Enterprise performance and SME policies in the Eastern Partner countries and peer regions

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ACRONYMS AND ABBREVIATIONS

BEEPS	Business Environment and Enterprise Performance Survey
EaP	Eastern Partner
EBRD	European Bank for Reconstruction and Development
EU	European Union
EU-PA	EU pre-accession
EU-10	New EU members
CDM	Crépon, Duguet and Mairesse
GDP	Gross domestic product
ICE	Italian Foreign Trade Institute
OLS	Ordinary least squares
R&D	Research and development
SBA	Small Business Act for Europe
SMEs	Small and medium-sized enterprises
3SLS	Three-stage least squares

EXECUTIVE SUMMARY

The countries of the Eastern partner region – Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine – are working to strengthen their competitiveness, diversify economic activity, and progressively open up their economies to trade and investment opportunities. As major contributors to job creation and inclusive growth, small and medium-sized enterprises (SMEs) represent a vital component of this reform agenda. SME potential is underexploited in the Eastern partner region, where SMEs account for half of employment and one-third of value added, compared to approximately 60-70% of employment and 60% of value added among OECD member countries.

In 2014-15, the countries of the region underwent a second Small Business Act for Europe (SBA) assessment, which resulted in the publication of the *SME Policy Index: Eastern Partner Countries 2016* (OECD, 2015a). The assessment revealed progress in SME reforms. Many of the recommendations made in 2012 had been implemented, and there were substantial improvements in the business environment for SMEs. However, more work remains to be done to ensure that policy reforms lead to tangible improvements in firm performance.

This paper attempts to provide further guidance to policy makers by exploring the relationship between policy settings and SME performance in the areas of access to finance, innovation and internationalisation. Using the Business Environment and Enterprise Performance Survey (BEEPS) dataset from the European Bank for Reconstruction and Development and the World Bank, and established econometric models commonly used in the literature, we carry out two types of analysis. For each topic, we first analyse SME performance in the Eastern partner region, comparing across time and benchmarking against the EU pre-accession countries and ten new EU members. We then adapt established econometric models, introducing scores from the relevant dimensions of the SME Policy Index 2012 assessment, to assess the impact of SME policy on firm performance indicators.

Our findings indicate that SMEs in the Eastern partner region underperform compared to their peers in other regions. In particular, Eastern partner SMEs are less likely to invest in research and development (R&D), less likely to report innovation activity, less likely to have access to loans, and less likely export than SMEs in the EU pre-accession countries and new EU members. When we examine the determinants of firm performance, we find that in each case firm size is a core determinant, reaffirming the conventional theory that SMEs are more likely to face barriers when accessing finance, innovating and internationalising, often due to lack of skills, resources and information. We also find a strong link between the various policy areas, with SMEs that have access to finance being more likely to export and exporting SMEs being more likely to invest in R&D.

Finally, SME Policy Index scores are found to be positively associated with firm performance in each of the three areas, and an increase in scores is correlated with an increased likelihood to access loans, to spend on R&D, and to export. All in all, these findings reveal that improvements in the policy environment do play a role in shaping firm performance. They emphasise the importance of continued SME policy development in the Eastern partner region and beyond, as well as the need to design measures which are coherent across policy domains, and to exploit the potential synergies between them.

INTRODUCTION

The Eastern partner countries (Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine) are in a process of economic transformation, moving from a centralised model towards a more diversified, open economic structure. Furthermore, the region is struggling with serious economic challenges as a result of lower commodity prices and weaker demand in major export markets. All six are striving to strengthen competitiveness, diversify their economies, boost growth and increase resilience against these external shocks.

Small and medium-sized enterprises (SMEs) play an integral role in all economies and are major contributors to sustainable and inclusive growth and job creation. They account for 60-70% of employment and generate more than 60% of total value added in OECD countries. However, SMEs face challenges along a number of dimensions – such as access to finance, skills, innovative capacity, and opportunities for internationalisation – which inhibit their growth and contribution to economic development.

SMEs are a fundamental component of the Eastern partner (EaP) region's reform agenda. Yet while SMEs comprise between 83 and 99% of all firms in the EaP, they account for only about half of employment and one-third of value added. Moreover, the vast majority of SMEs in the partner countries are subsistence-based micro-enterprises in low-added-value sectors, such as agriculture and retail. There is a dearth of dynamic and innovative SMEs with high growth potential. Designing and implementing effective policies to fully exploit the potential of SMEs is a crucial step in building more inclusive and resilient economies in the Eastern Partner region.

In 2014-15, the countries of the region underwent a second Small Business Act for Europe (SBA) assessment, which resulted in the publication of the *SME Policy Index: Eastern Partner Countries 2016* (OECD, 2015a). It assesses the progress of SME policies in all six EaP countries towards the ten principles of the SBA. It identifies strengths and weaknesses in SME policies, compares performance across countries and policy areas, and suggests country-specific roadmaps for policy reform.

The 2016 assessment reveals progress across the Eastern partner region in SME policy development, although this progress is uneven across countries and policy areas. Many of the recommendations made in 2012 have been implemented. The countries have made significant progress in the overall implementation of business environment reforms, which are a necessary step towards a level playing field for all businesses. Moreover, greater attention is being given to the institutional aspects of SME policy making, with a clear drive towards introducing medium-term SME strategies and setting up dedicated agencies. However, the assessment finds that targeted support measures are still needed to enhance SME competitiveness, innovation and internationalisation. While there are some existing support measures in place, they are often rather limited in scope and implementation.

However, while the 2016 SBA assessment provides useful insight into the progress in introducing targeted SME policies, it does not analyse SME performance. It is important to understand SME performance for two reasons. First, it enables us to evaluate the extent to which policies have succeeded in stimulating SME growth and increasing the economic contribution of SMEs. Second, it allows us to assess the effect of other macro- and micro-level factors in determining SME performance.

This paper attempts to bridge the gap between policy and performance in two ways. First, our analysis benchmarks SME performance indicators within the EaP region and against the EU pre-accession (EU-PA) countries and new EU members (EU-10).[1] Second, it attempts to draw a link between policy and performance to measure the impact of policies. In doing so, it aims to assess the relevance of the SME Policy Index (see Box A.1, Annex A for overview and methodology), solidify its analytical underpinnings, and further understand where and when the introduction of targeted SME support measures and instruments could improve SME performance.

This is a cross-sectional exercise exploiting cross-country variations in the scores of selected SME Policy Index dimensions and micro-level firm performance variables. As such, it does not shed a light on whether improvements in SME policy development result in improvements in SME performance on a within country basis – our analysis uses the BEEPS V, which was carried out in 2013 in Eastern Europe and Central Asia, and therefore captures the SMEs' situation in the period immediately following the 2012 SBA assessment. As with any cross-country cross-sectional exercise, it is difficult to account fully for all of the macroeconomic and country-level factors that affect SME performance, and although country fixed effects and macroeconomic indicators, such as GDP, have been integrated into the models, the results must nevertheless be interpreted with some caution. One potential avenue to extend the work in the future as another round of BEEPS becomes available will be to draw correlations between the changes in SME Policy Index scores (between the 2012 and 2016 assessments) with the changes in performance variables, which would allow for controlling of country-specific factors. The paper does not provide a basis for any conclusions with regards to the effectiveness of one form of support measure over another – given the specificities of each country and support programme, this would be better analysed on a within-country basis, potentially relying on programme evaluation methods.

It is also worth noting that the paper uses the term "performance" in a broad sense, going beyond overall performance indicators such as productivity to reflect how firms perform in the different policy areas covered by the SME Policy Index. Of particular importance is the distinction between the topic of access to finance, and the topics of internationalisation and innovation. While innovation and internationalisation are performance areas in their own right, in addition to their contribution to firm productivity, access to finance is an input into firm performance, as it allows firms to invest, grow and export. Hence, the paper attempts to assess both direct and indirect indicators of firm performance.

Benchmarking SME performance: Data and methodology

The primary challenge of benchmarking SME performance in the EaP region is data availability and consistency. In EU and OECD countries, the *Eurostat-OECD Manual on Business Demography Statistics* provides a common methodological framework for business demography statistics that maximises their international comparability and relevance, recognising and addressing the different conditions and legal frameworks that govern the production of business statistics at the national level (OECD and Eurostat, 2008). Nevertheless, there are major problems with the quality and availability of statistical data on SMEs in the EaP. Although all countries collect structural business statistics by size class, in some cases important variables – such as contribution to gross domestic product (GDP), value added and exports – are missing. Moreover, micro-enterprises are not included in Azerbaijan and Georgia, given their respective SME definitions, and official statistics in Armenia do not offer a breakdown by size. Detailed business

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1.   The EU-PA region covers Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, FYR Montenegro, Serbia and Turkey. The EU-10 region covers Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia. Croatia is considered an EU pre-accession country for the purposes of the paper as both the policy and performance data were collected prior to Croatia's accession to the EU.

demography data (including birth, death, churn and survival rates) are collected only in Armenia, Azerbaijan and Moldova (OECD, 2015a).

The problem is further compounded by differences in the definition of SMEs both within and across countries. Ukraine (2012), Moldova (since 2006) and Armenia (since 2011) are fully aligned with European Union (EU) criteria in their SME definitions.[2] Meanwhile, Georgia has two separate SME definitions, one in law and another in the tax code, neither of which is consistent with EU criteria; and Belarus relies on a single employment criterion. Azerbaijan held separate SME definitions by sector until June 2015, when a single consistent definition was introduced. However, the employment criterion continues to be in conflict with the thresholds for simplified taxation, and micro-enterprises are not recognised.

Lack of harmonisation in SME definitions and inadequate and inconsistent data collection pose a significant challenge, not only to regional benchmarking, but also to analysing SME performance in each country. Furthermore, while the EU SBA factsheets benchmark SME performance across the 28 EU countries using a combination of Eurostat and Eurobarometer data, equivalent data are not available in the EaP.

Given these data constraints, this paper relies on the Business Environment and Enterprise Performance Survey (BEEPS). BEEPS is a joint initiative of the European Bank for Reconstruction and Development and the World Bank. It is a cross-sectional firm-level survey of micro, small, medium-sized, and large enterprises, whose objective is to gauge firms' perceptions of their business environment. BEEPS covers a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures, and is conducted in 30 countries in Eastern Europe, Central Asia, Middle East and North Africa, and Russia (see also Box A.2, Annex A). To date, five rounds of the exercise have been carried out, the fourth round taking place in 2009 and the fifth in 2013.

The BEEPS dataset has the advantage of providing a consistent definition and methodology across the countries of Eastern Europe, allowing for benchmarking across countries. Moreover, it provides a source of firm-level data that can be utilised for econometric analysis. Nevertheless, the dataset does also present some shortcomings. The size of the sample per country is relatively small (1002 for Ukraine and 360 for the other five EaP countries), particularly once it is broken down by size and sector, making it difficult, for example, to draw conclusions by country-size-sector groups[3]. Furthermore, since this is not population data, the ability to draw conclusions on a cross-country level is limited by the extent to which the samples are representative of the firms in the countries and sectors they represent (see also Box A.2, Annex A for more details on the sampling)[4]. Another limitation is the fact that the BEEPS survey is conducted on formally registered companies, and cannot account for the performance of SMEs in the informal economy, which continues to account for a sizeable portion of GDP in the EaP region.

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2.   According to the EU definition, SMEs are defined as enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

3 .   Even "horizontal" policies may have heterogeneous effects on firms depending on their sector of operation. For example, Calvino, Criscuolo and Menon (2016), find that start-ups in volatile sectors and in sectors that exhibit higher growth dispersion are significantly more exposed to national policies and framework conditions.

4 .   Inverse probability weightings have been used in the case of descriptive statistics to provide population estimates.

We focus our analysis on three areas: access to finance, innovation and internationalisation. These correspond to four dimensions of the SME Policy Index and the relevant SBA principles:

- Dimension 6: Access to finance for SMEs (Small Business Act Principle 6)

- Dimension 7: Standards and technical regulations (Small Business Act Principle 7)

- Dimension 8b: Innovation policy for SMEs (Small Business Act Principle 8)

- Dimension 10: Internationalisation of SMEs (Small Business Act Principle 10).

These represent areas where the policy development and targeted support for SMEs in the EaP region remain relatively weak, and the BEEPS dataset contains questions that shed light on the performance of SMEs. In each area, the SME Policy Index assesses the level of policy development on a scale of 1-5, with 1 being the weakest and 5 being the strongest level (see also Annex A for a breakdown of the indicators and an overview of the SME Policy Index methodology).

For the purposes of this analysis, we adopt the SME definition used in the BEEPS survey (see Box A.2, Annex A). Consequently, we rely solely on the employment criterion and categorise firms as follows:

- micro: fewer than 5 employees

- small: 5-19 employees

- medium-sized: 20-99 employees

- large: more than 100 employees.

We carry out two types of analysis. In each section, we first benchmark SME performance using selected indicators from the BEEPS questionnaire, identifying trends over time and variations across countries, and comparing EaP countries with the EU-PA and EU-10 regions. We then adapt established econometric models commonly used in the literature to explore correlations between firm performance and the policy environment. In each case, we introduce scores from the relevant dimensions of the SME Policy Index 2012 assessment as a proxy for SME policy development in the respective policy area. We carry out cross-sectional analysis using the BEEPS V, which was carried out in 2013 in Eastern Europe and Central Asia. Other policy environment variables, such as the World Bank Doing Business and OECD Trade Facilitation Indicators, are also tested for comparison and robustness. While establishing a causal link between policies and performance is a challenging prospect, and results must be interpreted with some caution, our analysis provides some initial evidence of a correlation between targeted policies and enterprise performance.

SME ACCESS TO FINANCE

Introduction

Access to finance is widely considered to be one of the greatest constraints to private sector development, particularly in emerging economies (Beck and Demirguc-Kunt, 2006). Research conducted using firm-level surveys indicates that financing constraints are binding, particularly for smaller firms, which benefit disproportionately from improved functioning of the financial sector (Beck, Demirguc-Kunt and Maksimovic, 2005; Beck et al., 2006). The impact of better access to finance on firm performance acts through a number of channels. Access to finance aids firm entry into the market, promoting more start-ups (Klapper, Laeven and Rajan, 2006). For existing SMEs, improved financial development results in higher growth rates (Beck, Demirguc-Kunt and Maksimovic, 2005) and increased propensity to innovate (Ayyagari, Demirguc-Kunt and Maksimovic, 2007). Maksimovic, Ayyagari and Demirguc-Kunt (2006) also find that finance is the most robust variable affecting firms' growth rates.

External financing poses a problem for SMEs for several reasons. Information asymmetries prevent lenders from accurately evaluating the credit-worthiness of firms, and lenders are unable to respond through an increased risk premium, as it would increase the probability of attracting riskier borrowers or encourage firms to undertake riskier investments (Stiglitz and Weiss, 1981). SMEs are more susceptible to asymmetric information and agency problems, as they often lack accurate and detailed credit histories and they are less able to offer collateral as a means to compensate for risk. Furthermore, the administrative costs of lending are fixed, making larger loans cheaper than smaller ones (Wagenvoort, 2003).

These micro factors constraining external financing are further compounded by macro-level rigidities in the financial and regulatory environment. Weak property rights or inefficient insolvency procedures can increase the risk of lending to SMEs, for example, by making the enforcement of collateral difficult in case of default. Undeveloped financial markets, lack of competition among lenders, and dominance of state-owned banks which lend to priority sectors all contribute to reduced bank lending to SMEs.

Beck, Deminguc–Kunt and Maksimovic (2008), using the World Business Environment Survey, find that small firms in countries with weak protection of property rights use less external finance, specifically bank finance. Moreover, their findings indicate that SMEs do not rely more on alternative financing such as leasing, trade finance, supplier credit or development banks, indicating they rely more on internal funds and informal sources. These findings illustrate the limits of SMEs' ability to compensate for weak financial and legal systems.

There are a number of possible policy interventions to address market failures which reduce access to finance for SMEs (see Box 1). These can be a mix of horizontal measures to strengthen the legal and regulatory framework for finance, and targeted schemes to support SME access to finance. For example, a well-functioning cadastre, as well as a system to register security interests over movable assets, facilitates taking collateral, while a legal framework that allows creditors to enforce this collateral in an efficient way helps to stimulate bank lending. In addition to establishing an adequate legal and regulatory framework for secured transactions, government policies can help mitigate lending risks through various channels. For example, credit guarantees can help increase banks' risk appetite and alleviate collateral constraints for SMEs. Information asymmetries between creditor and borrower can be reduced by establishing comprehensive and reliable credit information systems (OECD, 2015a).

Governments can also facilitate the development of alternative modes of financing – such as micro-finance, leasing and factoring – by creating adequate legal frameworks and supervisory mechanisms, and by helping to raise awareness of the range of financing options available to SMEs. Non-bank sources of financing can play an important role in complementing bank financing and offering alternatives to SMEs. Leasing, for example, can help SMEs modernise equipment while enabling them to overcome collateral constraints that they face with banks. Micro-finance institutions, too, can play an important role in offering financial products and services outside of traditional bank financing, tailored to the needs to SMEs. Moreover, factoring services can provide SMEs with working capital financing without imposing additional liabilities on borrowers' balance sheets (OECD, 2015a).

Access to finance remains one of the key challenges for businesses operating in the EaP countries and is perceived as the most or second most important obstacle to doing business by companies in Armenia, Azerbaijan and Belarus, according to the BEEPS V. Given the challenges faced by the EaP region, policies that facilitate SME access to finance are as crucial as ever. Bank lending remains the main source of finance for SMEs across the region, although the global financial and economic crisis has seen lending generally tighten. Alternative sources of financing, such as leasing, factoring and venture capital, remain limited, while micro-financing is the most common non-bank option in many countries (OECD, 2015a). Protection of creditor rights as an incentive for secured and unsecured lending (and thus access to finance) is also significantly behind international best practice lending in most countries (EBRD, 2009).

Box 1. Improving access to finance for SMEs: SME financing programmes in Ireland

Finance is a key demand of SMEs. It is important that government creates a set of measures to support SME access to financing which are coherent and which do not create excessive market distortions. Planning such a set of measures requires detailed research into SMEs' financial problems and regular review, based on the performance of the financial sector.

Ireland was hit very hard by the financial crisis and this led to a decline in business lending every year between 2008 and 2013. In order to address this challenge, annual independent surveys of credit conditions for SME loans were conducted on behalf of the Irish Government between April 2011 and September 2014. Thanks to these surveys, the government closely followed up the collateral requirements, interest rates and approval rates of SME loans, also breaking down the data according to the size of the SMEs. The survey results indicated that micro-enterprises with fewer than ten employees faced the greatest difficulties in accessing bank finance. According to the most recent survey, 41% of the SMEs were asked for specific collateral for their loans, while the interest rate was relatively high both compared with 2010 data and with the interest rates in other European countries. SMEs use financing not only for growth and investment needs but also to satisfy working capital needs which can include financing their supply chains. This is especially relevant given that many banks are deleveraging and that SMEs rely on the banking sector heavily for financing needs – Irish SMEs are among the most reliant in Europe on bank funding.

Financial support is co-ordinated by the SME Credit and Lending Division of the Ministry of Finance, which is tasked with ensuring that viable SMEs can access finance from a wide variety of sources, including bank and non-bank sources. The Division also works closely with the Credit Review Office, which acts as an appeals body for SMEs refused credit by banks and monitors the lending behaviour of the major banks.

The SME Credit and Lending Division promotes and evaluates options to diversify funding for SMEs away from banks. As SMEs represent a wide variety of business types and sizes, government policy in Ireland supports a wide variety of supports for the sector. In terms of non-bank funding the SME Credit and Lending Division supports the use of the following policy interventions: loan guarantee schemes; direct lending to SMEs (with and without private sector); provision of finance from the National Pension Reserve Fund to the real economy through partnership with private sector investors; venture capital schemes; supply chain finance support; support for reigniting markets to securitise SME loans, which can lead to safe increases in bank credit directed at SMEs; peer-to-peer and crowdfunding support; encouraging initial public offerings and retail bond markets; and supporting the ability of funds to extend loans to SMEs. These measures are complemented by a statutory Code of Conduct for Business Lending to Small and Medium Enterprises (published by the Central Bank in 2009) and SME lending targets for the two main domestic banks. In addition there is a programme, Building Financial Capability in SMEs, which aims to develop skills among SME owners on available financial sources, application processes and assessments made by the providers of finance.

Finally, the SME State Bodies Group, established in 2012, aims to develop key policy initiatives to support SME access to credit and other forms of finance, and to ensure their implementation. It is chaired by the Department of Finance and attended by state bodies with an interest in access to finance for SMEs. The Group works intensively on the issues related to SME funding in conjunction with the relevant stakeholders through the SME Funding Consultation Committee.

Source: Department of Finance (n.d.), "SME credit and lending", www.finance.gov.ie/what-we-do/banking-financial-services/sme-credit-lending.

Data and trends

Measurement is one of the primary challenges when diagnosing the extent to which firms are financially constrained. In principle, a firm is defined as financially constrained if a windfall increase in the supply of internal funds results in a higher level of investment spending (Beck et al., 2006). Since such occurrences are rare and difficult to identify, direct measures of access to finance are virtually non-existent, with much of the literature relying on perception-based indicators or use of external financing as a proxy for access. However, these measures have a number of shortcomings in evaluating firm credit constraints. Usage data are not indicative of access as they ignore the possibility that firms do not obtain credit because they do not need external finance. Similarly, self-perception is a flawed proxy, since it is difficult to gauge

the extent to which it conforms to the objective situation of the firm based on investment decisions. Recent literature has developed more sophisticated proxy indicators for financially constrained status using data on actual firm experience in applying for and acquiring external financing (Kuntchev et al., 2013; Hainz and Nabokin, 2013).

BEEPS includes a set of detailed questions on how the firm finances working capital and investment, whether the firm has applied for a loan, the result of the application, and the reasons for not applying. This is further supplemented by questions on interest rates, collateral requirements and value, and firms' perception of access to finance as an obstacle to doing business.

Figure 1 illustrates the sources of working capital financing for SMEs in the EaP region. In comparison to the EU pre-accession (EU-PA) countries and the new EU members (EU-10), SMEs in EaP are more likely to rely on internal funds, except in Armenia. Bank financing is particularly underused in Azerbaijan and Ukraine. As expected, bank financing is the top source of external finance for SMEs, with credit from non-bank institutions constituting less than 1% of working capital in every country and the two benchmarking regions. The most significant difference between EaP and benchmarking regions relates to the use of alternative financing in the form of purchases on credit from suppliers and advances from customers – while this is an important source of financing for SMEs in EU-PA and EU-10 (representing on average 9% of working capital in EU-PA and 12% in EU-10), it is underused in the EaP region.

Figure 1. SME sources for working capital financing (2011)
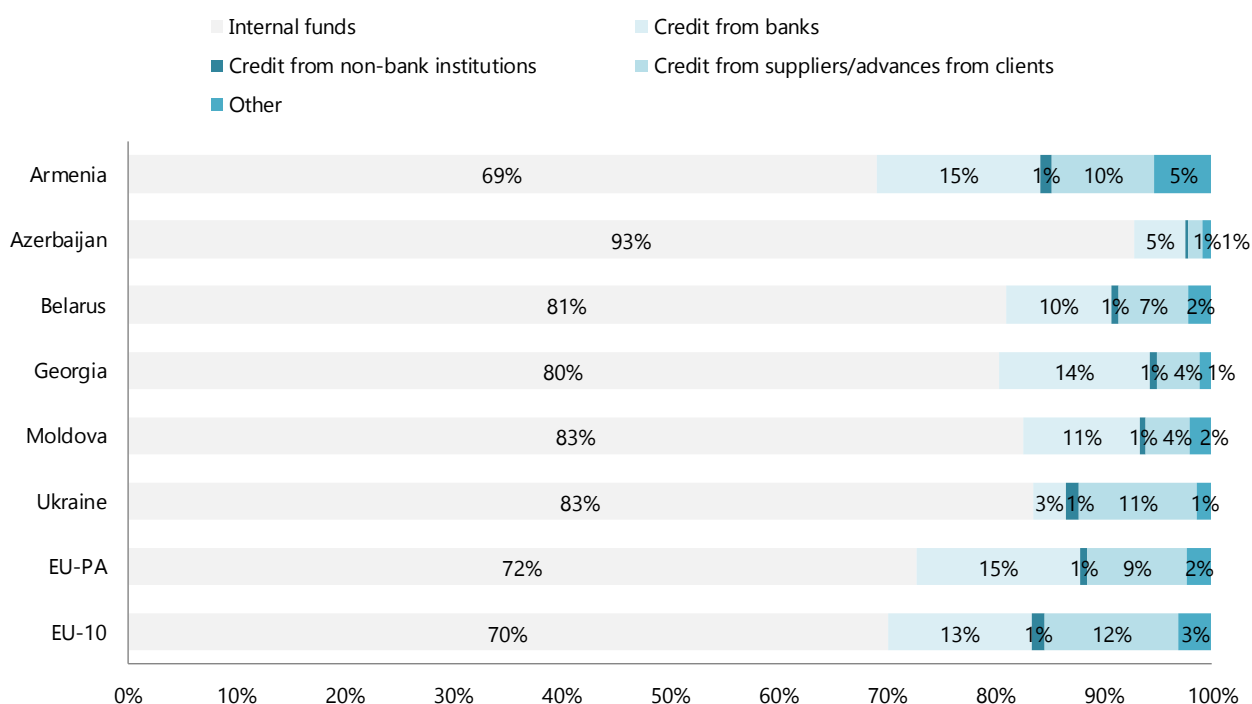
15

Figure 2. Percentage of SMEs with at least one loan from a financial institution (2009 vs 2013)
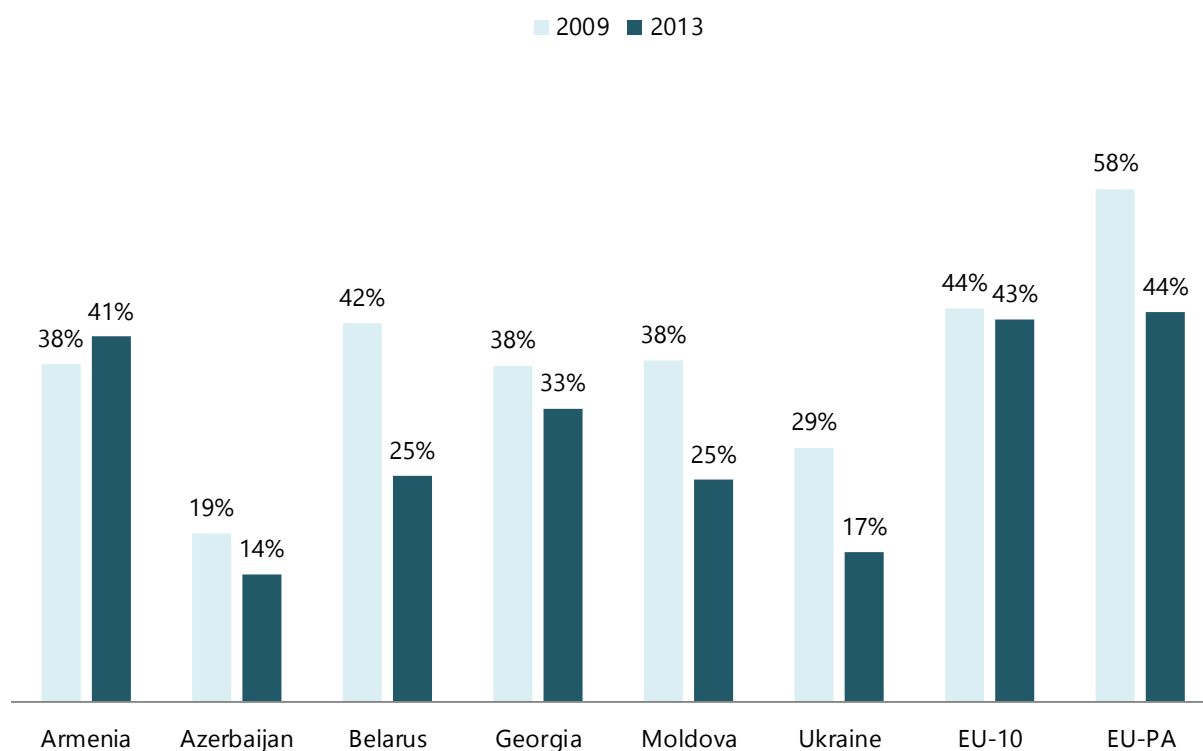
■ 2009 ■ 2013

The lower propensity of SMEs in the EaP to use external financing is confirmed by the percentage of SMEs reporting they currently hold a loan (Figure 2). In 2013, all EaP countries had a lower percentage of SMEs with a loan in comparison to EU-PA (44%) and EU-10 (43%). Azerbaijan (14%) and Ukraine (17%) perform particularly poorly in this respect. Further, the percentage of SMEs holding a loan has fallen since 2009 in five of the six EaP countries, with a particularly dramatic decline in Belarus (from 42% to 25%), likely reflecting the impact of the financial crisis.

Figure 3. Average annual interest rate on most recent loan (2013)

Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

Figure 4. Collateral required from SMEs as percentage of most recent loan (2013)

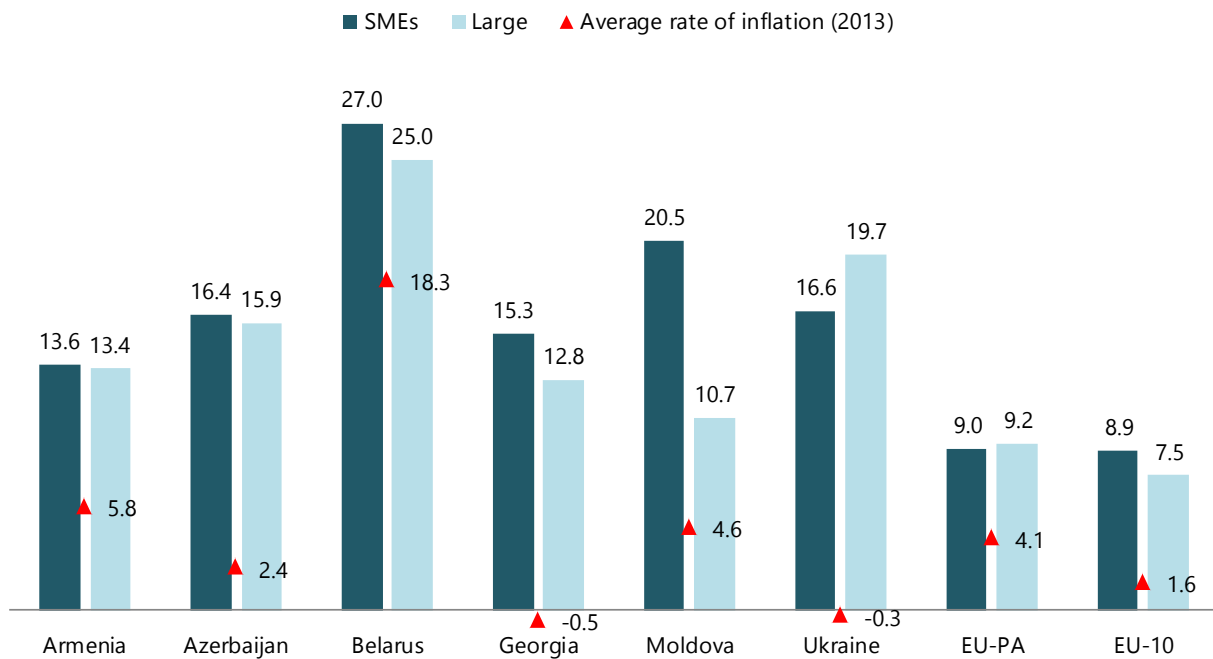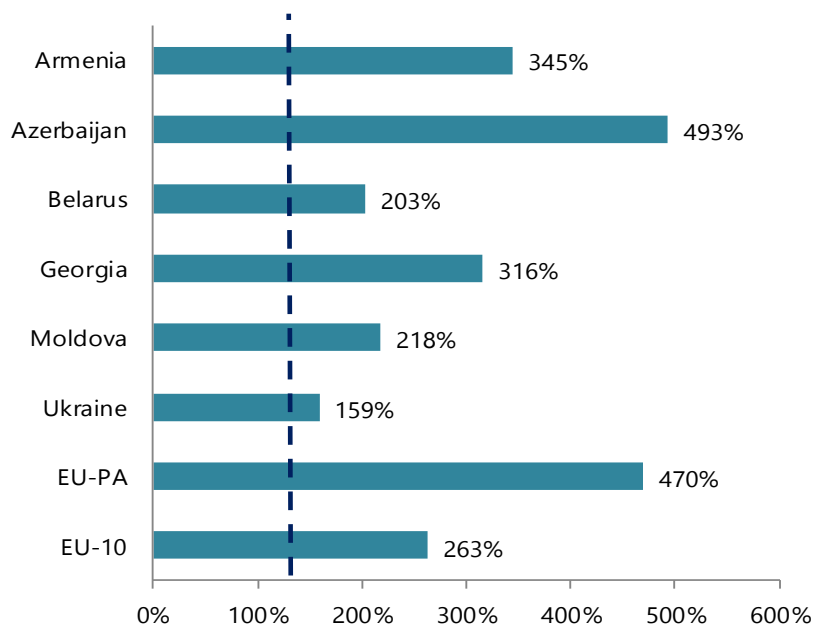*Source*: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

SMEs in the EaP region face significantly higher interest rates than their EU-PA and EU-10 counterparts (Figure 3). The average real interest rate reported on the recent loan by SMEs ranges from 16.6% (in Ukraine) to 13.6% (in Armenia), compared to 9.0% in EU-PA and 8.9% in EU-10. SMEs appear to face a particularly large premium compared to larger firms in Belarus (10% vs. 4.8%) and Moldova (20.5% vs. 10.7%).

The value of collateral required is above the value of the loan for 262 out of 286 firms reporting collateral value in the EaP region, and average collateral value is above 200% in every country except Ukraine (Figure 4). However, the EU-PA and EU-10 regions fare no better, with stringent collateral requirements reported in the EU-PA region in particular: OECD (2016) reports a median collateral rate of 53% among 15 participating countries in 2012, by comparison.

Figure 5. Correlation between SME Policy Index scores and percentage of SMEs with a loan
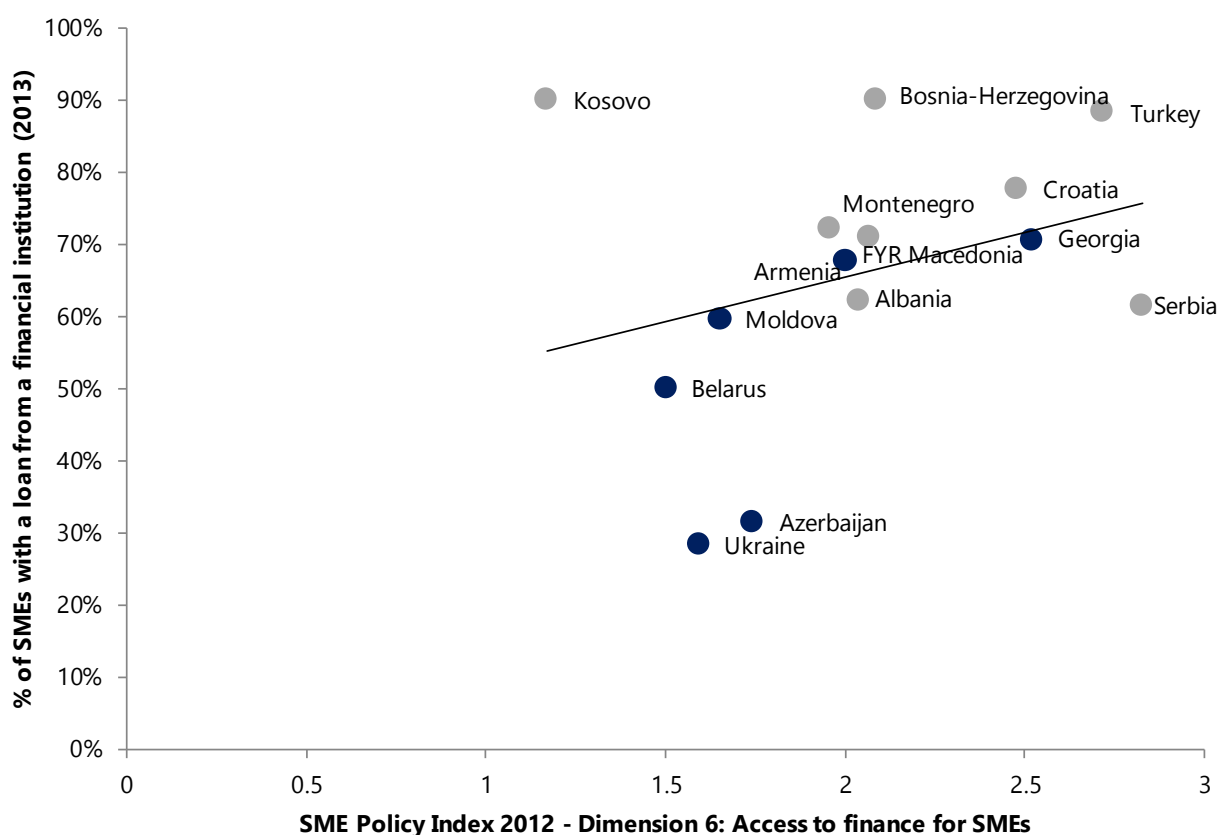
Note: The EaP countries are indicated in dark blue.

Overall, the survey results illustrate SMEs' greater reliance on internal funds in the EaP region, likely influenced by the higher interest rates and prohibitively high collateral requirements they face. Although there is some variation across the region, on the whole the six countries underperform compared to their EU-PA and EU-10 counterparts. Moreover, as indicated in Figure 5, it is possible to observe a positive correlation between the policy environment for access to finance for SMEs, as proxied by SME Policy Index scores on access to finance, and the percentage of SMEs that hold a loan from a financial institution. The correlation is more apparent for the EaP countries, suggesting that non-policy factors may be driving the differences among the EU-PA countries.

Method

We base our analysis on the model developed by Hainz and Nabokin (2013) to measure access to credit using the BEEPS 2005 dataset. We apply the model to the BEEPS V dataset, restricting the analysis to Eastern Partner, EU pre-accession and EU-10 regions, and introducing as an additional macro variable the SME Policy Index 2012 – Dimension 6: Access to finance for SMEs scores.

First, following the methodology used by Hainz and Nabokin (2013), we use the detailed BEEPS questions on the financing of firms to construct an objective measure of access to credit and compare this with a perception-based indicator of access to credit. When investigating access to credit, it is essential to consider only firms that have demand for credit to avoid wrongly identifying all firms without a loan as credit-constrained. To identify firms with credit demand, we make use of the differentiation between rejected and discouraged firms and firms with no need for credit. We classify the following groups as having demand for credit:

1. firms that are using loans,

2. firms that have applied for a loan, but were rejected

3. firms that were discouraged from applying for credit.

A firm is classified as discouraged when it has not applied for credit because it was discouraged from doing so, and not because it did not require credit. Accordingly, the binary variable *demand* equals 1 for the first three cases. It equals 0 if the firm does not have a loan because it had no need for credit and therefore did not apply for one.

Subsequently, to analyse access to credit we consider only firms which experienced demand. Firms that demand credit and have a loan are classified as having access to credit (a), while firms with credit demand that do not have a loan are classified as being credit constrained (b,c). The variable *access* therefore equals 1 if a firm has a loan and 0 if a firm does not have a loan, although it does have credit demand.

Figure 6. Demand and access to credit by SMEs (2013)
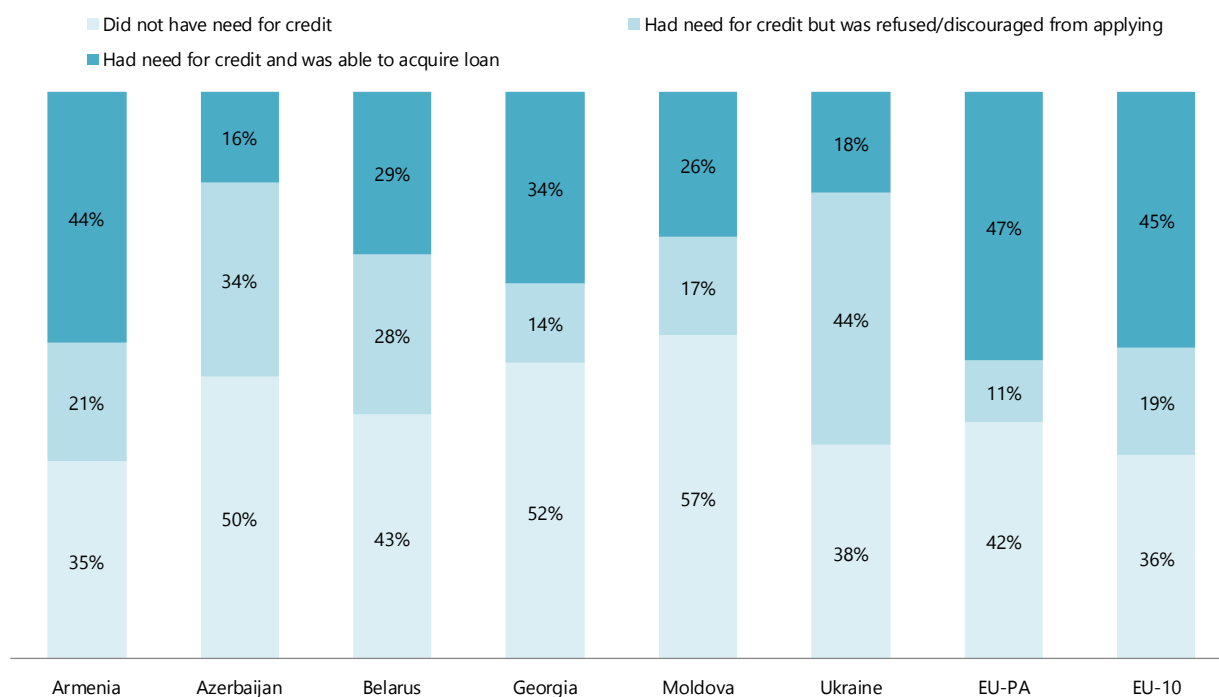
Legend:
- Did not have need for credit
- Had need for credit but was refused/discouraged from applying
- Had need for credit and was able to acquire loan

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine	EU-PA	EU-10
Had need for credit and was able to acquire loan	44%	16%	29%	34%	26%	18%	47%	45%
Had need for credit but was refused/discouraged	21%	34%	28%	14%	17%	44%	11%	19%
Did not have need for credit	35%	50%	43%	52%	57%	38%	42%	36%

An initial comparison across the regions shows that demand for credit varies between 50 and 70% between the countries and regions (Figure 6). However, there are more significant differences across countries when we look at access to loans. There are a larger proportion of SMEs with unmet credit demand in the EaP, with the exception of Georgia – the highest being in Azerbaijan (34%) and Ukraine (44%). This is in comparison to just 11% in EU-PA and 19% in EU-10.

Second, we construct a perception-based indicator based on the question asked to firms on whether access to financing in general, i.e. the financing available from banks, was problematic in terms of the operation and growth of their businesses. The variable *perceived access* varies from 1 "major obstacle" to 4 "no obstacle", such that a higher value indicates a better perceived access to finance.

We first carry out a probit estimation of access to credit, restricting our sample to firms that have credit demand.[56] However, the selection into the demand group might not be random and unmeasured determinants could jointly influence the firm's demand for a loan and the probability of getting access to credit. Therefore, we also estimate the probit model with sample selection based on Heckman (1979), or "heckprobit", which implies binary outcomes for both stages. Following Hainz and Nabokin (2013), we include a firm's individual perception of competition as exclusion restriction. The competitive environment

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5 .   A probit model is a type of regression where the dependent variable can only take two values, in this case 0 or 1.

6.   We have excluded foreign-owned or partially foreign-owned firms from our analysis as these firms may have access to other forms of financing, such as loans from the mother company, which are not covered by the BEEPS questionnaire.

of a firm should influence credit demand, because faced with greater competition; firms may invest more often in order to improve their position relative to other competitors and therefore may need external finance more often. However, banks will base their decision to grant a loan mainly on figures that are observable in the firm's balance sheet. For the assessment of the competitive environment, banks rely on global industry ratings, rather than region- and firm-specific circumstances.

We also re-estimate the same equation using the perception-based indicator (perceived access) as the dependent variable (ordinary least squares or OLS regression) to evaluate whether a perception-based indicator of access to finance identifies the same determinants of credit constraints. In all equations we include firm-level explanatory variables, including size and sector dummies, firm age, and a *transparency* dummy to indicate whether the firm had its annual financial statements checked and certified by an external auditor, as well as country fixed effects. We also introduce the *productivity* variable to proxy for the credit-worthiness of the firm.

We then introduce a variable on SME Policy Index 2012 scores for Dimension 6: Access to finance for SMEs (for Eastern Partner and EU pre-accession regions) measuring development of legal and regulatory framework and alternative sources of finance. We also test the model with World Bank Doing Business: Getting Credit distance to frontier scores as an alternative policy measure. The precise definition and measurement of variables are presented in the Annex.

Results

Objective access to credit

Table 1 summarises the results of the estimation using the objective measure of access to credit. Columns 1, 2 and 5 present the results of a probit estimation of access to credit among those firms that have demand. We first estimate using country-fixed effects using the full sample of firms (Column 1). We then estimate a specification replacing country dummies with country level explanatory variables – in particular the World Bank Getting Credit distance to frontier scores (Column 2) and SME Policy Index scores (Column 5). We find that small firms are less likely to have access to loans, while transparent firms and firms in non-retail services sectors (e.g. IT, construction and communications) are more likely to have access. Likelihood of access also increases with firm productivity, and is unaffected by the age of the firm. The SME Policy Index variable is also strongly correlated with having access to credit (significant at 1%). The magnitude of the coefficient is related to the small variation in SME Policy Index scores (1.17-2.83) among the countries, which nevertheless produces strong differences in terms of performance.

Columns 3, 4 and 6 present probit estimations with sample selection (heckprobit). The selection equation indicates that demand for credit is strongly determined by firm size. On the whole, medium-sized firms are 12-14% and large firms are 20-26% more likely than small firms to demand credit. However, the effect of firm size on access is much stronger, and medium-sized firms are 12-45% and large firms are 46-79% more likely than small firms to access credit. This suggests that smaller firms are more credit-constrained and need to rely more on internal financing. Sector differences in access to and demand for finance mostly disappear once we control for sample selection, a result similar to that found in Hainz and Nabokin (2013). Both demand and access to credit are positively correlated with firm productivity, although the effect is about 3 times stronger for access. This effect is likely to be endogenous – financial institutions are more likely to offer loans to firms with profit potential, and access to finance in turn affects sales and productivity. The age variable does not have a statistically significant effect on either demand or access to finance in any of the specifications, although this may be due to the fact that younger firms also tend to be smaller in size, resulting in the age effect being captured by the size dummies. Meanwhile, firm transparency (measured by use of an external auditor) is strongly correlated with both access and demand.

Examining the country-level policy environment variables, the SME Policy Index 2012 – Dimension 6: Access to finance for SMEs scores are insignificant in the demand equation but have a positive and significant effect on probability of accessing a loan, suggesting that the policy environment does not affect the need for external financing, although it does affect ease of access. It is worth noting that policies to ease access to finance do not appear to have a distortive effect on the market, as they do not appear to influence demand. Meanwhile, World Bank Doing Business – Getting Credit 2011 scores do not appear to have significant effect on access to credit.

Perceived access to credit

Table 2 reports the results of the regression using the perception-based indicator of access to finance as a dependent variable. When we use the full sample of firms (Columns 1, 2 and 5), many of the determinants appear to be insignificant, although SME Policy Index scores are strongly correlated with perceived access as well as objective access (at 1% significance).

When we limit our sample to those firms that have demand (Columns 3, 4 and 6), firm size becomes a relevant factor. Large firms perceive themselves are having better access to finance than small firms, although this does not appear to be the case for medium-sized firms. Productivity is also positively correlated with perceived access, although the coefficients are very small (0.03-0.07). SME Policy Index scores are once again strongly correlated with perceived access, and the strength of the effect increases once we restrict the sample to those firms that have demand. World Bank Doing Business – Getting Credit 2011 scores are statistically significant, although the coefficient is negative and very close to zero.

On the whole, both firm-level and policy environment variables are better predictors of objective access than perceived access to finance, suggesting that perception-based indicators are noisier and are insufficient substitutes for direct measures.

Table 1. Determinants of access to credit

	(1)	(2)	(3)		(4)		(5)	(6)	
	Probit	Probit	Heckprobit		Heckprobit		Probit	Heckprobit	
Dependent variable	Access	Access	Access	Demand	Access	Demand	Access	Access	Demand
Firm age (years)	0.00109	0.00285	0.000657	0.000139	0.00193	0.00191	0.00172	0.000144	0.00266
Medium (dummy)	0.447***	0.377***	0.318***	0.135***	0.248***	0.138***	0.277***	0.124**	0.117**
Large (dummy)	0.788***	0.701***	0.592***	0.259***	0.512***	0.225***	0.693***	0.457***	0.193**
Manufacturing (dummy)	-0.0453	-0.138**	-0.0841	0.125***	-0.153***	0.0890**	-0.134*	-0.144**	0.0490
Retail (dummy)	-0.152**	-0.189***	-0.115*	-0.0421	-0.137**	-0.0566	-0.187**	-0.141**	-0.0305
Transparency (dummy)	0.298***	0.263***	0.209***	0.153***	0.162***	0.143***	0.314***	0.183***	0.151***
Productivity (log of sales per employee)	0.182***	0.236***	0.139***	0.0464***	0.173***	0.0518***	0.246***	0.146***	0.0525***
Fixed assets investment (dummy)				0.255***		0.308***			0.320***
Perceived competition (1-5)				0.0825***		0.0807***			0.0631***
GDP (log USD)		0.211***			0.208***	-0.105***	-0.329***	-0.259***	-0.0403
Domestic credit to private sector (% of GDP)		-0.00422***			-0.00350***	0.000223	-0.00528***	-0.00657***	0.00604***
World Bank Doing Business – Getting Credit 2011 (0-100)		-0.00314*			-0.00227	-0.00132			
SME Policy Index 2012 – Dimension 6: Access to finance for SMEs (0-4)							0.941***	0.824***	-0.0604
Fixed effects	Country	None	Country	Country	None	None	None	None	None
No. observations	3806	3607	5585	5585	5348	5348	2424	3564	3564
Regions	All	All	All	All	All	All	EaP & EU pre-accession	EaP & EU pre-accession	EaP & EU pre-accession

Note: Statistical significance is indicated by: * (10%), ** (5%), and *** (1%). Country fixed effects were computed using dummy variables for N-1 countries.

Table 2. Determinants of perceived access to finance

Dependent variable: Perceived access						
	(1)	(2)	(3)	(4)	(5)	(6)
	All firms	All firms	Firms with demand	Firms with demand	All firms	Firms with demand
Firm age (years)	-0.00180	-0.00310**	-0.0000645	-0.00166	-0.00330	0.000353
Medium (dummy)	-0.00929	-0.0237	0.0786	0.0755	0.00913	0.0816
Large (dummy)	0.0705	0.115*	0.149**	0.215***	0.154**	0.204**
Manufacturing (dummy)	-0.0848**	-0.0222	-0.00663	0.0620	-0.0431	0.0691
Retail (dummy)	0.0810*	0.0857*	0.112*	0.116*	0.0727	0.120
Transparency (dummy)	-0.0801**	-0.0619*	-0.0212	0.00672	-0.113***	-0.0539
Productivity (log of sales per employee)	0.0177	0.0208	0.0425**	0.0548***	0.0335**	0.0707***
GDP (log USD)		0.0170		0.0398	-0.0312	-0.110
Domestic credit to private sector (% of GDP)		-0.00258***		-0.00367***	-0.00521***	-0.00557***
World Bank Doing Business – Getting Credit 2011 (0-100)		-0.00366***		-0.00396***		
SME Policy Index 2012 – Dimension 6: Access to finance for SMEs (0-4)					0.201***	0.386***
Fixed effects	Country	None	Country	None	None	None
No. observations	6260	6004	3783	3585	3994	2412
Regions	All	All	All	All	EaP & EU pre-accession	EaP & EU pre-accession

Note: Statistical significance is indicated by: * (10%), ** (5%), and *** (1%). Country fixed effects were computed using dummy variables for N-1 countries.

Conclusions

Our findings indicate that SMEs in the EaP are indeed more credit-constrained then their EU-10 and EU-PA counterparts. We find that while demand for credit does not vary significantly across the regions (50-70%), fewer SMEs in the EaP region have access to a loan (28%), compared to EU-10 (42%) and EU-PA (50%) countries.

We use both an objective measure of access to credit (based on whether firms have applied and been approved a loan) and a perception-based measure (based on the extent to which firms report themselves as being credit-constrained) to understand the determinants of access to finance among enterprises. We use both firm-level and policy-environment variables. Among firm-level variables, firm size has the strongest effect on the likelihood of obtaining a loan. Large firms are 60-70% less likely to be credit-constrained than small firms, underlining the importance of improving both bank and non-bank financing measures for SMEs.

The policy environment for accessing credit, as indicated by SME Policy Index scores, has a strongly statistically significant effect on both objective and perceived access, although it is insignificant for demand. This provides an initial indication that policy measures to increase access to finance for SMEs, including non-traditional measures such as microfinance and credit guarantee schemes can be beneficial in reducing credit constraints of firms. It also appears that such policy measures do not have distortionary effects on the market in terms of affecting credit demand by firms. The World Bank Doing Business – Getting Credit scores do not appear to have a significant effect on access to finance, potentially due to their narrower focus. The Getting Credit indicator measures the degree to which collateral and bankruptcy laws protect rights of borrowers and lenders, and the scope of credit information available through a credit bureau or a credit agency. This is in contrast to the broader scope of the SME Policy Index – Dimension 6 indicator, which covers the overall legal and regulatory framework, sources of external finance, and financial literacy.

SME INNOVATION

Introduction

Innovation encompasses the creation and adoption of new products, processes, marketing methods or organisational practices (OECD/Eurostat, 2005). Economic theory views innovation as one of the core determinants of productivity and economic growth (see Box 2). Despite the firm-level benefits of innovation, market and government failures can result in firms underinvesting in innovative activity. This can result from low economic returns to investment, which is created through barriers to competition, inadequacy of human capital and lack of co-operation among different stakeholders. Firms may also be constrained due to difficulties in reaping the economic benefits of innovation, which may stem from weak intellectual property rights, burdensome laws and regulations, and the positive externalities of innovation investment that will not be captured by the firm itself.

These barriers are even greater for small and medium-sized enterprises (SMEs), as regulations, lack of transparency in rules and regulations, inefficient legislation and unfair competition can pose greater obstacles to smaller enterprises. In addition, SMEs face difficulties accessing finance for research and development (R&D) investment, for example seed capital. They may not be as able to manage their intellectual assets due to a lack of knowledge of the need for and strategies to acquire intellectual property rights protection, as well as the costs of applying for a patent, in which they could ultimately be unsuccessful (OECD, 2008).

Although the Eastern Partner countries, particularly Ukraine and Belarus, inherited large technical and scientific education systems and research institutions from the Soviet Union, the policy environment for private sector innovation remains underdeveloped across the region. In particular, the innovation infrastructure is often focused on information and communication technology, without recognition for the role of other forms of innovation. Innovation support measures focus mostly on state-owned enterprises. The links between research institutions and the private sector, and the commercialisation of innovation, are generally weak (OECD, 2015a).

Box 2. Innovation and productivity

Innovation allows growth beyond the simple accumulation of factor inputs, and as such can account for at least 50% of economic growth (OECD, 2008). There are three different channels through which innovation can contribute to economic growth (OECD, 2008):

- Technological innovation can enhance physical capital in the form of machinery and computers. OECD studies estimate this to account for 0.35 percentage points of gross domestic product (GDP) growth between 1995 and 2013 (OECD, 2015b).

- Investment in R&D, software, organisational capital etc. can enhance intangible capital, contributing to economic growth. In EU countries, this has accounted for an estimated 0.5 percentage points of GDP growth between 1995 and 2007 (OECD, 2015b).

- Innovation can increase multifactor productivity. Multifactor productivity growth is estimated to have accounted for over 0.7 percentage points of GDP growth between 1995 and 2013 (OECD, 2015b).

Multifactor productivity is a key driver of long-term economic development and a central reason for the gap in income levels across countries (OECD, 2015b). The link between R&D, innovation, and productivity has also been identified in firm-level studies across industrialised and developing countries. At the firm level, innovation allows more efficient use of resources, and contributing to 'creative destruction'; as some firms gain greater market share and others exit the market as their productivity remains low (Schumpeter, 1942).

According to the OECD's *Oslo Manual*, four types of innovation can be identified depending on the output of innovation (OECD/Eurostat, 2005):

1. A *product innovation* is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.

2. A *process innovation* is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

3. A *marketing innovation* is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

4. An *organisational innovation* is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.

Innovation can also be categorised by its degree of novelty. The *Oslo Manual* recognises three different types of innovation: new to the firm, new to the market and new to the world. The first two categories are particularly relevant in emerging economies, which are not yet at the technology frontier and still in the process of adopting existing technologies. Diffusion of innovation among firms is also an important factor in determining how relevant and useful the innovation will be for the economy as a whole.

There is a substantial body of research that examines the determinants of innovation and attempts to establish a link between innovation and productivity (Hall, 2011). Many of these studies rely on microdata collected from innovation surveys based on the Oslo Manual framework, such as the Community Innovation Surveys co-ordinated by Eurostat. Innovation surveys complement aggregate data produced from R&D surveys (e.g. total R&D expenditure broken down by business sector and size) with information on the features of innovating firms (OECD, 2008). Use of microdata allows for specific inquiry into the type, size and features of firms that innovate, and the type of innovation they carry out. In particular, these surveys measure innovation in terms of its inputs, i.e. investment in R&D, acquisition of machinery and equipment to produce new products and processes, and training related to the introduction of new products

and processes. In addition, the surveys measure the output of innovative activity, in terms of the introduction of new products and processes or marketing and organisation methods.

Existing studies find strong links between firm-level innovation and firm-level factors such as size, exporting status, innovation co-operation and receipt of public support. In addition, a large body of research finds a correlation between innovation and productivity in a broad range of countries (OECD, 2008).

Box 3. Policy support to innovation: The Central Innovation Programme for SMEs in Germany

The Central Innovation Programme for SMEs is the basic programme of the Federal Ministry of Economics and Energy for market-driven technology support of innovative SMEs in Germany. It has three components: co-operation projects, individual projects, and co-operation networks.

Support is provided to R&D co-operation projects carried out among SMEs or between SMEs and with universities or research organisations. Individual projects are single-company R&D projects, which are provided with research subsidies. For co-operation networks, networking projects between innovative SMEs are supported through a subsidy to the network manager. These programmes are open to all technologies, and support both manufacturing and services SMEs, though predominantly manufacturing SMEs. Individual projects were initiated within the scope of the Pact for Employment and Stability in Germany towards Securing Jobs, Strengthening Growth Factors, and Modernising the Country (Economic Stimulus Package II). In order to support the increased financing needs of SMEs for R&D projects during the economic crisis, the funding opportunities were extended to also provide funding to individual projects, although the programme was originally designed to support collaborative projects.

Between 2008 and 2015, 47 889 applications were submitted and 32 036 projects with a funding volume of EUR 4.4 billion were approved. 24 027 projects have been conducted by SMEs and 8 009 projects were implemented jointly by SMEs and research institutes.

The following critical success factors were identified in a peer review of the programme:

- a clearly defined role of the scheme and of the additional value brought by the scheme to the innovation system (openness to all technologies, easy and fast procedures for close-to-the-market SME projects, no regional limitations)

- strong political support bringing sufficient resources with it

- continuous and well-targeted promotion of the programme

- a real effort to make the scheme customer-friendly (e.g. streamlined procedures, continuous application, integration of three programmes into one programme with three modules).

Sources: ZIM (n.d.), "The Central Innovation Programme for SMEs", www.zim-bmwi.de/zim-overview; European Commission (2009) *Eight Innovation Programmes and their Good Practices*, European Commission, Brussels, www.vinnova.se/PageFiles/604825187/D2%203%20Final%20report%20IPF%20WP2.pdf.

Data and trends

While official innovation surveys, such as those carried out in the EU and OECD countries, are not yet available in the Eastern Partner countries, comparable microdata on innovation has recently become available for this region through the Business Environment and Enterprise Performance Survey (BEEPS). BEEPS V for the first time introduced a detailed innovation module, looking at firms' innovation activities and management/organisational practices over the last three years[78].

The module builds on the established guidelines contained in the third edition of the *Oslo Manual*, covering product and process innovation, organisational and marketing innovation, R&D spending and the protection of innovation. In the main questionnaire, respondents are asked – by means of simple yes/no questions – whether their firms have introduced any new or significantly improved products, processes, organisational arrangements or marketing methods in the last three years, and whether they have spent money on R&D during that period. Firms that have engaged in any of these innovation activities are asked more detailed questions in the innovation module. Crucially, firms are asked to provide a detailed description of their main product or process innovation. These descriptions of new products and processes are then compared with the description of the firm's main business, to verify self-reported innovative activity (EBRD, 2014).

Figure 7. Firms reporting product innovation (2010-2012)
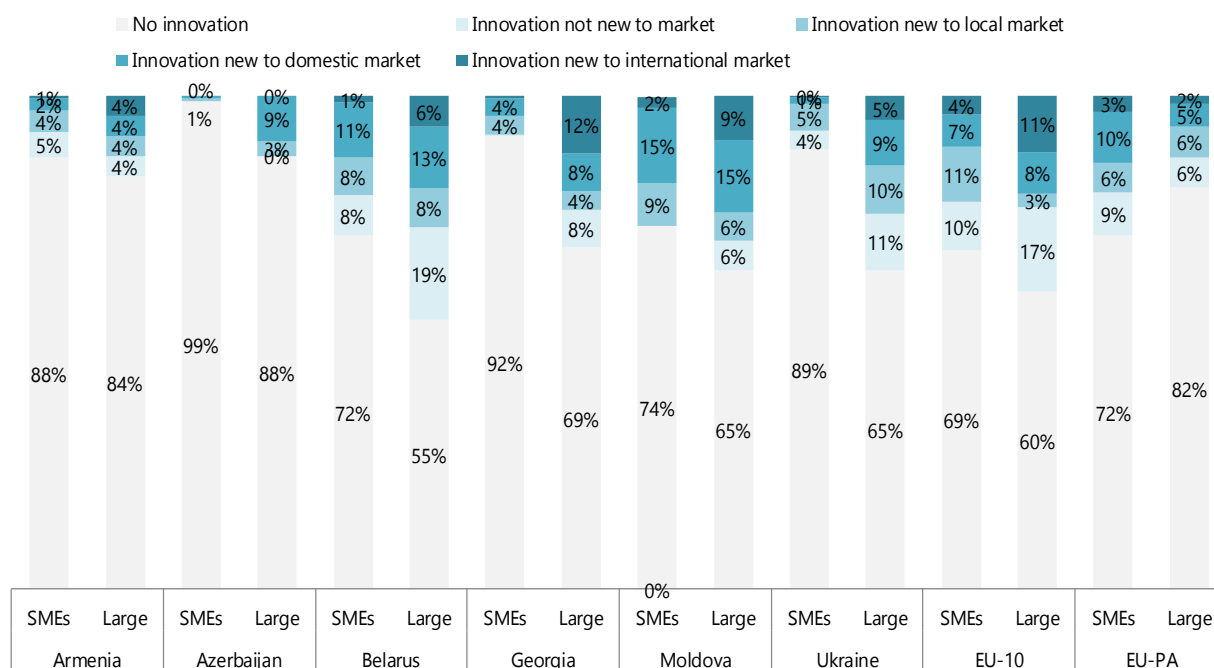
Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

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7 .   The BEEPS IV contained a small innovation section focused primarily on product innovation (see Figure 9).

8 .   The time ranges indicated in the graphs refer to the years for which innovation activities are reported.

Figure 8. Manufacturing SMEs reporting product innovation (2010-2012)
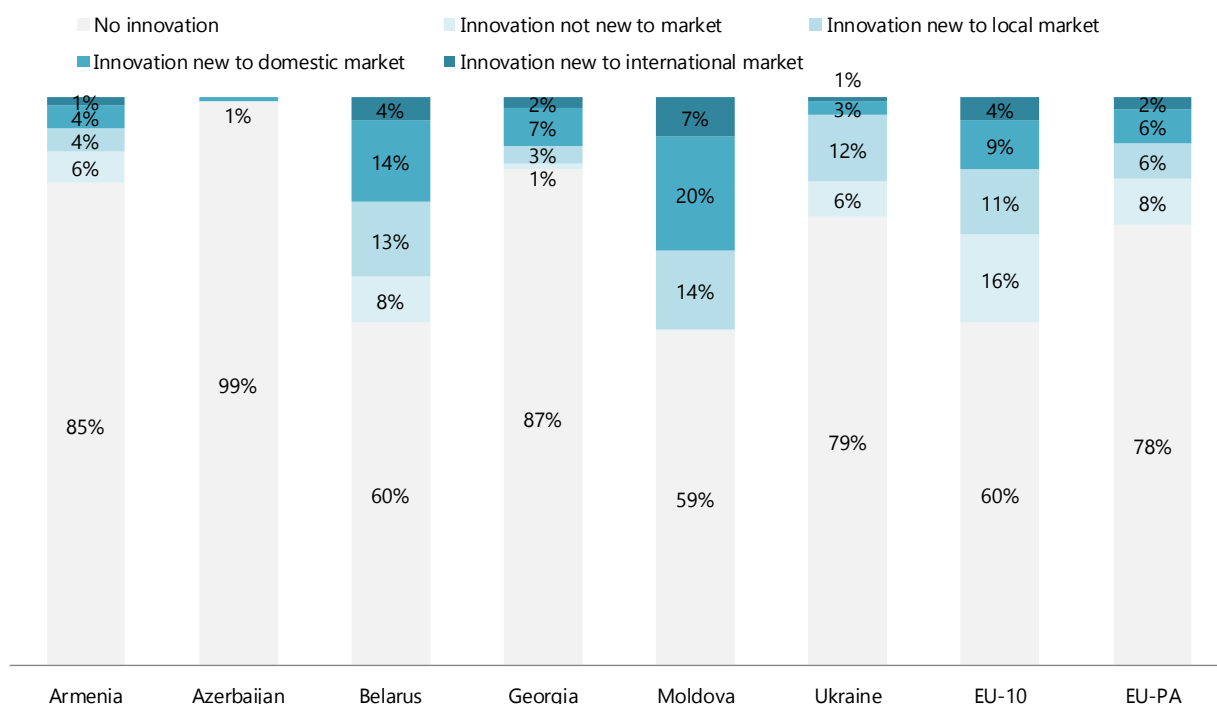
Legend:
- No innovation
- Innovation not new to market
- Innovation new to local market
- Innovation new to domestic market
- Innovation new to international market

Armenia: 85%, 6%, 4%, 4%, 1%

Azerbaijan: 99%, 1%

Belarus: 60%, 8%, 13%, 14%, 4%

Georgia: 87%, 1%, 3%, 7%, 2%

Moldova: 59%, 14%, 20%, 7%

Ukraine: 79%, 6%, 12%, 3%, 1%

EU-10: 60%, 16%, 11%, 9%, 4%

EU-PA: 78%, 8%, 6%, 6%, 2%

Figure 7 summarises the propensity to undertake product innovation in the EaP. Innovation performance varies greatly across the region, although performance is generally poorer than in the EU-10 and EU-PA regions. The gap between SMEs and large enterprises is more notable in Georgia (8% vs. 31%) and Ukraine (11% vs. 35%). Overall, firms in Belarus report the greatest number of innovations with 28% of SMEs and 45% of large enterprises having carried out a product innovation in the past three years. Manufacturing SMEs are more likely to introduce product innovation and more likely to introduce innovations that are new to the national or international market (Figure 8).

Figure 9. Percentage of SMEs introducing product innovation per country
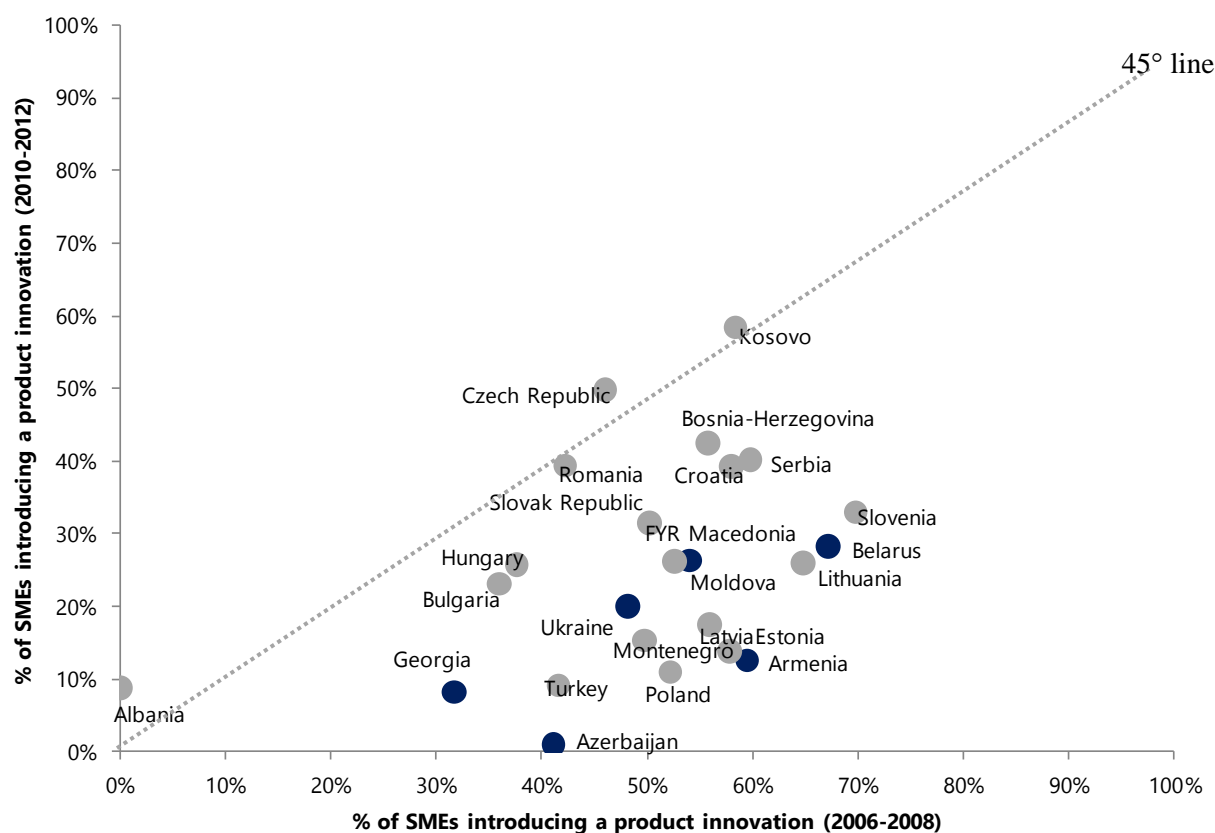
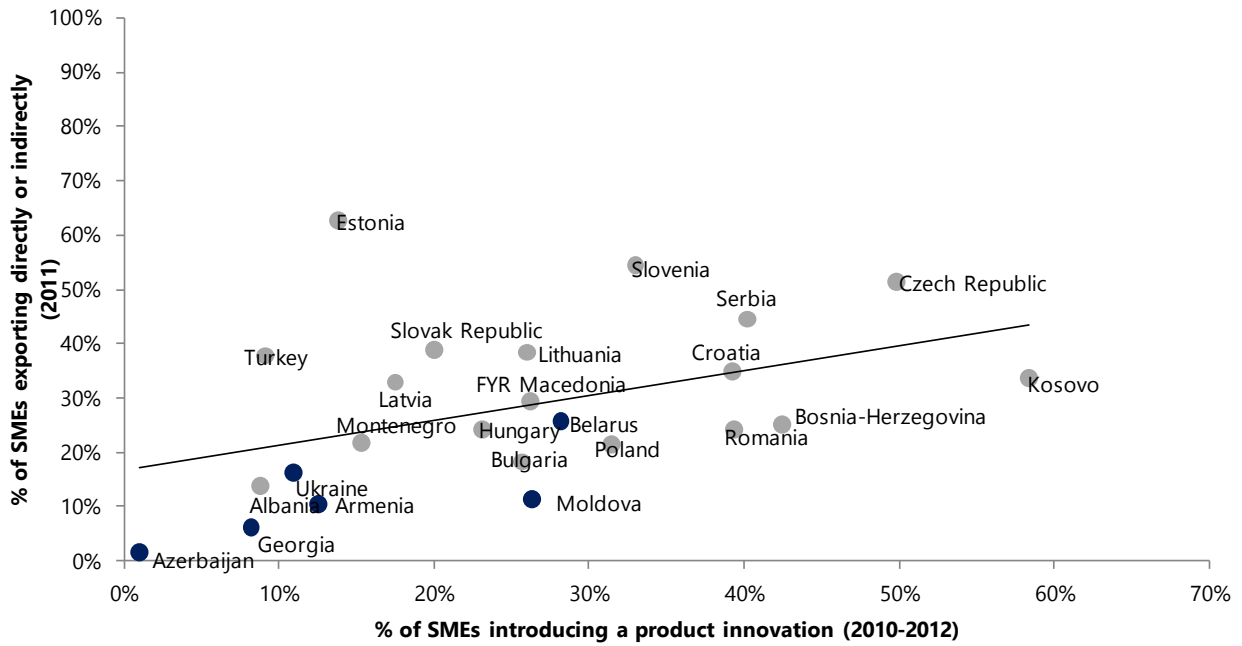*Note:* The EaP countries are indicated in dark blue.

Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016); EBRD (2010), *Business Environment and Enterprise Performance Survey*, BEEPS IV (2008-2009), dataset, European Bank for Reconstruction and Development, London, http://ebrd-beeps.com/ (accessed July 2016).

Comparison between BEEPS IV (2006-2008) and BEEPS V (2010-2012) (Figure 9) suggests that innovation has fallen across almost all countries in the post-crisis period. In the EaP, Georgia, Armenia and Azerbaijan have experienced the greatest decline, although all EaP countries fall below 30% in 2010-2012.

There is also a close relationship between country performance in innovation and internationalisation with few exceptions (Figure 10). However, performance is weaker in both areas in Eastern Partner countries, with a lower percentage of SMEs exporting or innovating than in the EU-PA and EU-10. Barriers to internationalisation and lower quality of innovations may be reasons for this weaker performance.

Overall, the innovation potential of SMEs is not yet fully exploited in the EaP, with most countries underperforming compared to their EU-PA and EU-10 counterparts. Moreover, EaP SMEs have been affected more strongly by the crisis and perform significantly less well in BEEPS V. Furthermore, there is an overall positive relationship between a good policy environment for innovation (as measured by SME Policy Index Dimension 8b: Innovation) and the percentage of SMEs that invest in R&D, with Kosovo as a notable outlier (Figure 11).

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Figure 10. Correlation between percentage of SMEs innovating and exporting, by country

Note: The EaP countries are indicated in dark blue.

Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

Figure 11. Correlation between SME Policy Index scores and percentage of SMEs investing in R&D
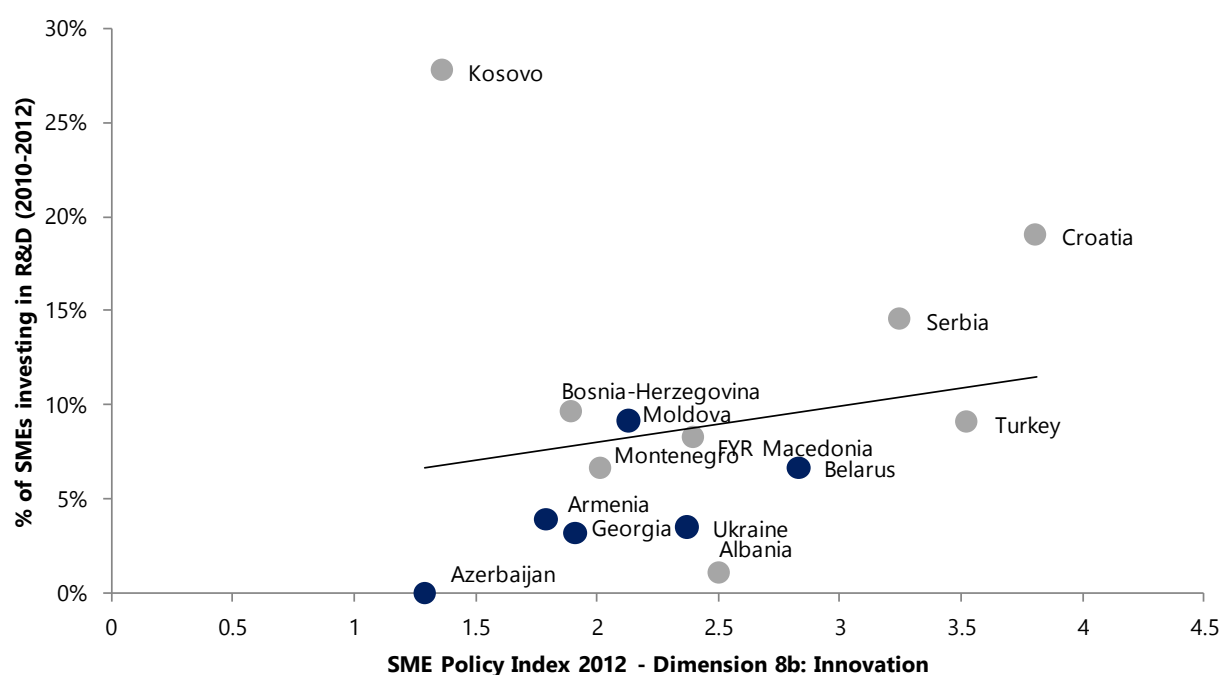
Note: The EaP countries are indicated in dark blue.

Method

There are a broad range of empirical studies which attempt to model and measure the link between innovation and productivity using firm-level studies. Although initial studies have measured innovation effort in the form of R&D, this can lead to underestimation of the impact of innovation on productivity, as R&D does not capture the full extent of innovative effort (Hall, Lotti and Mairesse, 2009). This will be particularly severe in the case of SMEs, where the official R&D measures are likely to underreport innovative effort (Kleinknecht, 1987). Another strand of the literature has focused on measuring the link between innovation output and productivity to overcome this problem. Crépon, Duguet and Mairesse (1998) combined the two approaches into a full structural model of the innovation process, modelling the relationship between innovation input, innovation output and productivity; referred to from here on as the Crépon, Duguet and Mairesse (CDM) model. The model has subsequently been applied to a number of countries and time periods, with some variations and mostly with the use of Community Innovation Surveys.

The CDM model addresses two problems in the measurement of a link between innovation and productivity. First, it accounts for selection bias resulting from the fact that while all firms may expend some R&D effort, only a small proportion will report R&D expenditure. Second, the estimation method takes into consideration the problem of endogeneity resulting from the fact that some of the explanatory variables are jointly determined with the dependent variable – e.g. there may be unobservable factors which determine both firm productivity and innovation output. The model thus has three stages and four equations:

1. Equation 1: Whether firms report having undertaken R&D investment.

2. Equation 2: How much firms invest in R&D (R&D intensity), conditional on the fact that they report having undertaken R&D investment.

3. Equation 3: The knowledge production function which relates innovation output to innovation input in the form of R&D expenditure per employee.

4. Equation 4: The output production function relating innovation output to labour productivity.

We apply the model to the BEEPS V dataset, restricting the sample to firms from the Eastern Partner, EU pre-accession and EU-10 regions, and introducing SME Policy Index - Dimension 8b: Innovation scores to control for the level of innovation policy progress. The precise definition and measurement of all variables are presented in the Annex.

Following Griffith et al. (2006) and Hall, Lotti and Mairesse (2009), we estimate the CDM model for all firms, rather than restricting the sample to those reporting R&D expenditure. This reflects the fact that while all firms may undertake some form of R&D effort, only a small proportion will report it in the form of official R&D spending. As such, equations 1 and 2 are estimated based on reported R&D figures, and the predicted values for R&D for all firms are used to proxy for innovation input in equation 3.

Following a number of other studies estimating the CDM model[9], we employ a generalised tobit model to jointly estimate equations 1 and 2, and three-stage least squares (3SLS) to jointly estimate equations 3 and 4. The use of 3SLS allows for feedback effects between innovation output and productivity, accounting for potential endogeneity.

Although the BEEPS data allow for measurement of innovation as a dummy variable (i.e. whether the firm has undertaken product, process, marketing or organisational innovation in the past three years) this measure does not account for the intensity of innovation. As a result, we follow a large body of literature in using sales per employee due to new products as a measure of innovation output. We also follow the literature in using sales per employee to proxy for labour productivity.

Results

Results for the four equations are outlined in Table 3. The model is first applied to the entire dataset (Column 1), and then applied to the manufacturing subsample (Column 2) to explore sector-specific dynamics in the innovation-productivity relationship. We also introduce the SME Policy Index - Dimension 8b: Innovation scores as a proxy for innovation policy development in the country (Column 3).

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9 .   The econometric specification and variables have been adapted from Lööf and Heshmati (2006).

Table 3. Determinants of R&D, innovation and productivity

	(1)	(2)	(3)
	All sectors	Manufacturing only	With SME Policy Index variable
Dependent variable: Decision to invest in R&D (whether the firm reports R&D expenditure)			
Firm size (log of number of employees)	0.195***	0.179***	0.173***
Employees with university degree (% of workforce)	0.007***	0.009***	0.005***
Firm age (years)	0.001	0.003	0.002
Manufacturing (dummy)	0.544***		0.321***
Retail (dummy)	-0.137**		-0.172**
EU pre-accession (dummy)			0.546***
Labour intensive industry (dummy)	-0.368***		-0.326***
SME Policy Index 2012 – Dimension 8b: Innovation (0-4)			0.089**
Dependent variable: R&D intensity (R&D expenditure per employee, in logs)			
Firm size (log of number of employees)	-0.872***	-0.705***	-0.922***
Indirect exports (% of sales)	0.011***	0.017***	0.010**
Direct exports (% of sales)	0.005**	0.005	0.013***
Firm age (years)	-0.001	0.000	-0.000
Manufacturing (dummy)	-1.452***		-0.942**
Retail (dummy)	0.139		0.758*
Subsidy received (dummy)	0.036	0.628**	0.459*
EU pre-accession (dummy)			-1.294***
Labour intensive industry (dummy)	0.550**		0.800**
SME Policy Index 2012 – Dimension 8b: Innovation (0-4)			0.074
Dependent variable: Innovation output (innovation sales per employee, in logs)			
Innovation input (predicted R&D intensity from equation above)	0.527***	0.181**	0.237***
Firm size (log of number of employees)	0.363***	0.052	0.078
Productivity (log of sales per employee)	1.137***	1.100***	0.718***
Firm age (years)	-0.006**	-0.006**	-0.007***
Manufacturing (dummy)	0.860***		0.051
Retail (dummy)	-0.182**		-0.219*
Inverse Mill's ratio	-0.019	0.069	-0.183
EU pre-accession (dummy)			0.338***
Labour intensive industry (dummy)	-0.276**		-0.112
Dependent variable: Productivity (sales per employee, in logs)			
Innovation output (log of sales of innovative products per employee)	0.764***	0.616***	0.904***
Firm size (log of number of employees)	0.079***	0.057**	0.116**
Indirect exports (% of sales)	-0.006***	-0.004***	-0.004**
Direct exports (% of sales)	-0.002***	-0.000	-0.005**
Firm age (years)	0.004*	0.003	0.005

Manufacturing (dummy)	-0.104		-0.035
Retail (dummy)	0.103		0.161
Investment in fixed assets (dummy)	0.022	0.066*	0.135**
Employees with university degree (% of workforce)	0.001	0.002	0.002
EU pre-accession (dummy)			0.217
Labour intensive industry (dummy)	-0.038		-0.058
Market orientation: national (dummy)	0.052	0.143**	0.295***
Market orientation: international (dummy)	0.035	0.155*	0.366**
Fixed effects	Country	Country	None
No. observations	9 014	3 947	5 909

Note: Statistical significance is indicated by: * (10%), ** (5%), and *** (1%). Country fixed effects were computed using dummy variables for N-1 countries.

We find that the likelihood of reporting R&D expenditure and innovation output increases with firm size, although the latter is only significant in the full sample regression. The estimates indicate roughly a 0.6% increase in sales of innovative products per employee for a 1% increase in number of employees. Meanwhile, R&D investment per employee is inversely linked to firm size in all three regressions. This is aligned with findings from Hall, Lotti and Mairesse (2009), and is explained by the fact that while larger firms invest less in R&D per employee, due to their size, they are more likely to report R&D and invest more in absolute terms, resulting in higher innovation output. This is a result of the fact that innovative activities have substantial fixed costs and often benefit from economies of concentration and agglomeration.

When using the full sample, we can see that manufacturing firms are the most likely to report R&D expenditure, followed by non-retail services and retail, and the same relationship exists for innovation output, with manufacturing firms reporting more innovative success. Meanwhile, labour intensive industries, in particular, are less likely to report R&D expenditure[10]. These findings are in line with our expectations, given that we limit our analysis to product innovation, which is undertaken mainly by manufacturing firms, particularly in capital-intensive industries.

We also find that exporting firms invest more in R&D, a relationship which holds in all of the regressions. The effect is particularly strong for indirect exporters, where a 1% increase in exports is reflected in 1.1% increase in R&D expenditure per employee. This conforms to expectations regarding increased technology transfer and adoption with internationalisation, particularly for those countries which are within the technology frontier.

The age of the firm is statistically insignificant in nearly all equations, while a higher percentage of employees with a university degree increases the probability of investing in R&D, and having received a subsidy has a positive and significant effect on R&D intensity in two of three specifications.

Our findings also confirm the strong relationship between innovation input, innovation output and productivity identified in literature. Innovation input (in terms of predicted R&D intensity) has a large, positive and significant effect on innovation sales, although the elasticity is smaller (0.181 vs. 0.527) when

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10. The labour intensive dummy has been included to account for the different levels of technological intensity in the sectors of operation (constructed based on Lööf, Heshmati, Asplund and Nåås, 2001); sector fixed effects (by two-digit industry classification) have not been included due to the small size of the sample and too few R&D investors per sector to draw meaningful results.

the regression is limited to the manufacturing sector. Innovation output appears to have a very strong effect on productivity with an elasticity between 0.7 and 0.9, significant in all of the regressions. The effect of innovation output on productivity is slightly lower in the manufacturing sector. Given the expected time lag in the relationship between R&D, innovation and productivity, and the cross-sectional nature of the data used in this exercise, it is possible that effects are captured entirely, and our results provide upper or under estimates of the actual effect.

Finally, the policy environment, as measured by SME Policy Index: Dimension 8b – Innovation scores, has a positive and significant association with the likelihood of investing in R&D, and a positive but insignificant relationship with R&D intensity, indicating the relevance of the policy environment particularly at the initial R&D decision stage.

Conclusions

While there is great variation across the region, SMEs in the EaP are generally less likely to innovate than those in EU-10 and EU-PA regions. Innovation performance is particularly weak among SMEs in Armenia, Azerbaijan and Georgia. The percentage of SMEs carrying out product innovation is also correlated with the percentage of SMEs exporting either directly or indirectly, which conforms to traditional expectations that innovation and internationalisation are mutually reinforcing. Innovation improves competitiveness in international markets through increased productivity, while internationalisation boosts profits from innovation and allows learning about new markets and technologies.

Our findings also confirm that the strong relationship between innovation input, output and productivity found in other regions also exists for the EaP and benchmarking regions. Firm size is an important determinant, particularly for the decision to invest in R&D. As expected and confirmed in the literature, smaller firms are less likely to carry out any form of R&D expenditure at all. Meanwhile, the decision to undertake R&D is strongly and positively correlated with the policy environment, as measured by SME Policy Index – Dimension 8b: Innovation scores. A 1-point increase in SME Policy Index scores (range 1-5) is associated with a 9% increase in the likelihood of firms investing in R&D.

These findings reaffirm the relevance of policy support measures in boosting R&D investment, and consequently innovation and productivity performance, particularly among smaller firms that are less likely to have the knowledge and resources to carry out such investment.

INTERNATIONALISATION OF SMES

Introduction

Globalisation means that almost all businesses have the potential for international co-operation – or suffer the consequences of international competition. Globalisation is the major driver of small and medium-sized enterprise (SME) internationalisation. Globalisation creates new opportunities for SMEs, making it easier to deal with other countries and, coupled with digitalisation, a greater ability to work at a global level. In many cases there are potential export markets which are more dynamic than the domestic market, allowing internationalised SMEs to grow faster. On the other hand, globalisation exposes firms to greater competition in the market and means that even SMEs operating exclusively on a local market need to understand foreign competitors in order to survive. Research has shown that even the smallest businesses are internationalising at an increasing rate, and indeed many start-ups are launched with cross-border business activities in mind – the "born global" trend (OECD, 2009).

The numerous benefits to SMEs engaged in international trade are well documented, with a considerable body of evidence that international trading activity stimulates productivity growth by strengthening competition and innovation and increasing access to new ideas and technology (NIESR, 2015). International trade enables businesses to achieve growth and economies of scale which domestic markets alone would not provide. Exporters are consistently found to out-perform non-exporters using a variety of measures of success, including profitability, production, wages and sales volumes (OECD, 2009).

Empirical research into the detail of this performance reveals a more mixed picture, regarding whether success is a result of exporting or successful firms are more likely to export. Wagner (2012) suggests that there is evidence of pre-entry differences and that the degree to which there is evidence for learning-by-exporting is mixed. Manufacturing firms exhibit a clear link between export and productivity, while for services there is some evidence of self-selection but no evidence of learning by exporting. On the question of learning-by-exporting, a literature review in Silva, Africano and Afonso (2010) shows a mixed picture from a variety of surveys and approaches to measurement.

A survey of French firms (OECD, 2012b) indicates that firm size has an impact on the proportion of firms which internationalise, but not on the extent to which individual firms internationalise their activities. Smaller firms traded a higher percentage of their exports through indirect channels. SMEs based in larger cities appear to have a competitive advantage, possibly related to better opportunities for networking. Constraints vary by size of firm, with financing constraints disproportionately affecting small firms, particularly in manufacturing; conversely, larger firms are driven by factors such as foreign ownership or international certification, which are less important to SMEs. Moreover, high-growth markets (such as Brazil, Russia, India and China) are perceived by both policy makers and SMEs to have higher barriers to entry for exporting SMEs than traditional markets (OECD, 2012a).

Barriers to internationalisation commonly reported by SMEs include a lack of information, knowledge and experience in international markets; the high costs of establishing and maintaining foreign distribution and marketing networks; and the difficulties involved in managing complex relationships at a distance. OECD (2009) considers how barriers to internationalisation relate to each other and the importance attached to them by SMEs. Eleven clusters were identified, with the most important being: finance and

payment collection (shortage of working capital, difficulties in getting payment); tariffs and regulations (both the level of costs, and the lack of understanding of foreign regulation); risk and infrastructure (including foreign exchange and political risk); home government support; resources; product development and support; and capabilities. A survey of European SMEs, examining the potential to export to third countries (i.e. outside the EU), showed that the most important barriers were payment risks, difficult paperwork and lack of financing, but these were followed by non-financial risks such as lack of adequate market information, foreign laws and regulation, and differing technical standards (EIM, 2011).

In light of such barriers, SMEs have attracted the attention of policy makers, with recognition on the part of governments that these barriers have the effect of reducing the ability of high-growth firms to achieve their full potential in international markets. Furthermore, any barriers to international trade are likely to impinge disproportionately on internationalised SMEs, which are often the most productive, research and development (R&D) intensive and growth-oriented, and thus potentially the strongest contributors to a dynamic national economy.

It is important to understand that SMEs can be divided into different categories based on their attitude towards internationalisation. OECD (2009) identifies five types, which experience different barriers and require different types of support:

- the curious (little appreciation of opportunities or barriers);

- the frustrated (have experience and appreciate that they lack resources and abilities);

- the tentative (limited experience, but face problems which require external assistance);

- the enthusiastic (considerable experience and recognise needs for development); and

- the successful (extensive experience and relevant skills).

In terms of policy responses, while all will require information and resources (including finance), in terms of skills and knowledge needs, the curious and the frustrated will need more generic and basic assistance (as well as general promotion to encourage them to export at all) than those who are already involved in exporting and need more specific and targeted approaches.

Support for SME internationalisation is of particular importance to countries in transition. New international trade agreements (in particular free trade agreements with the EU and the formation of the Eurasian Economic Union) mean that tariffs and procedures for trading across borders have changed rapidly. As well as basic information on the changes (and prospective changes), SMEs need assistance in identifying the opportunities that arise from these changes and combatting the threats, including the entry into the local market by international companies. Making the most of opportunities has implications for the domestic market, for example in certification and maintenance of quality standards. At the same time, the pressures of transition mean that export markets are often more lucrative and faster-growing than domestic markets, as well as being larger in size. As a result, policy makers need to consider strategies to facilitate SME internationalisation from a very early stage.

Data and trends

Measuring the determinants of SME internationalisation can present a number of methodological challenges. While studies of internationalisation generally concentrate on exports, the term has a broader meaning and an "internationalised" firm can also be involved in other international activities, such as collaboration with foreign firms (e.g. collaborative R&D, technology transfer), investment abroad, work with foreign direct investment in the home country, or importing in order to gain competitive advantages in the production of goods and services which are then exported. Internationalisation itself is difficult to measure, since there is a need to compare not only the proportion of SMEs which are in some way internationalised but also the relative intensity of this internationalisation (how important it is to individual SMEs).

An examination of the Business Environment and Enterprise Performance Survey (BEEPS) V dataset confirms many of the findings from previous studies of SME internationalisation. For instance, the fact that SMEs face considerable barriers in entering international markets is clearly illustrated in Figure 12, which compares the average levels of direct and indirect exports (as a share of sales revenue) for SMEs and large companies in the Eastern Partner countries, along with averages for the EU pre-accession and EU-10

regions. Large firms generally exhibit higher rates of both direct and indirect exports. SME exports vary significantly across the Eastern Partner countries, with the lowest rates observed in Azerbaijan (0.3%), and considerably higher rates observed in the EU pre-accession (18.8%) and EU-10 (12.5%) regions. In most cases (Belarus being one notable exception), indirect exports make up a greater share of total exports for SMEs than for large firms, suggesting that SMEs tend to find recourse in exporting through intermediaries such as wholesalers and distributors as a means of avoiding the fixed costs that are often associated with foreign market entry.

Figure 12. Average percentage of annual sales exported directly or indirectly (2011)
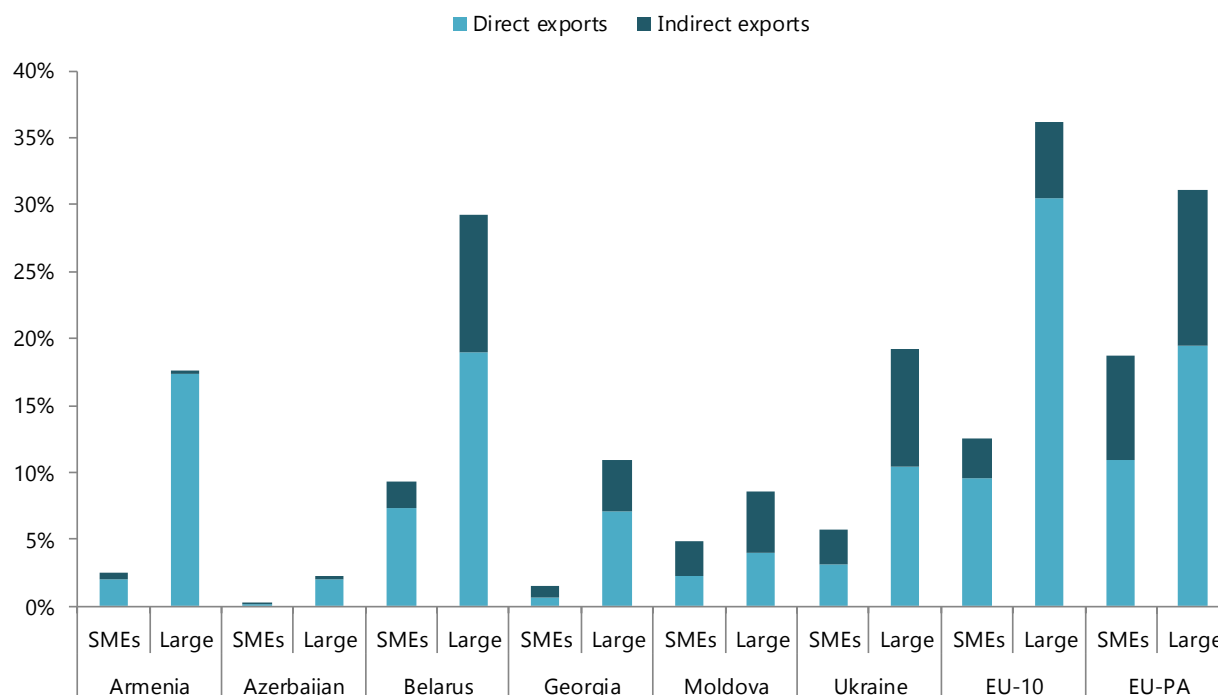
Note: An indirect export is when the manufacturer sells its goods to a trader or another agent who then exports the product without modifications.

Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

Figure 13 illustrates a clear positive correlation between SME innovation (measured as the share of SMEs that spent on R&D between 2010 and 2012) and SME internationalisation (exports as a share of sales). A similar relationship is observed in Figure 14, which plots SME access to credit and exports, although correlation is weaker suggesting other variables (including firm-level factors) may dominate in this case. However, performance in the Eastern Partner countries is weak when compared with countries in the EU pre-accession (EU-PA) and new EU member (EU-10) regions.

Figure 13. Correlation between percentage of SMEs investing in R&D and SME exports
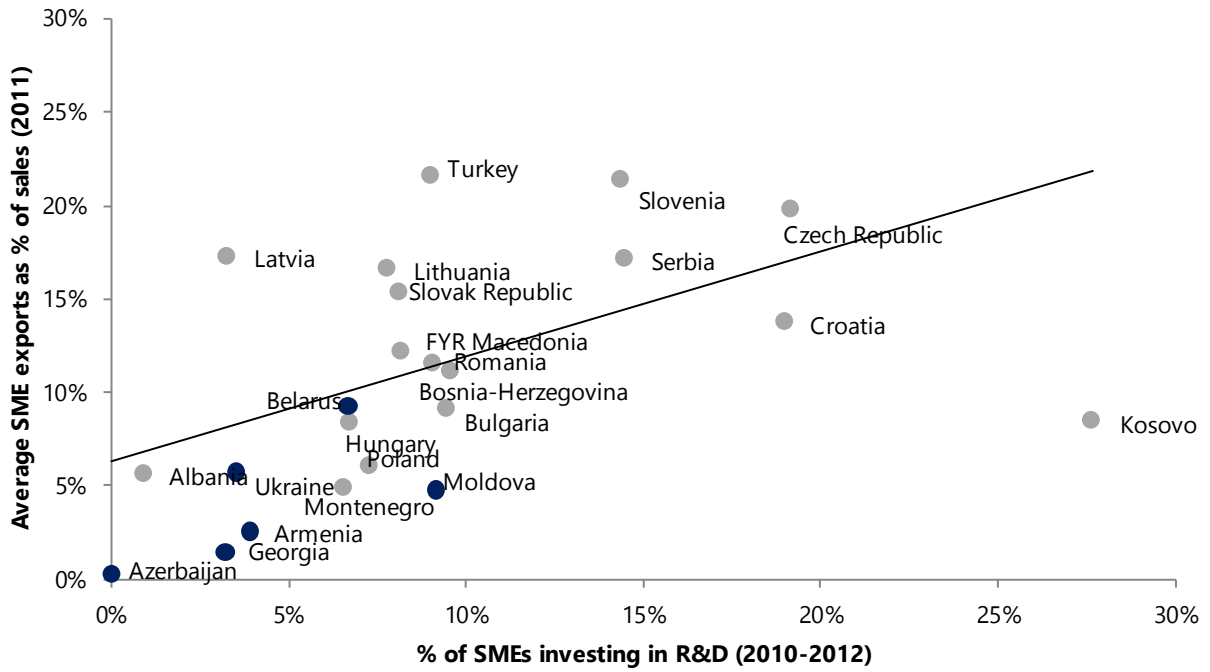
Note: The EaP countries are indicated in dark blue.

Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

Figure 14. Correlation between SME access to credit and SME exports
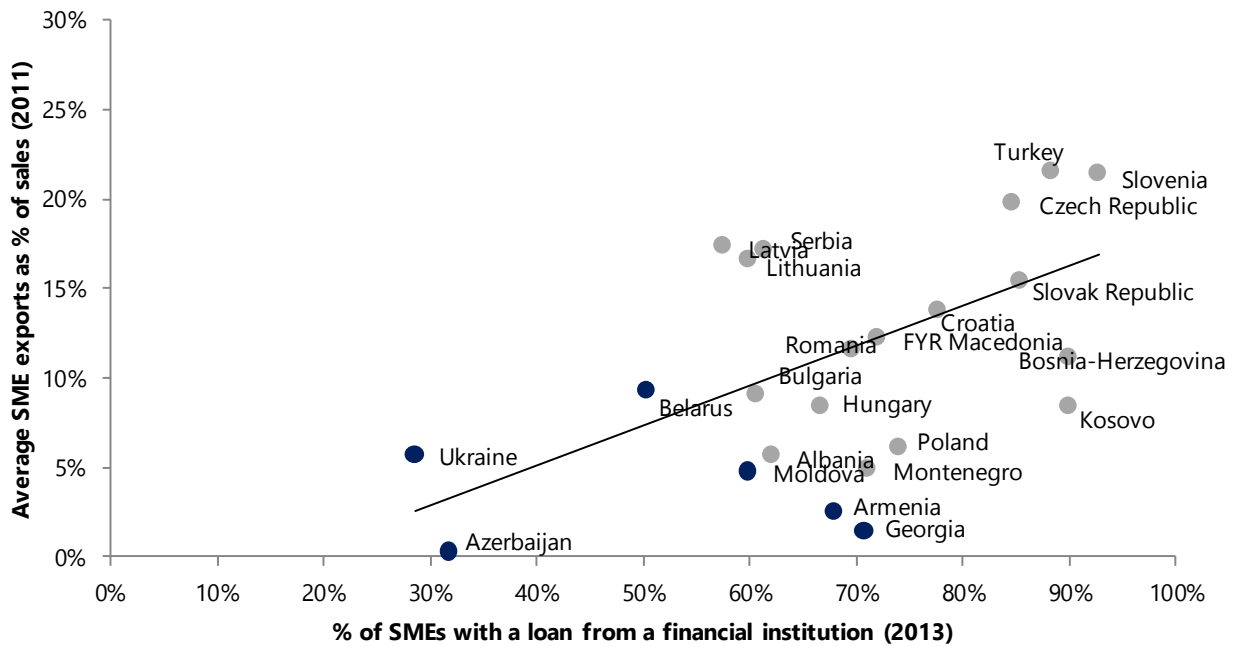
Note: The EaP countries are indicated in dark blue.

Source: EBRD (2015), *Business Environment and Enterprise Performance Survey*, BEEPS V (2011-2014), dataset available at http://ebrd-beeps.com (accessed July 2016)

Furthermore, the importance of controlling for institutional and policy settings is demonstrated in Figure 15, which illustrates positive correlations between SME exports and various measures of trade policy and trade regulations, which are further examined in the regression analysis. These include the World Bank's Trading Across Borders 2011 index, the OECD Trade Facilitation Indicators 2012, and the OECD SME Policy Index 2012 (Dimension 7: Standards and technical regulations and Dimension 10: Internationalisation of SMEs). The strongest correlation seems to be observed for Dimension 7 of the SME Policy Index, suggesting that the removal of technical barriers to trade can provide a significant boost to SME exports. Curiously, a high score in the World Bank's Trading Across Borders indicator seems to be *necessary but not sufficient* for SMEs' participation in international markets. In other words, while countries that underperform in the index tend to have low rates of internationalisation, those with high scores exhibit a much wider variation in SME exports.

Figure 15. Correlation between various trade-related policy measures and SME exports

Method

Following Shirokova and Tsukanova (2013) and Lejárraga et al. (2014), we measure the key drivers and determinants of SME internationalisation. We apply the model to the BEEPS V dataset, restricting the sample to firms from the Eastern Partner, EU pre-accession and EU-10 regions, and using a cross-sectional ordinary least squares (OLS) regression. We include both firm-level explanatory variables (firm size, foreign ownership, use of internationally recognised quality certification, use of technology licensed from a foreign-owned company, R&D expenditure, access to credit, employee training programmes, and sector of operation) and country-level institutional and policy controls (World Bank Trading Across Borders 2011, OECD Trade Facilitation Indicators 2012, SME Policy Index 2012 – Dimension 7: Standards and technical regulations, and SME Policy Index 2012 – Dimension 10: Internationalisation of SMEs). The precise definition and measurement of variables are presented in the Annex.

Following Shirokova and Tsukanova (2013) and Lejárraga et al. (2014) we measure firm size by the number of employees. Firm size is expected to be positively correlated with the degree of internationalisation because a large number of employees is a proxy for success and the accumulation of knowledge and experience. Moreover, internationalisation can be viewed as an expansionary phase in the overall life-cycle of a firm's development (Shirokova and Tsukanova, 2013).

Results

The results of the regression analysis are presented in Table 4. We first estimate an econometric model of export intensity, which measures the extent to which various firm-level variables influence SME internationalisation (Column 1). In Columns 2, 3 and 4 we substitute country dummies with variables that proxy for the institutional and policy development in the country: World Bank's Trading Across Borders index, OECD Trade Facilitation Indicators, and the OECD SME Policy Index 2012 (Dimensions 7 and 10). Column 5 introduces sector fixed effects, while Columns 6 and 7 restrict the dependent variable to direct and indirect exports, respectively.

Table 4. Determinants of SME internationalisation

Dependent variable	(1) Exports (% sales)	(2) Exports (% sales)	(3) Exports (% sales)	(4) Exports (% sales)	(5) Exports (% sales)	(6) Direct Exports (% sales)	(7) Indirect Exports (% sales)
Firm size (log of number of employees)	3.200***	3.092***	3.022***	2.861***	2.616***	2.152***	0.706***
Foreign ownership (%)	0.160***	0.162***	0.173***	0.115***	0.114***	0.115***	-0.001
Quality certification (dummy)	3.932***	3.935***	4.537***	5.202***	6.087***	4.711***	0.556
Foreign technology (dummy)	1.522**	1.694**	1.543**	1.963**	2.160**	0.155	1.752***
R&D expenditure (dummy)	4.513***	5.072***	4.798***	4.590***	4.184***	2.937***	1.730**
Access to credit (dummy)	1.322**	1.620***	2.603***	1.232*	1.141*	1.314**	-0.119
Employee training (dummy)	0.087	1.283**	1.178*	1.564**	1.411*	1.926***	-0.385
Manufacturing (dummy)	11.042***	11.680***	11.285***	7.956***		4.627***	3.334***
Retail (dummy)	-3.980***	-3.935***	-3.211***	-3.139***		-2.417***	-0.726
Log GDP (2011)		0.774***	1.182***	0.298	0.212	-0.038	0.342*
World Bank Trading Across Borders 2011 (0-100)		0.200***					
OECD Trade Facilitation Indicators 2012 (0-22)			0.398***				
SME Policy Index 2012 – Dimension 7: Standards and technical regulations (0-4)				3.032***	2.369***	1.170*	1.850***
SME Policy Index 2012 – Dimension 10: Internationalisation of SMEs (0-4)				2.539***	2.799***	1.685***	0.867***
Constant	8.174***	-21.232***	-15.535***	-17.130***	-17.677	-10.125***	-7.005***
Fixed effects	Country	None	None	None	Sector	None	None
No. observations	8 491	8 491	7 979	5 645	5 645	5 647	5 647
F-stat	71.04***	180.08***	160.46***	106.97***	38.66***	78.29***	29.07***
R^2	0.212	0.189	0.181	0.186	0.245	0.143	0.058
Adjusted R^2	0.206	0.185	0.176	0.180	0.236	0.138	0.053
Regions	All	All	All excl. Estonia, Kosovo, Slovenia	EaP and EU pre-accession	EaP and EU pre-accession	EaP and EU pre-accession	EaP and EU pre-accession

Note: Statistical significance is indicated by: * (10%), ** (5%), and *** (1%). Country and sector fixed effects were computed using dummy variables for N-1 countries.

The results demonstrate that firm size clearly has an important impact on trade performance, with larger firms tending to be more active in international markets than SMEs. Firms with a high share of foreign ownership, firms with an internationally recognised quality certification and firms using technology licensed from a foreign company are also more likely to be exporters. The link between innovation and internationalisation is illustrated by the strong positive correlation between R&D expenditure and export activity, which is observed in all of the models. In particular, firms that have spent on R&D within the past three years are likely to export up to 5 percentage points more of their sales revenue. Furthermore, the coefficient of the access to credit variable is positive and statistically significant, suggesting that financing is often a necessary precondition for firms to engage in international markets. Although the coefficient of the employee training variable is not statistically significant in the base model, a positive relationship is observed in Columns 2 – 6. This is evidence of the important link between skills

development (measured by firms that conduct formal training programmes for their employees) and internationalisation.

At the sector level, we find that manufacturing firms have a substantially higher likelihood of exporting – the coefficient suggests that they export about 11 percentage points more of their sales revenue than firms in the services sector. This is likely due at least in part to the large number of SMEs involved in proximity services, which tend to be non-tradable. On the other hand, firms in the retail sector are less active in international markets, exporting 4 percentage points less of their sales revenue than services firms, on average.

The results do not change significantly when the dependent variable is restricted to direct exports (Column 6), with the exception of the foreign technology variable, which is no longer statistically significant. It is interesting to note that the coefficient of the firm size variable is statistically significant but weaker in magnitude in Column 7, suggesting that smaller firms are more likely to export through indirect channels. Similarly, the coefficient of the retail dummy is insignificant, which may be explained by the greater ease with which retail and services firms can supply foreign consumers through indirect channels, rather than facing the physical challenges associated with direct cross-border trade. Key factors that drive SME internationalisation, such as foreign ownership or access to international quality certification, do not seem to have an impact on indirect exports. This suggests a certain level of sophistication is required for firms to engage directly in international markets. Moreover, access to credit does not have a determinate impact on indirect exports – which reflects the lower requirements for large-scale capital investments (e.g. machinery) relative to direct exporters. Having formal training programmes for employees also does not explain export performance through indirect channels.

In terms of policy variables, both the World Bank Trading Across Borders (Column 2) and OECD Trade Facilitation Indicators (Column 3) exhibit a positive correlation with exports at the firm level, suggesting that country-level trade regulations and border procedures can have an important influence on a firm's ability to increase its exports.

Similarly, the SME Policy Index variables for Dimension 7: Standards and technical regulations and Dimension 10: Internationalisation of SMEs are strongly significant (at 1% level) in all regressions (Columns 4, 5, 6 and 7). The only exception to this is the coefficient for Dimension 7 in the direct exports regression (Column 6), which is significant at the 10% level. The results indicate that the SME Policy Index scores are an important predictor of exports at the firm level. This suggests that SMEs can benefit greatly from the removal of technical barriers to trade and government programmes to help export-oriented SMEs to access international markets. The estimates are broadly robust to the introduction of sector fixed effects (Column 5).

Conclusions

The globalisation of production and liberalisation of trade flows has created important benefits and opportunities for SMEs, allowing them to increase productivity, boost sales and profitability, and strengthen their innovative capacity. At the same time, SMEs face a number of barriers and constraints in accessing international markets. These include factors internal to the firm, such as the ability to access finance, skills and innovation, and broader policy and institutional conditions faced by firms, such as the regulations and infrastructure to facilitate trade.

In spite of the variation across countries, we find that SMEs in the EaP tend to be far less involved in export markets than their counterparts in the EU-10 and EU-PA regions. This was also observed when examining correlations between average SME exports and the percentage of SMEs that undertook R&D

expenditures or obtained a loan. SMEs also tend to export through indirect channels to a greater extent than their larger counterparts.

The results indicate that size is a determinant factor and SMEs do indeed face structural difficulties in accessing international markets. The sector of operation is also a strong driver of internationalisation, particularly for manufacturing firms. This suggests that SMEs could benefit from a more tailored approach to promoting SME internationalisation, taking account of factors such as firm size and industry characteristics.

An important contribution of the findings is the strong evidence of a link between expenditure on R&D and SME internationalisation. This suggests a need to co-ordinate public support for innovation with export promotion policies. Moreover, the link between access to credit and SME internationalisation demonstrates the importance of ensuring that SMEs have sufficient access to capital to finance the necessary investments to engage in export markets.

The results also substantiate our expectations that institutional policy factors have an important influence on the degree of SME internationalisation. In particular, the findings call for renewed efforts on the part of governments to improve logistical performance, reduce the cost of border procedures and technical barriers to trade, and implement sound export promotion programmes for SMEs. Given the high cost of proactive policies to support SME internationalisation, countries can maximise impact through careful targeting of support measures.

SUMMARY AND CONCLUSIONS

This paper uses the Business Environment and Enterprise Performance Survey (BEEPS) from the European Bank for Reconstruction and Development and the World Bank to analyse small and medium-sized enterprise (SME) performance in Eastern Partner countries. It analyses the areas of access to finance, innovation and internationalisation; and benchmarks performance against the EU pre-accession and new EU member regions. Further, the paper exploits and adapts existing econometric models, with the use of the SME Policy Index 2012 scores, to test the impact of policy instruments on firm performance. Our findings have several implications for policy.

First, our benchmarking indicates that the relatively low level of SME policy development in the Eastern Partner (EaP) region is indeed reflected in relatively poorer performance of EaP SMEs compared to their peers in EU pre-accession countries (EU-PA) and new EU members (EU-10). Although there are top performers in the region on each dimension, the average performance in the region illustrates the underexploited potential of SMEs in the EaP. In particular, Eastern Partner SMEs are less likely to invest in research and development (R&D), less likely to report innovation activity, less likely to have access to loans, and less likely export directly or indirectly than SMEs in EU-PA and EU-10.

Second, although we address three separate themes, the findings of the paper highlight the interlinked nature of these policy areas. Access to finance is not only an obstacle to doing business in itself, but it can hinder firm performance by creating a barrier to innovation and internationalisation. Similarly, innovation and internationalisation are mutually reinforcing activities, and firms entering new markets are more likely to engage in innovation, and vice versa. We find that SMEs with access to finance are more likely to export and exporting SMEs are more likely to invest in R&D. The interlinked nature of the barriers that SMEs face has important implications for policy making as it emphasises the need for co-ordination across various government ministries, and the value of consultative and comprehensive SME strategies that are able to address all areas and exploit the synergies between them.

Finally, we find that policy environment factors, as measured by SME Policy Index results, are indeed strongly associated with firm performance on all three dimensions. An improvement in scores is correlated with an increased likelihood to access a loan, to invest in R&D, and to export. Further, our findings are largely robust to inclusion of other policy environment variables, such as the World Bank Doing Business and OECD Trade Facilitation Indicators. While the cross-sectional nature of the exercise necessitates caution in drawing causal links, our findings appear to illustrate that business environment reforms and SME support measures do affect firm performance. They emphasise the importance of SME policy reforms, as measured by the SME Policy Index, in improving access to finance, innovation and internationalisation among SMEs in the Eastern Partnership and beyond.

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ANNEX A. VARIABLE DEFINITIONS

SME access to finance

Dependent variables

Access (dummy): Takes the value of 1 if the firm has a loan, otherwise 0.

Demand (dummy): Takes the value of 1 if the firm has a loan, applied for a loan, did not apply for a loan because it was discouraged, otherwise 0.

Perceived access (0-4): To what extent the firm perceives access to finance to be an obstacle, 0 being a very severe obstacle, 4 being no obstacle.

Firm-level variables

Firm age: Number of years since the establishment began operations.

Medium (dummy): Takes the value of 1 if firm has between 20-100 employees, otherwise 0.

Large (dummy): Takes the value of 1 if firm has 100 or more employees, otherwise 0.

Subsidy (dummy): Takes the value of 1 if the firm has received a subsidy from national, regional or local governments or European Union sources in the past three years, otherwise 0.

Transparency (dummy): Takes the value of 1 if the firm had its annual financial statements checked and certified by an external auditor, otherwise 0.

Labour productivity: Sales per employee in the last fiscal year, in USD and logs, otherwise 0.

Manufacturing (dummy): Takes the value of 1 if the firm is involved in manufacturing activities (omitted dummy non-retail services) , otherwise 0.

Retail (dummy): Takes the value of 1 if the firm is involved in retail activities (omitted dummy non-retail services), otherwise 0.

Fixed assets investment (dummy): Takes the value of 1 if the firm purchased any fixed assets (e.g. machinery, vehicles, equipment, land or buildings) in the last fiscal year, otherwise 0.

Perceived competition: The extent to which practices of competitors in the informal sector poses an obstacle to the current operations of the firm, 0 being no obstacle, 4 being a very severe obstacle.

Country-level variables

GDP: GDP per capita average values for 2011, in USD and logs. Source: IMF (2015).

Domestic credit to private sector: Domestic credit to private sector as percentage of GDP in 2011. Source: IMF (2015).

World Bank Doing Business – Getting Credit 2011 (0-100): World Bank Doing Business 2011 distance to frontier scores in "Getting Credit", where 0 represents the lowest performance and 100 represents the frontier. The indicator is broken down into four sub-indicators: strength of legal rights index; depth of credit information index; credit registry coverage (% of adults); and credit bureau coverage (% of adults).

SME Policy Index 2012 – Dimension 6: Access to finance for SMEs (0-4): SME Policy Index 2012 scores, readjusted to a 0-4 scale. The indicator is broken down into three sub-indicators: sources of external finance for SMEs (credit guarantee schemes, microfinance, leasing, venture capital etc.); legal and regulatory framework (cadastre, credit information services, registration systems for moveable assets); and financial literacy.

SME innovation

Dependent variables

R&D expenditure (dummy): Takes the value of 1 if the firm reports undertaking any R&D expenditure in the past three years, otherwise 0.

R&D intensity: R&D expenditure per employee in the last fiscal year, in USD and logs.

Innovation output: Sales income from product innovation per employee in the last fiscal year, in USD and logs.

Labour productivity: Sales per employee in the last fiscal year, in USD and logs.

Firm-level variables

Firm size: Log of the number of permanent, full-time workers at the end of the last fiscal year.

Direct exports: Percentage of sales exported directly in the last fiscal year.

Indirect exports: Percentage of sales exported indirectly in the last fiscal year.

Firm age: Number of years the firm has been in operation.

Tertiary education (%): Percentage of employees with a university degree.

Subsidy (dummy): Takes the value of 1 if the firm has received a subsidy from national, regional or local governments or European Union sources in the past three years, otherwise 0.

Fixed assets investment (dummy): Takes the value of 1 if the firm purchased any fixed assets (e.g. machinery, vehicles, equipment, land or buildings) in the last fiscal year, otherwise 0.

Manufacturing (dummy): Takes the value of 1 if the firm is involved in manufacturing activities (omitted dummy non-retail services) , otherwise 0.

Retail (dummy): Takes the value of 1 if the firm is involved in retail activities (omitted dummy non-retail services) , otherwise 0.

Labour intensive industry (dummy): Takes the value of 1 if the firm belongs to a labour-intensive industry, otherwise 0. Classification based on Lööf, Heshmati, Asplund and Nåås (2001).

EU pre-accession (dummy): Takes the value of 1 if the firm is in the EU pre-accession region, otherwise 0.

Market orientation (dummies): Whether the firm's main market is local, national and international (omitted dummy local).

Country-level variables

SME Policy Index 2012 – Dimension 8b: Innovation (0-4): SME Policy Index 2012 scores, readjusted to a 0-4 scale. The indicator is broken down into two sub-indicators: policy framework for innovation and support services for innovative companies.

SME internationalisation

Dependent variables

- Exports: The percentage of the establishment's sales that were either direct exports or indirect exports (sold domestically to a third party that exports products).

- Direct exports: The percentage of the establishment's sales that were directly exported.

- Indirect exports: The percentage of the establishment's sales that were indirectly exported (sold domestically to a third party that exports products).

Firm-level variables

- Firm size: The logarithm of the number of permanent, full-time workers at the end of the last fiscal year.

- Foreign ownership: The percentage of the firm owned by private foreign individuals, companies or organisations.

- Quality certification (dummy): Takes the value of 1 if the establishment has an internationally recognised quality certification, otherwise 0.

- Use of foreign technology (dummy): Takes the value of 1 if the establishment currently uses technology licensed from a foreign-owned company, otherwise 0.

- R&D expenditure (dummy): Takes the value of 1 if the establishment has spent funds within the last three years on R&D activities, either in-house or contracted with other companies, otherwise 0.

- Access to credit (dummy): Takes the value of 1 if the establishment currently holds a line of credit or a loan from a financial institution, otherwise 0.

- Employee training (dummy): Takes the value of 1 if the establishment had formal training programmes for its permanent, full-time employees over the past fiscal year, otherwise 0.

- Manufacturing (dummy): Takes the value of 1 if the establishment is involved in manufacturing activities, otherwise 0.

- Retail (dummy): Takes the value of 1 if the establishment is involved in retail activities, otherwise 0.

Country-level variables

- Log GDP (2011): The logarithm of 2011 GDP in USD billions. Source: IMF (2015).

- World Bank Doing Business – Trading Across Borders 2011 (0-100): World Bank Doing Business 2011 distance to frontier scores in "Trading Across Borders", where 0 represents the lowest performance and 100 represents the frontier. The indicator is broken down into 8 sub-indicators: Documents to export (number); Time to export (days); Cost to export (USD per container); Cost to export (deflated USD per container); Documents to import (number); Time to import (days); Cost to import (USD per container); Cost to import (deflated USD per container).

- OECD Trade Facilitation Indicators 2012 (0-22): Takes the country scores from the 2012 assessment of the OECD Trade Facilitation Indicators, which is measured as the sum of 11 sub-indicators: Information availability; Involvement of the trade community; Advance rulings; Appeal procedures; Fees and charges; Formalities – documents; Formalities – automation; Formalities – procedures; Internal border agency co-operation; External border agency co-operation; and Governance and impartiality.

- SME Policy Index 2012 – Dimension 7: Standards and technical regulations (0-4): Takes the country-level scores from the SME Policy Index 2012 for the Eastern Partner and EU pre-accession regions, readjusted to a 0-4 scale. The indicator is broken down into eight sub-indicators: Technical regulations; Standardisation; Accreditation; Conformity assessment; Metrology; Market surveillance; Administrative and regulatory information; and Sanitary and phytosanitary standards (SPS) – institutional framework.

- SME Policy Index 2012 – Dimension 10: Internationalisation of SMEs (0-4): Takes the country-level scores from the SME Policy Index 2012 for the Eastern Partner and EU pre-accession regions, readjusted to a 0-4 scale. The indicator is broken down into three sub-indicators: Export promotion programmes; Financial support for export promotion activities; and National SME promotion events.

Box A.1. The SME Policy Index: Overview and methodology

The SME Policy Index is a benchmarking tool to help emerging economies monitor and evaluate progress in policies that support SMEs. The index was developed in 2006 by the OECD in partnership with the European Commission, the European Bank for Reconstruction and Development (EBRD), and the European Training Foundation (ETF). It has been applied to several regions which fall under the European Neighbourhood Policy and the Enlargement Policy: the Western Balkans (in 2006, 2009, and 2012, which included Turkey for the first time); the EaP countries (in 2012 and 2016); and the Middle East and North Africa (in 2008 and 2013).

The SME Policy Index is based on the results of two parallel assessments. A self-assessment is conducted by governments, and involves the country SBA co-ordinator – the government official assigned to lead the policy assessment – collecting inputs from the various agencies and ministries involved in SME policy development and implementation. In addition, an independent assessment is conducted by the OECD and its partner organisations, which is based on inputs from a team of local experts who collect data and information and conduct interviews with key stakeholders and private sector representatives. The final scores are the result of the consolidation of these two assessments, enhanced by further desk research by the four partner organisations, country missions and consultations with government representatives.

The Index assesses both quantitative and qualitative policy indicators. The quantitative indicators include data from the World Bank's *Doing Business* reports, while the qualitative indicators assess the policy development path in a certain area, such as the establishment of a regulatory impact assessment or a credit guarantee scheme. Scores between 1 and 5 are used to assess the level of policy reform for each sub-dimension and dimension, with 1 being the weakest and 5 being the strongest level. For qualitative indicators, the scores typically correspond to the levels of policy development shown in Table A.1.

Table A.1. Policy development scale

Level 1	Level 2	Level 3	Level 4	Level 5
There is no law, institution, tool or (information) service in place for the area concerned	There is a draft law, institution, tool or (information) service and there are some signs of government activity to address the area concerned	A solid legal and/or institutional framework is in place for this specific policy area, tool or (information) service	Level 3, plus some concrete indications of effective policy implementation of the law, institution or tool	Level 4, plus some significant evidence of concrete and effective policy implementation of the law, institution, tool or service. This level comes closest to good practice identified for OECD countries

Source : https://www.oecd.org/globalrelations/smallandmedium-sizedenterprisessmepolicyindex.htm

Box A.2. BEEPS survey and methodology

The Business Environment and Enterprise Performance Survey (BEEPS), from the EBRD and the World Bank, is a firm-level survey of a representative sample of an economy's private sector. It covers a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures.

Sector and size coverage

Since 2008, the BEEPS survey universe has consisted of the majority of manufacturing sectors (excluding extraction), retail and residual stratum that includes most services sectors (wholesale, hotels, restaurants, transport, storage, communications, IT) and construction. This corresponds to firms classified with ISIC Rev 3.1 codes 15-37, 45, 50-52, 55, 60-64, and 72. Only formal (registered) companies with five or more employees are eligible for interview; there are no restrictions on their age. In some larger economies such as Russia, Turkey and Ukraine, the survey design allows stratification by some of the sectors with the largest contribution to employment and value added. Firms with 100% government/state ownership are no longer eligible to participate in BEEPS. Prior to 2008, the survey universe consisted of industry and most service sectors. This corresponded to firms classified with ISIC Rev 3.1 codes 10-14, 15-37, 45, 50-52, 55, 60-64, 70-74, 92.1-92.4 and 93. Firms that operated in sectors subject to government price regulations and prudential supervision, such as banking, electric power, rail transport, and water and waste water were excluded. Only formal (registered) companies with two or more employees and at least three years old were eligible for interview. There were no restrictions on ownership. The details for the first three rounds of BEEPS, if known, can be found in the reports on sampling and implementation, available in the data section.

Who conducts the surveys and who is surveyed

Due to sensitive survey questions addressing business-government relations and bribery-related topics, private contractors, rather than any government agency or an organisation/institution associated with government, are hired by the EBRD and the World Bank to collect the data. Confidentiality of the survey respondents and the sensitive information they provide is necessary to ensure the greatest degree of survey participation, integrity and confidence in the quality of the data. Surveys are usually carried out in co-operation with business organisations and government agencies promoting job creation and economic growth, but confidentiality is never compromised. Who is surveyed: BEEPS is answered in face-to-face interviews by business owners and top managers. Sometimes the survey respondent calls company accountants and human resource managers into the interview to answer questions in the sales and labour sections of the survey. Typically, 1200-1800 interviews are conducted in larger economies, 360 interviews are conducted in medium-sized economies, and for smaller economies, 150 interviews take place. The Sampling Note provides the rationale for these sample sizes.

Structure of the survey

Since 2008, BEEPS has used three instruments: the Manufacturing Questionnaire, Retail Questionnaire, and Core (residual sectors) Questionnaire. Although many questions overlap, some are only applicable to one type of business. For example, retail firms are not asked questions about production and non-production workers. The standard BEEPS topics include firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilisation, land and permits, taxation, informality, business-government relations, innovation and technology, and performance measures. Over 90% of the questions objectively ascertain characteristics of a country's business environment. The remaining questions assess the survey respondents' opinions on what the obstacles are to firm growth and performance. The mode of data collection is face-to-face interviews.

Sampling and weights

BEEPS has been conducted since 1999. Since the fourth round in 2008, BEEPS follows the Enterprise Surveys Global Methodology and uses stratified random sampling. In a stratified random sample, all population units are grouped within homogeneous groups and simple random samples are selected within each group. This method allows computing estimates for each of the strata with a specified level of precision while population estimates can also be estimated by properly weighting individual observations. The sampling weights take care of the varying probabilities of selection across different strata. Under certain conditions, estimates' precision under stratified random sampling will be higher than under simple random sampling (lower standard errors may result from the estimation procedure).

The strata for BEEPS are firm size, sector, and geographic region within a country. Firm size levels are 5-19 (small), 20-99 (medium), and 100+ employees (large-sized firms). In most economies, the majority of firms are small and medium-sized, and therefore BEEPS over-samples large firms since larger firms tend to be engines of job creation. Sector breakdown is usually manufacturing, retail, and other services. For larger economies, such as Russia, Ukraine and Turkey, specific manufacturing sub-sectors are selected as additional strata on the basis of employment, value added, and total number of establishments figures.

The sampling frame is ideally derived from the universe of eligible firms obtained from the country's statistical office. Sometimes the master list of firms is obtained from other government agencies, such as tax or business licensing authorities. In some cases, the list of firms is obtained from business associations or marketing databases. In Albania, the sample frame is created via block enumeration, where the consultant "manually" constructs a list of eligible firms after 1) partitioning a country's cities of major economic activity into clusters and blocks, and 2) randomly selecting a subset of blocks which will then be enumerated. In surveys conducted since 2008, survey documentation contains the information on the source of the sampling frame and includes any special circumstances encountered during survey fieldwork. More details can be found in the Sampling Note. Obtaining panel data, i.e. interviews with the same firms across multiple years, is a priority in BEEPS. When conducting a new round of BEEPS, maximal effort is expended to re-interview as many firms (from the prior survey) as possible. For these panel firms, sampling weights can be adjusted to take into account the resulting altered probabilities of inclusion in the sample frame.

Source: EBRD (2016), "Methodology", http://ebrd-beeps.com/methodology.