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The Vienna Institute for International Economic Studies
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AMAT ADAROV
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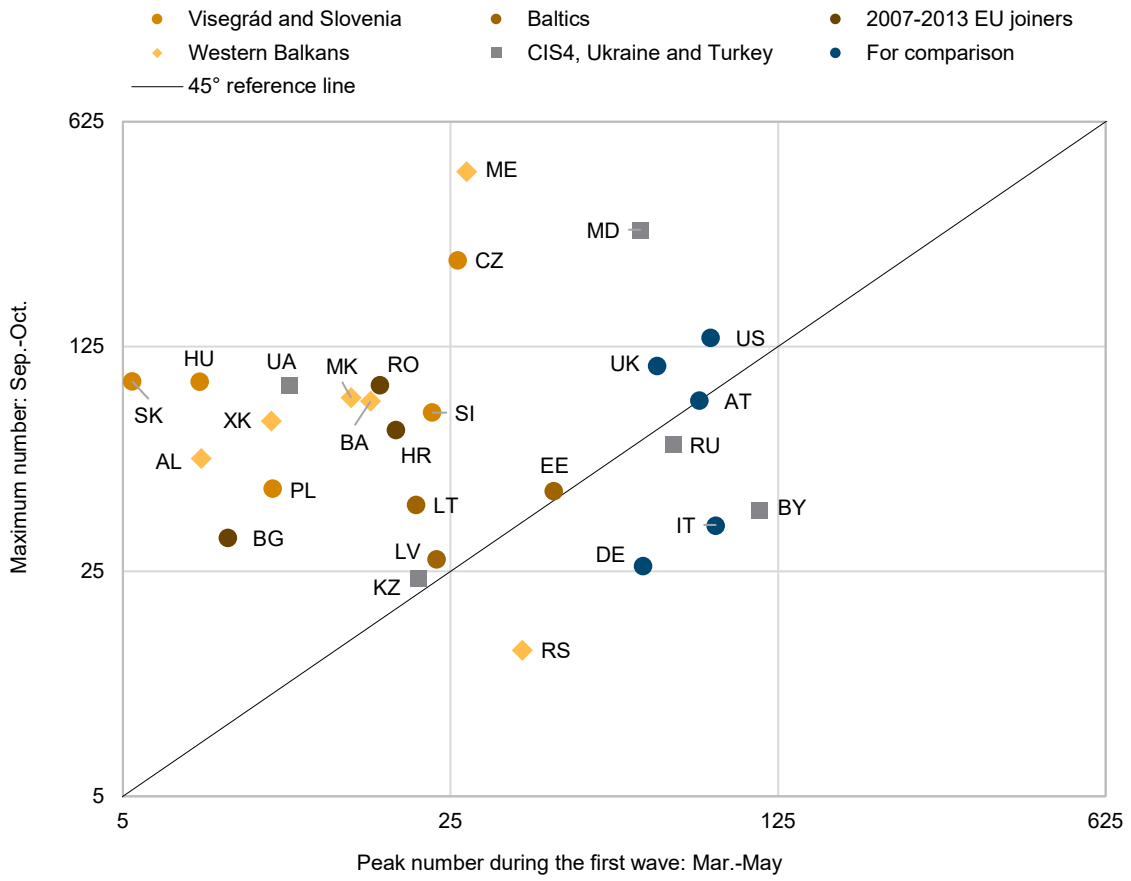
Chart of the month: The second wave of COVID-19 cases in CESEE is stronger than the first

BY JULIA GRÜBLER

Maximum numbers of new COVID-19 cases in early autumn exceed those of the first wave in spring



Notes: Maximum of 7-day moving averages for new COVID-19 cases per million inhabitants. Log scales. CIS4 comprises Russia, Belarus, Kazakhstan and Moldova.
Sources: New COVID-19 cases: World Health Organization – WHO Coronavirus Disease (COVID-19) Dashboard, last updated: 4 October 2020. Population in 2019: wiiw annual database for CESEE; Eurostat for non-CESEE EU and the United Kingdom; World Bank for the USA. Author's computations and visualisation.

The first wave of COVID-19 cases in CESEE came in spring. The peak of daily new COVID-19 cases was reached in early April for EU members in CEE, in mid-April in the Western Balkan economies and in mid-May in the CIS economies. Peak numbers of new COVID-19 cases per country are plotted along the horizontal axis of the chart.

In most countries of CESEE, the number of reported cases per day during the first weeks of autumn is several times higher than in spring. These economies are depicted above the 45° line. In total, there are only four economies where the autumn highs – at least according to official statistics – have so far remained at below the spring peak level: Russia, Belarus, Turkey and Serbia.

The maximum number of new COVID-19 cases[1] per million inhabitants in early autumn exceeds the levels of the first wave in spring by a factor of 1.4 in the Baltics. For 2007-2013 EU joiners, the numbers have risen by a factor of 4.8. For the aggregate of Visegrád economies and Slovenia, the maximum values are seven times higher; for Hungary, as much as 13 times; and for Slovakia almost 19 times. The peak numbers for the Western Balkans are 2.9 times higher than in spring, with Montenegro facing a 16-fold increase. In early autumn, the group comprising the CIS economies and Ukraine reached its earlier peak levels; however, Ukraine has seen its daily numbers increase by a factor of 8 compared to its maximum in spring.

Fourteen economies in CESEE recorded more than 50 daily new cases per million inhabitants during the first weeks of autumn. Three of them in particular stand out: the Czech Republic (232), Moldova (287) and Montenegro (437). In light of the sharply increasing numbers, new measures to restrict people's mobility are regularly being (re-)introduced, and uncertainties surrounding new lockdowns in the region have become a real economic risk.

[1] Computed as a 7-day moving average, as data reporting shows lags and cyclicality (e.g. fewer tests at the weekend).

Opinion Corner*: A new economic model after the COVID-19 pandemic and Russia[1]

BY RUSLAN GRINBERG[2]

The COVID-19 pandemic is likely to accelerate the search for a new economic model, which will become more socially oriented. However, Russia is not participating in this search. It is torn between the two extreme schools of economic thought: market liberals and proponents of a return to Soviet-style planning, with very little in between.

THE SPECTRE OF SOCIALISM

The COVID-19 pandemic has intensified the search for a new economic model for the modern world. Until recently there had been little doubt which economic model was the most efficient: the market economy. The freer the market, the greater the welfare of society. Not only is selfishness not a vice – on the contrary, it is almost a virtue; everyone's vices bring welfare for all. All we have to do is to give market forces free rein, minimise state activity, launch all-embracing privatisation and commercialise the social sector of the economy, such as education, healthcare, science and culture.

This paradigm is being questioned today. Market fundamentalism has not lived up to expectations. The goal of welfare for all has not been attained. Instead, we have witnessed one outrageous social outcome: the unheard-of wealth of a few, with stagnating middle-class incomes and widespread poverty and destitution.

Criticism of neo-liberalism has increased steadily since the 2008 global crisis, but today the very concept of the market economy is in doubt. And its most active, if not zealous, critics are the Americans, the trendsetters in economics. Among the most influential of these, in my opinion, are economists such as Joseph Stiglitz, James Galbraith, Nouriel Roubini and Paul Krugman. I had the chance to talk to some of them, and the most unexpected outcome was the feeling that they were somehow in favour of revising the very model of modern economy. Inequality is for them not the main threat, but rather a symptom of the failure of a system that constantly reproduces insecurity, lack of protection, instability, anxiety and fear.

Thus, the spectre of socialism is haunting the world. I would venture to assume that if our so-called real socialism had not been burdened with terrifying repressions and disregard for human rights, Bernie Sanders – a man not just with social-democratic convictions but almost a communist – would by now have come to power in the United States, the citadel of capitalism.

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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 The Russian-language version of this text was originally published in the Russian daily *Moskovskiy Komsomolets* on 22 July 2020: https://www.mk.ru/print/article/2697903/

2 Ruslan Grinberg is Scientific Advisor at the Institute of Economy of the Russian Academy of Sciences, Moscow.

I hope very much that it will not come to the dismantling of the market economy. Unwittingly, a direct analogy comes to mind with Winston Churchill's famous remark about democracy as 'the worst way of managing society except for all the others'. But the current economic model will radically change under the pressure of objective trends. Of these, the main one is the rapid slippage of the economy into the area of market failures, that is, those areas where the interaction of private economic agents simply ignores the interests of society as a whole. First of all, we are of course talking about healthcare, education, culture and science, which are experiencing increasing financial difficulties as a result of the constant cuts in state support, thereby threatening citizens' access to the benefits that are of vital importance. The response to the COVID-19 pandemic is a clear indication that health systems are not prepared for such disasters.

What will be the socioeconomic structure in the post-pandemic world? Hopefully it will be more just, but not at the expense of freedom. In any case, history offers successful examples of 'humanising' capitalism. Roosevelt's 'New Deal' in the 1930s as well as Kennedy's 'New Frontier', Johnson's 'Great Society' and Chancellor Erhard's 'Wohlstand für alle' in the 1950s and 1960s were the first successful attempts to create an almost classless society, where two-thirds of the population represent a well-off prosperous middle class.

The current reality is somewhat similar to the post-war one. Just as then, today's world is literally crying out for a policy of social equalisation. But the problem of inequality is not the only one. Right before our eyes the human environment is being destroyed. In order to at least stop this process, we have to keep two threatening phenomena at bay: hyper-individualism on the one hand, and hyper-consumerism on the other. In short, one way or another we must build into the future economic model not only a social but also an ecological imperative.

LIVE LIKE ABRAMOVICH, RULE LIKE STALIN

And how does Russia participate in the search for a new economic model? Practically not at all. In many respects, Russia is still looking for its future in the past. According to a long tradition, we have two absolutely irreconcilable schools of thought, and both are archaic. Essentially, we are talking about the conflict between the 'yesterdays' and the 'before-yesterdays' – true believers in the free market on the one hand, and true believers in the planned economy and authoritarianism on the other. The latter want to return to the Soviet Union of the 1970s (with elements of the 1930s), whereas the former want to go back to the semi-anarchical 1990s. There are also those who want to combine the two: to enjoy the acquired wealth of the 1990s in the conditions that prevailed in the 1970s. In the words of one witty commentator, they want to 'live like Abramovich and rule like Stalin'. And some of them have succeeded.

There is in fact no point in analysing the ideas of the supporters of a return to the Soviet practice of directive planning – its results speak for themselves. But if we proceed from the (in my view absurd) assumption of the growing relevance of the global military threat, their views do not seem so strange. The mobilisation economy is indeed a highly directive one.

Much more interesting are the views of the proponents of the free market which 'went out of fashion' almost everywhere – but not in Russia. According to market liberals, the successful development of the

Russian economy is hindered by excessive state interference. It is common global practice to quantify government participation in the economy through the ratio of government spending to GDP. This figure in Russia today is 34%, in the developed world it is in the range of 45% to 55%. So where does the state interfere more in the economy and thus allegedly ‘harm’ it? And in terms of the scale of private property we are not behind the developed world either. According to Rosstat, the national statistical service, the share of the private sector in the Russian economy is 80%, in line with the levels observed in Western countries.

Nevertheless, the Russian state does interfere in the economy – and not only there. On the one hand, in the 21st century we have restored the archaic model of the executive vertical and the resulting practice of ‘manual management’. On the other hand, the Russian bureaucracy is aiming to improve the efficiency of everything through quantitative indicators. The results are rather sad: political monopoly is easily combined with economic monopoly, leading to the consolidation of the unity of power and property at all levels. Corruption is becoming systemic. And finally, the main vice of this model is that the state interferes where it is not necessary, carefully ‘patronising’, for example, private small and medium-sized businesses. At the same time, it minimises its participation in such sectors as education, healthcare, culture and fundamental science, where nothing can replace the state apart from sporadic outbreaks of private charity. One of the most widely used words of recent times is ‘optimisation’. It has already essentially destroyed the Russian Academy of Sciences on the eve of its 300th anniversary – and this, to all appearances, is not its last victim.

It is funny to see how from time to time the fierce zealots of the free market, both governmental and non-governmental, and even anti-governmental, seriously explain Russia’s economic policy failures by pointing to the supposedly excessive presence of the state in the economy. And they also like to worry about the unenviable state of the country’s small and medium-sized businesses. For some reason they believe that only the latter, having freed themselves from restrictions, can finally make the modernisation leap that has been expected for almost a quarter of a century. I have a vague suspicion that it is this quasi-religious belief in the omnipotence of self-regulation mechanisms, combined with harsh anti-state rhetoric, which underlies their actual denial of industrial policy and strategic planning, despite their verbal recognition of the need for both. It is no coincidence that relevant laws in this area are essentially declarative in nature.

The Soviet authorities' rejection of market mechanisms was based on the ideological grounds of their incompatibility with the preservation of the purity of ‘socialist’ principles. This proved to be very costly for the Soviet economy – and for the country itself. Is it worth repeating the same mistake today, with perhaps the same consequences, appealing not to the existing reality but this time to the impossibility to compromise the principles of the ‘market’ purity?

Foreign direct investment and global value chains: empirical relationship and policy implications

BY AMAT ADAROV AND ROBERT STEHRER

Global value chain integration is strongly related to foreign direct investment flows, which might be hampered by regulatory restrictions. These, however, might be justified from a national or EU-wide security and resilience perspective.

INTRODUCTION

The fragmentation of production and the distribution of individual tasks across countries, following improvements in cross-border connectivity and the rise of information and communication technologies, have expanded the opportunities to participate in international production and trade without the need to develop complete value chains within a single country. An essential element of integration in value chains is foreign direct investment (FDI). It is intuitive that FDI constitutes an integral element of international production sharing, along with trade in intermediate products, as the formation of global value chains (GVCs) is to a large extent facilitated by multinational corporations.

In recent research (Adarov and Stehrer, 2019), we showed empirically, using panel data analysis at aggregate country and sectoral levels, that FDI does indeed facilitate cross-border production sharing. The result is intuitive, although it is clear that not all FDI is associated with GVC integration (e.g. horizontal FDI and FDI associated with profit shifting and transfer pricing) – and conversely, participation in GVCs does not require foreign investment; yet empirical evidence linking FDI and GVC dynamics is still lacking. Notably, we also found that the impact of FDI differs both across sectors and for backward and forward GVC integration (in essence, backward GVC integration is the share of foreign value added in a country's gross exports, while forward GVC integration conveys the share of domestic value added in a country's gross exports that is further used by the importing country to produce its own exports). In particular, we found that inward FDI is especially conducive to the formation of backward linkages, while outward FDI facilitates forward GVC participation, especially in high-tech manufacturing sectors.

QUANTIFYING THE IMPACT OF FDI ON GVCS

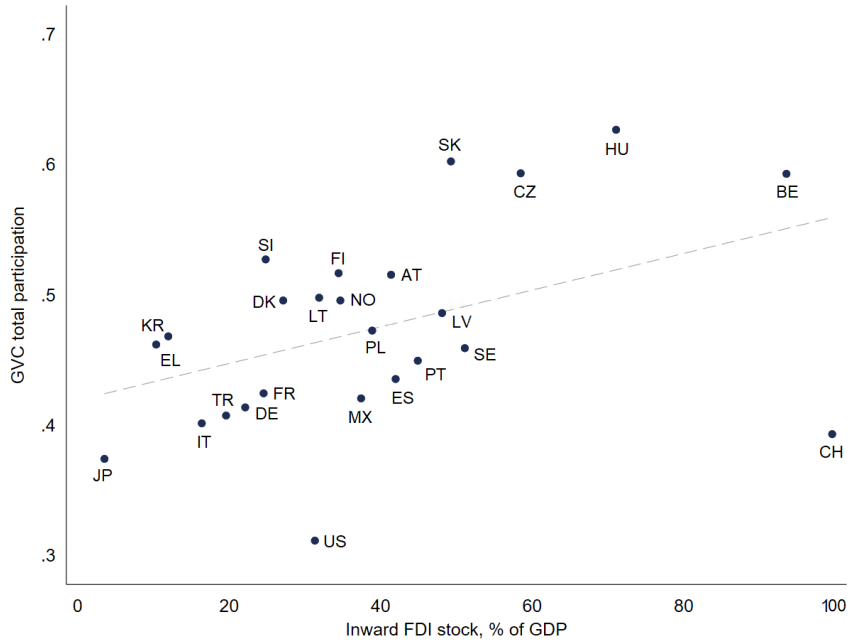
For preliminary intuition, Figure 1 shows the general association between inward FDI and total GVC participation for 2014 (the most recent year for which the world input-output data used to compute GVC measures is available), and illustrates the extent to which the results could be biased if special purpose entities (SPEs) and outlier tax-haven countries are included in the sample. As one can see, simple scatterplots indicate a clear positive association between FDI and GVC integration.

For a more robust assessment, however, we estimate a series of specifications based on fractional response models, controlling for other relevant factors, including real capital stock, real GDP, real effective exchange rate, real GDP per capita (as a general measure of a country's level of economic

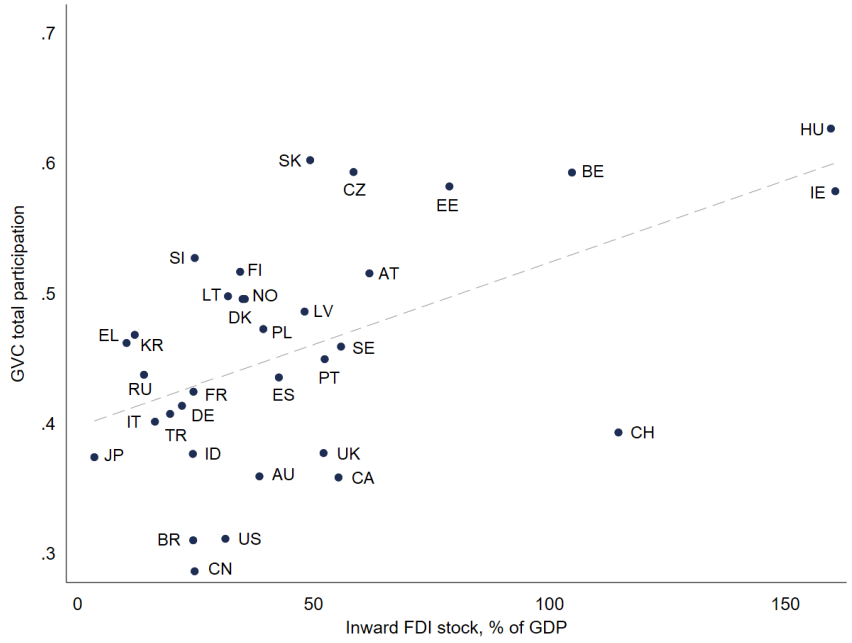
development), real labour productivity (real value added per hour worked), share of manufacturing value added in GDP (as a proxy for the overall level of industrialisation of a country), real GDP growth rate, average applied import tariff rate and institutional quality indicators, as well as control for cross-country heterogeneity and common year effects. The estimation is based on a panel dataset, including the European countries over the period 2000-2014 with FDI data that excludes SPEs.

Figure 1 / Relationship between GVC participation and inward FDI in 2014

Excluding SPEs (excluding LU and NL)



Including SPEs (excluding LU and NL)



Source: WIOD, Eurostat, OECD, own estimations.

Table 1 shows the estimated marginal effects of inward and outward FDI on backward, forward and total GVC participation (the full estimates are available in Adarov and Stehrer, 2019). Overall, we find that the inward FDI stock ratio is positively associated with backward GVC participation, while outward FDI is conducive to forward GVC participation. Both the inward and the outward FDI stock ratio estimates are positive and statistically significant at least at the 10% level in total GVC participation. The results suggest that an increase in the inward FDI-to-GDP share by 0.1 increases backward GVC participation by about 0.016 (for reference, the values of backward GVC participation for most of the countries in the sample fall within the range 0.18-0.52, and inward FDI stock as a share of GDP varies from 0.05 to 0.66). The marginal effect of outward FDI on forward linkages is weaker, at 0.08, although one should note that forward GVC participation varies in a narrower range of 0.15-0.28. In the case of total GVC participation, the impact of FDI variables is slightly stronger and more statistically significant.

Complementing the evidence from the aggregate country-level analysis, we also run a series of similar estimations for individual sectors (based on the NACE Rev. 2 classification). The main results of the sector-level analysis are as follows:

› The textile/clothing sector exhibits a particularly strong across-the-board response to FDI in terms of both upstream and downstream integration.

› Outward FDI facilitates forward GVC participation in high-tech manufacturing sectors – machinery, transport and (especially) electrical equipment.

› A significant positive impact of inward FDI on backward GVC participation is found in the textile and clothing, agricultural and chemicals sectors. The sizeable marginal effects of inward FDI on backward GVC linkages in the high-tech manufacturing are not statistically significant.

Table 1 / Drivers of GVC participation, country-level analysis, predictive margins

	Backward GVC participation	Forward GVC participation	Total GVC participation
Inward FDI stock, share of GDP	0.157*	0.019	0.196***
	(0.086)	(0.056)	(0.060)
Outward FDI stock, share of GDP	-0.006	0.079*	0.099*
	(0.069)	(0.041)	(0.056)

Note: The table shows average marginal effects for the FDI variables (see the full estimation results in Adarov and Stehrer, 2019). Delta-method standard errors are in parentheses. *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

BARRIERS TO FDI

In light of the empirical results, addressing the bottlenecks to FDI constitutes an important dimension of policies targeted at GVC facilitation (for additional discussion, see Adarov and Stehrer, 2020). In the context of the EU, both the market-seeking and the efficiency-seeking motives of FDI are relevant, as the EU constitutes the largest market in the world. The significant socio-economic heterogeneity of the EU countries allows for diverse specialisation patterns in different sectors and tasks along global and regional value chains, owing to country-specific competitive advantages. The general ‘framework’ conditions related to business-cycle dynamics and long-run structural characteristics (quality of

institutions, infrastructure, human capital and other factors directly related to economic competitiveness) are of critical importance in facilitating FDI inflows.

In addition to the general macroeconomic conditions, regulatory frameworks targeting cross-border capital flows affect the ability of a country to attract FDI. The OECD FDI Regulatory Restrictiveness Index quantifies the extent to which countries erect barriers to FDI. The index measures statutory restrictions on foreign direct investment across 22 economic sectors. The discriminatory nature of measures, i.e. when they apply to foreign investors only, is used as the central criterion for scoring. Four types of restrictiveness measures are reported on a 0 (open) to 1 (closed) scale, including:

I) Foreign equity limitations;

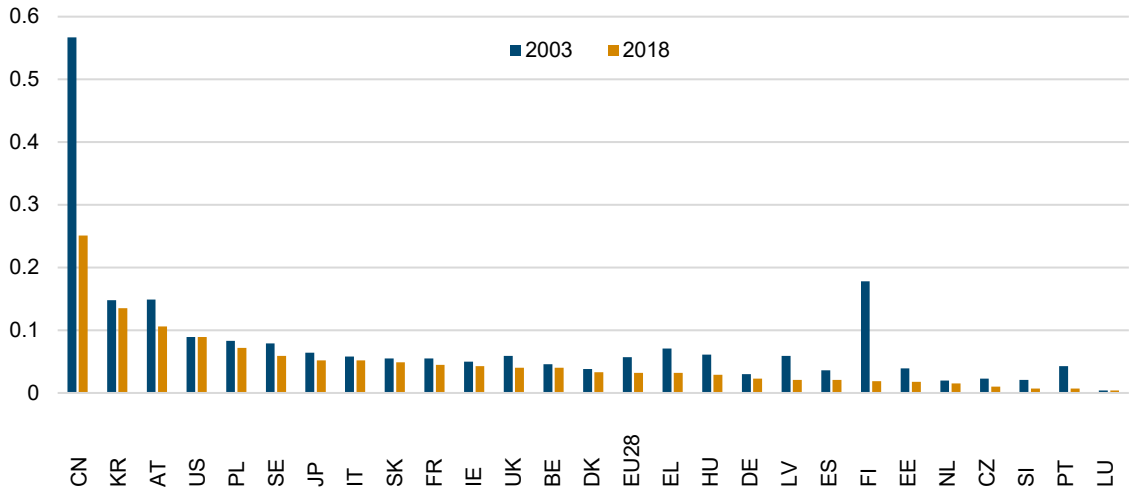
II) Discriminatory screening or approval mechanisms;

III) Restrictions on the employment of foreigners as key personnel;

IV) Other operational restrictions, e.g. restrictions on branching and on capital repatriation or on land ownership by foreign-owned enterprises.

The overall FDI Regulatory Restrictiveness Index is then computed as an average of the sectoral scores. Figure 2 shows the aggregate FDI Regulatory Restrictiveness Index for the EU countries and selected peer economies. As can be seen, the EU is characterised by a rather open investment regime, relative to its peers. Most EU countries have a much lower degree of regulatory obstacles to FDI than the US, Japan and China (which has an especially high level of FDI restrictions). In addition, over the period 2003-2018, the EU average FDI Regulatory Restrictiveness Index has declined by about half, i.e. the EU has become more open to FDI. At the same time, there is significant heterogeneity across European countries. Within the EU, as of 2018, Austria is reported to have the most restrictive FDI regime, while the least restrictive is in Luxembourg, where virtually no obstacles to foreign investors are reported.

Figure 2 / OECD FDI Regulatory Restrictiveness Index

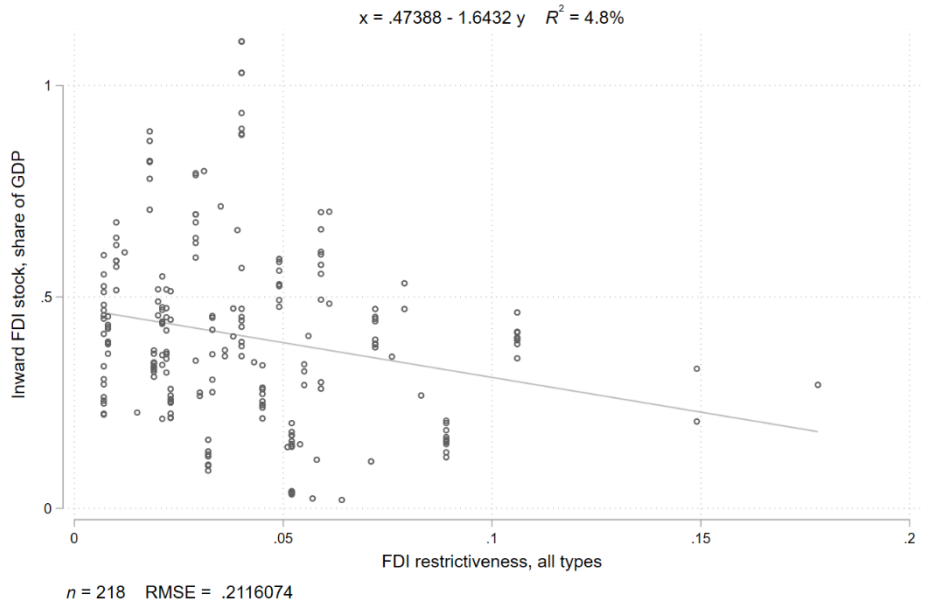


Source: OECD, own calculations.

As can be seen from Figure 3, FDI regulatory restrictions appear to have a strong negative effect on FDI inflows. Looking at the specific components of the FDI Regulatory Restrictiveness Index (Figure 4), we

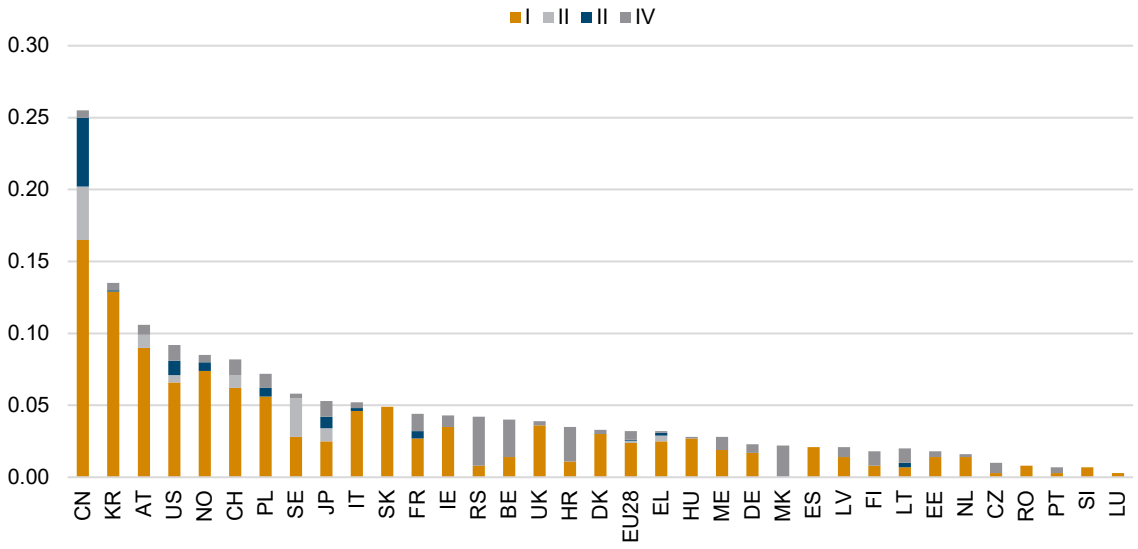
can see that the regulatory measures are mostly associated with equity restrictions. Other types of restrictions are sizeable only in some countries of the sample (China, Sweden, Japan, Belgium and Croatia).

Figure 3 / FDI restrictiveness vs inward FDI, global sample, 2003-2018[1]



Source: Own calculations.

Figure 4 / FDI regulatory restrictiveness by components, 2018



Note: The legend specifies the following: (I) Foreign equity limitations; (II) Discriminatory screening or approval mechanisms; (III) Restrictions on the employment of foreigners as key personnel; (IV) Other operational restrictions on FDI.
Source: OECD.

[1] The sample includes countries and years reported in the OECD FDI Regulatory Restrictiveness database (does not cover every year in the period 2003-2018).

While the importance of a robust macroeconomic framework, strong institutions and a solid infrastructure are obvious, the need for statutory restrictions on FDI in the EU is a more complicated matter. On the one hand, restrictions on inward FDI hinder the benefits that the host country receives from FDI in the form of additional capital, technology spillovers, development of global value chains and job creation. On the other hand, concerns are being voiced over heightened vulnerabilities to external shocks and foreign control of strategic European assets that may come with greater inward FDI. The latter has received growing attention in EU policy circles and the media in connection with the acquisition of EU assets by Chinese companies, and has led to policy proposals that seek to introduce a screening mechanism for FDI in 'strategic' sectors.[2] The initiative intends to empower EU member states to screen FDI from non-EU countries on the grounds of security or public order and to impose mitigating measures or prevent a foreign investor from acquiring or gaining control of a company. As the EU is, on average, relatively open to FDI, according to the FDI Regulatory Restrictiveness Index, and has been a significant recipient of FDI, these measures, although distortionary and protectionist, are justified if applied pragmatically only to those sectors that are indeed sensitive from a national security perspective (including ICT sectors, national defence, public infrastructure), rather than exploited to provide an unfair advantage to domestic companies over foreign competitors.

REFERENCES

Adarov, A. and R. Stehrer (2019) 'Implications of foreign direct investment, capital formation and its structure for global value chains', *wiiw Working Paper*, No. 170, Vienna, November.

Adarov, A. and R. Stehrer (2020) 'Capital dynamics, global value chains, competitiveness and barriers to FDI and capital accumulation in the EU', Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-19934-2, https://doi.org/10.2760/74061, JRC121096.

[2] In particular, the initiative on the screening of FDI into the EU was presented by the European Commission on 13 September 2017 and officially entered into force on 10 April 2019: https://ec.europa.eu/commission/presscorner/detail/en/IP_19_2088

ICT capital and intangibles as drivers of value-added growth

BY AMAT ADAROV AND ROBERT STEHRER

ICT capital and intangible capital have been significant drivers of economic growth in the last two decades, though they have lost some steam since the global financial crisis. For EU-CEE, however, there is still a potential to exploit these drivers of growth.

In this article, we outline the role of ICT capital and intangible assets as drivers of value-added growth, drawing on the EU KLEMS Release 2019 (Adarov and Stehrer, 2019). First, we differentiate between ICT and non-ICT capital; this capital is split into tangible assets (information technology and communication technology) versus intangible capital (software and databases (SoftDB)). Secondly, we highlight the role of intangible assets in growth performance. Specifically, we consider the role of intangible assets, which have hitherto not been included in the National Accounts data, but which were capitalised in the analytical database of the EU KLEMS Release 2019.[1]

DESCRIPTIVE ANALYSIS AND SELECTED GROWTH-ACCOUNTING RESULTS

In this section, we consider the growth performance of two European country groups – those countries that have been EU members since at least 1995 (EU15) and the Central and Eastern European countries that joined later (EU-CEE) – as well as of Japan and the US. We draw on the EU KLEMS Release 2019 Analytical Database, i.e. including a larger set of intangible assets (see Box 1). Before presenting the results from the growth accounting, we give an overview of the relevance of ICT capital, which is considered to have been the most important asset driving growth across countries in recent decades.

Focusing on ICT capital, Figure 1 shows the capital-labour ratios for tangible and intangible ICT with respect to labour employed, also examining the changes between the pre- and post-crisis periods (for those countries for which a detailed capital asset composition is available in the EU KLEMS 2019). As can be seen, European countries exhibit significant heterogeneity in terms of capital intensities: Austria, Sweden and Denmark appear to be the leaders at the digital capital frontier, as measured by the importance of ICT and SoftDB relative to the number of persons employed (France, too, for SoftDB, but not for tangible ICT).[2] Perhaps surprisingly, the US and Japan do not stand out with respect to this indicator.

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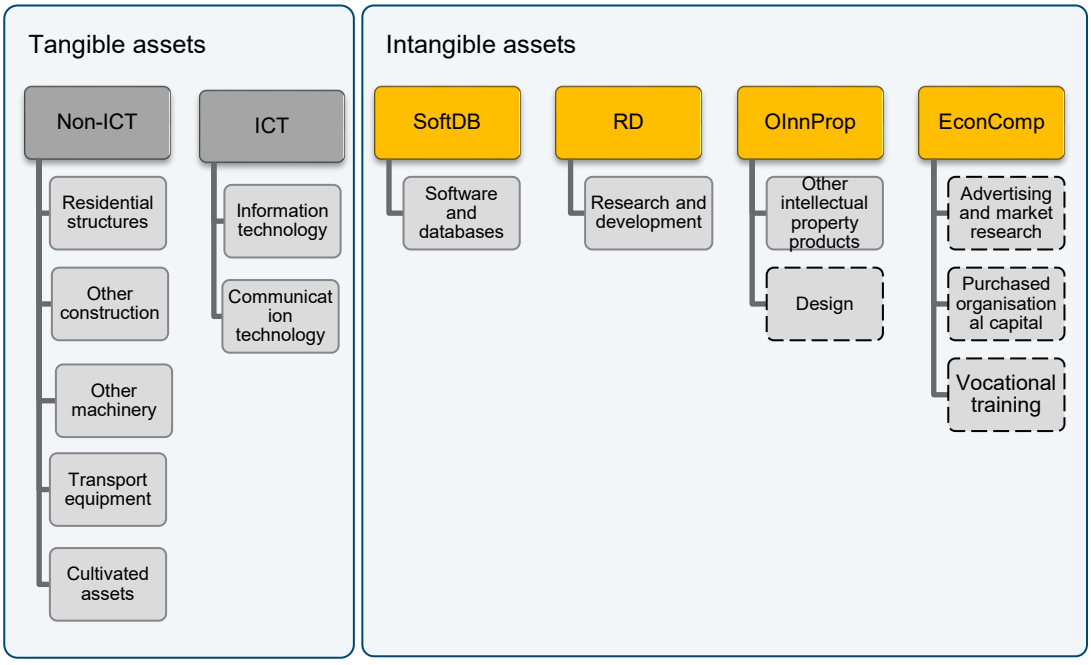
1 The KLEMS approach analyses the role of factor inputs capital (K) and labour (L) for value-added growth, and in addition energy (E), material (M) and services (S) for gross output growth. The EU KLEMS Release 2019 (www.euklems.eu) is a newly developed dataset for European countries (plus the US and Japan), which distinguishes 14 different capital asset types, including intangible assets outside the boundaries of National Accounts, as proposed in Haskel and Westlake (2018); for details of the EU KLEMS data, see Stehrer et al. (2019).

2 To a certain extent, these indicators also depend on the exact way in which capital stocks are measured across countries.

BOX 1 / ASSET TYPES AND GROWTH ACCOUNTS IN THE EU KLEMS RELEASE 2019

In the EU KLEMS Release 2019 database, 14 different asset types are distinguished. The new EU KLEMS release, besides additional time coverage, introduces a capital asset type classification that expands on earlier versions of the database. It includes the 10 asset types available from the National Accounts capital data that were included in previous EU KLEMS data: Cultivated assets (Cult), Dwellings (RStruc), Other buildings and structures (OCon), Transport equipment (TraEq), Other machinery equipment (OMach), Computer hardware (IT), Telecommunications equipment (CT), Computer software and databases (SoftDB), Research and development (RD) and Other intellectual property products (OIPP). But in addition, the database introduces four new 'supplementary' intangible asset types: Advertising and market research (AdvMRes), Design (Design), Purchased organisational capital (POCap) and Vocational training (VT); for details of its construction, see Stehrer et al. (2019). Based on Haskel and Westlake (2018), these are grouped into six broader categories, as shown in Box Figure 1. The two left columns shaded in grey indicate tangible assets (split into non-ICT and ICT), while those coloured yellow show the intangible assets considered. The focus of the analysis here is on the tangible ICT capital (ICT) and intangible ICT capital (SoftDB).

Box Figure 1 / Aggregates of capital services including tangible and intangible assets



Note: Dashed lines indicate asset types outside the boundaries of National Accounts.
Source: own elaboration, based on Haskel and Westlake (2018).

Additional data included are time series on value-added growth, growth of hours worked and employment (for details, see Stehrer et al., 2019). Together with information on labour inputs, a growth-accounting exercise is performed, where the growth rate of real value added (in chain-linked volumes) is explained by the growth rate of capital services and labour services; the part not explained is a measure of total factor productivity (TFP) growth. Capital services are calculated as weighted averages of growth of the various asset types that can be grouped in various ways (e.g. as outlined in the figure above), with weights being calculated based on the user cost of capital approach (for details, see Jorgenson et al., 2005; Timmer et al., 2010; Stehrer et al., 2019). Further, labour services are the weighted growth rates of hours worked differentiated to several types of labour inputs (i.e. split by education, age and gender), with the weights being the wage rates of these groups. This method allows labour services growth to be split into a quantitative effect (i.e. growth in hours worked) and a composition effect.

Figure 1 / Capital stocks of tangible and intangible ICT per person employed, USD

Note: the figure shows real capital stock (chain-linked volumes, reference prices 2010) per person employed by asset group, averages over the periods 2000-2006 and 2010-2017. Countries are listed by ISO2 in alphabetical order.
Source: own computations based on EU KLEMS 2019 data.

With such data to hand, the growth-accounting approach allows us to indicate the contribution of the growth of various input factors to value-added growth (for details, see Jorgenson et al., 2005; Timmer et al., 2010; Stehrer et al., 2019; and Box 1). The results are presented in Table 1, differentiating between EU15, EU-CEE, Japan and the US.[3]

Concerning overall growth and focusing on the pre- and post-crisis period, one can discern a slowdown in value-added growth in all countries, though this is less pronounced in Japan (which, however, experienced slower growth rates throughout the period considered). Comparing the EU15 member states and EU-CEE, one finds similar dynamic patterns, though growth rates are generally higher (between one and two percentage points) in the EU-CEE countries. This pattern remained intact after the 2008 crisis.

Table 1 / Growth-accounting results (in percentage points)

	EU15			EU-CEE		
	2000-2007	2008-2009	2010-2016	2000-2007	2008-2009	2010-2016
Value added (in %)	2.31	-2.05	1.38	4.82	0.27	2.16
Hours worked	0.48	-0.78	0.25	-0.04	0.24	-0.05
Labour composition	0.19	0.25	0.26	0.40	0.16	0.38
Tangible non-ICT	0.48	0.36	0.20	0.95	1.10	0.68
Tangible ICT	0.05	0.02	0.02	0.07	0.08	0.01
Intangible ICT	0.04	0.03	0.03	0.03	0.03	0.02
Intangible non-ICT	0.10	0.05	0.10	0.09	0.12	0.12
TFP	0.97	-1.98	0.52	3.32	-1.46	1.00

	Japan			USA		
	2000-2007	2008-2009	2010-2016	2000-2007	2008-2009	2010-2016
Value added (in %)	1.21	-3.71	1.41	2.59	-1.50	2.07
Hours worked	-0.16	-1.58	0.08	0.28	-2.04	0.76
Labour composition	0.37	0.41	0.21	0.14	0.38	0.12
Tangible non-ICT	0.15	-0.20	-0.09	0.73	0.08	0.48
Tangible ICT	0.18	0.05	0.01	0.16	0.09	0.04
Intangible ICT	0.17	0.01	0.03	0.07	0.04	0.05
Intangible non-ICT	0.23	-0.02	0.09	0.19	0.11	0.17
TFP	0.27	-2.38	1.08	1.02	-0.17	0.45

Source: EU KLEMS Release 2019, own results.

The broad picture suggests that growth *before the crisis* in the EU15, the EU-CEE countries and the US was largely driven by TFP growth. Hours worked and labour composition contributed relatively more in the EU countries than in the US. Further, investments in tangible assets (in particular non-ICT capital) played a significant role, especially in the EU-CEE economies. Tangible non-ICT capital also contributed more to growth in the US than in the EU15 member states. Growth in intangible assets played a less important role. Conversely, growth in Japan before the crisis was mostly driven by labour composition changes (i.e. reallocation of labour towards more efficient workers), ICT capital and intangible assets (particularly software and databases). In terms of value-added growth, the contribution of ICT assets to

[3] Country aggregates are calculated using Törnqvist aggregates, based on nominal GDP at current exchange rates.

growth was below 4% in the EU15 and even lower for the EU-CEE at around 2%, but was much higher in Japan (28%) and higher, too, in the US (at almost 9%).

Growth performance *after the crisis* shows a significant decline in the contribution of TFP in the EU15, EU-CEE and the US (known as the 'productivity slowdown'); only in Japan has TFP growth picked up. The contribution of changes in labour composition has remained relatively stable (with the exception of Japan). Growth in non-ICT capital has still played an important role in the EU-CEE countries and the US, but this is less the case in the EU15 and Japan. Interestingly, the contribution of ICT asset growth to overall value-added growth after the crisis has declined only slightly for the EU15 (to about 3.6%) and EU-CEE (to 1.4%); however, the contribution of this element has declined much more substantially for Japan (to about 3%) and has halved for the US (to about 4%).

Furthermore, it should be noted that the contribution of intangible non-ICT assets (particularly R&D and economic competencies) has remained stable since the crisis nearly everywhere (except for in Japan).

WHICH INPUTS ARE ECONOMETRICALLY SIGNIFICANT DRIVERS OF VALUE ADDED?

To answer this question, we perform an econometric analysis to assess whether IT and CT growth and the growth of other intangible assets contribute significantly to value-added growth. The analysis is based on the EU KLEMS sample of countries, dropping outliers (Cyprus, Luxembourg and Malta), which amounts to 23 countries over the period 2000-2017.[4] The specification is based on the log-differenced version of the Cobb-Douglas production function, which explains real value-added growth of country c in year t, $\Delta \ln Y_{ct}$, as a function of the growth of real capital inputs ($\Delta \ln K_{ct}$), the growth of labour inputs ($\Delta \ln L_{ct}$) and the TFP growth term ($\Delta \ln A_{ct}$), calculated as a residual:

$$\Delta \ln Y_{ct} = \alpha \, \Delta \ln L_{ct} + \beta \Delta \ln K_{ct} + \Delta \ln A_{ct}$$

For the purposes of our analysis, the capital input variable is further split into components, so that the set Q = {ICT; SoftDB; Non-ICT; RD; OInnProp; EconComp} comprises the main capital asset groups (in terms of capitals services growth):

$$\Delta \ln Y_{ct} = \alpha \Delta \ln L_{ct} + \sum_{q \in Q} \beta_q \, \Delta \ln K_{qct} + \Delta \ln A_{ct}$$

Alternative specifications also include hours worked ($\Delta \ln H_{ct}$) and labour composition ($\Delta \ln LC_{ct}$) instead of labour services (as discussed above, the labour services variable in the baseline specification is decomposed as $\Delta \ln L_{ct} = \Delta \ln LC_{ct} + \Delta \ln H_{ct}$). In order to control for unobserved heterogeneity at the country and sector levels and to alleviate potential omitted variable issues, we also include fixed effects (country, sector, year fixed effects or their interaction, depending on the specification). The model is first estimated using country-level aggregates via fixed effects (FE) as the baseline estimator (controlling for country fixed effects), and the pooled OLS (POLS) and Arellano-Bover/Blundell-Bond system generalised method of moments (System GMM) are also reported as alternatives for comparison.

[4] The sample includes AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, IE, IT, JP, LT, LV, NL, NO, PT, SE, SI, SK, UK, US.

The estimation results are reported in Table 2. Notably, among the different capital asset groups, only tangible ICT and the intangible assets comprising economic competencies (EconComp) are statistically significant drivers of value-added growth. The marginal contribution of tangible ICT capital is 0.04 for the baseline specification, which implies that a 1 percentage point (pp) increase in the growth of tangible ICT capital leads to a growth of about 0.04 pp in real value added. A 1 pp increase in the growth of economic competencies assets translates to a growth of about 0.1 pp in value added.

Table 2 / Aggregate country analysis: estimation results for value-added growth

	FE 1	FE 2	POLS 3	System GMM 4
Labour services	0.573*** (0.087)		0.485*** (0.079)	0.609*** (0.104)
Hours worked		0.623*** (0.092)		
Labour composition		-0.049 (0.176)		
ICT	0.042*** (0.012)	0.036*** (0.010)	0.037** (0.014)	0.058*** (0.013)
SoftDB	0.003 (0.004)	0.003 (0.004)	0.005 (0.005)	0.004 (0.004)
Non-ICT	-0.152 (0.212)	-0.246 (0.205)	0.209 (0.205)	-0.264 (0.238)
RD	-0.010 (0.040)	-0.003 (0.038)	-0.044 (0.043)	-0.016 (0.038)
OInnProp	0.016 (0.044)	-0.003 (0.041)	0.051 (0.045)	-0.020 (0.039)
EconComp	0.123*** (0.043)	0.102*** (0.035)	0.093** (0.044)	0.149*** (0.050)
Value added, lag				0.121* (0.072)
Constant	0.022*** (0.004)	0.032*** (0.004)	0.017*** (0.004)	-0.006 (0.004)
Year FE	yes	yes	yes	Yes
Observations	335	335	335	320
R-squared	0.764	0.784	0.718	

Note: All variables are included in log-differences. Standard errors clustered by country are included in parentheses. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.
Source: EU KLEMS Release 2019, own results.

With respect to the other inputs, as expected, the growth of labour services, particularly its 'hours worked' component, contributes positively to real value-added growth with high statistical significance and a marginal impact of about 0.6, implying that a 1 pp change in the growth of labour services is associated with a 0.6 pp change in value-added growth.

CONCLUSIONS

To summarise, both ICT capital (in particular, hardware components of information and communication technologies) and economic competencies (including capitalised expenditure on advertising and market research, organisational capital like consultancy services) have been significant drivers of growth over the past two decades. However, since the crisis of 2008-2010, ICT capital has lost steam in terms of its contribution to growth; this, together with a decline in total factor productivity growth, partly explains the general 'productivity slowdown' that most countries have experienced in the post-crisis period. Economic competencies, as measured in the EU KLEMS Release 2019, have proved to be a more stable component of growth since the crisis.

The EU-CEE countries show a similar pattern to the EU15 countries in terms of sources of growth, though at a higher level of value-added growth. However, though the contribution of ICT capital to growth (as a percentage of overall value-added growth) before the 2008-2010 crisis was lower in EU-CEE, it has declined even more strongly since the crisis. The role of intangible non-ICT capital (including economic competencies) has increased in both the EU15 and – particularly so – in EU-CEE. However, in the EU-CEE countries, as a percentage of value-added growth, it remains below the contribution in the EU15.

REFERENCES

Adarov, A. and R. Stehrer (2019), Tangible and intangible assets in the growth performance of the EU, Japan and the US. Vienna Institute for International Economic Studies (wiiw) Research Report No. 442, Vienna, October.

Haskel, J. and S. Westlake (2018), *Capitalism Without Capital: The rise of the intangible economy*, Princeton & Oxford: Princeton University Press.

Jorgenson, D., M.S. Ho and K.J. Stiroh (2005), *Productivity*, Vol. 3 *Information Technology and the American Growth Resurgence*, Cambridge, MA: MIT Press.

Stehrer, R., A. Bykova, K. Jäger, O. Reiter and M. Schwarzhappel (2019), Industry level growth and productivity data with special focus on intangible assets, Deliverable 3 for DG ECFIN project Contract No. 2018 ECFIN-116/SI2.784491.

Timmer, M.P., R. Inklaar, M. O'Mahony and B. van Ark (2010), *Economic Growth in Europe: A comparative industry perspective*, Cambridge: CUP.

Monthly and quarterly statistics for Central, East and Southeast Europe

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Conventional signs and abbreviations used

%	per cent
ER	exchange rate
GDP	Gross Domestic Product
HICP	Harmonized Index of Consumer Prices (for new EU Member States)
LFS	Labour Force Survey
NPISHs	Non-profit institutions serving households
p.a.	per annum
PPI	Producer Price Index
reg.	registered

The following national currencies are used:

ALL	Albanian lek	HRK	Croatian kuna	RON	Romanian leu
BAM	Bosnian convertible mark	HUF	Hungarian forint	RSD	Serbian dinar
BGN	Bulgarian lev	KZT	Kazakh tenge	RUB	Russian rouble
BYN	Belarusian rouble	MKD	Macedonian denar	TRY	Turkish lira
CZK	Czech koruna	PLN	Polish zloty	UAH	Ukrainian hryvnia

EUR euro – national currency for Montenegro, Kosovo and for the euro-area countries Estonia (from January 2011, euro-fixed before), Latvia (from January 2014, euro-fixed before), Lithuania (from January 2015, euro-fixed before), Slovakia (from January 2009, euro-fixed before) and Slovenia (from January 2007, euro-fixed before).

Sources of statistical data: Eurostat, National Statistical Offices, Central Banks and Public Employment Services; wiiw estimates.

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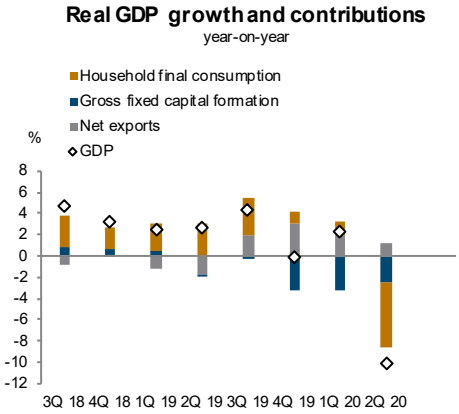
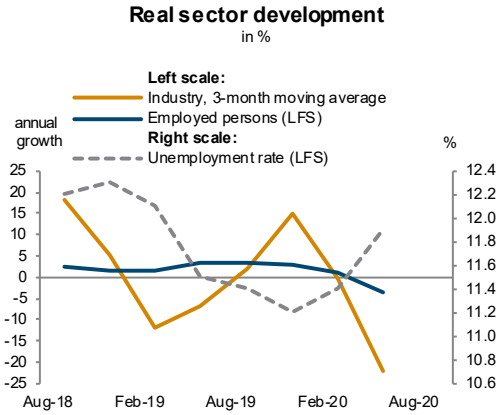
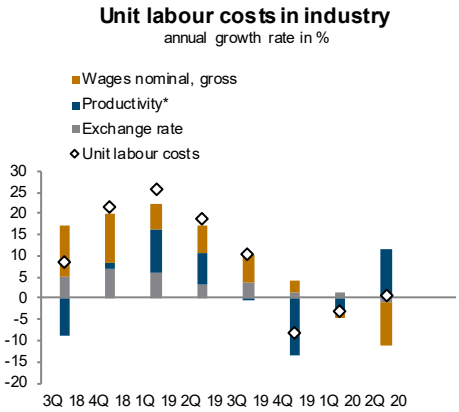
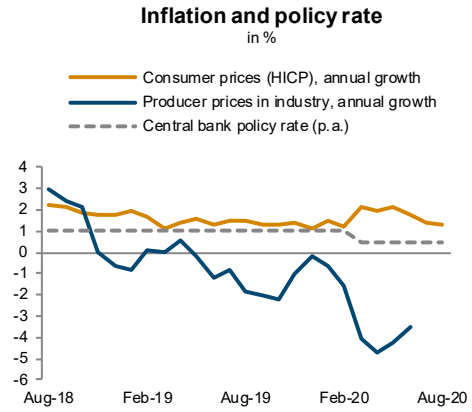
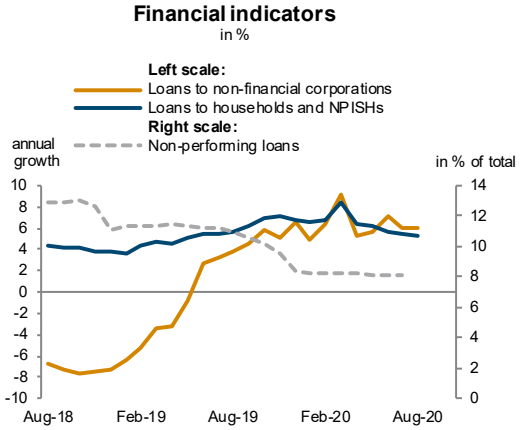
Albania

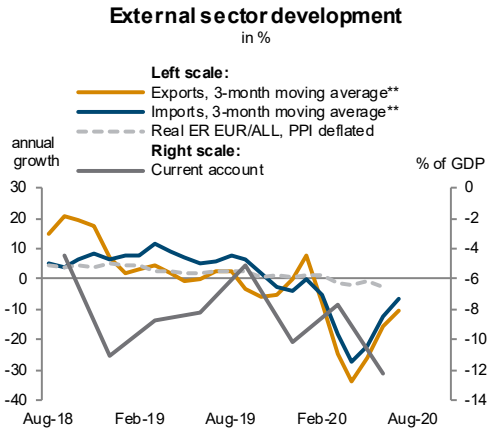












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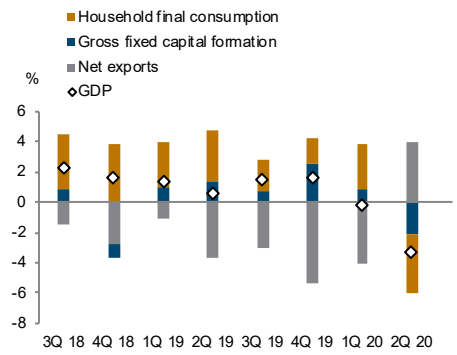
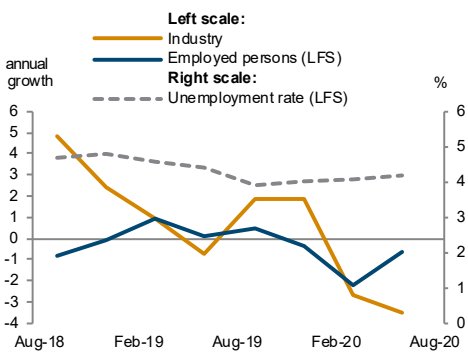
Belarus

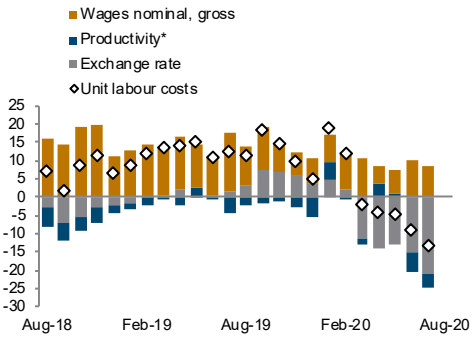
Real GDP growth and contributions
year-on-year



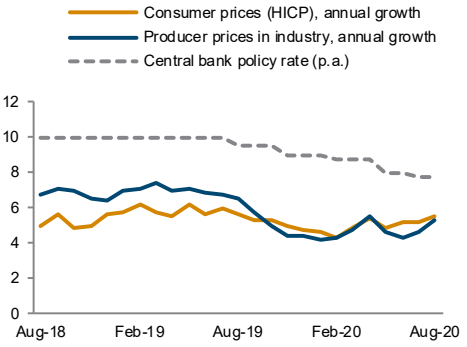
Real sector development
in %



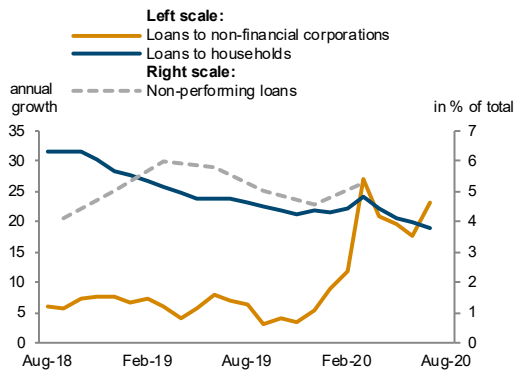
Unit labour costs in industry
annual growth rate in %



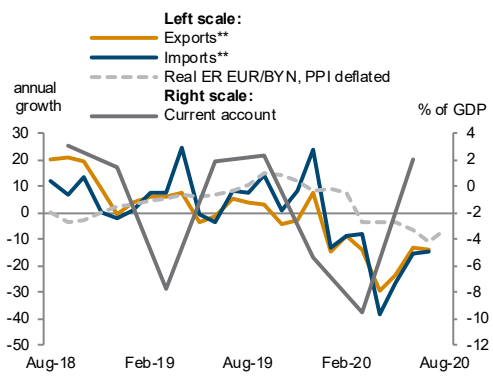
Inflation and policy rate
in %



Financial indicators
in %



External sector development
in %



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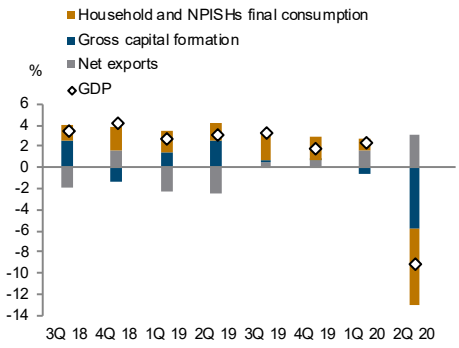
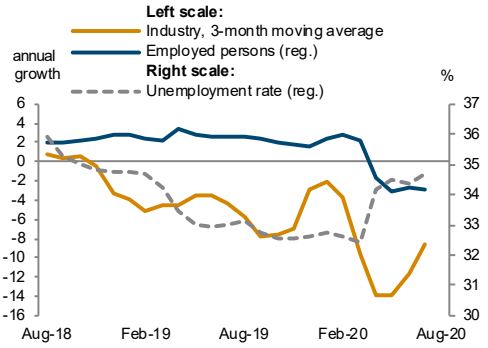
Bosnia and Herzegovina

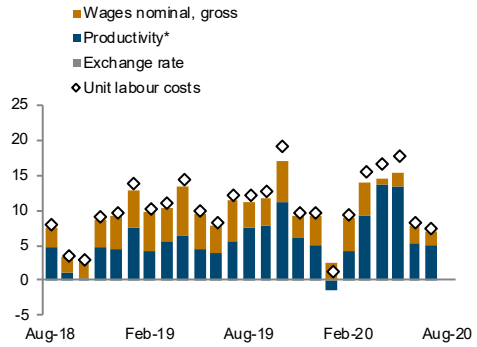
Real GDP growth and contributions
year-on-year



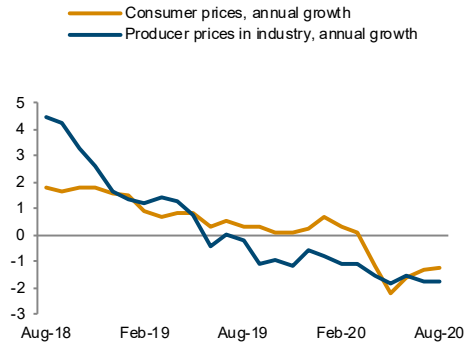
Real sector development
in %



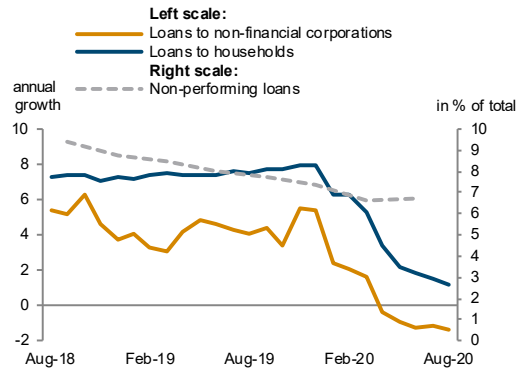
Unit labour costs in industry
annual growth rate in %



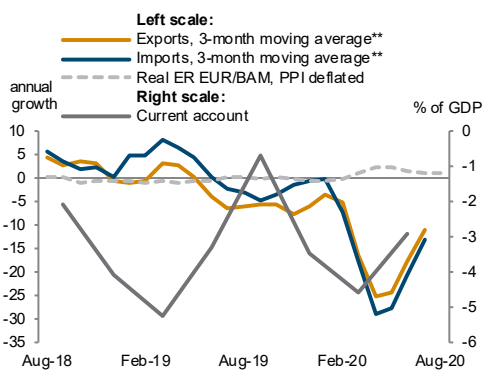
Inflation
in %



Financial indicators
in %



External sector development
in %



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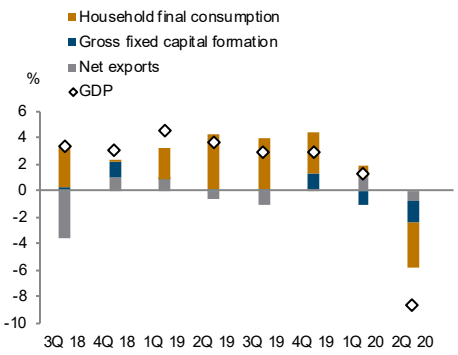
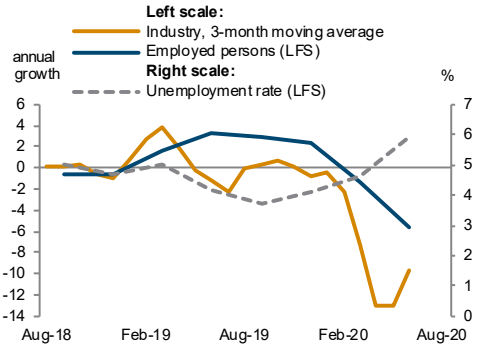
Bulgaria

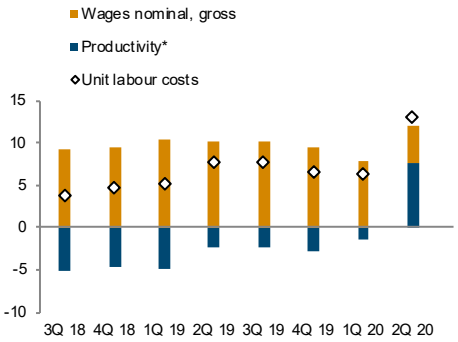
Real GDP growth and contributions
year-on-year



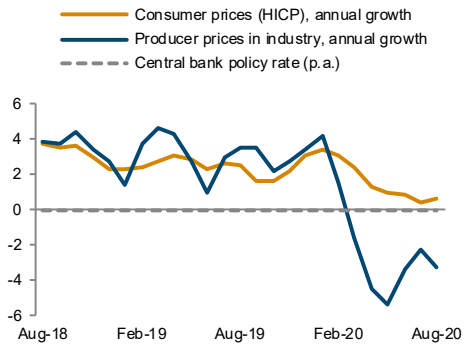
Real sector development
in %



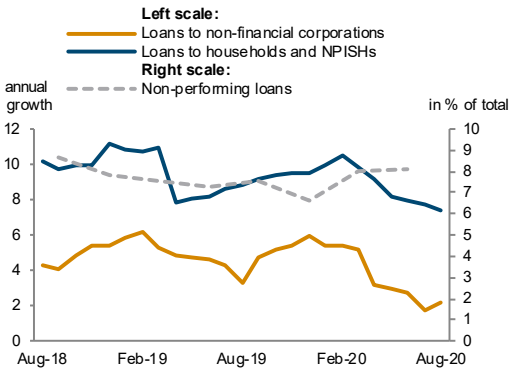
Unit labour costs in industry
annual growth rate in %



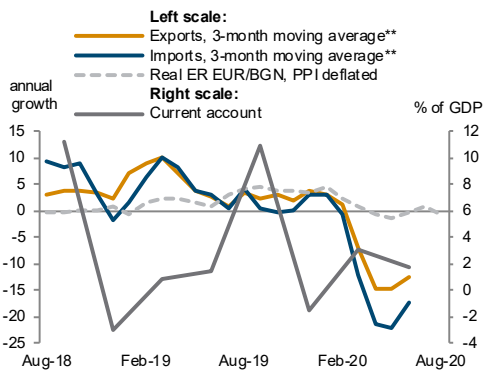
Inflation and policy rate
in %



Financial indicators
in %



External sector development
in %



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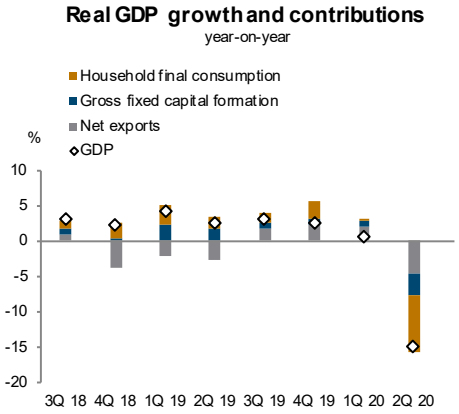
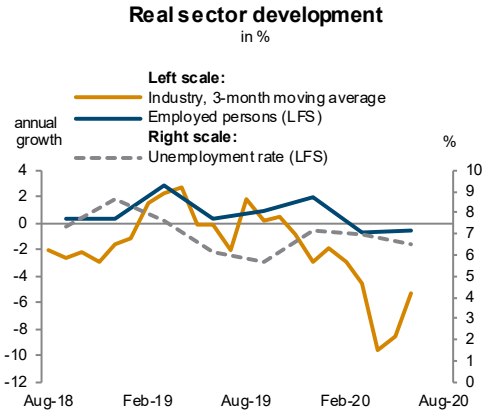
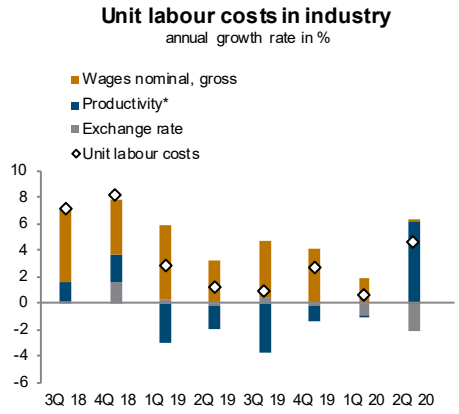
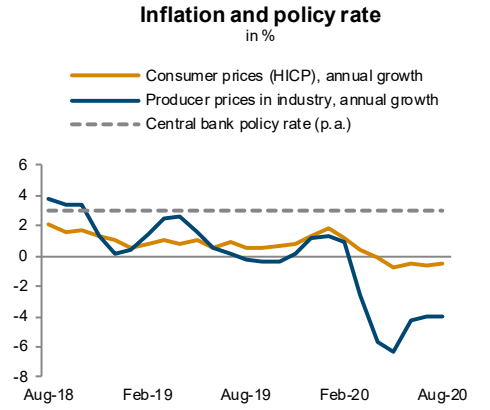
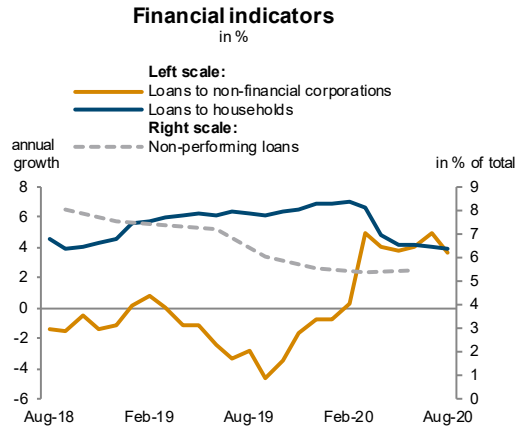
Croatia

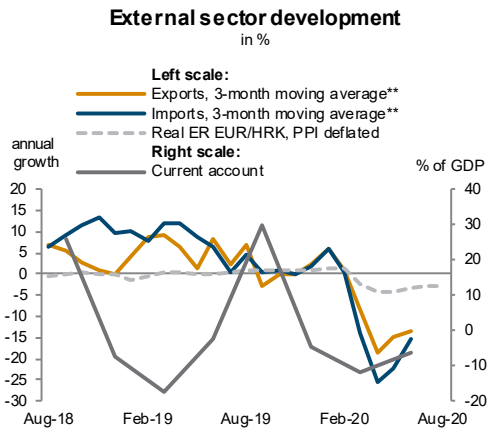












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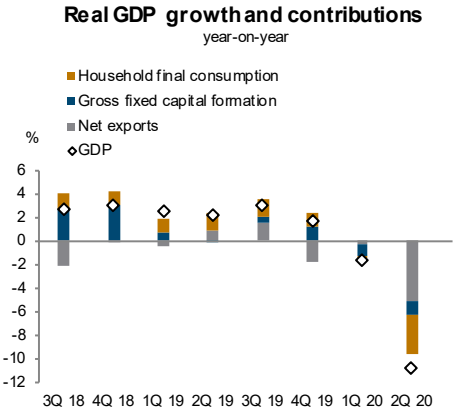
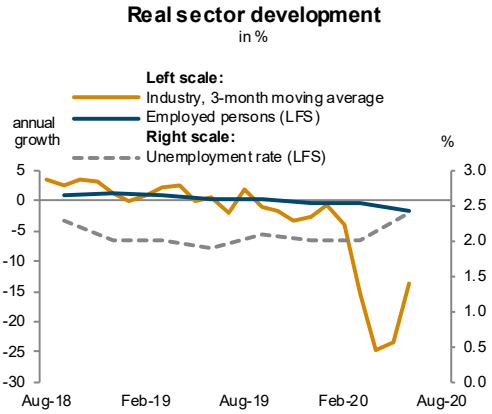
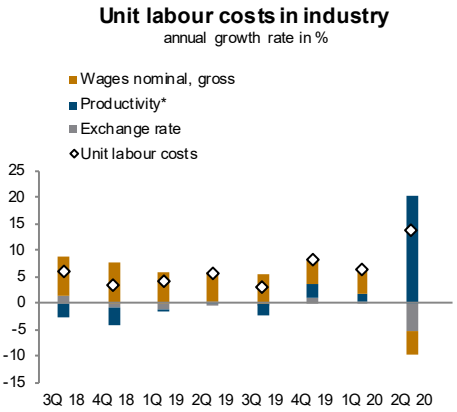
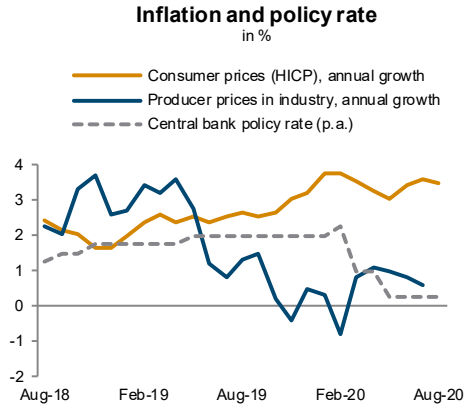
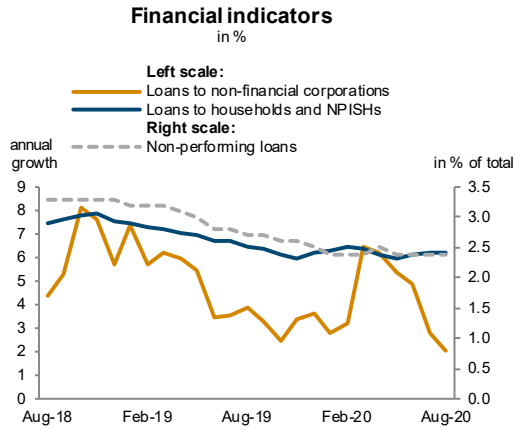
Czech Republic

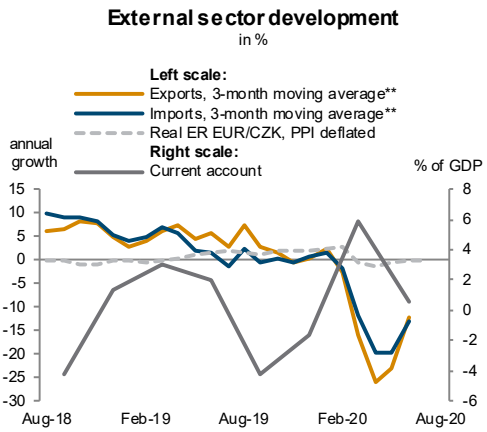












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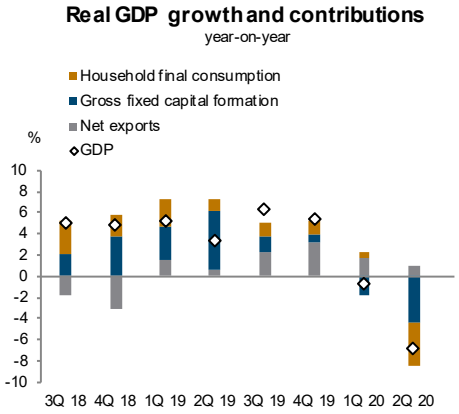
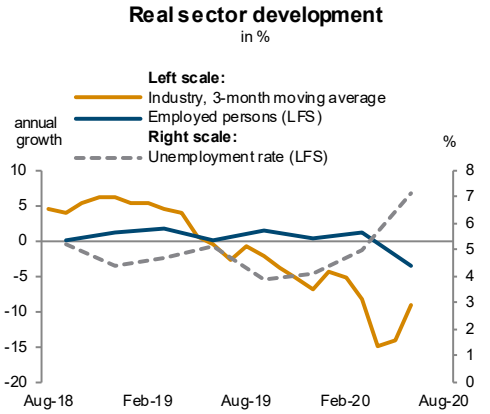
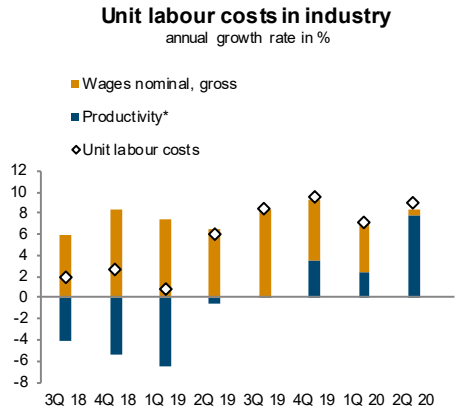
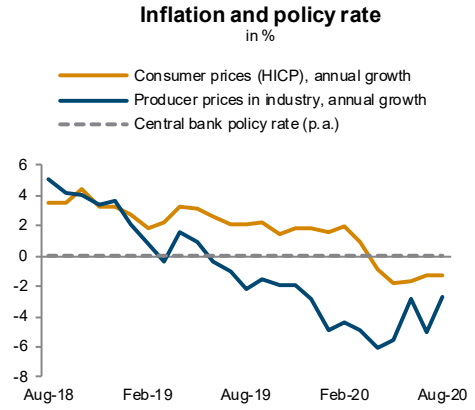
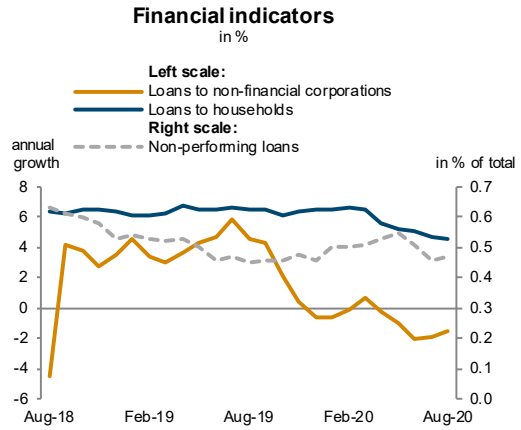
Estonia

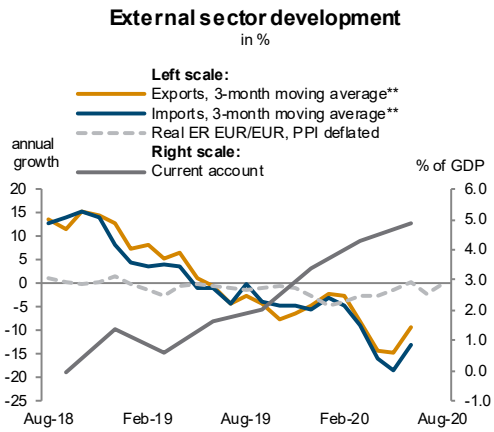












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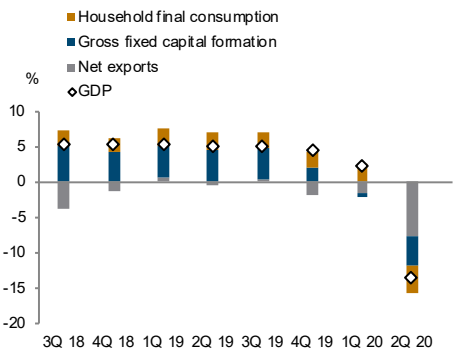
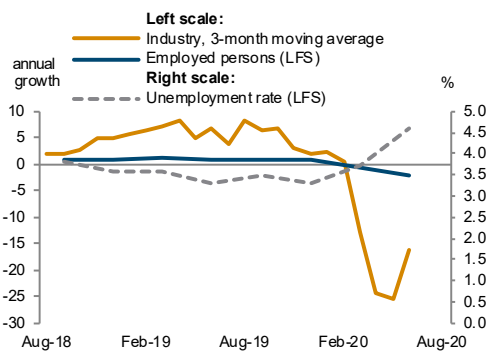
Hungary

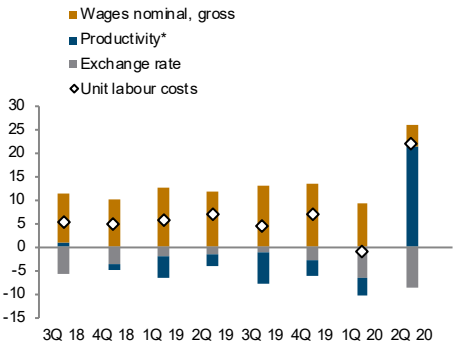
Real GDP growth and contributions
year-on-year



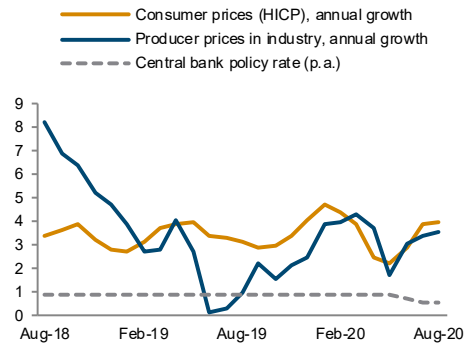
Real sector development
in %



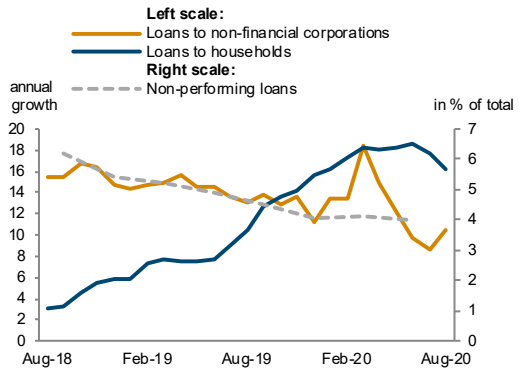
Unit labour costs in industry
annual growth rate in %



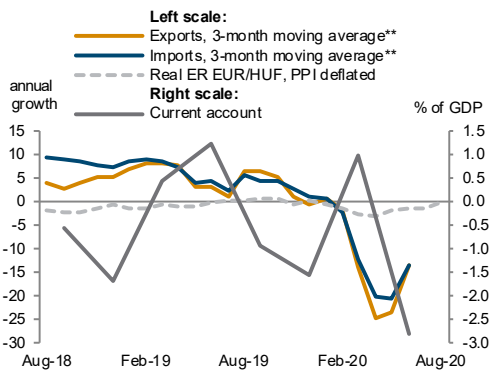
Inflation and policy rate
in %



Financial indicators
in %



External sector development
in %



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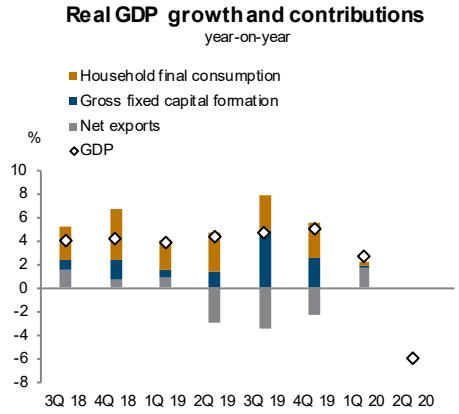
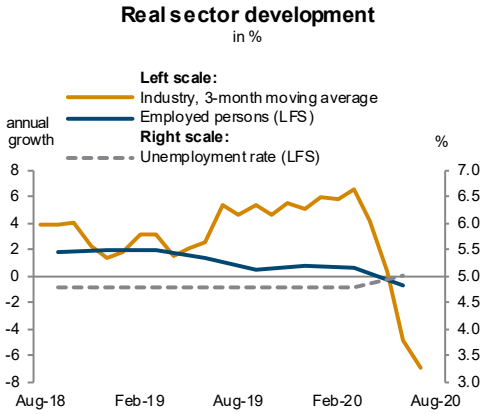
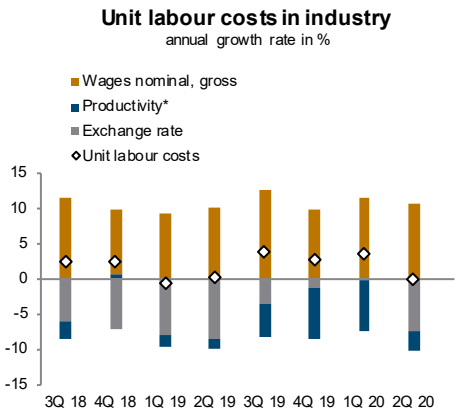
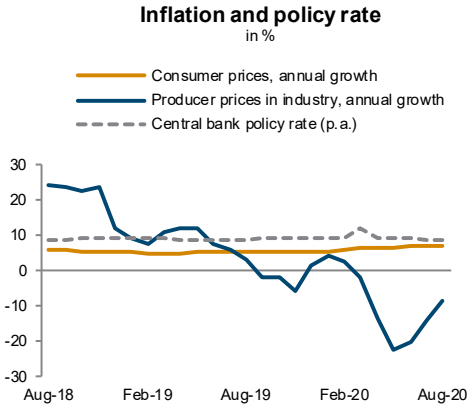
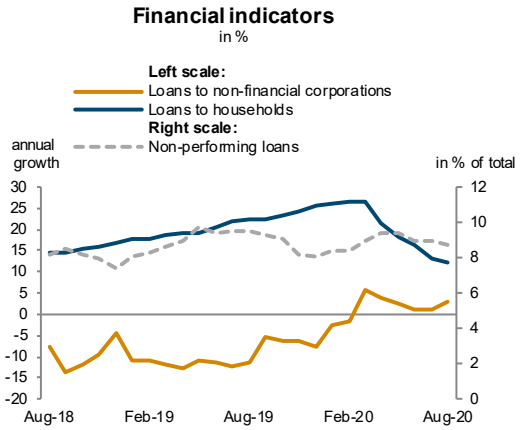
Kazakhstan

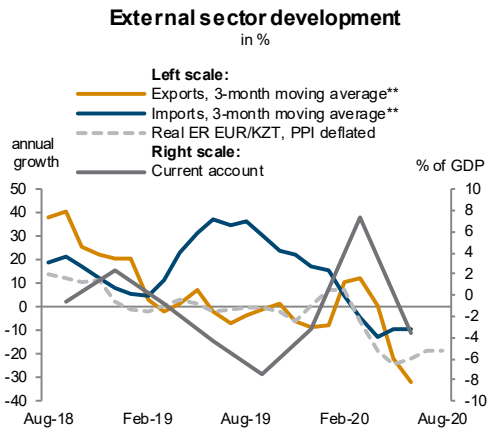












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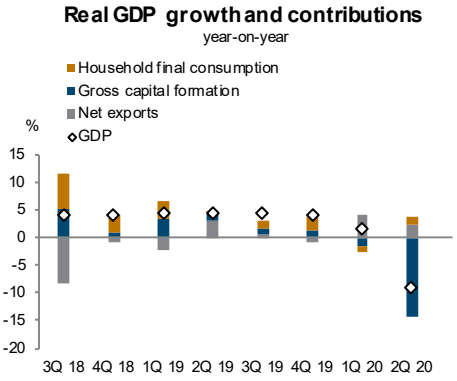
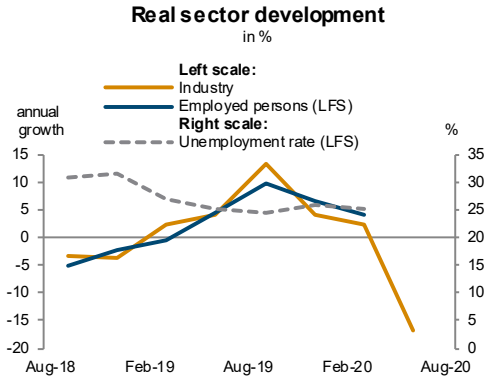
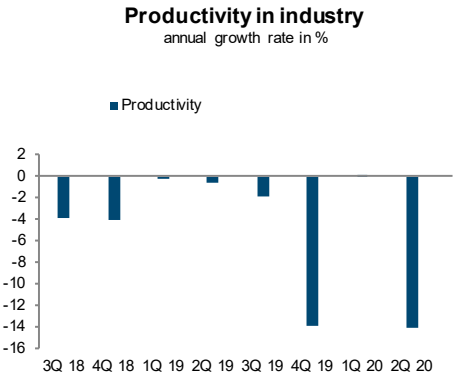
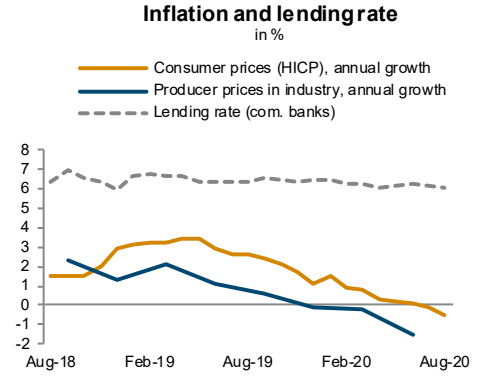
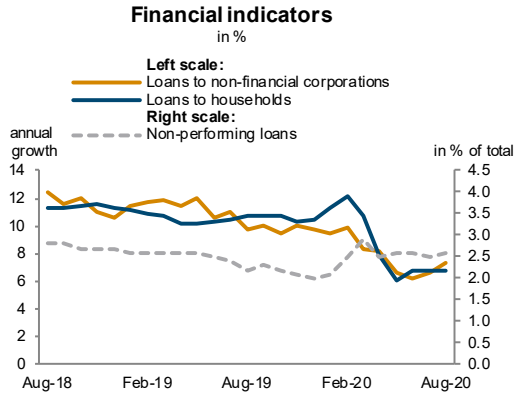
Kosovo

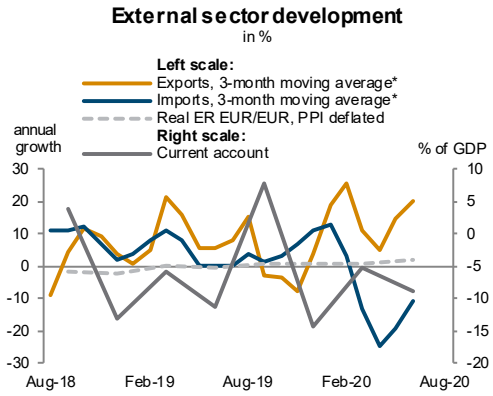












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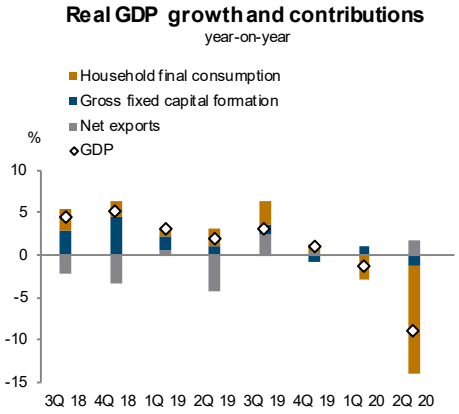
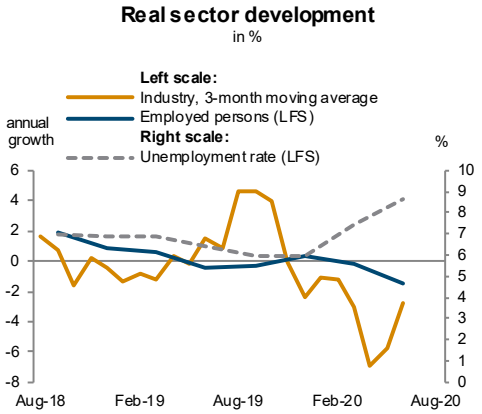
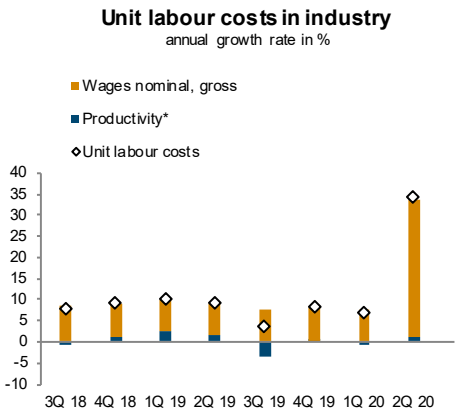
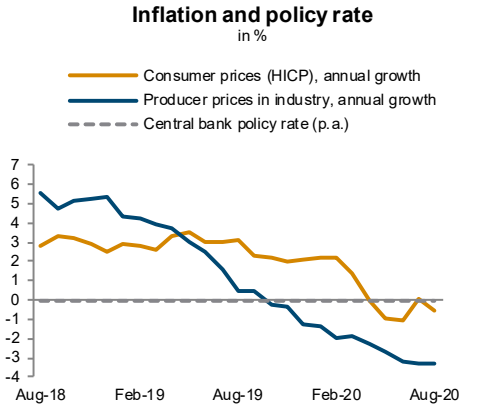
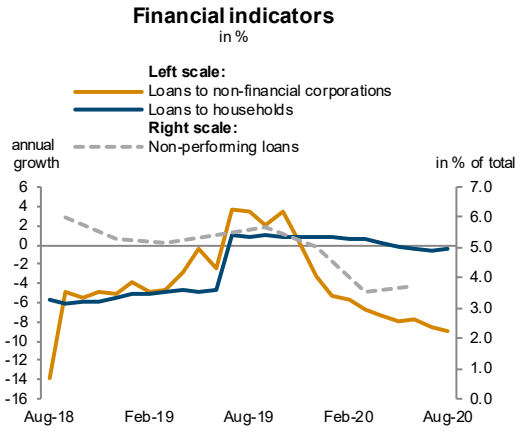
Latvia

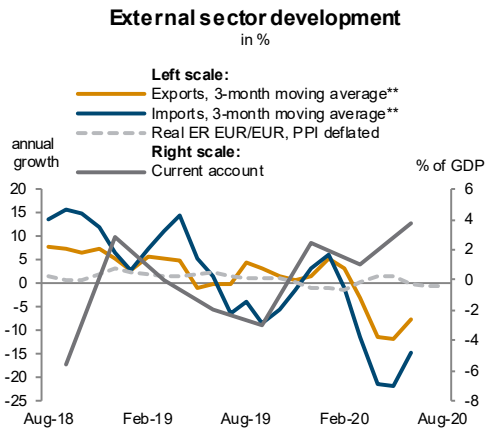












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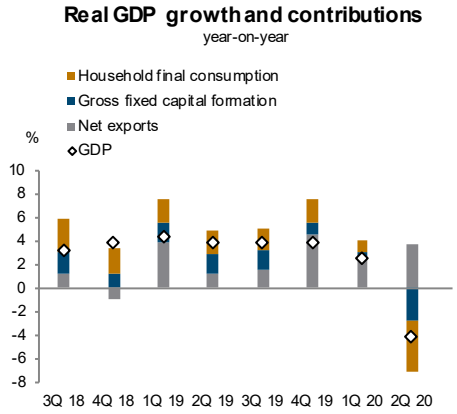
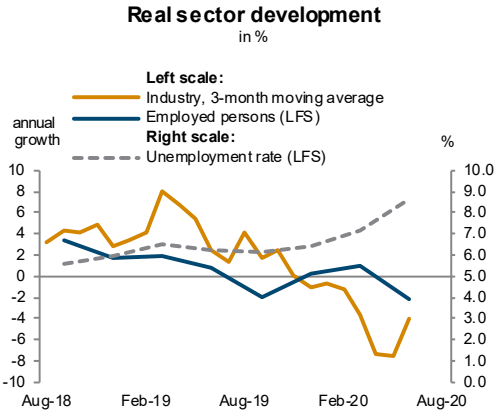
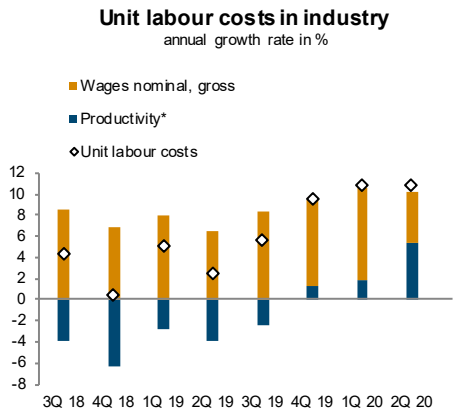
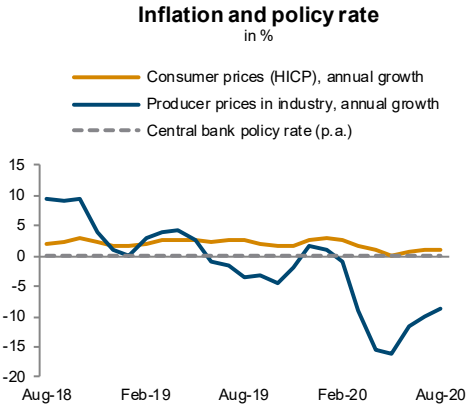
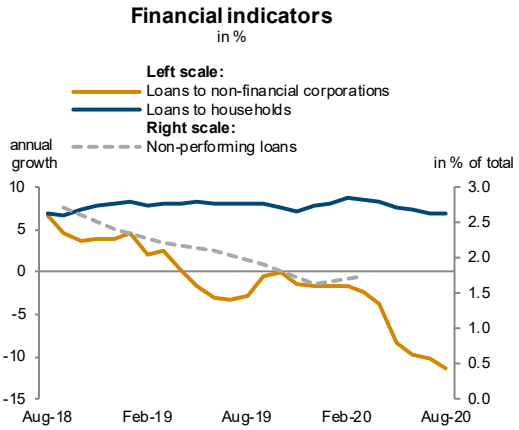
Lithuania

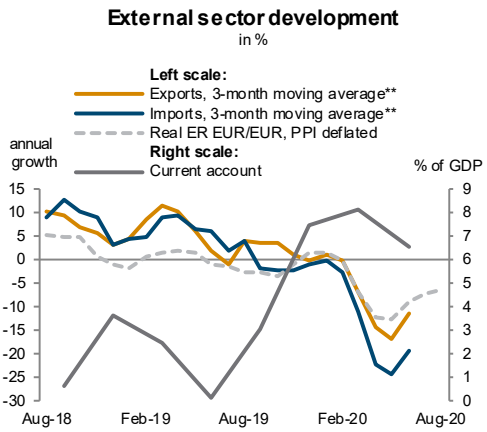












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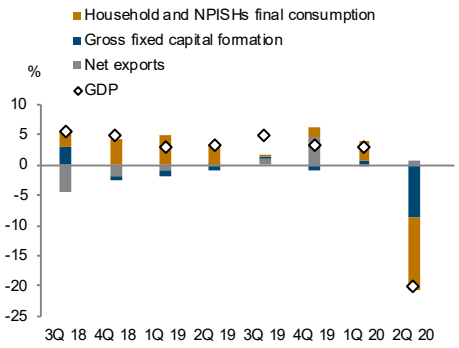
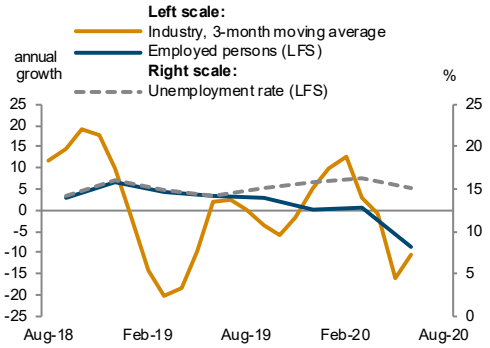
Montenegro

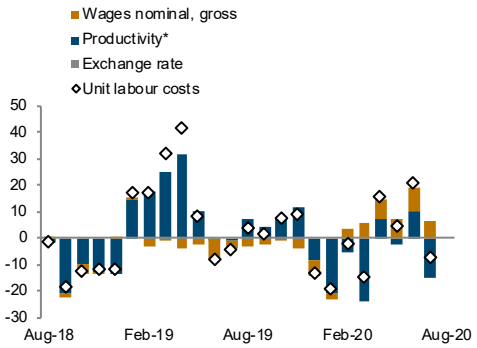
Real GDP growth and contributions
year-on-year



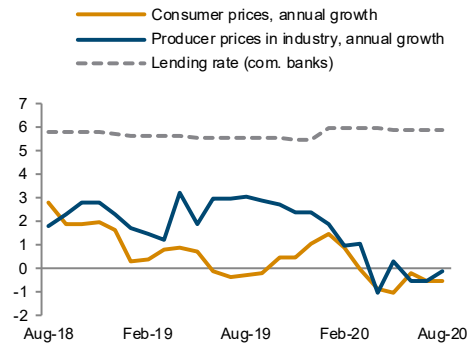
Real sector development
in %



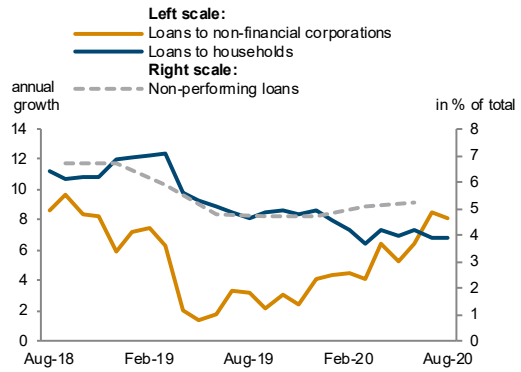
Unit labour costs in industry
annual growth rate in %



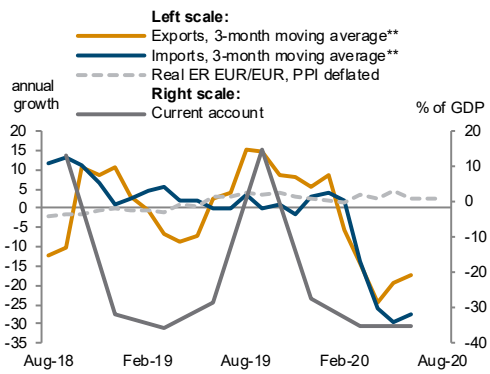
Inflation and lending rate
in %



Financial indicators
in %



External sector development
in %



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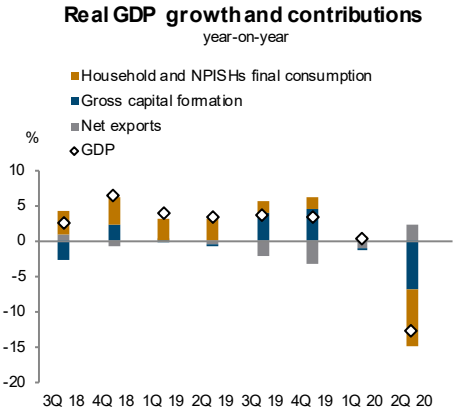
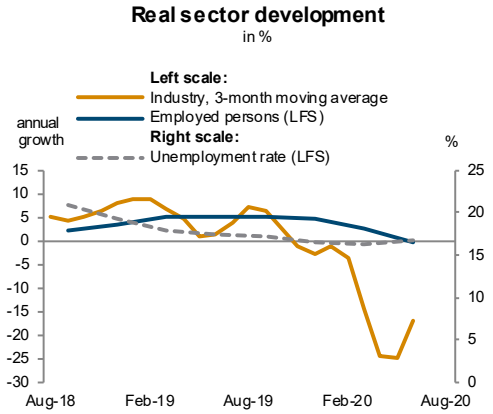
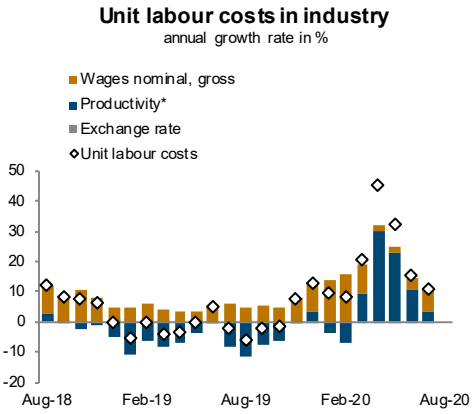
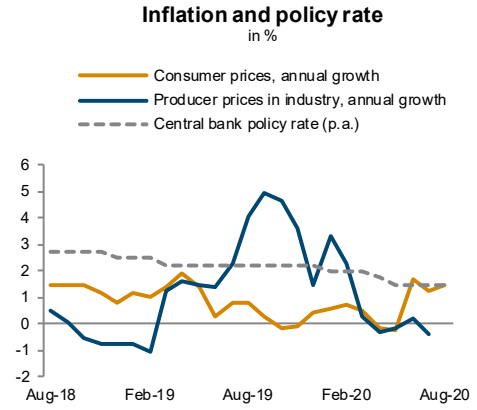
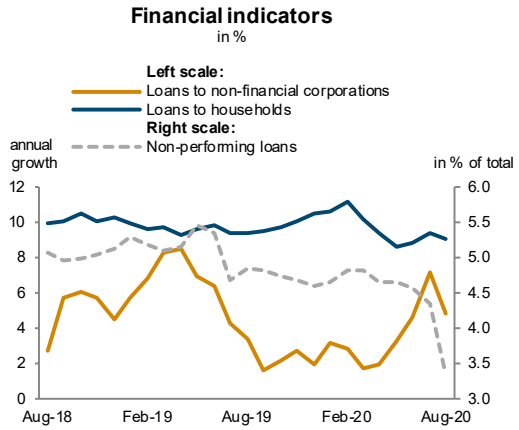
North Macedonia

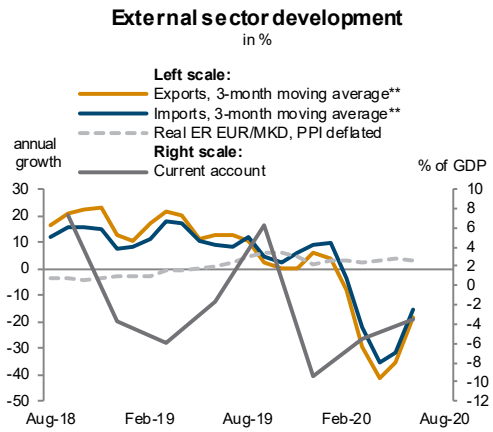












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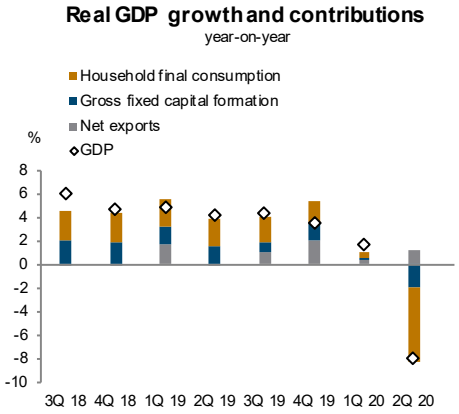
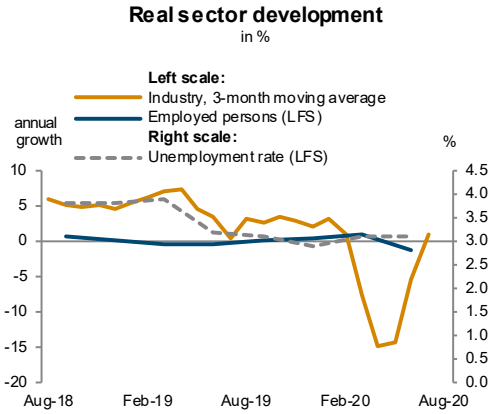
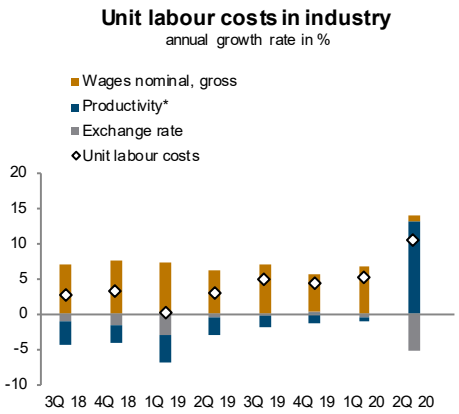
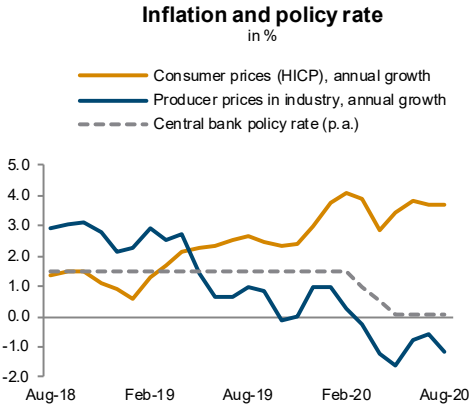
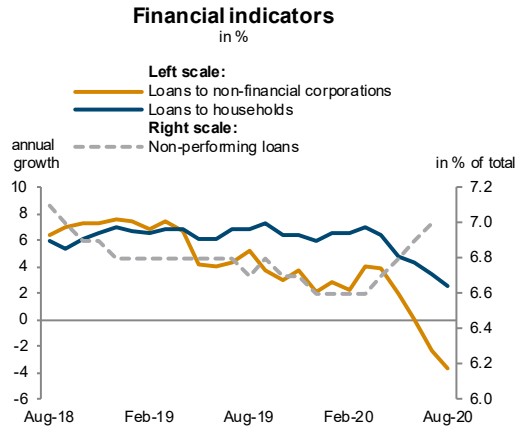
Poland

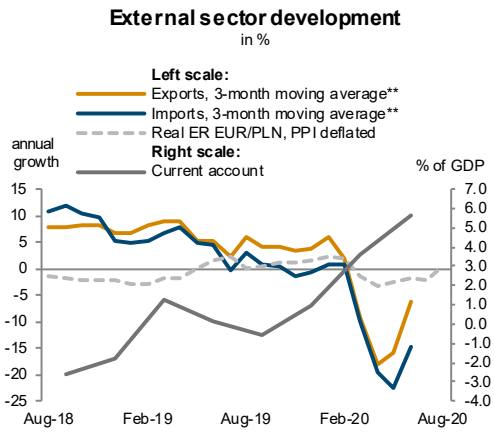












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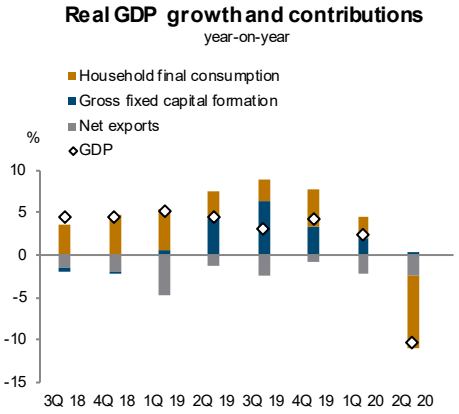
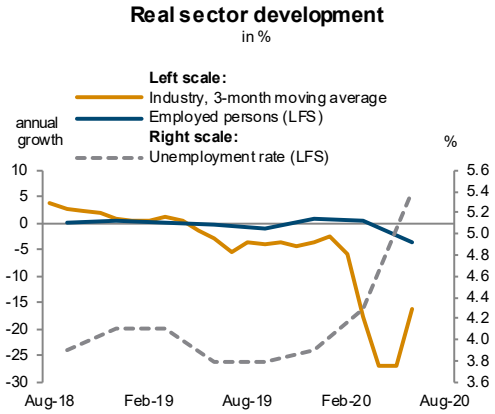
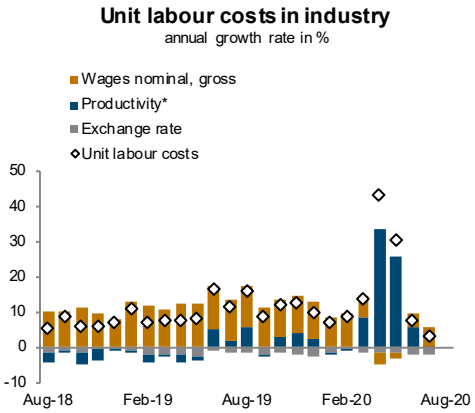
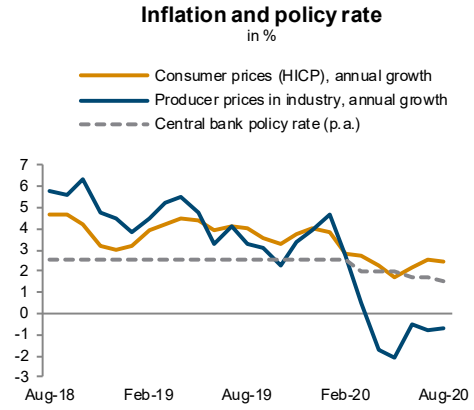
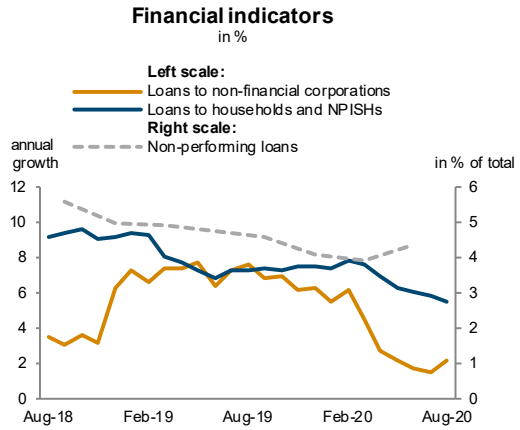
Romania

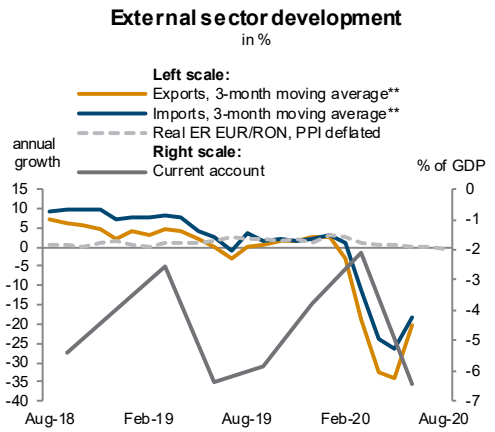












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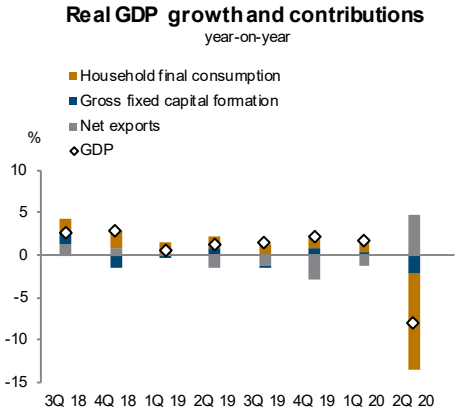
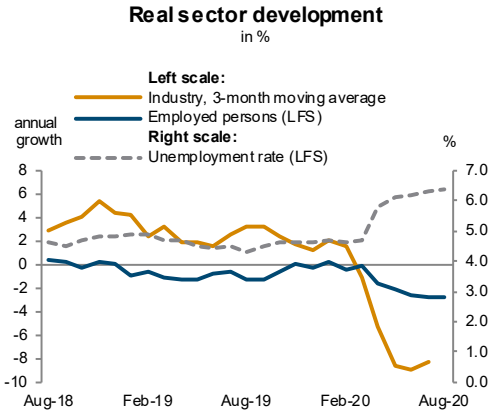
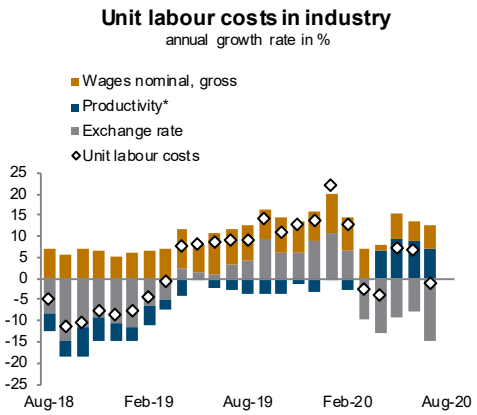
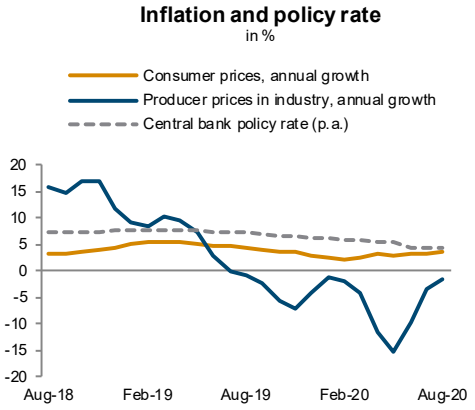
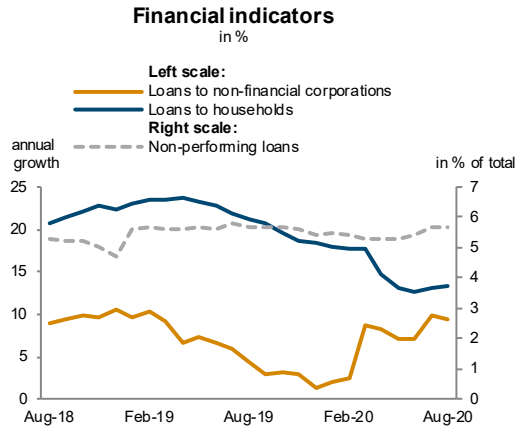
Russia

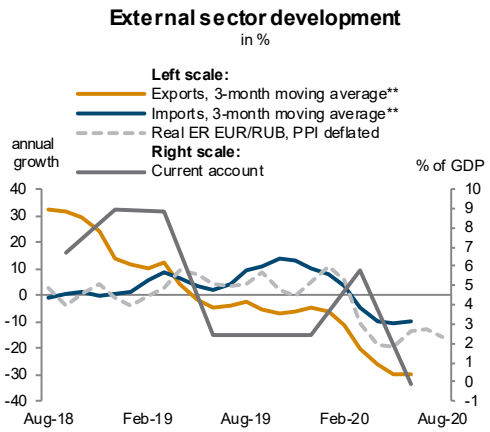












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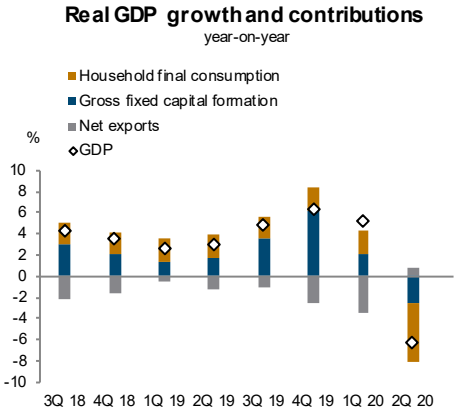
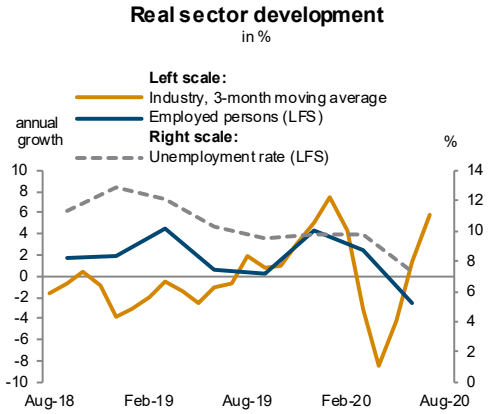
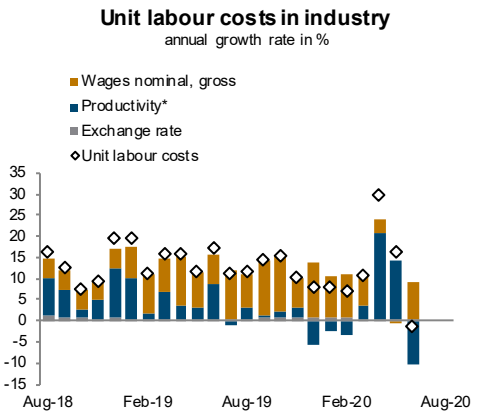
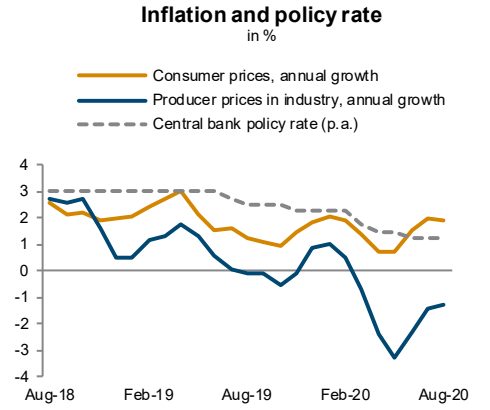
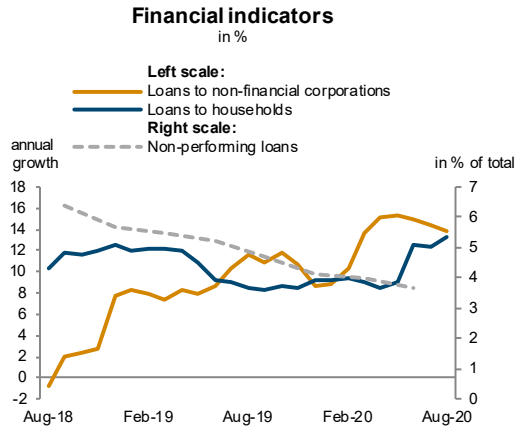
Serbia

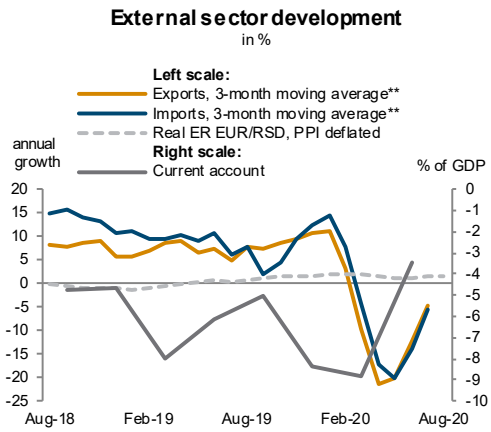












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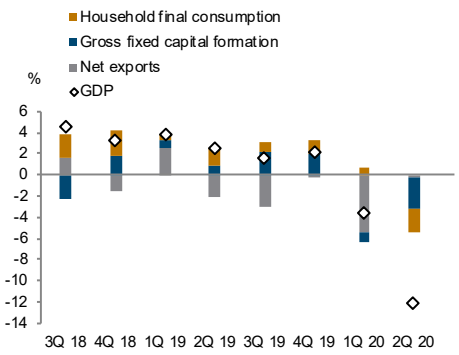
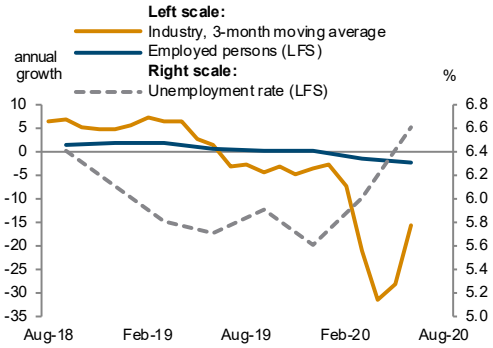
Slovakia

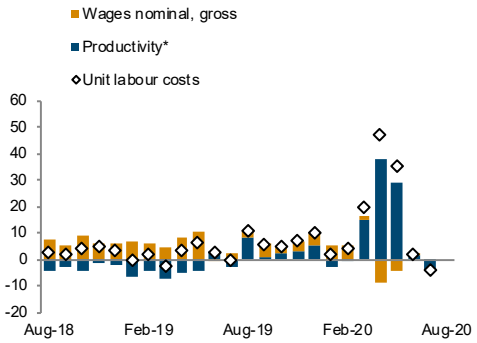
Real GDP growth and contributions
year-on-year



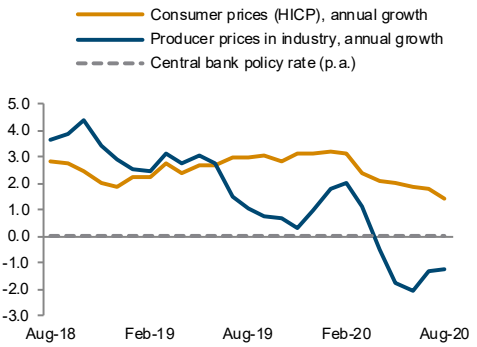
Real sector development
in %



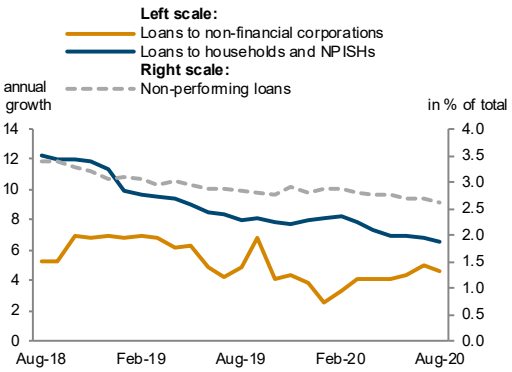
Unit labour costs in industry
annual growth rate in %



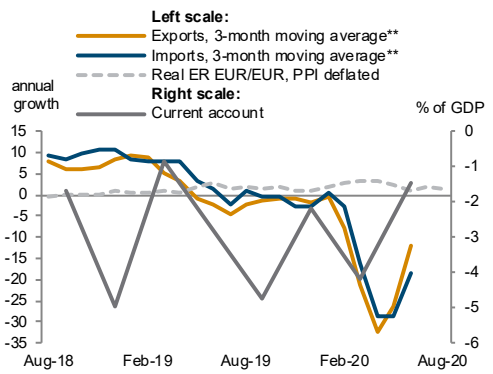
Inflation and policy rate
in %



Financial indicators
in %



External sector development
in %



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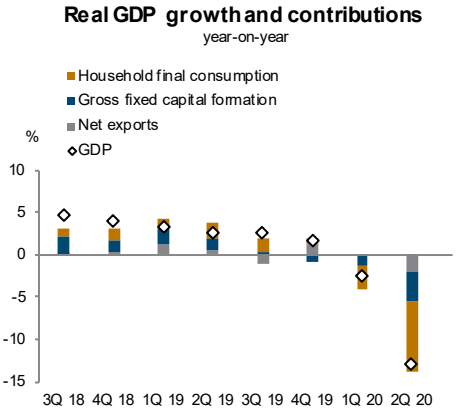
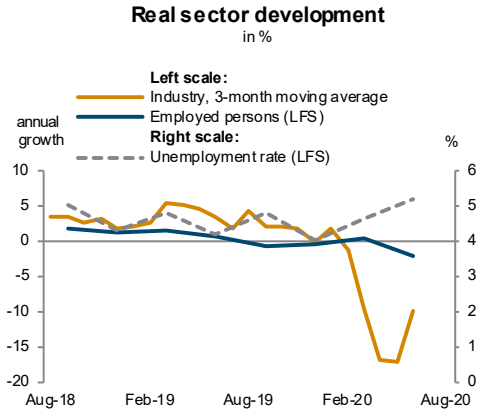
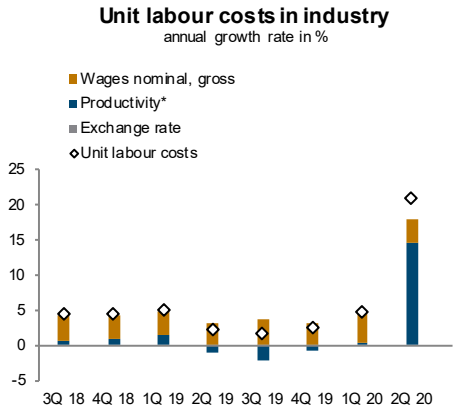
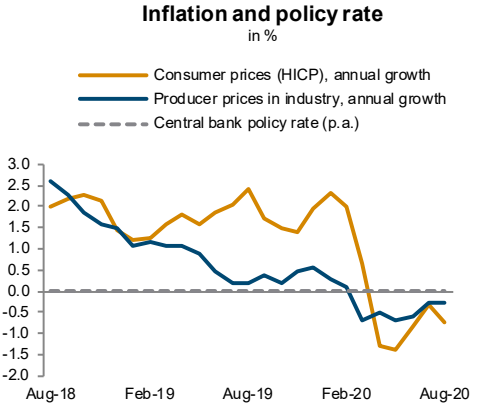
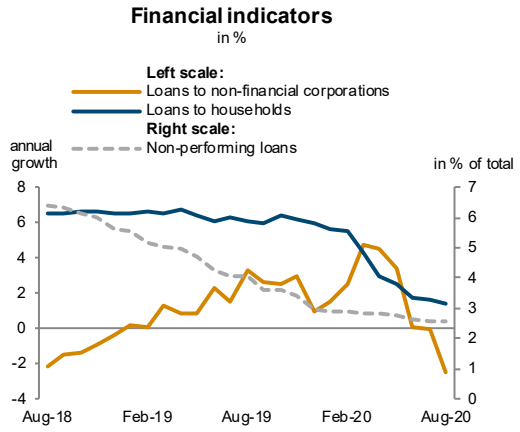
Slovenia

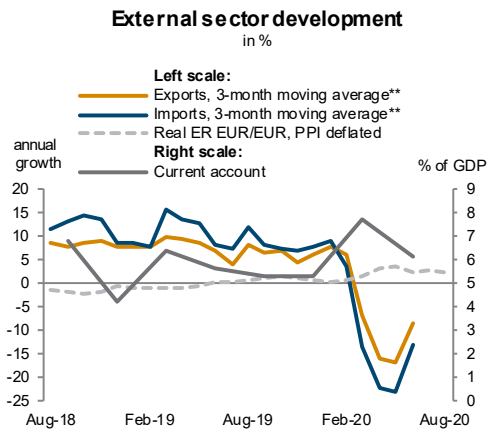












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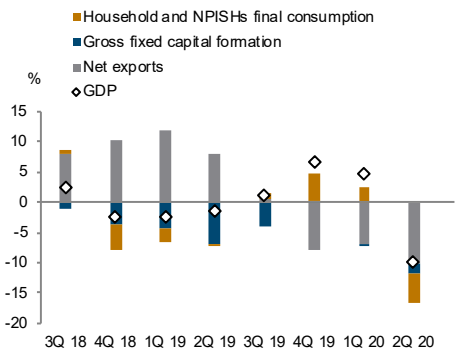
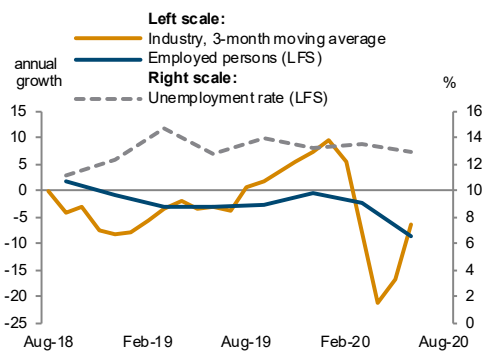
Turkey

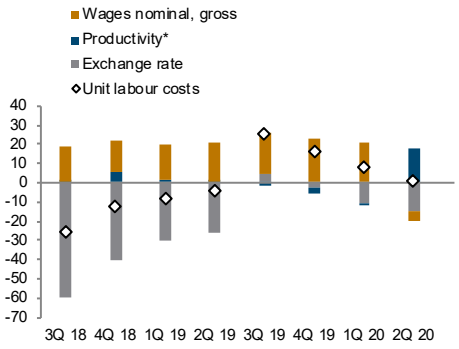
Real GDP growth and contributions
year-on-year



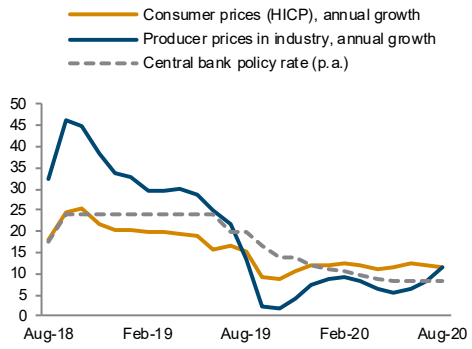
Real sector development
in %



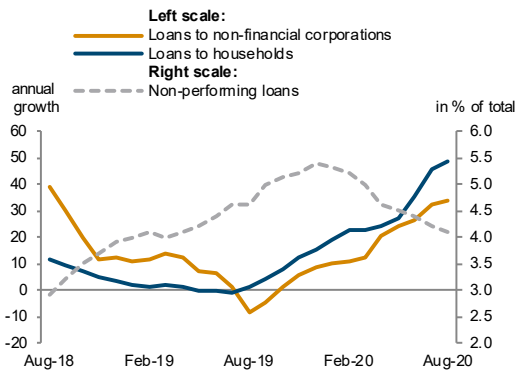
Unit labour costs in industry
annual growth rate in %



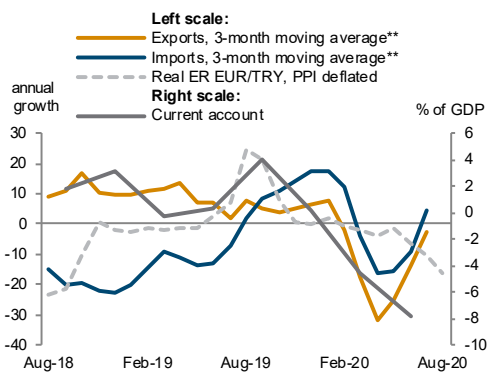
Inflation and policy rate
in %



Financial indicators
in %



External sector development
in %



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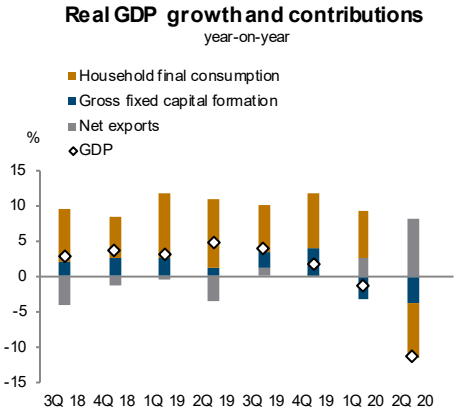
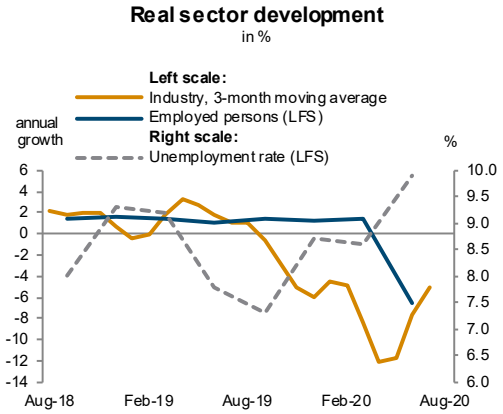
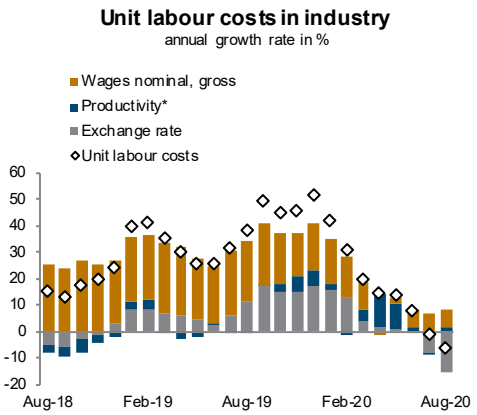
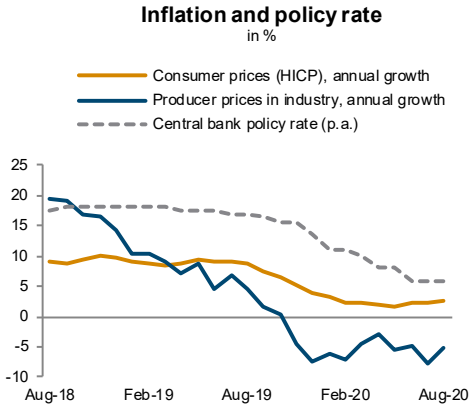
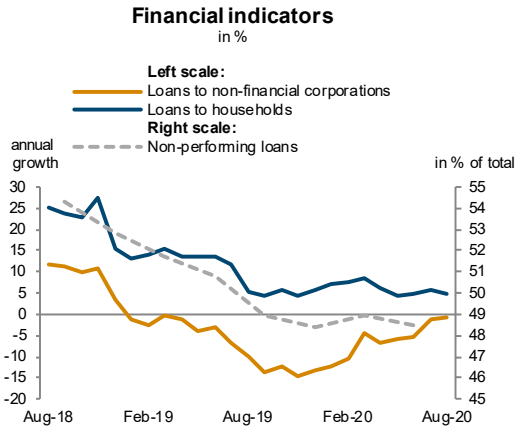
Ukraine

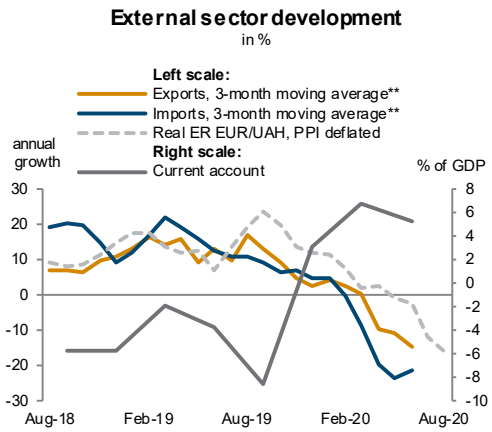












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multi-country articles and statistical overviews

Economics editor: Vasily Astrov

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