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Monthly Report

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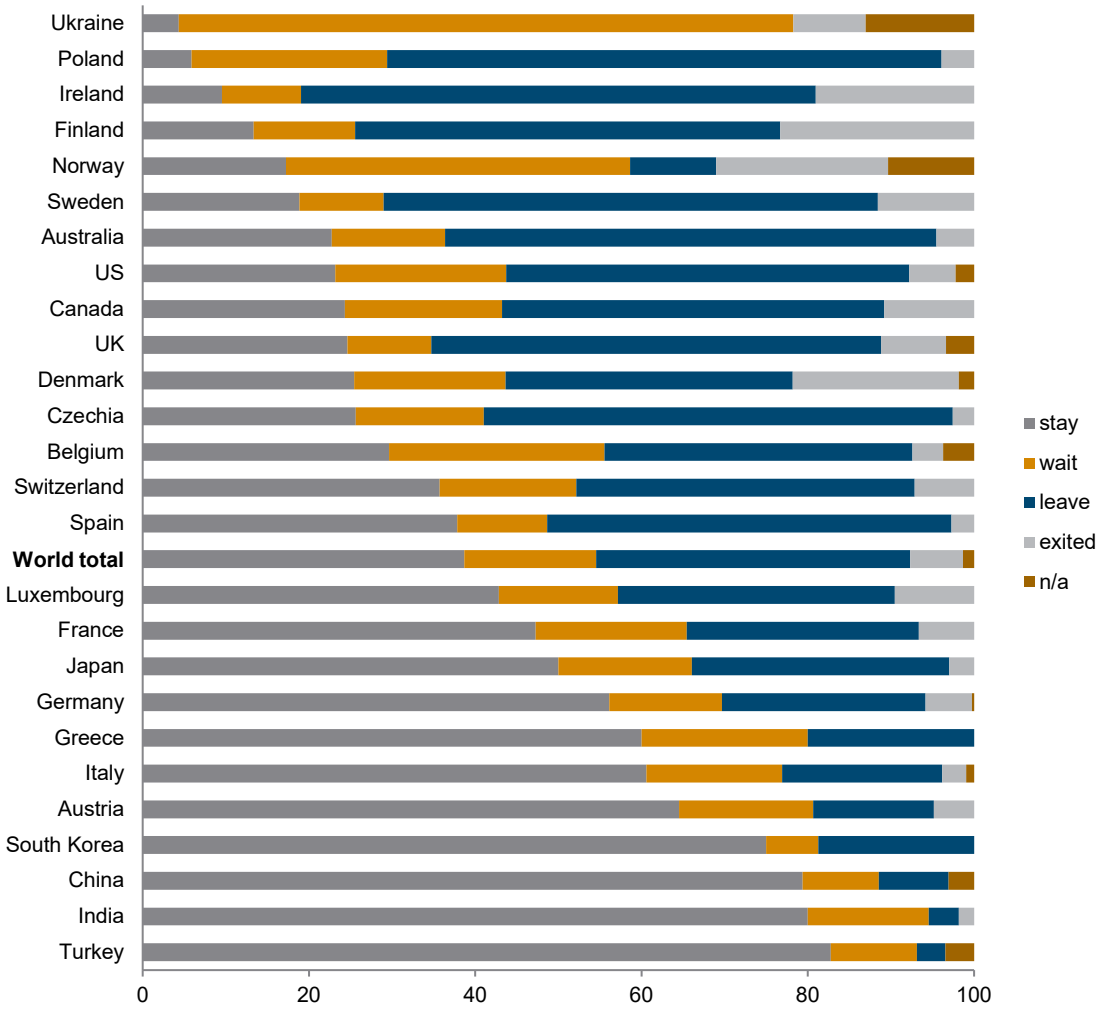
Chart of the month: Very few firms have left Russia since its invasion of Ukraine

BY VASILY ASTROV

Figure 1 / Current status of foreign firms in Russia, by country of origin*

% of total



*Note: Country of origin is defined as the country where the company's headquarters are located. Only countries with more than 20 companies operating in Russia at the start of the war are included. Status 'stay' is assigned to companies which continue with their Russian operations; 'wait' to companies which have reduced their current operations and are holding off on new investments; 'leave' to companies which have curtailed their Russian operations; and 'exited' to companies which have completed their withdrawal from Russia.
Source: own calculations, based on the Self Sanctions/Leave Russia database of the Kyiv School of Economics, https://kse.ua/selfsanctions-kse-institute/, as of 8 March 2023.

Following Russia's invasion of Ukraine in February 2022 and the adoption of wide-ranging Western sanctions, many foreign companies announced plans to stop exports to Russia and/or to withdraw from the country. However, the track record so far has been mixed. According to the database compiled by the Kyiv School of Economics, only 201 foreign companies (6% of the total) have completely withdrawn from the country at the time of writing.[1] In 2021, these companies generated revenues of around USD 46bn from their Russian operations, which corresponded to 15% of the total turnover of foreign companies in the country. Another 1,197 foreign companies (38% of the total) have curtailed their Russian operations; 502 (16% of the total) have reduced their current operations and held off on new investments; while 1,225 (39% of the total) are essentially continuing with 'business as usual' (Figure 1).

Figure 1 also demonstrates the wide variation across countries when it comes to the extent of the exodus from Russia. This should come as no surprise, given that (i) the main motivation for foreign firms to leave has been concern over their public image;[2] and (ii) domestic pressure to exit Russia varies a lot by country, and depends not least on the official position of its government. Indeed, around 80% of companies from the so-called 'friendly' jurisdictions (according to the official Russian classification), such as Turkey, China and India, have announced no plans to leave the Russian market. By contrast, companies from those countries that are among the most 'hawkish' on Russia (including Poland and the Nordic states) are overwhelmingly in the process of leaving the country or else have already done so. Ukraine is, of course, an extreme case: only two of its companies active in Russia (4% of the total) are continuing with 'business as usual'.

The sale of Russian assets by foreigners is also complicated by the bad terms they are typically offered: the associated price discount is reportedly 70% on average, and according to one study 7% of companies have left their assets behind without bothering to sell them.[3] Apart from market conditions, there are also legislative hurdles: the sale of Russian assets by investors from 'unfriendly' countries is subject to approval by a government sub-commission, which (among other conditions) requires at least a 50% price discount on the independent market valuation. The exit of 'unfriendly' investors from the financial, fuel and energy sectors is altogether prohibited, unless explicitly authorised by the president.[4] This may explain, at least in part, why some Western banks, for example (including most notably Austria's Raiffeisen and Italy's UniCredit), are stuck in Russia for the time being. Finally, it is likely that many foreign investors in Russia are simply playing for time: hoping that – sooner or later – the war will be over, the geo-political climate will eventually improve and at least some of the sanctions will be lifted, potentially leaving lucrative business opportunities in Europe's most populous country.

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1 Some other recent studies have come to similar conclusions. For instance, one study found that only 8.5% of EU and G-7 companies active in Russia had divested themselves of at least one of their Russian subsidiaries by the end of November 2022 (Simon Evenett and Niccolò Pisani, 'Less than nine percent of Western firms have divested from Russia', 20 December 2022, available at SSRN: https://ssrn.com/abstract=4322502 or http://dx.doi.org/10.2139/ssrn.4322502).

2 According to the Moscow-based Center for Strategic Research, which surveyed the 600 biggest foreign companies active in Russia at the beginning of September 2022, for more than half of the firms 'subjective reasons' (such as concerns over public image) were the main motivation for withdrawing. Other factors often mentioned were sanctions, logistical and payment difficulties, and fears of asset nationalisation: https://www.rbc.ru/economics/07/10/2022/633e94809a79475aa5d84f00

3 ibid.

4 Decree No. 520 'On the Application of Special Economic Measures in Financial and Fuel and Energy Sectors in Connection with Unfriendly Actions of Certain Foreign States and International Organisations' was published on 5 August 2022: http://publication.pravo.gov.ru/Document/View/0001202208050002

Opinion Corner*: Can Bitcoin become the next world currency?

BY SHAHAB SHARFAEI[1]

A decade and a half has passed since Bitcoin burst onto the scene. The hopes of the early adopters were that it would be the next world currency – a hope that remains unfulfilled. Fifteen years and a host of scandals and financial bubbles later, the question remains: can Bitcoin deliver on its initial promise?

BITCOIN AS AN ANSWER TO THE GLOBAL FINANCIAL CRISIS

Cryptocurrencies promise to transform the financial markets and change the way currencies are traded. Their creation was motivated by the perception that the international monetary system essentially represents a house of cards: it is unstable enough to be prone to recurrent crises. Although this perception may hold true, the question remains as to whether cryptocurrencies are the answer to the problem. Thousands of cryptocurrencies have since emerged, with each trying to leave its own mark on tackling the issue.

Bitcoin, in particular, was created in response to the monetary problems that contributed to the global financial crisis of 2008/2009. Following its inception, the price of Bitcoin went up spectacularly, reaching an all-time high of over USD 68,000 in April 2021. However, it has since crashed, due to a myriad of issues. This crash has been deeper than just the macro headwinds (rising inflation and a slowdown in economic growth) or the recent FTX debacle would have led us to expect. In answering the question of whether Bitcoin can become the next global currency, it is important to distinguish between the terms 'currency' and 'money'. The two are often used interchangeably, but they refer to different characteristics: money is a store of value, whereas currency represents money (i.e. is a receipt for the money). For instance, if a currency is backed by gold, then gold is the *money*, while *currency* is the receipt that entitles you to ownership of the money (i.e. gold). Thus, currency in itself has no value: it is money that has intrinsic value. The lack of any commodity backing for a currency gives it the unflattering status of a fiat currency, which is the case with all current national currencies.

Here, we focus on the initial motivation for the creation of Bitcoin and look at whether it can become a legitimate currency.[2] To this end, we will examine whether it satisfies the three criteria typically required of a currency – i.e. whether it can serve as (i) a medium of exchange, (ii) a unit of account, and (iii) a store of value.

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* Disclaimer: The views expressed in the Opinion Corner section of the Monthly Report are exclusively those of the authors and do not necessarily represent the official view of wiiw.

1 Shahab Sharfaei is a PhD researcher at Prague University of Economics and Business.

2 These arguments, however, can be extended to all cryptocurrencies. After all, they are categorised as 'cryptocurrencies' because they were conceived primarily as a new form of currency.

EXCESSIVE VOLATILITY PROBLEM

Bitcoin possesses some of the properties of a currency. However, it is far more volatile than other fiat currencies. For example, in 2021 the price of a single Bitcoin grew from under USD 30,000 to over USD 68,000, before crashing to below USD 16,000 in 2022. And of course, there has been further volatility more recently. In fact, Bitcoin markets experience volatility that is considerably higher than even the currencies of the least developed countries (Kasper, 2017). Such levels of instability can serve as an impediment to Bitcoin performing all the functions associated with a currency (i.e. medium of exchange and unit of account) in a reliable and effective way.

As it currently stands, before using it as a means of payment, a consumer first needs to purchase a Bitcoin (or Satoshi). It is very likely that as soon as the seller receives the Bitcoin, he (or she) will convert it back into the local currency. This carries with it an exchange rate risk, which rises according to the level of volatility in the Bitcoin price. The daily volatility of Bitcoin could be anything from a few percentage points up to 25% or even higher. Thus, using Bitcoin to buy a good valued at USD 100 could cost up to USD 25 more, depending on the time of the purchase. This type of price action – over and above the transaction costs – could complicate the use of Bitcoin as a medium of exchange.

Aside from its price volatility, Bitcoin also has considerable transaction fee volatility. Extreme fluctuations in transaction fees and processing times raised concerns about the viability of cryptocurrencies and led to the 'transaction fee crisis'. Transaction fee increases are usually a consequence of an influx of users who are quite prepared to pay. Such fee hikes might discourage other users from making transactions and could ultimately damage the long-term appeal of Bitcoin. This issue might self-correct, since the fee hikes will entice more miners of Bitcoin to join the system as it becomes more lucrative to mine, thereby increasing the supply of Bitcoins. Nevertheless, the constant fluctuations in both directions will increase the uncertainty on the Bitcoin market. Moreover, there are already many cryptocurrencies that have reduced the transaction costs significantly; and there is nothing to stop new cryptocurrencies further reducing – or indeed scrapping – these fees. Thus, even if Bitcoin could reduce the transaction fees, it will not give it an edge over the thousands of other cryptocurrencies in existence. There are also some concerns about the efficiency of these transaction fees. Basically, the transaction fees (which are ultimately borne by the users) serve only as a queue-sorting system, and thus should be considered 'social waste' (Basu et al., 2018).

THE CURIOUS CASE OF TESLA

The above factors highlight the unlikelihood of Bitcoin being accepted as a means of exchange by businesses, despite the assertions made in some news outlets and in academia. Economic reasoning suggests that the risk and the cost to firms will be very high if they use Bitcoin as a payment method. Instead, some businesses may facilitate the conversion of Bitcoin via a linked cryptocurrency exchange. This process is analogous to paying a bill in a foreign currency, which is then converted into the local currency at the time of the transaction. This would increase the transaction cost even beyond what it would be with direct payment in Bitcoin. While this mechanism would protect sellers, it would increase the cost for buyers, and so it is unlikely to be adopted on a large scale.

The case of Tesla illustrates this point. Before the recent Bitcoin bubble crash, Tesla announced that it would accept payment for its cars in Bitcoin. However, a closer look at the small print shows that the terms and conditions were phrased in such a manner that Tesla was absolved of all the volatility risk associated with the transaction (Tesla, 2021). The entire downside risk of transaction volatility was borne by the consumer, while Tesla only benefited from the upside transaction volatility. This probably explains why not many Tesla cars were sold for Bitcoin.[3] Tesla later scrapped the idea and sold most of its Bitcoin position.

The only way to mitigate the transaction risks associated with Bitcoin as a medium of exchange is for a nation state to adopt it as its principal currency. But even then, the prices of goods and services could fluctuate excessively if the price of Bitcoin were to move substantially. It is highly unlikely that any developed nation would adopt Bitcoin as its national currency and thereby surrender control over its money supply. It is more likely that a central bank would create its own digital currency, rather than adopt Bitcoin or any other existing crypto. However, the same is not true of less developed nations. For example, El Salvador, which has adopted Bitcoin as an official currency, did not have its own national currency, but instead used the USD as a medium of exchange.

CONCLUSION

Overall, Bitcoin is too expensive to use, too volatile, and too slow to serve as a medium of exchange.[4] Consequently, it cannot serve as a unit of account either (a unit of account and a medium of exchange are inseparable features of a currency – White, 1984). Furthermore, its excessive volatility makes it extremely difficult to measure the true price of a good in terms of Bitcoin. As such, it is highly unlikely that Bitcoin will ever become the world currency – or even a regional one.

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[3] Perhaps Tesla took this step because it had bought billions of dollars' worth of Bitcoin, which it held on its balance sheet; it might have only been a way of legitimising its business decision.

[4] Elon Musk, who famously bought Bitcoin both personally and for Tesla in 2021, called Bitcoin 'comically slow' (Lex Fridman Podcast, 30 December 2021).

Revisiting the benefits of EU membership: the case for the Western Balkans and Moldova

BY JAVIER FLÓREZ MENDOZA AND OLIVER REITER

Here we re-evaluate the possible economic effects that would arise from the Western Balkan countries plus Moldova joining the EU. Applying a standard model for trade policy analysis, we find increases in real GDP ranging from 0.2% (for Montenegro) to 1.3% (for North Macedonia). Estimated positive changes in exports range from 13% (for Albania) to 18% (for Montenegro). The EU countries would also see positive effects, though of a much smaller magnitude.

INTRODUCTION AND MOTIVATION

The accession of the six Western Balkan countries of Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia is an ongoing topic in the EU, while Moldova was officially recognised by the EU as an accession candidate last year (along with Ukraine). After years of relative inaction, a new methodology for EU accession was introduced in February 2020. And in October 2020, the European Commission adopted its 2020 EU Enlargement Package, which envisages additional conditions, but also additional economic assistance for potential new EU members. This has served to increase the attention given to the potential EU accession of the six Western Balkan countries. The Russian invasion of Ukraine then further alerted politicians in the EU to the need to bring Ukraine and Moldova, but also the Western Balkan countries closer to the EU and accelerate negotiations, in order to preclude any Russian interference tactics.

The two nations that have recently made some progress toward joining the EU are Albania and North Macedonia, which were given permission to begin accession negotiations on 18 July 2022.[1] However, public support for EU accession varies a lot by country: in 2021, 97% of Albanians were in favour;[2] and a similar survey showed 78% support in Montenegro. However, only 28% of Serbians 'would be glad' if Serbia joined the EU.[3]

The renewed interest in the EU membership bids of these countries warrants a fresh evaluation of the possible economic benefits that EU membership might bring.

The results we show are based on a structural gravity model (Anderson et al., 2018; Yotov et al. 2016), which is the workhorse model in international trade literature. With the gravity model, the effects of trade policy (such as signing a free trade agreement or joining a customs union) can be estimated, and

1 See https://www.euractiv.com/section/enlargement/news/explainer-next-steps-for-albania-north-macedonia-as-eu-agrees-starting-accession-talks/ (accessed on 20.2.2023).

2 See https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/729418/EPRS_ATA(2022)729418_EN.pdf (accessed 20.2.2023).

3 See https://www.eeas.europa.eu/delegations/montenegro/public-opinion-poll-citizens-support-eu-accession-more-strongly_en (accessed 20.2.2023) and https://www.intellinews.com/poll-shows-serbian-interest-in-eu-accession-waning-263181/ (accessed 20.2.2023).

counterfactual scenario analysis undertaken. The gravity model is well established, thanks to its solid theoretical foundations and tremendous predictive power, see, for example, Anderson (2011), Head and Mayer (2014), Arkolakis et al. (2012), Larch et al. (2019) and Baier et al. (2019) for a recent evaluation of trade policy measures.

DATA AND METHODOLOGY

The United States International Trade Commission (USITC) is the main data source. First, we use trade flows from the International Trade and Production Database for Estimation (ITPD-E) provided by Borchert et al. (2022). This database offers wide country coverage (265 countries and territories) and consistently constructed international and domestic trade flows for the period between 1986 and 2019. In addition, the ITPD-E Release 2 covers 170 industries classified into four main sectors: agriculture, mining and energy, manufacturing and services.[4] One of the main advantages of using this data set is that it includes intranational (or domestic) trade, which refers to the economic activity that takes place within a country's borders, for instance between regions within a country. Including domestic trade is relevant for general equilibrium analysis because of factors such as transportation cost or infrastructure, which can vary greatly between regions.[5] Second, we combined the trade data with the Dynamic Gravity Database (DGD) provided by Gurevich et al. (2018).[6] This database offers us several benefits, thanks to a wide variety of gravity covariates (such as distance, common language, contiguity, free trade agreements, and EU and World Trade Organization membership).

We develop a procedure that creates a balanced panel of countries, keeping countries that a) report domestic trade at the aggregate level and b) are of interest for our counterfactual analysis. In addition, we applied an imputation procedure to construct domestic trade for Montenegro for certain years.[7] Our final sample consists of 83 countries for the period 2006 to 2019.[8]

Despite being standard, the gravity model has some shortcomings. For example, the structural gravity model does not include inter-industry linkages (an increase in demand for final goods does not result in increased demand for intermediate input products), and so the results presented below may be regarded as lower bounds. There are newer quantitative trade models that incorporate inter-industry linkages (see Caliendo and Parro, 2015, and models that build on their work). These, however, necessitate the use of multi-country input-output databases, which are only available for a smaller sample of countries. Furthermore, the gravity model includes one representative household and firm agent for every country; thus, we cannot say anything about how gains and losses from trade policy are distributed among households or firms. We also note that the changes in GDP and exports that we report below are one-time variations, and not modifications to growth rates.

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4 ITPD-E Release 2 is available for download at: https://www.usitc.gov/data/gravity/itpde.htm

5 Borchert et al. (2021) define domestic trade as the difference between the gross value of total production and the value of total exports. Thus, we can differentiate between the value of economic activity that takes place within a country's border and across the international border.

6 DGD Version 2.1 is available for download at: https://www.usitc.gov/data/gravity/dgd.htm

7 Montenegro's internal trade was missing for the years 2010 to 2015. To achieve consistency for the imputed values, we relied on gross output from the wiiw annual database.

8 The starting year is 2006, to take account of the split between Serbia and Montenegro that took place in that year. Additionally, domestic trade for Montenegro is available from 2006 onwards.

Our methodological approach follows Anderson et al. (2018). The General Equilibrium with Poisson Pseudo Maximum Likelihood (GEPPML) approach consists of three main steps.

First, a 'baseline' scenario is established by estimating the 'baseline' gravity, which represents the *normal level of trade flows* between different countries. Moreover, 'baseline' general equilibrium (GE) indexes are constructed to reflect the economic conditions of different countries, taking account of changes in the inward multilateral resistance (IMR) and outward multilateral resistance (OMR), which are essential for GE analysis.[9]

Secondly, the 'conditional' scenario is established by estimating the 'conditional' gravity, which represents the level of trade flows between different countries *under specific conditions*, such as policy changes or economic shocks. In our case, this represents the counterfactual of the Western Balkans countries joining the EU and how this would affect trade costs. Subsequently, 'conditional' GE indexes are constructed to reflect the resulting changes in economic conditions via changes in trade costs.

Finally, the 'full endowment' scenario is established by estimating the 'full endowment' gravity, which represents the *ideal level of trade flows* between countries, where all countries are subject to changes not only in OMR and IMR, but also in the economic size of the countries, which is driven by changes in total output and expenditure. 'Full endowment' GE indexes are constructed to reflect ideal economic conditions. Furthermore, the GEPPML methodology combines structural gravity models and general equilibrium analysis to evaluate the impact of various economic scenarios on international trade flows and economic conditions. Figures 1 and 2, as well as Table 1, report the results from this step.

To achieve robustness, we follow recent developments in the gravity literature, as well as best practices concerning econometric estimation. In the main, we estimate the model using the Poisson Pseudo Maximum Likelihood (PPML) method, as proposed by Santos Silva and Tenreyro (2006). Due to the number of countries in our sample, we estimated the model using the PPML with high-dimensional fixed effects, as developed by Larch et al. (2019), which allows us to achieve faster convergence in the estimation. We also take into consideration changes in globalisation and implement the bias correction proposed by Weidner and Zylkin (2021). One important reason for this is that, since we included domestic trade, our estimates could be downward biased. Finally, we follow the recommendations of Egger et al. (2022) to use consecutive years and Yotov et al. (2016) to estimate the model including both international and intranational trade, use theory consistent control size (exporter and importer time, as well as asymmetric pair fixed effects) and proxies for trade costs – in our case, 'estibrated' (a mixture of estimation and calibration) trade costs in the estimation.

[9] The inward and outward multilateral resistances refer to trade barriers or challenges that can hinder trade flows between two countries. The IMR represents the obstacles that a country faces when trying to export. The OMR refers to the challenges faced by other countries in accessing a particular country. For further clarification on the multilateral resistance, see Anderson (2011).

Figure 1 / Export effects of Western Balkan countries and Moldova joining the EU

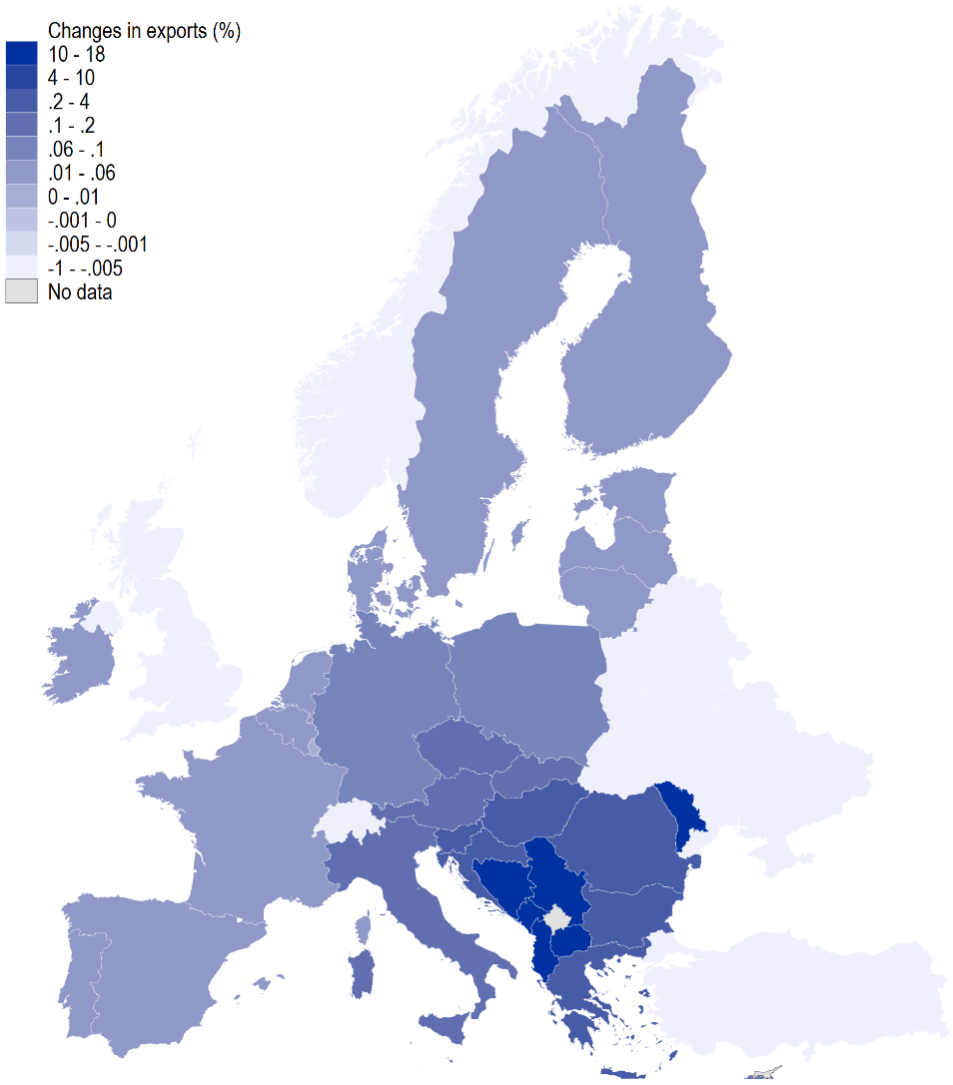

Figure 2 / Real GDP effects of Western Balkan countries and Moldova joining the EU

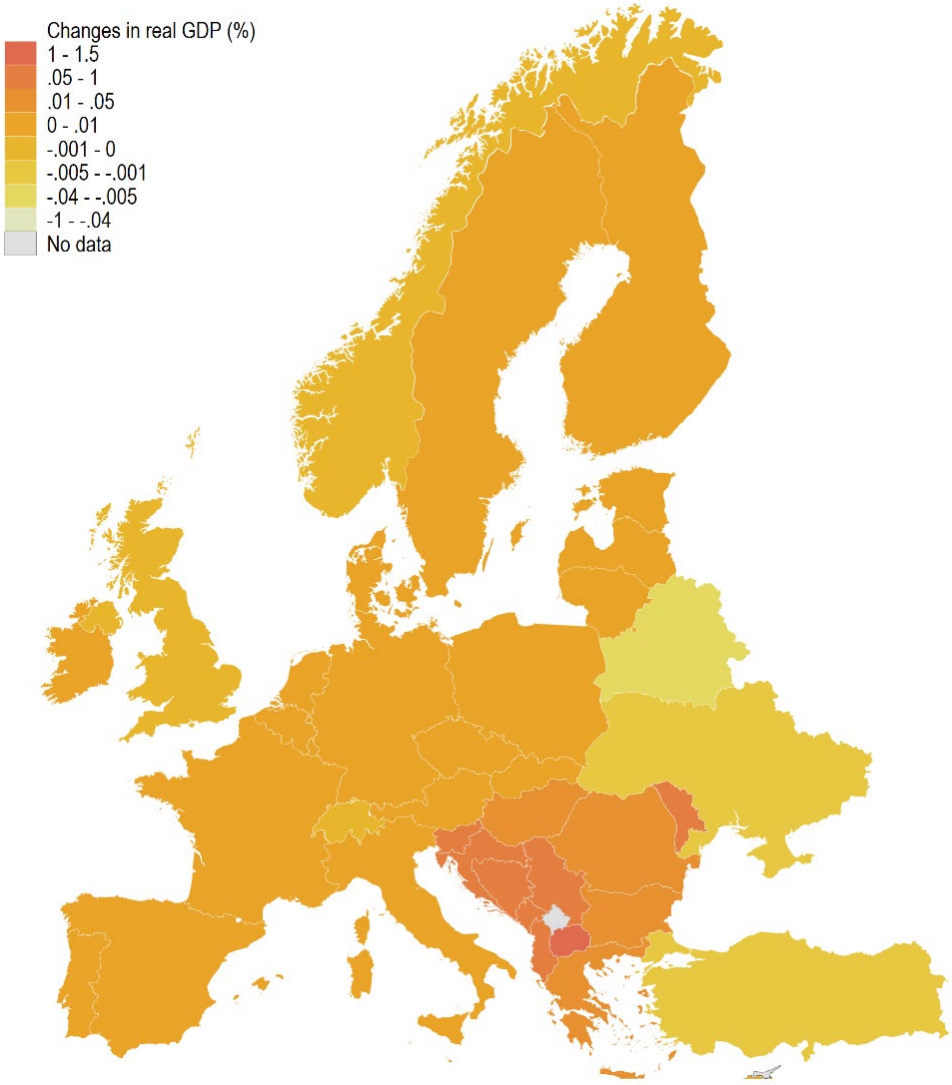

Table 1 / Main modelling results for the scenario of Western Balkan countries and Moldova joining the EU, selected countries

Country	% change in real GDP	% change in nominal exports	% change in producer prices
Albania	0.42	13.33	0.24
Bosnia and Herzegovina	0.63	16.70	-0.20
Moldova	0.56	13.99	-0.18
North Macedonia	1.30	14.75	0.50
Montenegro	0.23	17.68	-1.01
Serbia	0.62	13.63	0.07
Bulgaria	0.03	0.61	0.02
Hungary	0.02	0.22	0.01
Romania	0.01	0.49	0.01
Austria	0.01	0.18	0.01
Greece	0.01	0.45	0.03
Croatia	0.10	1.49	0.05
Italy	0.01	0.20	0.00
Poland	0.00	0.10	0.01
Slovakia	0.01	0.13	0.00
Slovenia	0.10	0.95	0.03

Our modelling results for the counterfactual scenario of the five Western Balkan countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia)[10] and Moldova joining the EU suggest economic benefits on both sides. Our findings show that for North Macedonia, the projected growth in real GDP is particularly large, at 1.3%; it is followed by Bosnia and Herzegovina (0.6%) and Serbia (0.6%). Montenegro, despite seeing its exports rise by almost 18%, would experience a rise in GDP of only about 0.2%. Likewise, the biggest gains in the EU in terms of GDP are for Croatia and Slovenia (0.1%). For Austria, we see positive, but relatively small, effects.

EU enlargement to encompass the Western Balkans and Moldova should also boost trade between the 'new' and 'old' EU members. On the one hand, the Western Balkan countries and Moldova would experience a significant increase in total exports: in this respect, the biggest beneficiary would be Montenegro, which, it is estimated, would see its total exports rise by nearly 18%. On the other hand, most existing EU member states could see an increase in their exports as well, with the highest gains projected for Croatia, followed by Slovenia and Bulgaria. Austria's exports are projected to increase by 0.2%.

The last column displays estimated changes in producer prices. Interestingly, Montenegro would experience a decrease in producer prices, meaning Montenegrin consumers would benefit from falling prices. Bosnia and Herzegovina and Moldova would both also see small decreases in prices, whereas Albania, North Macedonia and Serbia would see rising prices. The EU members would experience only very minor increases in prices.

[10] Kosovo could not be included due to data availability issues.

OUR CONCLUSIONS ARE IN LINE WITH EARLIER STUDIES

Our findings are well in line with previous literature on the effects of trade agreements in general, and specifically with the effects of EU membership on trade. Like this article, previous studies found positive effects stemming from (trade) agreements with the EU: Reiter and Stehrer (2018) find that Stabilisation and Association Agreements (SAAs) between the EU and Western Balkan countries increase gross and value-added trade flows by around 26%. Undertaking a similar counterfactual analysis as presented here, they find that these SAAs had positive real GDP effects ranging from 0.16% for Albania to 0.26% for Montenegro. Similarly, Reiter and Stehrer (2021) show that, besides promoting exports, SAAs also raise the participation of Western Balkan countries in global value chains. Grieveson et al. (2020) additionally find that SAAs increase the value of foreign direct investment inflows from the EU to the country signing the SAA.

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The role of state aid as a driver of export performance in the EU

BY CHIARA CASTELLI[1]

In response to the crises of 2007 and 2010, state aid to businesses in the EU was increased substantially, with an average of 16% of it directed towards R&D and innovation. We find evidence of public intervention having had a significant influence in promoting digital competitiveness, especially in terms of digital capital exports and particularly for relatively R&D-intensive industries. Our analysis shows that public intervention should favour a broader approach to supporting digital exports, as more specific state aid that targets R&D and innovation requires prior technological knowledge, if it is to be successful.

STATE AID IN THE EU

In response to the severe economic recession brought about by the financial and sovereign debt crises of 2007 and 2010, most European countries increased their financial support to the business sector, as is shown by comparing the state aid granted in 2007 and 2012 (Figure 1), measured as a share of gross value added (GVA). The largest increase was recorded in Latvia (+2.0 percentage points – pp), followed by Bulgaria (+0.9 pp), Greece (+0.8 pp)[2] and Slovenia (+0.8 pp).

By state aid, what we mean is the wide range of public interventions (e.g. grants, interest and tax concessions, guarantees, government participation in the ownership of an enterprise, etc.) aimed at supporting the development of specific industries and enterprises exposed to market failure, so long as these measures do not undermine the principles of fair competition that govern the EU Single Market.[3]

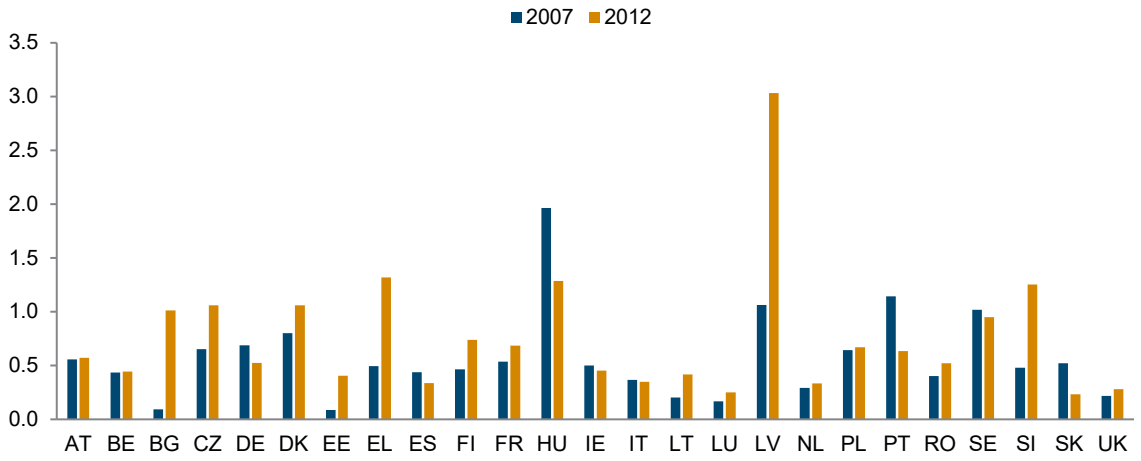
According to this definition, state aid is only permitted in certain circumstances: namely, when public intervention is necessary to guarantee sustainable and equitable development of the economy. Therefore, EU legislation regulates the specific policy objectives under which state aid can be considered compatible. Those objectives range from the promotion of environmental protection and energy saving to the regional development of deprived areas, the promotion of job opportunities for certain disadvantaged working categories (e.g. disabled workers) and the development of research and development (R&D) and innovation activities. This last objective is the focus of our analysis.

1 This research is financed by the Jubilee Fund of Oesterreichische Nationalbank (under the project title 'Comparative Advantage in the Digital Era', Project No. 18641). The financial support provided by Oesterreichische Nationalbank for this research is gratefully acknowledged.

2 This value should be read with caution, as Greece's GVA was severely affected during the crisis period. As a result, the increase observed in the corresponding state aid ratio was driven, at least in part, by the significant decrease in the denominator.

3 These principles include, among other, the prohibition to act in favour of any distortion of the market competition and trade within the EU by favouring certain companies or the production of certain goods. More information is available at the dedicated website of the European Commission: https://competition-policy.ec.europa.eu/state-aid_en

Figure 1 / State aid as a percentage of GVA, 2007 and 2012



Note: The sample includes all EU members, with the exception of Croatia, Cyprus and Malta, plus the UK.
Source: own calculations, based on state aid dashboard (European Commission) and GVA (EU KLEMS).

The exceptional nature of this type of public expenditure is further confirmed by Figure 1: for most EU member states, the value of state aid funds is only around 0.50% of GVA.

However, there are many exceptions where these funds represent a relatively significant share of GVA, especially in 2012. Interestingly, the top countries are a rather heterogeneous group, including as they do several EU-CEE economies, such as Latvia (3%), Hungary (1.28%), Slovenia (1.26%), Bulgaria and Czechia (both around 1%), as well as the more advanced north-western economies, such as Denmark (1%) and Sweden (0.95%). This heterogeneity may suggest that the use of state aid as an instrument to guard against market failure may not depend directly on a country's economic status.[4]

A DEEPER FOCUS ON R&D AND INNOVATION STATE AID

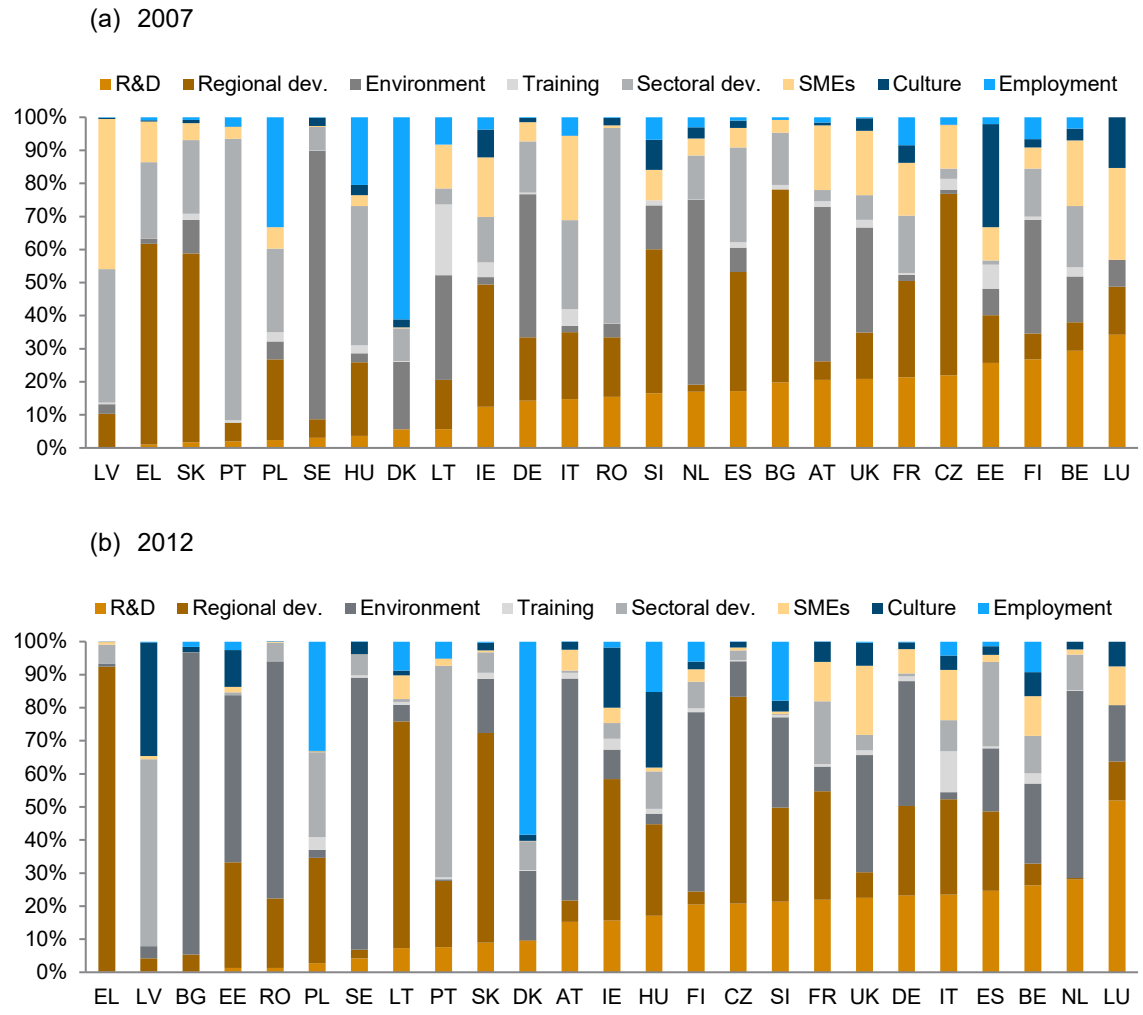
Zooming in on the distribution of national funds by policy objective, it is possible to focus on the availability of R&D and innovation funds by country over time (Figure 2). At first sight, the share of state aid for R&D and innovation activities appears to vary considerably across the EU countries. In fact, although the mean share of R&D spending in total state aid remained constant at around 16% between 2007 and 2012, developments in individual countries were very different.

Starting with the left-hand side of the two charts, Greece and Latvia had an almost complete absence of public R&D in 2007 and 2012; Estonia saw a -24 pp change between 2007 and 2012 and Bulgaria a -19 pp change, as those two countries moved from near the top of the distribution to the bottom. Romania (-14 pp), Finland (-6 pp) and Austria (-5 pp) also showed significant declines in terms of public R&D funding.

[4] Other advanced EU economies – such as Austria (0.57%), Germany (0.53%), Finland (0.74%) and France (0.68%) – also present high shares, compared to the rest of the sample.

Moving to the right-hand side of the panels in Figure 2, Luxembourg (+18 pp) has demonstrated outstanding public R&D and innovation support over time, being the only EU country where more than half of the overall state aid went on R&D. The Netherlands (+11 pp) and Belgium (-3 pp) also showed a remarkable public strategic interest in R&D activities, despite following opposite dynamics over time. Descending the 2012 ranking, Spain (+7 pp), Italy (+9 pp) and Germany (+9 pp) registered significant increases in their shares of state aid going on R&D, along with Hungary (+13 pp).

Figure 2 / State aid breakdown by policy objective, % of total funds



Note: Countries ordered by the share of R&D and innovation over total state aid.
Source: State aid dashboard (European Commission).

ANALYSIS OF SECTORAL EXPORT FLOWS

The purpose of the following analysis is to test for the effectiveness of state aid as a driver of trade performance and, in particular, of digital exports. Specifically, thanks to the methodology developed by Guarascio and Stöllinger (2022), it is possible to compute the Digital Factor Content of Exports (DFCE) for the years 2007 and 2012 for most EU countries at the industry level.

This procedure can be summarised briefly in two steps. In the first, information on country-industry endowments in digital labour and capital factors – expressed as digital tasks provided by labour services and information and communications technology (ICT) capital stock, respectively – is combined with information on inter-sectoral intermediate inputs linkages.[5] The result of this combination provides a quantification of both the (digital) labour and the capital factor inputs[6] required to obtain one unit of output for any given country-industry in the sample. In the second step, this information is combined with the corresponding export flows, in order to get the final DFCE at the country-industry level. Thanks to this procedure, we are able to measure both digital tasks and ICT capital embodied in sectoral exports across all EU members during the year of interest for the analysis – i.e. 2012.

On the institutional perspective, the possibility of differentiating between public funds according to policy objectives (as seen in the previous section) allows us to examine further whether the specific allocation of public funds to R&D and innovation activities played a relevant role in supporting digital competitiveness.

Therefore, we estimate the following econometric specification:

$$\ln f_{k,2012}^{rs} = \beta_1 \ StateAid_{2007}^{r} + \beta_2 \, RD_{k,2007}^{r} + \beta_3 \left(StateAid_{2007}^{r} \times RD_{k,2007}^{r}\right) + \gamma^{rs} + \varphi_k^{s} + \varepsilon_k^{rs}$$

where *r* is the exporter country, *s* is the importer country and *k* denotes the industry.[7] The dependent variable f_k^{rs} measures the DFCE, expressed as digital skills employed or ICT capital stock, both in logarithm form. On the right-hand side, the variable $StateAid$ represents the amount of either total or R&D-specific aid provided by the exporting country, and RD measures the R&D stocks of the exporter's industry. Both country and industry-specific variables are log transformed.[8] Finally, γ and φ control for country-pair and importer-industry variability, respectively, while ε is the random component.

Within this framework, we performed our analysis by keeping the response variables at 2012 values and lagging all controls to 2007, in order to account for potential simultaneity issues (following Wang and Li, 2017).

Thanks to the above specification, we can answer three main research questions:

1. Does state aid contribute to the promotion of digital exports, and if so, which kind of funds (i.e. total versus R&D-specific) is the most effective?
2. At the lower sectoral scale, are digital exports positively influenced by industry-specific R&D intensity?

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5 That is, the intermediate linkages quantify the amount of direct and indirect intermediate goods required from industry A to obtain one unit of output in industry B.

6 Similarly to the previous linkage term, the factor requirement linkages quantify how much input (in terms of labour and capital) is required from industry A to get one unit of output in industry B.

7 Specifically, the sample includes intra-EU export flows coming from 36 different economic sectors (NACE 2-digits) of 19 EU countries, namely Austria, Belgium, Bulgaria, Czechia, Germany, Estonia, Finland, France, Greece, Hungary, Italy, Lithuania, Luxembourg, Latvia, the Netherlands, Romania, Slovakia, Slovenia and Sweden. On the importer side, information is available for the group of exporter countries, plus Denmark, Greece, Ireland, Poland, Portugal and the United Kingdom.

8 Furthermore, all variables are expressed in constant terms (i.e. in constant 2015 euros) to account for inflation dynamics.

3. Is there a reinforcing role between the two, i.e. does public intervention improve digital exports in relatively more R&D-intensive industries?

To answer these questions, we can look at the results presented in Table 1.

Specifically, the first two columns show the estimated coefficients when **total state aid** is considered as an institutional variable and the two digital export categories are the response variables, i.e. digital skills (column 1) and ICT capital (column 2). Here, the positive and significant coefficients obtained in both the state aid and R&D main effects provide evidence of a conducive role for state aid, as well as for industry-specific assets as promoters of digital exports – especially in terms of ICT capital. This allows us to answer the first two research questions in the affirmative. Moreover, the inclusion of an additional coefficient on the interaction between the two variables highlights the presence of a complementary effect on digital competitiveness, as sectors with a stronger R&D vocation seem to benefit relatively more from state funds. This provides a positive answer to the third research question, too.[9]

Moving to the third and fourth columns of Table 1, we can focus on the effects of **R&D-specific public funds** on digital exports. A slightly different picture now emerges: the corresponding coefficient on state aid now has a negative sign, while both industry-specific R&D capacity and the interaction term remain positive, especially when ICT capital is considered. Such results may suggest that tailored policies aimed at fostering industrial technological competitiveness and innovation require firms to be equipped with adequate technological knowledge and skills, if those policies are to be successful.

Table 1 / Estimation results

	Total state aid		R&D state aid	
	(1)	(2)	(3)	(4)
	Ln FCT Emp du	Ln FCT K ict	Ln FCT Emp du	Ln FCT K ict
R&D stock × total state aid	0.0337***	0.123***		
	(0.00556)	(0.00798)		
Total state aid	8.718***	11.62***		
	(0.502)	(0.579)		
R&D stock	0.184***	0.777***	0.295***	0.426***
	(0.0315)	(0.0456)	(0.0280)	(0.0385)
R&D state aid			-8.158***	-10.73***
			(0.475)	(0.546)
R&D stock × R&D state aid			0.0374***	0.0417***
			(0.00344)	(0.00476)
Constant	49.62***	58.19***	49.62***	58.19***
	(2.644)	(2.983)	(2.644)	(2.983)
Observations	10,221	10,013	10,221	10,013
R-squared	0.909	0.877	0.909	0.877
Adjusted R-squared	0.864	0.864	0.864	0.864
Bilateral FE	Yes	Yes	Yes	Yes
Importer-Industry FE	Yes	Yes	Yes	Yes

Note: Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.
Source: own calculations.

[9] In absolute terms, each coefficient returns the corresponding outcome's elasticity with respect to the selected control variable. For instance, if we take the R&D variable as reference, a 1% increase in the value of R&D stock at the industry level increases exports of digital tasks by a total of 0.21% (0.18+0.03) and ICT capital exports by a total of 0.9% (0.78 +0.12).

CONCLUSIONS

Taken together, these results suggest that it is primarily broad state aid, rather than specific R&D funds, that has a significant impact on a country's digital export performance. A second takeaway from the analysis highlights the privileged role of ICT capital, rather than digital skills employed, in exploiting the beneficial role of national funds and of sectoral R&D vocation. This result could be explained, at least in part, by the context-specific nature of digital skills, which, in order to flourish as a significant component of aggregate economic outputs, such as exports, require a certain degree of industrial and institutional specialisation in innovation. Finally, the emerging evidence suggests the existence of a reinforcing role between sectoral R&D and institutional support in improving digital competitiveness, implying that greater R&D capacity is a prerequisite for the effectiveness of public interventions.

Although our analysis is based on data from 2007 and 2012, it nevertheless seems adequate to provide evidence on the long-term dynamics that may affect the structural transition towards a digitalised economic system, given that this process requires time to be fully implemented by all economic agents, especially firms.

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Forecasts of main economic indicators for Central, East and Southeast Europe for 2023-2025

From now on, instead of charts with monthly and quarterly statistics, every second month we aim to publish up-to-date forecasts and forecast revisions of the main economic indicators for CESEE countries: real GDP growth, consumer price index (CPI), unemployment rate, current account and fiscal balance. In addition to the existing January and July forecast updates, the additional new updates are scheduled for the March, May, October and December Monthly Report issues.

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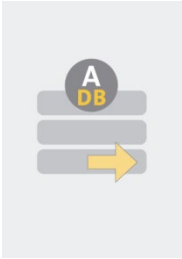

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For more information on both database access for Members and conditions of Membership, please contact Ms Barbara Pill (pill@wiiw.ac.at), phone: (+43-1) 533 66 10.

Table 1 / Real GDP growth and revisions since January 2023

Region		2023		2024		2025	
EU-CEE							
BG	Bulgaria	2.0	▲	2.5		3.0	
CZ	Czechia	0.4		2.4		2.7	
EE	Estonia	1.1	▲	3.5	▲	4.0	▼
HR	Croatia	1.5	▼	2.3	▼	2.5	
HU	Hungary	-0.5	▲	1.7		2.5	
LT	Lithuania	1.3		2.8		3.0	
LV	Latvia	0.0		3.3		2.8	
PL	Poland	1.0		2.2	▼	3.0	
RO	Romania	2.6	▲	4.5	▲	4.0	
SI	Slovenia	1.2		2.7		2.9	
SK	Slovakia	0.6		2.3		2.4	
Turkey							
TR	Turkey	3.0		3.2		4.0	
Western Balkans							
AL	Albania	3.0		3.6		3.8	
BA	Bosnia and Herzegovina	1.3	▼	2.2		2.5	
ME	Montenegro	2.6		3.3		3.0	
MK	North Macedonia	1.0		2.5		2.5	
RS	Serbia	1.5		2.6		3.0	
XK	Kosovo	3.4		3.8		4.0	
CIS+UA							
BY	Belarus	1.0		1.5		1.5	
KZ	Kazakhstan	3.5		4.0		4.0	
MD	Moldova	1.0		4.0		3.5	▼
RU	Russia	-1.5	▲	1.0		1.5	
UA	Ukraine	3.0		8.0		8.0	

Note: Cut-off date: 15 March 2023. Colour scale variation from the minimum (grey) to the maximum (gold). Arrow signifies direction of revisions since January 2023.
Source: wiiw.

Table 2 / CPI growth and revisions since January 2023

Region		2023		2024		2025	
EU-CEE							
BG	Bulgaria	10.0		7.0		5.0	
CZ	Czechia	10.3	▲	4.0		3.0	
EE	Estonia	9.3	▲	4.5	▲	3.2	▲
HR	Croatia	7.0	▲	3.0		2.0	
HU	Hungary	18.0	▲	8.0	▼	5.0	▼
LT	Lithuania	8.5		3.3		2.8	
LV	Latvia	10.0		4.5		3.3	
PL	Poland	12.5	▼	6.0		4.0	
RO	Romania	11.0		6.0		4.0	
SI	Slovenia	6.5		3.6		2.0	
SK	Slovakia	8.0		5.0		3.0	
Turkey							
TR	Turkey	37.0		19.0		11.0	
Western Balkans							
AL	Albania	4.0		3.0		2.8	
BA	Bosnia and Herzegovina	8.0		3.0		2.0	
ME	Montenegro	11.0	▲	3.5		2.5	
MK	North Macedonia	10.0		4.0		3.0	
RS	Serbia	9.0		4.0		3.0	
XK	Kosovo	7.0		2.5		2.0	
CIS+UA							
BY	Belarus	12.0		11.0		10.0	
KZ	Kazakhstan	13.0		9.0		6.0	
MD	Moldova	14.0		6.0		5.0	▼
RU	Russia	5.6	▲	4.7	▲	3.4	▲
UA	Ukraine	16.0		9.0		7.0	

Note: Cut-off date: 15 March 2023. Colour scale variation from the minimum (gold) to the maximum (grey). Arrow signifies direction of revisions since January 2023.
Source: wiiw.

Table 3 / Unemployment rate in % (LFS) and revisions since January 2023

Region		2023		2024		2025	
EU-CEE							
BG	Bulgaria	4.4	▼	4.5		4.5	
CZ	Czechia	2.7	▼	2.6	▼	2.6	
EE	Estonia	7.0	▼	6.2	▼	5.6	▼
HR	Croatia	6.5		6.3		6.1	
HU	Hungary	4.5		4.0		3.5	
LT	Lithuania	6.8		6.5		6.3	
LV	Latvia	7.4		7.2		6.8	
PL	Poland	3.3	▲	3.6	▲	4.0	▲
RO	Romania	5.5		5.4		5.3	
SI	Slovenia	4.3		4.2		4.2	
SK	Slovakia	5.9		6.2		6.0	
Turkey							
TR	Turkey	10.5		9.5		9.0	
Western Balkans							
AL	Albania	10.5		10.0		9.5	
BA	Bosnia and Herzegovina	16.1		15.7		15.6	
ME	Montenegro	15.0		13.9		13.0	
MK	North Macedonia	14.0		13.5		13.0	
RS	Serbia	9.0		8.5		8.0	
XK	Kosovo	23.5		23.2		22.5	
CIS+UA							
BY	Belarus	4.0		4.0		4.0	
KZ	Kazakhstan	4.9		4.8		4.8	
MD	Moldova	4.0		3.5		3.0	
RU	Russia	4.0	▼	4.0	▼	3.8	▼
UA	Ukraine	20.0		9.0		7.0	

Note: Cut-off date: 15 March 2023. Colour scale variation from the minimum (gold) to the maximum (grey). Arrow signifies direction of revisions since January 2023.
Source: wiiw.

Table 4 / Current account as % of GDP and revisions since January 2023

Region		2023		2024		2025	
EU-CEE							
BG	Bulgaria	-0.5	▲	-0.3	▼	0.3	▲
CZ	Czechia	-3.8		-2.6		-0.9	
EE	Estonia	-0.3	▼	0.2	▼	0.4	
HR	Croatia	-1.0	▼	-0.2	▼	0.8	▲
HU	Hungary	-4.0	▲	-4.0	▲	-3.5	
LT	Lithuania	-5.0		-4.0		-3.0	
LV	Latvia	-1.5		-2.0		-2.5	
PL	Poland	-1.0		0.0		0.5	
RO	Romania	-8.7		-7.5		-6.5	
SI	Slovenia	1.1		1.3		1.7	
SK	Slovakia	-6.4		-5.7		-5.2	
Turkey							
TR	Turkey	-5.0		-3.5		-3.5	
Western Balkans							
AL	Albania	-6.4		-6.0		-6.5	
BA	Bosnia and Herzegovina	-4.5	▼	-3.7		-4.0	
ME	Montenegro	-12.0		-10.7		-9.5	
MK	North Macedonia	-4.5		-3.3		-3.0	
RS	Serbia	-5.0		-4.0		3.0	
XK	Kosovo	-8.2		-7.4		-7.0	
CIS+UA							
BY	Belarus	1.5		1.3		1.1	
KZ	Kazakhstan	0.5		-0.5		-1.0	
MD	Moldova	-12.0		-10.0		-8.0	
RU	Russia	6.0	▼	6.5	▲	7.0	▲
UA	Ukraine	4.0		3.0		3.0	

Note: Cut-off date: 15 March 2023. Colour scale variation from the minimum (grey) to the maximum (gold). Arrow signifies direction of revisions since January 2023.
Source: wiiw.

Table 5 / Fiscal balance as % of GDP and revisions since January 2023

Region		2023		2024		2025	
EU-CEE							
BG	Bulgaria	-4.0	▲	-4.0		-3.0	
CZ	Czechia	-4.0		-2.5		-1.9	
EE	Estonia	-4.4	▼	-4.0	▼	-3.4	▼
HR	Croatia	-2.5		-2.0		-1.9	
HU	Hungary	-4.5	▲	-4.0		-3.5	
LT	Lithuania	-4.5		-2.8		-2.2	
LV	Latvia	-5.0		-3.5		-2.5	
PL	Poland	-4.5		-3.0		-3.0	
RO	Romania	-5.5	▼	-5.0	▼	-4.5	▼
SI	Slovenia	-3.7		-4.2		-3.0	
SK	Slovakia	-6.4		-4.4		-3.7	
Turkey							
TR	Turkey	-3.0		-2.5		-2.0	
Western Balkans							
AL	Albania	0.0		0.5		0.5	
BA	Bosnia and Herzegovina	-0.5		-0.2		0.7	
ME	Montenegro	-7.5		-7.5		-6.0	
MK	North Macedonia	-2.0		-2.0		-2.0	
RS	Serbia	-3.0		-2.5		-2.0	
XK	Kosovo	-1.0		0.5		0.5	
CIS+UA							
BY	Belarus	-3.0		-2.0		-1.0	
KZ	Kazakhstan	-2.7		-2.6		-2.0	
MD	Moldova	-5.5	▼	-4.5		-4.0	
RU	Russia	-4.0	▼	-3.5	▼	-3.5	▼
UA	Ukraine	-20.0		-12.0		-10.0	

Note: Cut-off date: 15 March 2023. Colour scale variation from the minimum (grey) to the maximum (gold). Arrow signifies direction of revisions since January 2023.
Source: wiiw.

Index of subjects – March 2022 to March 2023

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multi-country articles and statistical overviews

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IMPRESSUM

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Offenlegung nach § 25 Mediengesetz: Medieninhaber (Verleger): Verein "Wiener Institut für Internationale Wirtschaftsvergleiche", A 1060 Wien, Rahlgasse 3. Vereinszweck: Analyse der wirtschaftlichen Entwicklung der zentral- und osteuropäischen Länder sowie anderer Transformationswirtschaften sowohl mittels empirischer als auch theoretischer Studien und ihre Veröffentlichung; Erbringung von Beratungsleistungen für Regierungs- und Verwaltungsstellen, Firmen und Institutionen.

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