cluster size                           | Compa                 | ny size Exp          | oort share | Import share    | Homogeneit               | y Stabilit | У                           |
| = Austria = 100 MNEs<br>= other<br>countries   | = sm<br>= me<br>= lar | all<br>edium<br>ge O | = 100%     | <b>O</b> = 100% | = low<br>= mec<br>= high | dium 👓     | = low<br>= medium<br>= high |
| Source: Authors' calculations.                 |                       |                      |            |                 |                          |            |                             |
| rote. mines - mutuhational enterprise          | SES.                  |                      |            |                 |                          |            |                             |

<sup>19</sup> https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition\_en.

Chart 7

them are located outside Europe, with the Americas contributing strongly with 16%.

The homogeneity of clusters measured by intra-cluster variance is in the mid range compared to other groups,<sup>20</sup> with intra-cluster variance being rather high for import share and turnover in particular. At the same time, employment and outward FDI are homogenous. Cluster stability is low, as more detailed resolutions of the clustering tree (see chart 3) show two additional upcoming splits of this group until resolution 12 (k = 2).

#### 3.2.2 "Small foreign-controlled service providers"

Small foreign-controlled service providers are the largest cluster by far, comprising 782 multinationals that are almost exclusively in the nonmanufacturing business, above all in the service sector (38%), followed by "professional, scientific and technical activities"<sup>21</sup> (21%) and trade (20%). Homogeneity within this cluster is rather low, not least because of size. The cluster contains many small enterprises (51%), some larger multinationals (14%) and a significant share of enterprises without any employees in Austria (31%). Examples include companies like BAWAG, VAMED and HOFER. What they have in common with other group members is basically the fact that they are under foreign control and have a rather low export ratio.

The cluster's median turnover is among the lowest (EUR 7 million), as is the median number of employees (17). Only a small fraction of the companies grouped into this cluster trade in services, and the average share of imports (5%) and exports (4%) is very low. Essentially, this group of foreign-controlled multinationals in Austria serves the domestic market for services (e.g. hotel industry, catering, car rentals, transport services, financial services), goods (a wide range of industries, e.g. food, office equipment, opticians, petrol stations) and professional business services (holding companies). A close "neighboring" group is the "SPEs" cluster, which exists as a distinct group only from resolution k = 8 downward (see chart 3 for details). The main regions of origin of FDI investors in this cluster are Western Europe (74%), particularly Germany (36% of all cases). This group also contains the highest concentration of CESEE investors, with a small subgroup of the CESEE-controlled multinationals branching off at resolution 10 (k = 10). Thus, cluster stability is neither high nor low.

#### 3.2.3 "Austrian nonmanufacturers"

This is the "residual" cluster under Austrian control, consisting of only 651 multinationals compared with 1,904 multinationals in the five foreign-controlled clusters. This cluster is dominated by mostly small providers of various services

<sup>&</sup>lt;sup>20</sup> We compute homogeneity  $H_c$  of a cluster C in the following way: For each variable  $v \in \{1, ..., 20\}$  and a given cluster  $C \in \{1, ..., 8\}$  the intra-cluster standard deviation  $SD(v_c)$  is calculated. For each variable v the standard deviations are then ranked across clusters in descending order and assigned a corresponding position value (rank), i.e.  $Rv_c = f(SD(v_c))$  such that for two different clusters  $i \neq j$ , where  $i, j \in \{1, ..., 8\}$ , if  $SD(v_i) < SD(v_j)$  then  $Rv_i > Rv_j$  and  $Rv_c \in \{1, ..., 8\}$ . The overall score for a cluster is then computed as the sum of the cluster ranks across all variables  $H_c = \sum_{\nu=1}^{20} Rv_c$ . Hence, the higher  $H_c$  the more homogenous the cluster C. "SPEs" and "retail multinationals" achieve best results by a large margin (109 and 97, respectively) and are thus attributed the homogeneity label "high." Values between 70 and 80 were classified as "medium," cases below 70 as "low."

<sup>&</sup>lt;sup>21</sup> A large part of the holdings with nil employment are classified in this sector.
and surprisingly robust, with rather small differences between resolution level 12 (k = 12) and level k = 8 (see chart 3).

The multinationals in this cluster are mainly engaged in services (31%) and professional business services (in the form of holding companies; 26%). More than half of all private individuals included in the population were clustered into this group,<sup>22</sup> which is one explanation for the low median number of employees (9), low turnover (EUR 4 million) and low degree of foreign trade activity (export share: 4%, import share: 5%). More than half (58%) of the companies in this cluster qualify as small multinationals, but there are also some widely known larger enterprises, such as SPAR (HOLDAG Bet. GmbH), FLUGHAFEN WIEN, PORR and RAIFFEISEN-HOLDING NÖ/W. Essentially, this cluster contains Austrian enterprises in the nonmanufacturing business and individuals engaged in outward FDI without a specific CESEE focus.

#### 3.2.4 "Austrian export champions"

This cluster, encompassing 192 multinationals, features many of Austria's very large multinationals, thus accounting for the highest values with regard to many variables, such as the median number of employees (305) and median turnover (EUR 424 million) and the average amount of service exports (EUR 115 million) and service imports (EUR 111 million). The vast majority of multinationals in this group is in the manufacturing business (73%), followed with a huge gap by trade companies (13%). There is a clear export focus (72% export share), although many of the multinationals seem to be integrated in global value chains (import share: 41%). Recourse to international financial markets is strong in this group, as 21% of the multinationals in this cluster are known to be counterparties in cross-border financial derivatives contracts or issuers of bonds held by foreign investors. Every tenth member of this cluster also performs a cash-pooling function.<sup>23</sup>

Many of the multinationals in this cluster are household names in Austria, e.g. OMV, ANDRITZ, KTM, VERBUND, VOESTALPINE, LENZING and RED BULL. With a comparatively low CESEE outward FDI ratio (20%), investment targets and markets are spread globally. Another explanation for this rather low value could be that large multinationals with a very strong CESEE focus were clustered into the group of "Austrian CESEE experts." While homogeneity is low because of outliers in many variables, stability is high (this cluster remains broadly unchanged until cluster resolution k = 12).

#### 3.2.5 "Retail multinationals"

The second-largest cluster, consisting of 472 multinationals, is a very homogeneous group of foreign-controlled multinationals serving retail markets of all kinds in Austria. Two-thirds of the companies are trade businesses, with the second-largest sector (manufacturing) accounting for just 10% of the cluster population. The composition of the cluster remains broadly stable for resolutions from k = 4 down to k = 12.

<sup>&</sup>lt;sup>22</sup> Private individuals and foundations exist as multinationals in this paper if they hold outward foreign direct investments but no shares of domestic companies.

<sup>&</sup>lt;sup>23</sup> "Cash pooling" is a position on reporting templates for the balance of payments and the international investment position.

The main characteristics are a high share of imports (61%) combined with a low share of exports (11%). Most companies are neither small nor large, and homogeneity within the group is high. The median number of employees is 52, median turnover is EUR 28 million. Typical representatives of this cluster are companies like H&M, IBM, MAN, EDUSCHO, DEICHMANN, MIELE, NEW YORKER or ZARA. Typically, they do not hold outward FDI; this is the case only for 27 out of 472 companies in this cluster. The group heads of these multinationals are overwhelmingly located in Western Europe (80%; Germany: 42%).

#### 3.2.6 "Austrian CESEE experts"

This cluster encompasses 174 Austrian-controlled multinationals with a dedicated CESEE focus in their outward FDI. Homogeneity is rather low because the cluster comprises enterprise groups of all sizes and industries, including some major Austrian banks (ERSTE GROUP, RBI, OBERBANK), large multinationals from other sectors, e.g. EVN, STRABAG, UNIQA, WIENER STAEDTISCHE, POST, XXXLUTZ, but also a number of lesser-known smaller CESEE experts. About a third of the companies clustered into this group employ up to 10 people.

In this cluster, 94% of all outward FDI is invested in CESEE countries on average. The industry mix is highly balanced, led by professional business services (i.e. holding companies; 24%) and followed by trade (19%), services (18%) and manufacturing (18%). This cluster stands out with regard to the variables "BANK" (7%) and "capital market participation" (25%), which are likely to be correlated since all banks in this cluster are active on international financial markets. With a median age of 35 years, this cluster contains the most mature of all companies. Moreover, the cluster is highly stable; the partitioning algorithm would build almost identical clusters when forced to build nine, ten or eleven groups. Only at k = 10 would some companies (mainly the manufacturing companies) break off to form a new cluster.

#### 3.2.7 "CESEE hubs"

The second-smallest cluster (144 multinationals) is defined mainly by two characteristics: foreign control and outward FDI focus on CESEE countries. To some degree, there are similarities with the "Austrian CESEE experts" cluster, given the outward FDI focus on CESEE and the lack of a clear emphasis on a specific economic activity. The Austrian multinationals in this cluster serve exclusively as a hub to the CESEE region, with a minimum of managing and administrative personnel in Austria. In terms of economic activity, the single-biggest homogeneous group of multinationals in this cluster provides "professional business services" (i.e. holding companies; 17% of all multinationals in this group). The other 83% obviously are in some sort of production, trade or service business in Austria. The share of exports (29%) and imports (33%) is significantly higher than in the "Austrian CESEE experts" cluster (14% and 13%, respectively).

Household names in this cluster are REWE, TELEKOM AUSTRIA, SIEMENS and ALLIANZ. Homogeneity is also comparatively low given the broad mix of companies (companies of all sizes and industries) as in the "neighboring" cluster 6 above. Stability is high, with no further split occurring at least until k = 12.

#### 3.2.8 "SPEs"

According to the IMF's definition:

"An SPE resident in an economy, is a formally registered and/or incorporated legal entity recognized as an institutional unit, with no or little employment up to maximum of five employees, no or little physical presence, and no or little physical production in the host economy."  $^{24}$ 

Additional characteristics include foreign control and an exceptionally high degree of cross-border assets and liabilities.

As was to be expected, this cluster is highly homogeneous, with 51 out of the 52 multinationals in the dataset marked as SPE having been clustered into this group. The median number of employees in this cluster is zero, as is turnover and foreign trade. The PAM algorithm conducts a "SPE split" at k = 12. The closest "neighboring" group is "small foreign-controlled service providers," which builds a common cluster with SPEs at k = 7.

#### 4 Interpretation, conclusion and further research

This paper sheds some light on the relevance and increasing role of multinational enterprises active in Austria. To this effect we built a comprehensive dataset of multinationals in Austria and then clustered them into groups according to their key characteristics, using the partitioning-around-medoids algorithm.

The analysis delivers eight meaningfully interpretable groups of multinationals, three of which are Austrian-controlled, with the other five clusters being in foreign hands. There is a significant difference in complexity between these two segments. The Austrian-controlled units are characterized by a high degree of stability from a relatively early partitioning stage (k6), with no further splits occurring until k = 12, except for the branching-off of a CESEE group containing larger, export-orientated manufacturing companies. As the foreign-controlled units are more heterogeneous, they tend to be subject to splits between k = 7 and k = 11. Looking ahead, further experimentation in input parameters could verify the stability of our results at these cluster resolutions.

Additionally, one must bear in mind that we conducted a one-off exercise based on 2017 data only. An obvious next step could be to perform a similar analysis with 2018 data or time series with historic data to be able to assess the stability of the clusters are over time. Furthermore, we did not investigate all available variables, and there might be additional relevant data sources that could be linked to the multinationals database (e.g. R&D expenditure). Another rewarding question could be a more detailed investigation of "neighboring" clusters, e.g. "Austrian CESEE experts" and "CESEE hubs," to be able to establish the effect foreign control has had over time compared with domestic control. Likewise, intra-cluster consistency could be the subject of further research.

Finally, future research may look at the impact of various policy measures ranging from taxes to labor market policies for different types of multinationals, which would then allow for more effective and efficient policymaking. Last but not least, once the proposed taxonomy of environmentally sustainable activities has been completed, another avenue of future research might focus on identifying the characteristics and drivers of multinationals' "green" activities.

<sup>&</sup>lt;sup>24</sup> See www.imf.org/external/pubs/ft/bop/2018/pdf/18-03.pdf (page 19).

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#### Annex

#### **Cluster analysis**

When it comes to extracting intrinsic but unobserved information and structures from large datasets, there are various data-mining techniques to choose from. We are dealing with mixed-type data, and we are looking for an algorithm with which to identify distinct types of multinationals. Unlike in supervised machine-learning techniques, we do not impose any previously known category labels on the data which would denote their a-priori partition. Therefore, we picked cluster analysis from the unsupervised-learning toolbox to unveil clusters in a way that observations are similar within groups with respect to variables of interest, while the groups themselves stand apart from one another (Tryfos, 1998).

Similarly, cluster analysis can be performed with a plethora of different methods classifiable across multiple dimensions (see e.g. Baser and Saini, 2013). In general, different clustering methods lead to different outcomes. Cluster analysis is an

explorative technique, meaning that the best approach is highly subjective, and it should be one that is practical to handle and that delivers the "best"-i.e. meaningful, useful and well interpretable – results for the analyst.

Having said that, important decisions need to be made with respect to the clustering method and its parameters in the course of the data exploration process. One of the choices to be made is between a hierarchical or a partitional approach. The hierarchical approach is based on a nested sequence, proceeding either bottom-up - i.e. starting from as many clusters as there are observations and finishing with a single cluster comprising all observations (agglomerative approach) - or vice versa (divisive approach) (see e.g. Jain and Dubes, 1988).

In contrast to hierarchical methods, partitional clustering algorithms generate single partitions of the data into mutually disjoint subsets the number of which – conventionally denoted as k – needs to be specified by the researcher ex ante. Essentially, these algorithms first assign each data point to one of k clusters and then reshuffle the observations across clusters until each observation has the smallest distance to the center of the cluster. The methods differ, inter alia, in the way the "center" is defined and in the distance metric.

In general, hierarchical clustering methods are rather useful for smaller datasets. Moreover, different parameter specifications tend to produce very different outcomes, as was the case with our dataset. Having experimented with various hierarchical clustering methods, we ultimately opted for a partitional clustering method.

A very popular partitional approach is the so-called k-means method, well known for its efficiency in clustering large datasets. However, one of its key features is the fact that it uses arithmetic data "means" (so-called centroids) as the center of the clusters. The upshot is that this method typically works only on numerical variables.<sup>25</sup> In addition, its results are sensitive to outliers and noise in the data (Budiaji and Leisch, 2019). Since our dataset is a mixture of numerical and categorical variables and contains a number of outliers, the k-means method was not an option. The most common alternative for mixed-variable datasets is the "partitioning around medoids" (PAM) algorithm. It can be considered a more robust and universal algorithm than the k-means, not only because it can handle mixed data but also because it is less sensitive to outliers (Jin and Han, 2017). Rather than using "centroids," this method uses "medoids," which are not computed statistical means but actual data points from the dataset representative of each cluster.

It follows from the description of the PAM algorithm in section 2 that one of the key inputs for the algorithm is some distance metric. If the dataset contains purely numerical variables, different distance measures can be applied directly to the raw dataset just as with k-means. However, in case of mixed data, the distance between observations needs to be computed beforehand and provided as input to the algorithm as a distance matrix. A common option to compute distances for mixed data sets is the Gower-distance matrix (Gower, 1971). It uses an appropriate distance metric for each variable type, i.e. Manhattan for continuous and Dice for categorical datapoints, which is subsequently scaled to fall between 0 and 1. Then,

<sup>&</sup>lt;sup>25</sup> Extensions of the k-means method to mixed and categorical data have been developed in the literature. For an example see e.g. Nguyen et al. (2019).

## a linear combination using user-specified weights is calculated to create the final distance matrix.

Table A1

#### Variables and weights for PAM clustering

| Variable        | Name                                     | Туре     | Values                    | Description   | Weight for<br>clustering in % |
|-----------------|--|----------|---------------------------|---|-------------------------------|
| SPE             | Special purpose entity                   | Nominal  | 1 = ''yes''<br>0 = ''no'' | One or more units are classified as a special purpose entity  | 8                             |
| FOREIGN_CONTROL | Foreign control                          | Nominal  | 1 = "yes"<br>0 = "no"     | One or more units are controlled by a nonresident             | 8                             |
| CESEE_SHARE_ODI | CESEE share of outward FDI               | Interval | 0-100%                    | Outward FDI in CESEE as a share of total outward FDI          | 8                             |
| CESEE_SHARE_IDI | CESEE share of inward FDI                | Interval | 0-100%                    | Inward FDI in CESEE as a share of total inward FDI            | 8                             |
| BANK            | Banking license                          | Nominal  | 1 = ''yes''<br>0 = ''no'' | One unit is classified in ESA sector 1220A                    | 8                             |
| EMP             | Employees                                | Interval | N                         | Total number of employees (all units)                         | 8                             |
| AGE             | Age                                      | Ordinal  | N                         | Age of the oldest unit  | 8                             |
| IMP_QUOTA       | Import share                             | Interval | 0-100%                    | Import of goods divided by turnover                           | 8                             |
| EXP_QUOTA       | Export share                             | Interval | 0-100%                    | Export of goods divided by turnover                           | 8                             |
| ODI             | Outward FDI                              | Interval | Z                         | Outward FDI (extended direction principle)                    | 2                             |
| IDI             | Inward FDI                               | Interval | Z                         | Inward FDI (extended direction principle)                     | 2                             |
| OI_A            | Other investment assets                  | Interval | $\mathbb{N}$              | Other investment assets (BOP/IIP concept)                     | 2                             |
| OI_L            | Other investment liabilities             | Interval | $\mathbb{N}$              | Other investment liabilities (BOP/IIP concept)                | 2                             |
| TURN            | Turnover                                 | Interval | N                         | Turnover as reported in structural business statistics        | 8                             |
| FININS_EXP      | Insurance and financial services exports | Interval | N                         | Insurance and financial services exports as reported for ITSS | 2                             |
| FININS_IMP      | Insurance and financial services imports | Interval | N                         | Insurance and financial services imports as reported for ITSS | 2                             |
| TECH_EXP        | Technical services exports               | Interval | N                         | Technical services exports as reported for ITSS               | 2                             |
| TECH_IMP        | Technical services imports               | Interval | N                         | Technical services imports as reported for ITSS               | 2                             |
| OtherS_EXP      | Other services exports                   | Interval | N                         | Other services exports as reported for ITSS                   | 2                             |
| OtherS_IMP      | Other services imports                   | Interval | $\mathbb{N}$              | Other services imports as reported for ITSS                   | 2                             |

Source: OeNB, Statistics Austria, Authors' calculations.

Note: N = positive integers; Z = positive or negative integers; BOP/IIP = balance of payments/international investment position; ITSS = international trade in services statistics.



#### **Correlation of multinationals variables**

Source: Authors' calculations.

Chart A1

# A CESEE conundrum: low trust in government but high hopes for government-led job creation

#### Markus Eller, Thomas Scheiber<sup>1</sup>

OeNB Euro Survey results for ten countries in Central, Eastern and Southeastern Europe (CESEE) from 2018 indicate that a major share of respondents is disappointed with public governance. Yet, while trust in national governments is lacking, there is still a widespread belief that creating jobs is primarily a state responsibility, even 30 years after the onset of transition. As shown by a series of probit regressions, respondents are more likely to consider job creation to be above all a state responsibility if they belong to a low-income household, have comparatively little wealth and comparatively little education, rely on welfare payments, have worked for the public sector or reside outside the capital city. The views of respondents who express a lack of trust in government are also colored strongly by past economic hardship experiences. While there is, of course, a limit to how big the welfare state can get, our survey results imply that there is a case for national governments to build up buffers to be able to tide people over when incomes dry up in crisis episodes, and to invest more in developing human capital and improving social inclusion to address the concerns of marginalized societal groups.

JEL classification: A13, H11, P35 Keywords: public preferences, trust in government, government-led job creation, survey data, CESEE

People's attitudes toward public governance, the quality of public institutions and the role of the state in the economy are only rarely explored using survey data compiled across a variety of countries. Yet, comparable survey data allow us to study where, how and why attitudes vary across countries, thus enabling us to explain cross-country variations (see, for instance, Denisova et al., 2009; or Hobolt and Klemmemsen, 2005). For countries in Central, Eastern and Southeastern Europe (CESEE), such data are indeed available from the Life in Transition Survey (LiTS), jointly undertaken by the European Bank for Reconstruction and Development (EBRD) and the World Bank. And such data have also been made available through a 2018 wave of the OeNB Euro Survey,<sup>2</sup> which included a number of questions aimed at capturing individual attitudes toward public governance (building on Hayo and Neumeier, 2019; and Stix, 2013) and about the role the state should play in the economy (similarly to the first LiTS wave; see EBRD, 2006). Corroborating LiTS results, the OeNB Euro Survey results show that a major share of

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<sup>&</sup>lt;sup>2</sup> Source: Oesterreichische Nationalbank. OeNB Euro Survey. www.oenb.at/en/Monetary-Policy/Surveys/ OeNB-Euro-Survey.html. Sample: 1,000 people per country, aged 15 and over, in the following ten CESEE countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Hungary, North Macedonia, Poland, Romania and Serbia.

respondents in the ten investigated CESEE countries are concerned about different dimensions of public governance and distrustful of government. At the same time, they still expect the government to play a large role in the economy and soften the effects of market fluctuations, even 30 years after the onset of transition.<sup>3</sup>

This short study provides the relevant stylized facts (section 1) and sheds light on the characteristics of individuals expressing such views (section 2). With that we try to understand better the origins of subjective attitudes toward politics in the CESEE region. On the back of a large body of political science literature that provided evidence for public attitudes impacting public policy (e.g. Burstein, 2003; Hager and Hilbig, 2020; Hobolt and Klemmemsen, 2005; Manza et al., 2002), this knowledge should be useful for the design of targeted policies that enhance people's trust in, and support for, the respective institutional frameworks – not in the sense that people are manipulated for this purpose, but in the sense that their respective socioeconomic conditions are adequately accounted for. This could ultimately allow for more stable political and economic outcomes in the region (EBRD, 2019; IMF, 2016).

## 1 Distrusting government but counting on government for job creation – stylized facts

To uncover people's attitudes toward public governance, we initially investigate four different dimensions of how people perceive the behavior of politicians or the government/the state in their respective countries: (1) *distrust* in government, (2) vested interests (i.e. the perception that most politicians just serve the interests of particular groups rather than the interest of the general public), (3) short-term rent-seeking (i.e. the perception that most politicians are more concerned about the next elections than about the country's long-term well-being), and (4) poor tax revenue-managing capacities (i.e. the perception that the state is wasting taxpayer money rather than managing tax revenues conscientiously).<sup>4</sup> See chart 1 (upper panel) for a quick summary of the respective answers, indicating that public perception of public governance is clearly dominated by skeptical views. On average across the ten CESEE countries, between 65% and 70% of respondents raised concerns about vested interests, short-term rent-seeking or a poor tax revenuemanaging capacity. Distrust in government is also significant, with about 45% of respondents indicating that they do not trust their government.' Even though skeptical views on public governance are widespread across all ten CESEE countries surveyed, they are particularly pronounced in the Southeastern European (SEE)

<sup>&</sup>lt;sup>3</sup> Note that these results and the conclusions drawn from them are based on the 2018 fall wave of the OeNB Euro Survey. More recently, we have been witnessing national governments around the world taking a more active role in taming crises induced by market fluctuations amid the COVID-19 pandemic. Future survey waves may be expected to reveal the imprint the current crisis is going to leave on people's attitudes.

<sup>&</sup>lt;sup>4</sup> For detailed definitions of the variables, see table A1 in the annex.

<sup>&</sup>lt;sup>5</sup> It should be noted that according to data from the Gallup World Poll, respondents in CESEE countries are less trustful of their governments than respondents in economies of comparable income elsewhere (EBRD, 2019). Based on the third wave of LiTS (EBRD, 2016), only about two-fifths of respondents, in a broader set of CESEE countries than analyzed here, have confidence in their national governments. The OeNB Euro Survey time series on trust in government starts in 2009 (see chart A2 in the annex). Over the last decade, trust has increased significantly in Albania, Hungary, Poland and Serbia, while it has decreased significantly in Bosnia and Herzegovina, Czechia (until 2012) and North Macedonia. In Bulgaria, Croatia and Romania, it has remained broadly unchanged at a comparatively low level.

EU Member States<sup>6</sup> as well as in Bosnia and Herzegovina and North Macedonia. This negative perception of public governance might be surprising in view of 30 years of experience with implementing democratic structures and the fact that the countries were not suffering a notable crisis at the time the survey was conducted. Yet, the negative perception ties in with reports of international organizations that have raised concerns about still comparatively unfavorable levels of quality of institutions, governance and corruption in the region (e.g. EBRD, 2019; ECB, 2020; IMF, 2016).



Widespread belief that creating jobs is primarily a state reponsibility

% of respondents



Source: OeNB Euro Survey 2018.

Note: Weighted percentages excluding respondents with "don't know" answers or who refused to answer. Weights are calibrated on census population statistics for age, gender, region and, where available, on education and ethnicity (separately for each country). Entries for CESEE are unconditional averages across all observations using individual weights not adjusted for population size.

<sup>6</sup> The SEE EU Member States comprise Bulgaria, Croatia and Romania. Respondents in Romania express the strongest distrust in our sample, amid mass anti-government protests that started in 2017 and continued in 2018 on the back of relaxed anti-corruption laws.

#### Comparison with Corruption Perception Index

% of respondents agreeing with the statement "most politicians only serve the interests of particular groups"

Chart 2



"don't know" answers or who refused to answer.

Consistency between the scores of the Corruption Perception Index (CPI) published by Transparency International in 2018 and the OeNB Euro Survey responses on vested interests confirms the validity of our survey data (see chart 2). Countries with lower CPI scores (indicating higher corruption) coincide with higher shares of agreement that politicians of the respective country only serve vested interests. Albania, Hungary and Serbia seem to be an exception; their respondents less frequently report a prevalence of vested interests than countries with a similar CPI score.

In a second step, the survey asked respondents whether job creation should primarily be a state responsibility or a private sector responsibility (or a shared responsibility; for detailed country-specific answers, see also chart A1 in the annex). Despite the underlying concerns about public governance, demand for state intervention in the economy is nonetheless very substantial, with about

45% of respondents in the full sample arguing that job creation should *primarily* be a responsibility of the state (see lower panel in chart 1). Support for this role is largest in Bosnia and Herzegovina and North Macedonia with shares of about 60%, followed by Albania and Romania with shares of about 53%. The overall share of respondents who do *not* trust government *but* primarily look to the state for job creation (blue bars in the lower panel of chart 1) is about 20% in the full sample, with Romania, Bosnia and Herzegovina, and North Macedonia showing the largest shares (around 30%). Even though the share of respondents thus holding seemingly contradictory beliefs is, at first glance, not extraordinarily high, it should be emphasized that respondents who express distrust in government often make up a significant share of those who expect jobs to be created above all by government (e.g. more than half in the SEE EU Member States and Bosnia and Herzegovina).

Existing literature points to a paradoxical relationship between distrust in public institutions and demand for more state regulation (e.g. Aghion et al., 2010), where the main trigger comes from private businesses imposing negative externalities on society in an environment with poor social capital and the society apparently choosing to demand more state regulation and tolerating occasional corruption to reduce these externalities. However, based on our sample we cannot confirm a statistically significant conditional correlation between respondents' demand for government-led job creation and distrust in government (unlike Denisova et al., 2010, for Russia). In any case, respondents holding both beliefs are characterized by a mixed socioeconomic profile that differs from other groups in the sample (see the next section).

## 2 Who are the people that do not trust government but look to the state for job creation first?

To explore these issues further, we examine whether respondents' political attitudes are shaped by their individual socioeconomic background (in line with, for instance, Pitlik et al., 2011). We run a series of probit estimations with countryfixed effects and robust standard errors adjusted for clustering at the regional level. We run regressions on six dependent variables: on the four variables of perceived public governance, on the variable representing job creation as primarily a state responsibility and on the dummy indicating the subgroup of respondents who distrust government but look to the government for job creation first. In all six regressions, we control for the same socioeconomic, sociodemographic and household characteristics. For a detailed list of all variables and their definitions, see table A1 in the annex.<sup>7</sup>

Selected marginal effects are reported in chart 3 for the full sample, while the complete set of regression results – also emphasizing differences between country groups – is shown in table A2 in the annex.<sup>8</sup> We find that distrust in government (upper left-hand panel in chart 3) and the perception of vested interests (upper right-hand panel), short-term rent-seeking behavior (middle left-hand panel) and the waste of taxpayer money (middle right-hand panel) are very robustly associated with economic hardship undergone in the recent past: Respondents who had to cut back on basic consumption for some time in the period from 2008 to 2018 are more likely to have very skeptical views of public governance. Conversely, receipt of social transfers has a mitigating effect on all four dependent variables: Respondents who received unemployment benefits for some time in the period from 2008 to 2018 are less likely to voice concerns about politicians' behavior, and respondents for whom welfare benefits are an important source of income are less likely to voice concerns about vested interests and waste of taxpayer money. Moreover, ownership of assets - in the form of a secondary residence or other real estate in addition to a main residence - is associated with less pronounced distrust and skepticism. Interestingly, other economically important variables such as educational attainment, employment status (except for self-employment) or net household income do not appear to matter in this context.9 In addition, and as expected, respondents who would vote for a ruling political party, who are interested in politics or who report a high degree of life satisfaction are significantly less skeptical about public governance. Furthermore, respondents' attitudes vary systematically with age, gender and religion (see table A2). The qualitatively

<sup>&</sup>lt;sup>7</sup> Results shown in this section are robust with regard to alternative specifications of standard errors (e.g. adjusted for clustering at the level of primary sampling units, instead of regions, or the use of Huber-White standard errors) and alternative definitions of explanatory variables (e.g. using a variable eliciting ideological preferences for left-wing, centrist or right-wing parties instead of the preference for a ruling party). The respective results are available upon request.

<sup>&</sup>lt;sup>8</sup> In addition to the full sample, we performed probit regressions on three different groups of countries: the CEE EU members Czechia, Hungary and Poland; the SEE EU members Bulgaria, Croatia and Romania; and the EU candidates and potential candidates Albania, Bosnia and Herzegovina, North Macedonia and Serbia.

<sup>&</sup>lt;sup>9</sup> However, Belabed and Hake (2018) show in a multi-level regression analysis that people are more likely to trust their national institutions if regional and country-level income inequality is low (particularly in EU candidates and potential candidates), if they earn comparatively more or if their relative income position is higher, and if the perceived levels of corruption are low and the rule of law is strong.

similar results do not come as a surprise, given that these four variables capture similar dimensions of people's attitudes toward public governance.

Our findings for the respondents who see job creation primarily as a state responsibility are quite different (lower left-hand panel in chart 3): in this case, responses show more differentiation in line with individuals' current economic situation - economic "fundamentals" matter much more. Those who are better off or less marginalized (i.e. those who have a higher level of education, belong to the





## 0.10

Note: Columns represent average marginal effects from probit estimations with country-fixed effects; standard errors are adjusted for clustering at the regional level. \*\*\*, \*\*, \*\* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. The eight explanatory variables enter as dummy variables. Additional dummy variables control for age, gender, party preference, employment status, religion, interest in politics, life satisfaction, housing condition relative to neighboring homes, prevalence of savings and household size (not shown). The results refer to the full set of data available for the ten surveyed CESEE countries, i.e. columns (1), (5), (9), (13), (17) and (21) in table A2

### Socioeconomic factors associated with skeptical views about public governance and distrust in government in CESEE countries

-0.05 -0.10 Politicians only think about re-election Average marginal effects 0.15 0.05 0.00 -0.05

upper income tercile, hold more assets – either in the form of a secondary residence or more savings –, have to rely less on public welfare benefits or live in the capital city) are less likely to look to the state for job creation first. The aggregate picture presented in chart 3 conceals some interesting cross-regional heterogeneity. For instance, as can be seen in table A2, being better off in terms of higher household income or owning a secondary residence makes respondents less likely to expect government-led job creation only in the three CEE EU Member States. Moreover, the regressions explaining preferences for looking to the state for job creation first are the only ones where no explanatory variable is statistically significant across all the three country groups, pointing to stronger cross-country differences in this case.

Finally, when focusing on the last dependent variable capturing respondents who hold both seemingly contradictory beliefs, i.e. express distrust in the government *and* expect governments to take the initiative in providing jobs (lower righthand panel in chart 3), it becomes evident that they share a mixture of characteristics: in addition to the socioeconomic factors that were already important for respondents who voiced distrust in government, marginalization effects play an important role as well. In particular, respondents are more likely to support both beliefs if they have experienced economic hardship, have not received unemployment benefits, have a low level of household income, do not have a secondary residence or live outside the capital city.

## 3 Key takeaways: adequate institution-building and social inclusion matter

While respondents are more likely to express trust in government if they are cushioned from economic hardship, have benefited from social transfers or hold safe assets, it is a serious policy challenge for all CESEE governments to run the state effectively and meet people's expectations. A more extensive welfare state may be hampered by limited spending capacities and fiscal space, especially over the longer run. Consequently, it would be important for politicians to develop, realize and appropriately communicate a long-term strategy that takes into account limited social transfer possibilities, tries to avoid catering to vested interests and makes an effort to ensure the build-up of buffers enabling the state to tide people over crisis periods.

Social inclusion also plays an important role according to our results. Those who are less marginalized (i.e. those who have comparatively higher levels of education, belong to the upper income tercile, possess comparatively more assets, do not rely heavily on public welfare benefits or live in the capital city) do not see job creation primarily as a state responsibility. Rather than expecting the state to intervene strongly in the job market to address the concerns of marginalized societal groups, which could be very expensive and would add to fiscal constraints, these respondents support a more active role for the state in investing in human capital and improving social inclusion by enhancing (access to) education and making targeted social transfers to the poor. The funds to pay for that will most likely have to come from longer-term-oriented budget policies.

However, given that populists, of both right- and left-wing varieties, could take advantage of distrust of government and people's worries about market turmoil fallout, there is a danger that short-term rent-seeking behavior gains further prevalence. One answer to these challenges consists in adequate institution-building. Sound institutions are crucial for providing the analytical capacities for policy design and implementation and promoting a conscientious and prudent management of tax revenues. Independent audit offices and fiscal councils that recently have been set up in several CESEE countries (or whose establishment has been debated) could prove to play essential roles in achieving these objectives and thus fostering trust and promoting satisfaction with public governance (OECD, 2017).<sup>10</sup> Moreover, appropriate fiscal rules could be helpful in bringing reelection-minded incumbents away from a solely short-run, election-oriented budget policy behavior<sup>11</sup> to a longer-run, growth-promoting orientation (Rose, 2006).

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- <sup>10</sup> In an environment of entrenched and long-lasting distrust in the government, building trusted institutions needs strong commitments. For instance, the analysis of Begovic et al. (2016) based on OeNB Euro Survey data suggests that currency board arrangements are more likely to increase the credibility of the monetary authority in countries with a low level of trust in the government and a weak economy.
- <sup>11</sup> "The government chooses economic policies during its incumbency which maximize its plurality at the next election" (Nordhaus, 1975, p. 174). Most likely, the related fiscal expansion before an election, followed by a tightening after the election, affects the real business cycle of a country in an asymmetric shock-type manner. The political economy literature has summarized this view as the "political business cycle." Brender and Drazen (2005) showed that political business cycles had been especially prevalent in new democracies such as the CESEE countries.

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#### Annex

| Variable description  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|
| Label   | Description  |  |  |  |  |  |  |
| (1) Perceptions of public   | governance (dependent variables in the regressions)  |  |  |  |  |  |  |
| Distrust in<br>government   | Dummy equals 1 if respondents reported to somewhat or completely distrust the central government/cabinet of ministers;<br>0 if they indicated complete/some trust or picked neither trust nor distrust (5-point Likert scale).   |  |  |  |  |  |  |
| Vested interests  | Dummy equals 1 if respondents rather/strongly agreed with the statement "most politicians in my country serve the interests of particular groups"; 0 if they rather/strongly agreed with the statement "most politicians in my country act in line with the general public's interest" or if they indicated no preference or considered both statements to be somewhat true.       |  |  |  |  |  |  |
| Short-term<br>rent-seeking  | Dummy equals 1 if respondents rather/strongly agreed with the statement "most politicians in my country are concerned about the next elections"; 0 if they rather/strongly agreed with the statement "most politicians in my country are concerned about the country's long-term well-being" or if they indicated no preference or considered both statements to be somewhat true. |  |  |  |  |  |  |
| Waste of taxpayer<br>money  | Dummy equals 1 if respondents rather/strongly agreed with the statement "the state is wasting taxpayer money"; 0 if they rather/strongly agreed with the statement "the state manages tax revenues conscientiously" or if they indicated no preference or considered both statements to be somewhat true.  |  |  |  |  |  |  |
| Government-led job creation   | Dummy equals 1 if respondents considered the state to be primarily responsible for creating jobs; 0 if they considered job creation to be primarily a private sector responsibility or a shared public/private responsibility, or said that it did not matter as long as jobs were available.  |  |  |  |  |  |  |
| Distrust in government<br>and expectations of<br>government-led job<br>creation | Dummy equals 1 if the dummy "distrust in government" equals 1 AND the dummy "government-led job creation" equals 1 for a given respondent; 0 otherwise.  |  |  |  |  |  |  |
| (2) Socioeconomic chara   | cteristics   |  |  |  |  |  |  |
| Cut back on consumption   | Dummy equals 1 if respondents had to cut back on basic consumption in the period from 2008 to 2018; 0 otherwise.   |  |  |  |  |  |  |
| Unemployment<br>benefits  | Dummy equals 1 if respondents received unemployment benefits in the period from 2008 to 2018; 0 otherwise.   |  |  |  |  |  |  |
| Welfare benefits  | Dummy equals 1 if respondents considered public welfare benefits to be very/rather important for their individual (or shared) budgets at the time of asking (with welfare benefits including unemployment compensation, public pension, benefits for families and children, etc.); 0 if they indicated that such benefits were not important or not part of household income.      |  |  |  |  |  |  |
| Wage cut<br>Employment status<br>Worked for the<br>public sector                | Dummy equals 1 if respondents had to accept wage cuts or delayed wage payments in the period from 2008 to 2018; 0 otherwise.<br>Dummy variables: self-employed, unemployed, retired, student. Base category: employed.<br>Dummy equals 1 if respondents worked for the public sector and received a wage income in the period from 2008 to 2018;<br>0 otherwise.                   |  |  |  |  |  |  |
| Secondary residence   | Dummy equals 1 if respondents confirmed that they or a household member owned a secondary residence or other real estate (beyond the main residence); 0 if they said that this was not the case, refused to answer or were not able to provide an answer.  |  |  |  |  |  |  |
| Savings<br>House in poorer/<br>better condition                                 | Dummy equals 1 if respondents reported to have savings; 0 otherwise.<br>Dummy variables take value 1 if interviewers considered a given dwelling to be in a better or poorer condition than the<br>neighboring dwellings. Base category: similar condition.  |  |  |  |  |  |  |
| (3) Sociodemographic ch   | aracteristics  |  |  |  |  |  |  |
| Age<br>Female<br>Educational<br>attainment                                      | Dummy variables for three age groups: 19 to 34 years, 35 to 54 years (base category) and 55 and more years.<br>Dummy variable that takes the value 1 if respondents were female, 0 otherwise (base category).<br>Dummy variables; degree of educational attainment (high, medium, low). Base category: low level of education.   |  |  |  |  |  |  |
| Religion  | Dummy variables: Muslim, Orthodox Christian, Catholic Christian, Protestant Christian (and other Christian faith), other faith groups (e.g. Jewish, Buddhist), no answer. Base category: atheist/agnostic.   |  |  |  |  |  |  |
| Interest in politics<br>Life satisfaction                                       | Dummy equals 1 if respondents rather/strongly agreed with the statement "I am very interested in politics"; 0 otherwise.<br>Dummy equals 1 if respondents rather/strongly agreed with the statement "all things considered, I am satisfied with my life<br>now"; 0 otherwise.  |  |  |  |  |  |  |
| Party preference  | Respondents were asked which party they would vote for if parliamentary elections were held during the coming week. Dummy variables: would vote for a ruling party, would not vote, were undecided or refused to answer. Base category: opposition party.  |  |  |  |  |  |  |
| (4) Household character   | istics   |  |  |  |  |  |  |
| Income  | Dummy variables for the level of total household income after taxes (high, medium, don't know/no answer). Base category: low income.   |  |  |  |  |  |  |
| Household size  | Dummy variables for the number of persons living permanently in a given household (two, three and more individuals).<br>Base category: single person.  |  |  |  |  |  |  |
| Capital city resident   | Dummy equals 1 if respondents' main residence is in the capital city; 0 otherwise.   |  |  |  |  |  |  |

#### Source: Authors' compilation.

Note: Unless otherwise stated, respondents with "don't know" answers or who refused to answer are excluded.

#### **Probit regression results**

Table A2

## **Probit estimations: distrust in government and public perception of public governance; in CESEE and per country group**

|   | Distrust in g       | government        |                   |                      | Most politicians only serve vested interests |               |                   |                   |
|---|---------------------|-------------------|-------------------|----------------------|--|---------------|-------------------|-------------------|
|   | CESEE               | CZ/HU/<br>PL      | BG/HR/<br>RO      | AL/BA/<br>MK/RS      | CESEE  | CZ/HU/<br>PL  | BG/HR/<br>RO      | AL/BA/<br>MK/RS   |
|   | 1                   | 2                 | 3                 | 4                    | 5  | 6             | 7                 | 8                 |
| Experienced wage cuts (2008-2018)               | 0.016               | -0.040            | 0.040             | 0.025                | -0.003                                       | -0.013        | -0.024            | 0.019             |
|   | (0.024)             | (0.033)           | (0.056)           | (0.034)              | (0.019)                                      | (0.038)       | (0.026)           | (0.035)           |
| Had to cut back on consumption (2008-2018)      | 0.079***            | 0.085***          | 0.090***          | 0.066**              | 0.117***                                     | 0.136***      | 0.095***          | 0.120***          |
|   | (0.016)             | (0.027)           | (0.025)           | (0.026)              | (0.015)                                      | (0.027)       | (0.019)           | (0.031)           |
| Public welfare benefits are currently important | -0.019              | -0.038            | 0.011             | -0.022               | -0.045**                                     | -0.092***     | 0.015             | -0.063**          |
|   | (0.020)             | (0.027)           | (0.034)           | (0.029)              | (0.019)                                      | (0.027)       | (0.029)           | (0.028)           |
| Received unemployment benefits (2008-2018)      | -0.055***           | -0.001            | -0.062*           | -0.069**             | -0.041**                                     | -0.037        | 0.002             | -0.049            |
|   | (0.020)             | (0.034)           | (0.036)           | (0.035)              | (0.019)                                      | (0.032)       | (0.022)           | (0.035)           |
| Public sector work experience (2008-2018)       | -0.012              | 0.011             | -0.027            | -0.022               | -0.009                                       | 0.031         | -0.036            | -0.028            |
|   | (0.020)             | (0.022)           | (0.030)           | (0.048)              | (0.018)                                      | (0.030)       | (0.026)           | (0.026)           |
| Would vote for a ruling party                   | -0.287***           | -0.298***         | -0.286***         | -0.272***            | -0.136***                                    | -0.152***     | -0.084***         | -0.169***         |
|   | (0.025)             | (0.039)           | (0.041)           | (0.046)              | (0.020)                                      | (0.034)       | (0.027)           | (0.035)           |
| Would not vote                                  | 0.007               | 0.035             | 0.037             | -0.031               | 0.046**                                      | 0.084**       | 0.047**           | 0.015             |
|   | (0.022)             | (0.040)           | (0.029)           | (0.044)              | (0.022)                                      | (0.041)       | (0.021)           | (0.047)           |
| Don't know for whom to vote                     | -0.079***           | -0.095*           | -0.056            | -0.088               | 0.043  | 0.047         | 0.041             | 0.012             |
|   | (0.029)             | (0.052)           | (0.041)           | (0.056)              | (0.027)                                      | (0.039)       | (0.034)           | (0.044)           |
| Refused to reveal voting preference             | -0.124***           | -0.051            | -0.077            | -0.176***            | 0.003  | -0.005        | 0.038             | -0.036            |
|   | (0.030)             | (0.057)           | (0.048)           | (0.052)              | (0.031)                                      | (0.049)       | (0.044)           | (0.052)           |
| Aged 19 to 34 years                             | 0.025               | -0.027            | 0.042             | 0.050*               | -0.026**                                     | -0.051***     | -0.010            | -0.025            |
|   | (0.016)             | (0.023)           | (0.028)           | (0.028)              | (0.013)                                      | (0.018)       | (0.023)           | (0.024)           |
| Aged 55+ years                                  | 0.002               | -0.049**          | 0.029             | 0.032                | 0.038**                                      | 0.042         | -0.005            | 0.065***          |
|   | (0.017)             | (0.023)           | (0.027)           | (0.027)              | (0.015)                                      | (0.029)       | (0.025)           | (0.022)           |
| Female  | -0.008              | -0.014            | -0.006            | -0.014               | -0.031***                                    | -0.022        | -0.030***         | -0.038*           |
|   | (0.010)             | (0.017)           | (0.020)           | (0.013)              | (0.011)                                      | (0.023)       | (0.011)           | (0.023)           |
| Educational attainment: high                    | 0.019               | 0.044             | 0.101*            | -0.034               | -0.023                                       | 0.013         | -0.022            | -0.052            |
|   | (0.029)             | (0.045)           | (0.056)           | (0.05)               | (0.027)                                      | (0.047)       | (0.039)           | (0.045)           |
| Educational attainment: medium                  | 0.023               | 0.042             | 0.100*            | -0.013               | -0.023                                       | 0.017         | -0.045            | -0.028            |
|   | (0.023)             | (0.039)           | (0.054)           | (0.034)              | (0.019)                                      | (0.039)       | (0.041)           | (0.027)           |
| Self-employed                                   | -0.051**            | -0.005            | -0.071**          | -0.102***            | 0.018  | 0.039         | -0.023            | 0.015             |
|   | (0.020)             | (0.031)           | (0.032)           | (0.034)              | (0.023)                                      | (0.040)       | (0.035)           | (0.033)           |
| Unemployed                                      | -0.006              | -0.009            | -0.015            | -0.012               | 0.009  | 0.028         | -0.072**          | 0.035             |
|   | (0.020)             | (0.042)           | (0.032)           | (0.028)              | (0.023)                                      | (0.043)       | (0.031)           | (0.029)           |
| Retired   | -0.015<br>(0.022)   | 0.057*<br>(0.032) | -0.037<br>(0.035) | -0.057*<br>(0.034)   | -0.004<br>(0.023)                            | 0.049 (0.040) | -0.026<br>(0.034) | -0.029<br>(0.038) |
| Student   | -0.052**<br>(0.023) | -0.006<br>(0.041) | -0.049<br>(0.044) | -0.090***<br>(0.032) | 0.005 (0.027)                                | 0.014 (0.049) | -0.017<br>(0.040) | 0.021 (0.049)     |
| Muslim  | -0.009<br>(0.051)   | 0.000<br>(.)      | 0.037 (0.058)     | -0.350***<br>(0.073) | 0.048 (0.052)                                | 0.000<br>(.)  | 0.082 (0.059)     | 0.050 (0.059)     |
| Orthodox Christian                              | -0.039              | -0.014            | 0.031             | -0.374***            | 0.058  | -0.048        | 0.055             | 0.040             |
|   | (0.042)             | (0.079)           | (0.058)           | (0.075)              | (0.066)                                      | (0.083)       | (0.061)           | (0.063)           |
| Catholic Christian                              | -0.066**            | -0.055**          | 0.031             | -0.500***            | 0.001  | 0.038         | -0.175**          | 0.060             |
|   | (0.026)             | (0.022)           | (0.052)           | (0.073)              | (0.026)                                      | (0.024)       | (0.076)           | (0.091)           |
| Other Christian faith (e.g. Protestant)         | -0.057*             | -0.109***         | 0.130*            | -0.294***            | -0.019                                       | -0.042        | -0.005            | 0.111             |
|   | (0.034)             | (0.030)           | (0.078)           | (0.099)              | (0.037)                                      | (0.040)       | (0.069)           | (0.088)           |

Source: Authors' calculations. OeNB Euro Survey 2018.

Note: Average marginal effects from probit estimations with country-fixed effects using data from the OeNB Euro Survey 2018; standard errors are adjusted for clustering at the regional level and reported in parentheses. \*\*\*, \*\*, \* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. For a definition of the variables, see annex table A1. P(DepVar=1) denotes the unconditional sample probability of the respective dependent variable. By construction, a positive (negative) average marginal effect implies that a respondent is more (less) likely to agree with the question underlying the dependent variable. Base categories are: preference for the opposition party, 35 to 54 years old, male, low educational attainment, employed, atheist/agnostic, main residence in a similar condition as neighboring homes, no savings, no secondary residence, not living in the capital city, low income, single household, Czech resident. The CESEE group comprises all ten OeNB Euro Survey countries. The second group consists of three Central and Eastern European countries that became EU members in 2004. The third country group consists of three Southeastern European countries that became EU members in 2007 and 2013, respectively. The final group consists of four EU candidates or potential candidates.

## Probit estimations: distrust in government and public perception of public governance; in CESEE and per country group

|  | Distrust in government |                      |                      |                      | Most politicians only serve vested interests |                      |                     |                      |
|--|------------------------|----------------------|----------------------|----------------------|--|----------------------|---------------------|----------------------|
|  | CESEE                  | CZ/HU/<br>PL         | BG/HR/<br>RO         | AL/BA/<br>MK/RS      | CESEE  | CZ/HU/<br>PL         | BG/HR/<br>RO        | AL/BA/<br>MK/RS      |
|  | 1                      | 2                    | 3                    | 4                    | 5  | 6                    | 7                   | 8                    |
| Other faith groups (e.g. Jewish, Buddhist)       | -0.012<br>(0.075)      | 0.033                | -0.158*<br>(0.084)   | -0.064 (0.1)         | -0.037<br>(0.083)                            | -0.013<br>(0.144)    | -0.105<br>(0.144)   | 0.003                |
| Religion: no answer                              | -0.023                 | -0.042               | -0.047               | -0.161               | -0.024                                       | -0.062               | 0.076*              | -0.081               |
| Very interested in politics                      | -0.034**<br>(0.015)    | 0.011                | -0.015               | -0.075***<br>(0.018) | -0.047***                                    | -0.074***<br>(0.025) | -0.011              | -0.059*              |
| Satisfied with life as it is                     | -0.136***<br>(0.017)   | -0.130***<br>(0.024) | -0.131***<br>(0.032) | -0.137***<br>(0.027) | -0.014<br>(0.016)                            | -0.001               | 0.011               | -0.037               |
| House in better condition than that of neighbors | 0.019 (0.013)          | 0.021 (0.026)        | 0.013 (0.027)        | 0.015 (0.016)        | -0.021 (0.015)                               | -0.055**<br>(0.022)  | 0.001 (0.025)       | -0.015 (0.025)       |
| House in poorer condition than that of neighbors | 0.041*                 | 0.031 (0.029)        | 0.009 (0.043)        | 0.056 (0.038)        | -0.005 (0.018)                               | -0.034 (0.039)       | -0.006 (0.024)      | 0.022 (0.023)        |
| Has secondary residence or other real estate     | -0.038***<br>(0.014)   | -0.062**<br>(0.025)  | -0.044*<br>(0.025)   | -0.017<br>(0.02)     | -0.034**<br>(0.016)                          | -0.087***            | -0.022 (0.026)      | -0.007<br>(0.022)    |
| Respondent reports savings                       | -0.016<br>(0.017)      | -0.025 (0.019)       | -0.032 (0.032)       | 0.003 (0.029)        | -0.005 (0.017)                               | -0.003 (0.032)       | -0.051*<br>(0.028)  | 0.043**<br>(0.021)   |
| Don't know/no answer on savings                  | -0.031 (0.037)         | -0.123***<br>(0.042) | 0.000 (0.058)        | 0.011 (0.089)        | -0.051 (0.039)                               | -0.058 (0.060)       | -0.042 (0.061)      | -0.044 (0.053)       |
| Capital city resident                            | -0.016 (0.035)         | -0.165***<br>(0.027) | 0.076**              | 0.004<br>(0.044)     | -0.045**<br>(0.018)                          | -0.107***            | 0.008 (0.024)       | -0.066***<br>(0.023) |
| High income                                      | 0.021 (0.019)          | -0.011<br>(0.037)    | 0.027                | 0.026                | 0.014 (0.022)                                | 0.029                | -0.039 (0.029)      | 0.059*               |
| Medium income                                    | 0.025                  | -0.032 (0.027)       | 0.039                | 0.054**              | -0.004 (0.016)                               | -0.016 (0.024)       | 0.000 (0.023)       | 0.002 (0.032)        |
| Don't know/no answer on income                   | 0.050***               | 0.073**<br>(0.034)   | 0.005 (0.032)        | 0.061**<br>-0.03     | -0.007 (0.030)                               | 0.067*               | -0.082**<br>(0.042) | 0.027 (0.037)        |
| 2-person household                               | 0.005 (0.022)          | 0.036 (0.035)        | 0.014 (0.037)        | -0.024<br>(0.036)    | 0.010 (0.019)                                | 0.017 (0.037)        | 0.006 (0.029)       | -0.001<br>(0.034)    |
| 3-plus-person household                          | -0.018 (0.024)         | -0.004 (0.043)       | 0.005 (0.040)        | -0.035<br>(0.035)    | 0.027 (0.021)                                | 0.005 (0.036)        | 0.016 (0.032)       | 0.048 (0.039)        |
| Country-fixed effects<br>Constant                | YES                    | YES                  | YES                  | YES                  | YES  | YES                  | YES                 | YES                  |
| Log likelihood                                   | -5,104.0               | -1,516.5             | -1,580.1             | -1,902.1             | -4,625.5                                     | -1,670.0             | -1,116.7            | -1,732.5             |
| Pseudo R squared                                 | 0.16                   | 0.13                 | 0.10                 | 0.16                 | 0.10   | 0.07                 | 0.08                | 0.11                 |
| Prob > Chi squared                               | 1,205.7                |                      |                      |                      | 2,027.3                                      |                      |                     |                      |
| Number of observations                           | 8,777                  | 2,667                | 2,702                | 3,404                | 8,411  | 2,656                | 2,619               | 3,132                |
| P(DepVar=1)                                      | 0.45                   | 0.36                 | 0.64                 | 0.38                 | 0.70   | 0.60                 | 0.82                | 0.69                 |

Source: Authors' calculations. OeNB Euro Survey 2018.

Note: Average marginal effects from probit estimations with country-fixed effects using data from the OeNB Euro Survey 2018; standard errors are adjusted for clustering at the regional level and reported in parentheses. \*\*\*, \*\*, \* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. For a definition of the variables, see annex table A1. P(DepVar=1) denotes the unconditional sample probability of the respective dependent variable. By construction, a positive (negative) average marginal effect implies that a respondent is more (less) likely to agree with the question underlying the dependent variable. Base categories are: preference for the opposition party, 35 to 54 years old, male, low educational attainment, employed, atheist/agnostic, main residence in a similar condition as neighboring homes, no savings, no secondary residence, not living in the capital city, low income, single household, Czech resident. The CESEE group comprises all ten OeNB Euro Survey countries. The second group consists of three Central and Eastern European countries that became EU members in 2004. The third country group consists of three Southeastern European countries that became EU members in 2007 and 2013, respectively. The final group consists of four EU candidates or potential candidates.

#### Probit estimations: public perception of public governance; in CESEE and per country group

|   | Most politicians are just concerned about the next elections |              |              |                 | The state is wasting taxpayer money |              |              |                 |
|---|--|--------------|--------------|-----------------|-------------------------------------|--------------|--------------|-----------------|
|   | CESEE  | CZ/HU/<br>PL | BG/HR/<br>RO | AL/BA/<br>MK/RS | CESEE                               | CZ/HU/<br>PL | BG/HR/<br>RO | AL/BA/<br>MK/RS |
|   | 9  | 10           | 11           | 12              | 13                                  | 14           | 15           | 16              |
| Experienced wage cuts (2008-2018)       | -0.010   | -0.046       | -0.016       | 0.008           | 0.044***                            | 0.024        | 0.014        | 0.078***        |
|   | (0.018)  | (0.032)      | (0.027)      | (0.028)         | (0.016)                             | (0.030)      | (0.030)      | (0.028)         |
| Had to cut back on consumption          | 0.105***   | 0.132***     | 0.067**      | 0.116***        | 0.080***                            | 0.094***     | 0.067**      | 0.077**         |
| (2008-2018)                             | (0.017)  | (0.026)      | (0.028)      | (0.030)         | (0.017)                             | (0.032)      | (0.028)      | (0.031)         |
| Public welfare benefits are currently   | -0.053***  | -0.084***    | 0.021        | -0.097***       | -0.031*                             | -0.051*      | 0.015        | -0.061**        |
| Important                               | (0.019)  | (0.024)      | (0.026)      | (0.030)         | (0.019)                             | (0.027)      | (0.032)      | (0.027)         |
| Received unemployment benefits          | -0.019   | 0.015        | 0.007        | -0.041          | -0.048**                            | -0.028       | -0.034       | -0.033          |
| (2008-2018)                             | (0.020)  | (0.035)      | (0.024)      | (0.032)         | (0.020)                             | (0.034)      | (0.028)      | (0.037)         |
| Public sector work experience           | 0.000  | 0.016        | -0.009       | -0.010          | -0.003                              | 0.047*       | -0.017       | -0.046**        |
| (2008-2018)                             | (0.016)  | (0.025)      | (0.027)      | (0.026)         | (0.015)                             | (0.025)      | (0.023)      | (0.022)         |
| Would vote for a ruling party           | -0.142***  | -0.134***    | -0.085**     | -0.202***       | -0.181***                           | -0.23/***    | -0.083***    | -0.220***       |
|   | (0.024)  | (0.036)      | (0.034)      | (0.039)         | (0.022)                             | (0.036)      | (0.028)      | (0.040)         |
| Would not vote                          | 0.027  | -0.009       | 0.069***     | -0.005          | 0.022                               | 0.052        | 0.054**      | -0.027          |
|   | (0.020)  | (0.031)      | (0.024)      | (0.041)         | (0.023)                             | (0.042)      | (0.024)      | (0.045)         |
| Don't know for whom to vote             | 0.04/*   | -0.007       | 0.098***     | 0.002           | 0.016                               | -0.023       | 0.064        | -0.039          |
|   | (0.024)  | (0.032)      | (0.031)      | (0.045)         | (0.028)                             | (0.040)      | (0.041)      | (0.041)         |
| Refused to reveal voting preference     | -0.009   | -0.031       | 0.073        | -0.0/2*         | -0.013                              | -0.002       | 0.065        | -0.091**        |
|   | (0.030)  | (0.049)      | (0.044)      | (0.042)         | (0.030)                             | (0.045)      | (0.044)      | (0.045)         |
| Aged 19 to 34 years                     | -0.020   | -0.03/*      | -0.015       | -0.007          | -0.028**                            | -0.080***    | -0.007       | -0.006          |
|   | (0.013)  | (0.021)      | (0.020)      | (0.022)         | (0.013)                             | (0.024)      | (0.020)      | (0.018)         |
| Aged 55+ years                          | 0.018  | 0.065**      | -0.003       | -0.003          | 0.002                               | -0.007       | -0.046*      | 0.048           |
|   | (0.015)  | (0.028)      | (0.026)      | (0.024)         | (0.021)                             | (0.044)      | (0.026)      | (0.032)         |
| Female                                  | -0.026***  | -0.005       | -0.03/***    | -0.03/*         | -0.013                              | 0.009        | -0.011       | -0.030          |
|   | (0.010)  | (0.020)      | (0.011)      | (0.020)         | (0.010)                             | (0.017)      | (0.013)      | (0.021)         |
| Education attainment: high              | -0.022   | 0.022        | -0.047       | -0.051          | -0.011                              | 0.060        | -0.069*      | -0.025          |
|   | (0.028)  | (0.049)      | (0.037)      | (0.049)         | (0.025)                             | (0.043)      | (0.039)      | (0.034)         |
| Education attainment: medium            | -0.03/*  | 0.009        | -0.072**     | -0.050          | -0.008                              | 0.063*       | -0.054       | -0.027          |
|   | (0.019)  | (0.039)      | (0.036)      | (0.030)         | (0.019)                             | (0.036)      | (0.036)      | (0.025)         |
| Self-employed                           | 0.042**  | 0.094**      | -0.010       | 0.011           | 0.023                               | 0.023        | -0.02/       | 0.069*          |
|   | (0.021)  | (0.037)      | (0.027)      | (0.032)         | (0.022)                             | (0.039)      | (0.026)      | (0.037)         |
| Unemployed                              | -0.005   | -0.012       | -0.037       | 0.008           | -0.008                              | -0.044       | -0.060*      | (0.014          |
|   | (0.021)  | (0.046)      | (0.026)      | (0.032)         | (0.020)                             | (0.046)      | (0.032)      | (0.027)         |
| Retired                                 | -0.002   | -0.002       | -0.024       | 0.005           | 0.013                               | 0.088**      | -0.008       | -0.035          |
| Chudaat                                 | (0.021)  | (0.040)      | (0.023)      | (0.034)         | (0.024)                             | (0.044)      | (0.036)      | (0.037)         |
| Sludeni                                 | -0.008   | 0.020        | -0.030       | -0.012          | (0.00)                              | 0.020        | -0.008       | (0.008          |
| Muslim                                  | (0.026)  | (0.047)      | (0.037)      | (0.046)         | (0.030)                             | (0.040)      | (0.032)      | (0.049)         |
| 1*iusiim                                | -0.012   | -0.341       | (0.037       | -0.101          | -0.00Z                              | 0.000        | -0.021       | (0.082          |
|   | (0.031)  | (0.177)      | (0.074)      | (0.036)         | (0.034)                             | (.)          | (0.067)      | (0.080)         |
| Orthodox Unristian                      | (0.056   | -0.033       | (0.063       | -0.000          | (0.049)                             | -0.103       | (0.031       | (0.0/0          |
| Cathalia Christian                      | 0.014  | 0.010        | (0.000)      | 0.044           | 0.025                               | 0.072)       | (0.070)      | 0.093)          |
| Catholic Unristian                      | (0.022)  | (0.010       | (0.077)      | -0.000          | -0.033                              | -0.023       | (0.095)      | (0.007          |
| Other Christian faith (a g Dratestart)  | 0.025  | 0.022)       | 0.077)       | 0.081           | 0.027)                              | 0.030)       | 0.066        | 0.007)          |
| Other Christian latin (e.g. Protestant) | (0.035)  | (0.041)      | (0.032       | (0.065)         | (0.024                              | (0.041)      | (0.096)      | (0.110)         |
|   | (0.055)  | (0.041)      | (0.070)      | (0.005)         | (0.050)                             | (0.041)      | (0.090)      | (0.110)         |

#### Source: Authors' calculations. OeNB Euro Survey 2018.

Note: Average marginal effects from probit estimations with country-fixed effects using data from the OeNB Euro Survey 2018; standard errors are adjusted for clustering at the regional level and reported in parentheses. \*\*\*, \*\*, \*\* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. For a definition of the variables, see annex table A1. P(DepVar=1) denotes the unconditional sample probability of the respective dependent variable. By construction, a positive (negative) average marginal effect implies that a respondent is more (less) likely to agree with the question underlying the dependent variable. Base categories are: preference for the opposition party, 35 to 54 years old, male, low educational attainment, employed, atheist/agnostic, main residence in a similar condition as neighboring homes, no savings, no secondary residence, not living in the capital city, low income, single household, Czech resident. The CESEE group comprises all ten OeNB Euro Survey countries. The second group consists of three Central and Eastern European countries that became EU members in 2004. The third country group consists of three Southeastern European countries that became EU members in 2007 and 2013, respectively. The final group consists of four EU candidates or potential candidates.

#### Probit estimations: public perception of public governance; in CESEE and per country group

|  | Most politicians are just concerned about the next elections |                     |                      |                     | The state is wasting taxpayer money |                      |                   |                      |
|--|--|---------------------|----------------------|---------------------|-------------------------------------|----------------------|-------------------|----------------------|
|  | CESEE  | CZ/HU/<br>PL        | BG/HR/<br>RO         | AL/BA/<br>MK/RS     | CESEE                               | CZ/HU/<br>PL         | BG/HR/<br>RO      | AL/BA/<br>MK/RS      |
|  | 9  | 10                  | 11                   | 12                  | 13                                  | 14                   | 15                | 16                   |
| Other faith groups (e.g. Jewish, Buddhist)       | -0.101<br>(0.096)  | -0.146<br>(0.144)   | -0.006<br>(0.158)    | -0.309**<br>(0.146) | -0.152<br>(0.094)                   | -0.203<br>(0.132)    | -0.163<br>(0.184) | -0.033<br>(0.186)    |
| Religion: no answer                              | -0.075*  | -0.121**            | 0.021                | -0.114              | -0.039                              | -0.119*<br>(0.071)   | -0.011            | 0.208                |
| Very interested in politics                      | -0.054**   | -0.074**            | -0.020               | -0.072*             | -0.044**                            | -0.070**             | 0.008             | -0.071**             |
| Satisfied with life as it is                     | -0.022<br>(0.020)  | -0.024<br>(0.031)   | 0.020) 0.021 (0.029) | -0.054<br>(0.034)   | -0.037**<br>(0.018)                 | -0.016<br>(0.024)    | -0.004<br>(0.031) | -0.079***<br>(0.030) |
| House in better condition than that of neighbors | -0.022<br>(0.014)  | -0.052**<br>(0.024) | -0.031<br>(0.020)    | 0.004 (0.022)       | -0.002<br>(0.015)                   | -0.009<br>(0.025)    | -0.008<br>(0.025) | 0.005<br>(0.021)     |
| House in poorer condition than that of neighbors | 0.002<br>(0.022)   | -0.040<br>(0.032)   | -0.015<br>(0.026)    | 0.042<br>(0.042)    | -0.003<br>(0.020)                   | 0.013<br>(0.027)     | -0.028<br>(0.037) | 0.006<br>(0.028)     |
| Has secondary residence or other real estate     | -0.036**<br>(0.015)  | -0.067**<br>(0.026) | -0.031<br>(0.023)    | -0.017<br>(0.023)   | -0.033**<br>(0.015)                 | -0.059***<br>(0.021) | -0.032<br>(0.032) | -0.016<br>(0.022)    |
| Respondent reports savings                       | -0.020 (0.015)   | -0.007 (0.022)      | -0.042 (0.028)       | -0.013<br>(0.021)   | -0.002 (0.015)                      | 0.009 (0.028)        | -0.031 (0.021)    | 0.015 (0.023)        |
| Don't know/no answer on savings                  | -0.049   | -0.032              | -0.043               | -0.102              | -0.031 (0.037)                      | -0.031<br>(0.061)    | -0.030            | -0.036               |
| Capital city resident                            | -0.047**   | -0.151***           | 0.003                | -0.035*             | -0.027                              | -0.094***            | 0.000             | -0.023               |
| High income                                      | 0.014  | 0.013               | -0.020<br>(0.023)    | 0.047               | 0.006                               | -0.005               | -0.042            | 0.064*               |
| Medium income                                    | 0.009  | -0.025              | 0.001                | 0.048*              | 0.014                               | -0.013               | 0.007             | 0.046*               |
| Don't know/no answer on income                   | 0.018  | 0.087*              | -0.052               | 0.048               | 0.019                               | 0.061 (0.041)        | -0.028            | 0.051                |
| 2-person household                               | 0.022  | 0.034               | 0.014 (0.023)        | 0.017               | 0.031 (0.020)                       | 0.059*               | 0.015             | 0.021 (0.041)        |
| 3-plus-person household                          | 0.035**  | 0.043               | 0.018                | 0.037               | 0.019                               | 0.026                | 0.002             | 0.022                |
| Country-fixed effects                            | YES  | YES                 | YES                  | YES                 | YES                                 | YES                  | YES               | YES                  |
| Constant   | YES  | YES                 | YES                  | YES                 | YES                                 | YES                  | YES               | YES                  |
| Log likelihood                                   | -4,607.0   | -1,653.9            | -1,119.4             | -1,730.3            | -4,848.1                            | -1,673.2             | -1,263.6          | -1,810.2             |
| Pseudo-R-squared                                 | 0.09   | 0.06                | 0.08                 | 0.12                | 0.09                                | 0.07                 | 0.06              | 0.10                 |
| Prob > Chi squared                               | 1,019.2  |                     |                      |                     | 1,012.4                             |                      |                   |                      |
| Number of observations                           | 8,414  | 2,650               | 2,617                | 3,147               | 8,329                               | 2,637                | 2,580             | 3,108                |
| P(DepVar=1)                                      | 0.71   | 0.62                | 0.83                 | 0.68                | 0.66                                | 0.57                 | 0.78              | 0.65                 |

Source: Authors' calculations. OeNB Euro Survey 2018.

Note: Average marginal effects from probit estimations with country-fixed effects using data from the OeNB Euro Survey 2018; standard errors are adjusted for clustering at the regional level and reported in parentheses. \*\*\*, \*\*, \* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. For a definition of the variables, see annex table A1. P(DepVar=1) denotes the unconditional sample probability of the respective dependent variable. By construction, a positive (negative) average marginal effect implies that a respondent is more (less) likely to agree with the question underlying the dependent variable. Base categories are: preference for the opposition party, 35 to 54 years old, male, low educational attainment, employed, atheist/agnostic, main residence in a similar condition as neighboring homes, no sacondary residence, not living in the capital city, low income, single household, Czech resident. The CESEE group comprises all ten OeNB Euro Survey countries. The second group consists of three Central and Eastern European countries that became EU members in 2004. The third country group consists of three Southeastern European countries that became EU members in 2007 and 2013, respectively. The final group consists of four EU candidates or potential candidates.

## Probit estimations: expectations of government-led job creation, subgroup of both beliefs; in CESEE and per country group

|                                       | Expecting jobs to be created primarily by government |              |              |                 | Distrusting government but expecting jobs to be created primarily by government |              |              |                 |
|---------------------------------------|--|--------------|--------------|-----------------|---|--------------|--------------|-----------------|
|                                       | CESEE  | CZ/HU/<br>PL | BG/HR/<br>RO | AL/BA/<br>MK/RS | CESEE   | CZ/HU/<br>PL | BG/HR/<br>RO | AL/BA/<br>MK/RS |
|                                       | 17   | 18           | 19           | 20              | 21  | 22           | 23           | 24              |
| Experienced wage cuts (2008-2018)     | -0.007   | -0.034       | 0.025        | -0.011          | 0.006   | -0.044*      | 0.017        | 0.011           |
|                                       | (0.024)  | (0.042)      | (0.041)      | (0.042)         | (0.019)   | (0.025)      | (0.037)      | (0.034)         |
| Had to cut back on consumption        | -0.014   | 0.003        | -0.021       | -0.019          | 0.037***  | 0.033**      | 0.034        | 0.047*          |
| (2008-2018)                           | (0.019)  | (0.027)      | (0.036)      | (0.026)         | (0.014)   | (0.016)      | (0.027)      | (0.026)         |
| Public welfare benefits are currently | 0.057***   | 0.03         | 0.026        | 0.093***        | -0.012  | -0.030*      | 0.004        | -0.001          |
| important                             | (0.02)   | (0.034)      | (0.025)      | (0.033)         | (0.015)   | (0.017)      | (0.026)      | (0.025)         |
| Received unemployment benefits        | -0.011   | -0.008       | -0.003       | -0.037          | -0.036**  | -0.024       | -0.026       | -0.027          |
| (2008-2018)                           | (0.023)  | (0.044)      | (0.04)       | (0.038)         | (0.018)   | (0.027)      | (0.033)      | (0.031)         |
| Public sector work experience         | 0.050**  | 0.100***     | 0.058*       | 0.004           | 0.025   | 0.031**      | 0.016        | 0.029           |
| (2008-2018)                           | (0.025)  | (0.035)      | (0.034)      | (0.037)         | (0.016)   | (0.015)      | (0.031)      | (0.030)         |
| Would vote for a ruling party         | 0.012  | 0.017        | -0.014       | 0.001           | -0.134***   | -0.131***    | -0.098***    | -0.162***       |
|                                       | (0.017)  | (0.033)      | (0.029)      | (0.031)         | (0.018)   | (0.024)      | (0.022)      | (0.040)         |
| Would not vote                        | 0.028  | 0.059        | 0.056**      | -0.002          | 0.017   | 0.033        | 0.071***     | -0.027          |
|                                       | (0.02)   | (0.037)      | (0.024)      | (0.036)         | (0.020)   | (0.028)      | (0.022)      | (0.045)         |
| Don't know for whom to vote           | 0.031  | -0.047       | 0.091**      | 0.024           | -0.021  | -0.058*      | 0.041        | -0.056          |
|                                       | (0.027)  | (0.033)      | (0.042)      | (0.057)         | (0.026)   | (0.030)      | (0.030)      | (0.060)         |
| Refused to reveal voting preference   | 0.022  | -0.094*      | 0.112***     | 0.009           | -0.051**  | -0.051       | 0.040        | -0.109**        |
|                                       | (0.027)  | (0.055)      | (0.037)      | (0.041)         | (0.026)   | (0.040)      | (0.040)      | (0.045)         |
| Aged 19 to 34 years                   | -0.016   | -0.057***    | 0.042**      | -0.035          | 0.015   | -0.048***    | 0.055**      | 0.033           |
|                                       | (0.013)  | (0.019)      | (0.018)      | (0.021)         | (0.012)   | (0.017)      | (0.024)      | (0.020)         |
| Aged 55+ years                        | 0.001  | -0.01        | -0.018       | 0.024           | -0.004  | -0.026       | -0.024       | 0.036           |
|                                       | (0.016)  | (0.027)      | (0.031)      | (0.027)         | (0.014)   | (0.019)      | (0.025)      | (0.022)         |
| Female                                | 0.007  | -0.003       | 0.007        | 0.012           | -0.005  | -0.019       | 0.002        | -0.000          |
|                                       | (0.012)  | (0.02)       | (0.022)      | (0.023)         | (0.010)   | (0.015)      | (0.019)      | (0.019)         |
| Education attainment: high            | -0.071**   | -0.116***    | -0.123*      | -0.027          | -0.030  | -0.025       | -0.028       | -0.047          |
|                                       | (0.033)  | (0.04)       | (0.066)      | (0.048)         | (0.021)   | (0.036)      | (0.040)      | (0.034)         |
| Education attainment: medium          | -0.044**   | -0.051*      | -0.093**     | -0.011          | -0.011  | -0.009       | -0.025       | 0.003           |
|                                       | (0.02)   | (0.029)      | (0.04)       | (0.03)          | (0.016)   | (0.029)      | (0.030)      | (0.022)         |
| Self-employed                         | -0.052*  | -0.06        | 0.033        | -0.089**        | -0.035*   | -0.006       | -0.035       | -0.065*         |
|                                       | (0.027)  | (0.044)      | (0.038)      | (0.043)         | (0.019)   | (0.025)      | (0.031)      | (0.035)         |
| Unemployed                            | 0.028  | 0.080*       | -0.016       | 0.034           | 0.005   | 0.066**      | -0.037       | 0.007           |
|                                       | (0.022)  | (0.048)      | (0.041)      | (0.029)         | (0.017)   | (0.027)      | (0.034)      | (0.027)         |
| Retired                               | 0.01   | 0.028        | 0.024        | -0.007          | 0.009   | 0.045        | 0.007        | -0.016          |
|                                       | (0.023)  | (0.04)       | (0.04)       | (0.038)         | (0.021)   | (0.028)      | (0.035)      | (0.034)         |
| Student                               | -0.045*  | -0.086       | -0.035       | -0.02           | -0.039  | -0.006       | -0.038       | -0.056          |
|                                       | (0.027)  | (0.057)      | (0.043)      | (0.045)         | (0.024)   | (0.043)      | (0.040)      | (0.041)         |
| Muslim                                | 0.064  | -0.018       | 0.005        | 0.098           | 0.073*  | 0.000        | 0.016        | -0.173**        |
|                                       | (0.054)  | (0.245)      | (0.072)      | (0.082)         | (0.042)   | (.)          | (0.049)      | (0.078)         |
| Orthodox Christian                    | -0.018   | 0.042        | -0.008       | -0.028          | 0.023   | 0.001        | 0.064*       | -0.236***       |
|                                       | (0.047)  | (0.089)      | (0.063)      | (0.081)         | (0.031)   | (0.042)      | (0.036)      | (0.088)         |
| Catholic Christian                    | 0.099**  | 0.078        | 0.135**      | 0.159           | 0.029   | 0.024        | 0.135***     | -0.321***       |
|                                       | (0.038)  | (0.05)       | (0.067)      | (0.115)         | (0.021)   | (0.020)      | (0.028)      | (0.080)         |

Source: Authors' calculations. OeNB Euro Survey 2018.

Note: Average marginal effects from probit estimations with country-fixed effects using data from the OeNB Euro Survey 2018; standard errors are adjusted for clustering at the regional level and reported in parentheses. \*\*\*, \*\*, \*\* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. For a definition of the variables, see annex table A1. P(DepVar=1) denotes the unconditional sample probability of the respective dependent variable. By construction, a positive (negative) average marginal effect implies that a respondent is more (less) likely to agree with the question underlying the dependent variable. Base categories are: preference for the opposition party, 35 to 54 years old, male, low educational attainment, employed, atheist/agnostic, main residence in a similar condition as neighboring homes, no savings, no secondary residence, not living in the capital city, low income, single household, Czech resident. The CESEE group comprises all ten OeNB Euro Survey countries. The second group consists of three Central and Eastern European countries that became EU members in 2004. The third country group consists of three Southeastern European countries that became EU members in 2007 and 2013, respectively. The final group consists of four EU candidates or potential candidates.

## Probit estimations: expectations of government-led job creation, subgroup of both beliefs; in CESEE and per country group

|  | Expecting jobs to be created primarily by government |                      |                     |                      | Distrusting government but expecting jobs to be created primarily by government |                      |                      |                      |
|--|--|----------------------|---------------------|----------------------|---|----------------------|----------------------|----------------------|
|  | CESEE  | CZ/HU/<br>PL         | BG/HR/<br>RO        | AL/BA/<br>MK/RS      | CESEE   | CZ/HU/<br>PL         | BG/HR/<br>RO         | AL/BA/<br>MK/RS      |
|  | 17   | 18                   | 19                  | 20                   | 21  | 22                   | 23                   | 24                   |
| Other Christian faith (e.g. Protestant)          | -0.018<br>(0.069)                                    | 0.036                | 0.12 (0.153)        | -0.388***<br>(0.076) | -0.027<br>(0.039)   | -0.023<br>(0.032)    | 0.155                | -0.410***<br>(0.084) |
| Other faith groups (e.g. Jewish, Buddhist)       | 0.124  | 0.005                | -0.03<br>(0.114)    | 0.372***             | 0.119   | -0.075               | -0.013<br>(0.074)    | 0.343***             |
| Religion: no answer                              | 0.03   | 0.025                | 0.001               | 0.129                | 0.013   | -0.021               | -0.012               | 0.027                |
| Very interested in politics                      | -0.044***  | -0.05                | -0.003              | -0.058***            | -0.026**<br>(0.012)   | 0.012                | -0.029               | -0.049***<br>(0.017) |
| Satisfied with life as it is                     | -0.008   | -0.009               | -0.056**<br>(0.025) | 0.019                | -0.082***<br>(0.012)  | -0.065***<br>(0.015) | -0.088***<br>(0.022) | -0.088***<br>(0.021) |
| House in better condition than that of neighbors | 0.011<br>(0.02)                                      | -0.035<br>(0.035)    | 0.089***            | -0.006<br>(0.029)    | 0.030**   | 0.010                | 0.069***             | 0.013                |
| House in poorer condition than that of neighbors | -0.018<br>(0.022)                                    | -0.009 (0.03)        | 0.041 (0.052)       | -0.049*<br>(0.029)   | 0.010 (0.016)   | -0.021<br>(0.018)    | 0.022 (0.038)        | 0.022 (0.024)        |
| Has secondary residence or other real estate     | -0.039**<br>(0.019)                                  | -0.055*<br>(0.031)   | -0.026<br>(0.023)   | -0.047<br>(0.035)    | -0.028**<br>(0.012)   | -0.065***<br>(0.024) | -0.016<br>(0.020)    | -0.020<br>(0.018)    |
| Respondent reports savings                       | -0.059***<br>(0.017)                                 | -0.062**<br>(0.031)  | -0.017<br>(0.021)   | -0.067**<br>(0.028)  | -0.016<br>(0.012)   | -0.033<br>(0.020)    | -0.011<br>(0.018)    | 0.007 (0.022)        |
| Don't know/no answer on savings                  | -0.014<br>(0.043)                                    | 0.092<br>(0.079)     | -0.016<br>(0.058)   | -0.131**<br>(0.058)  | -0.024<br>(0.035)   | -0.001<br>(0.049)    | 0.003<br>(0.075)     | -0.106***<br>(0.032) |
| Capital city resident                            | -0.085*<br>(0.046)                                   | 0.044<br>(0.037)     | -0.04<br>(0.031)    | -0.183***<br>(0.055) | -0.050**<br>(0.024)   | -0.041**<br>(0.018)  | 0.009<br>(0.023)     | -0.097**<br>(0.040)  |
| High income                                      | -0.070***<br>(0.024)                                 | -0.127***<br>(0.035) | -0.067<br>(0.041)   | -0.026<br>(0.045)    | -0.046***<br>(0.015)  | -0.075***<br>(0.023) | -0.064*<br>(0.034)   | -0.020<br>(0.019)    |
| Medium income                                    | -0.047**<br>(0.022)                                  | -0.086**<br>(0.036)  | -0.069*<br>(0.04)   | -0.006<br>(0.037)    | -0.023<br>(0.018)   | -0.063***<br>(0.022) | -0.042<br>(0.035)    | 0.016 (0.027)        |
| Don't know/no answer on income                   | 0.021<br>(0.024)                                     | 0.070*<br>(0.042)    | 0.005<br>(0.042)    | 0.018<br>(0.04)      | 0.028*<br>(0.016)   | 0.055***<br>(0.021)  | 0.006<br>(0.032)     | 0.024<br>(0.024)     |
| 2-person household                               | 0.005<br>(0.02)                                      | 0.058*<br>(0.031)    | -0.049**<br>(0.024) | 0.031<br>(0.042)     | 0.009<br>(0.018)  | 0.035<br>(0.023)     | -0.010<br>(0.029)    | 0.013<br>(0.037)     |
| 3-plus-person household                          | 0.012<br>(0.024)                                     | 0.107***<br>(0.029)  | -0.054*<br>(0.029)  | 0.004<br>(0.046)     | 0.002<br>(0.018)  | 0.029<br>(0.020)     | -0.025<br>(0.031)    | 0.013<br>(0.033)     |
| Country-fixed effects                            | YES  | YES                  | YES                 | YES                  | YES   | YES                  | YES                  | YES                  |
| Constant   | YES  | YES                  | YES                 | YES                  | YES   | YES                  | YES                  | YES                  |
| Log likelihood                                   | -5,574.1   | -1,669.2             | -1,623.0            | -2,151.1             | -3,949.5  | -950.1               | -1,348.0             | -1,534.7             |
| Pseudo-R-squared                                 | 0.08   | 0.07                 | 0.09                | 0.08                 | 0.10  | 0.13                 | 0.09                 | 0.14                 |
| Prob > Chi squared                               | 749.7  |                      |                     |                      | 2,373.3   |                      |                      |                      |
| Number of observations                           | 8,804  | 2,674                | 2,703               | 3,427                | 8,706   | 2,636                | 2,676                | 3,390                |
| P(DepVar=1)                                      | 0.45   | 0.39                 | 0.37                | 0.56                 | 0.20  | 0.15                 | 0.24                 | 0.22                 |

Source: Authors' calculations. OeNB Euro Survey 2018.

Note: Average marginal effects from probit estimations with country-fixed effects using data from the OeNB Euro Survey 2018; standard errors are adjusted for clustering at the regional level and reported in parentheses. \*\*\*, \*\*, \* denote that the average marginal effect is statistically different from zero at the 1%, 5% and 10% level, respectively. For a definition of the variables, see annex table A1. P(DepVar=1) denotes the unconditional sample probability of the respective dependent variable. By construction, a positive (negative) average marginal effect implies that a respondent is more (less) likely to agree with the question underlying the dependent variable. Base categories are: preference for the opposition party, 35 to 54 years old, male, low educational attainment, employed, atheist/agnostic, main residence in a similar condition as neighboring homes, no savings, no secondary residence, not living in the capital city, low income, single household, Czech resident. The CESEE group comprises all ten OeNB Euro Survey countries. The second group consists of three Central and Eastern European countries that became EU members in 2004. The third country group consists of three Southeastern European countries that became EU members in 2007 and 2013, respectively. The final group consists of four EU candidates or potential candidates.

Chart A1



## Detailed country-specific responses to the main survey questions of interest

Who should be responsible for the following tasks? Job creation

Source: OeNB Euro Survey 2018.

Note: Weighted percentages; weights are calibrated on census population statistics for age, gender, region and, where available, on education and ethnicity (separately for each country). Entries for CESEE are unconditional averages across all observations using individual weights not adjusted for population size.



Source: OeNB Euro Survey.

Note: Respondents were asked to express their trust in government on a scale from 1 (I trust completely) to 5 (I don't trust at all). The weighted values represent the share of respondents who picked "somewhat trust" or "trust completely." Excluding respondents with "don't know" answers or no answers. Weights are calibrated on census population statistics for age, gender, region, and, where available, education and ethnicity (separately for each country).

## CESEE-related abstracts from other OeNB publications

The abstracts below alert readers to studies on CESEE topics in other OeNB publications. Please see *www.oenb.at* for the full-length versions of these studies.

#### Austrian banks' expansion to Central, Eastern and Southeastern Europe Milestones – review and outlook

#### Stefan Kavan, Tina Wittenberger

Austria's largest banks jumped at the chance of expanding their low-margin domestic operations by entering Central, Eastern and Southeastern European (CESEE) markets soon after the fall of the Iron Curtain. By establishing new banks and/or acquiring stakes in existing banks, they were able to rapidly gain a foothold in the region and benefit from the reform mood and growth momentum fueled by the prospect of potential EU membership for CESEE economies. Dynamic loan growth generated high profits, but the rapid expansion was not without downsides. Much of the lending occurred in foreign currencies and was refinanced by the parent banks. The underlying risks materialized when the global financial and economic crisis emerged in 2008 and drove up costs, thus leading to a period of consolidation in the banking industry. Macroprudential measures designed to mitigate risks to financial stability were an important lesson learned by banking supervisors from the crisis, and Austria was no exception in this respect. With the economy recovering, the past few years have been characterized by an enhanced ability of clients to pay back their loans. However, the good profits have also been supported by re-accelerating credit growth, which has created new systemic challenges and necessitated macroprudential measures in some CESEE countries. The economic catching-up process in Austrian banks' enlarged home market continues to provide the potential for significant growth and profits. At the time of writing, profit conditions and loan portfolio quality were good. Yet, the long recovery driven by credit growth and the recent weakening of the economy also come with numerous challenges, which the banks in question and banking supervisors will have to address.

Published in Monetary Policy & the Economy Q1–Q2/20.

## Mapping financial vulnerability in CESEE: understanding risk-bearing capacities of households is key in times of crisis

#### Nicolas Albacete, Pirmin Fessler, Maximilian Propst

A crisis of the real economy — like the current crisis caused by the coronavirus pandemic — and the countermeasures taken by countries worldwide can lead to a severe financial crisis if the ability of debtors to pay back their debt is questionable. Necessary support and the costs involved in providing it directly depends on the financial buffer households have and their general risk-bearing capacity. It is crucial to understand both to be able to anticipate potential problems and prepare for mitigating their impact. Policies designed to mitigate the effects of income losses could benefit greatly from better knowledge of the exact nature of the nonlinearities involved. We analyze newly available micro data on households' balance sheets to examine financial vulnerability in Central, Eastern and Southeastern European (CESEE) countries and Austria. As Austrian banks have a high and increasing exposure in the region, households' risk-bearing capacities in CESEE are an important factor in determining credit risks of the banking sector in Austria. The Household Finance and Consumption Survey (HFCS) allows us to study the general indebtedness of households as well as borrower-level vulnerability in eight CESEE countries and compare them to Austria. While the share of households owning their homes is comparably large in these countries, the share of households holding mortgage debt is not particularly large. Uncollateralized debt levels, by contrast, vary greatly across the region, and some of the countries show rather high levels of loan-tovalue ratios, which point to more generous credit standards in mortgage lending. Subtracting the assets of vulnerable households from their debt reveals that the levels of potential losses for banks are generally low. Furthermore, we use a machine learning approach to reweight the data, thereby decomposing the observed differences between CESEE and Austria into one part that can be explained by observable household characteristics and a remainder which might be linked to banks' different treatment of similar clients in different countries.

Published in Financial Stability Report 39.