Balance of Payments Report

2022

CNB CZECH NATIONAL BANK

Contents

This publication offers an analysis of the evolution of the main items of the Czech Republic's balance of payments over the past year, supplemented with short academic articles focusing on the balance of payments and international trade. As we use preliminary balance of payments data subject to revision, the data from previous years may differ in the various issues of this publication. The electronic version, including the previous issues, can be downloaded from the CNB website https://www.cnb.cz/en/monetary-policy

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I.   EXTERNAL BALANCE OF THE CZECH ECONOMY

The Czech economy recorded a record external imbalance in 2022. The current and capital account balance, expressing the balance of trade and other transactions between residents and non-residents fell, after eight years of slight surpluses, to a deficit of 1.1% of GDP in 2021. This slight imbalance worsened sharply in 2022 to -6.0% of GDP. This imbalance is comparable only with 1996 in the Czech Republic's "economic history". The result was a deepening of the Czech economy's debt position regarding other countries. The total negative investment position of Czech businesses, banks, the general government and households vis-à-vis non-residents was almost 20% of GDP at the end of 2022 (it was only approx. 13% at the end of the first quarter of 2021).

> The Czech economy's balance with other economies – its external balance – is the sum of the goods and services balance with income balances (current account) and the capital account balance. These accounts cover all transactions between residents and non-residents related to international trade in goods and services, payments for capital and labour (primary income), unilateral transfers (secondary income) and transactions of other nature (capital account).

I.1   BALANCE OF PAYMENTS

The current account of the balance of payments ended 2022 with a significant deficit of 6.1% of GDP (Chart 1)**.** The main cause of this year-on-year collapse was a further significant price increase of imported raw materials, in particular fuels, after the Russian invasion of Ukraine. Production problems related to disruptions in global supply chains after the COVID-19 pandemic also continued to affect exporters in 2022. Together with other, less important influences, these factors returned the Czech Republic – after almost 20 years as a net exporter – to being a net importer of goods and services (Chart 2). The sequence of crises, however, has not yet affected the profitability of Czech businesses in foreign ownership. These generated record revenues from domestic investment for their foreign owners that, in proportion to the size of the economy, roughly correspond to the levels before the pandemic and, in net terms, deepened the current account balance by 6% of GDP.

Chart 1: The Czech Republic found itself in a deep external imbalance in 2022

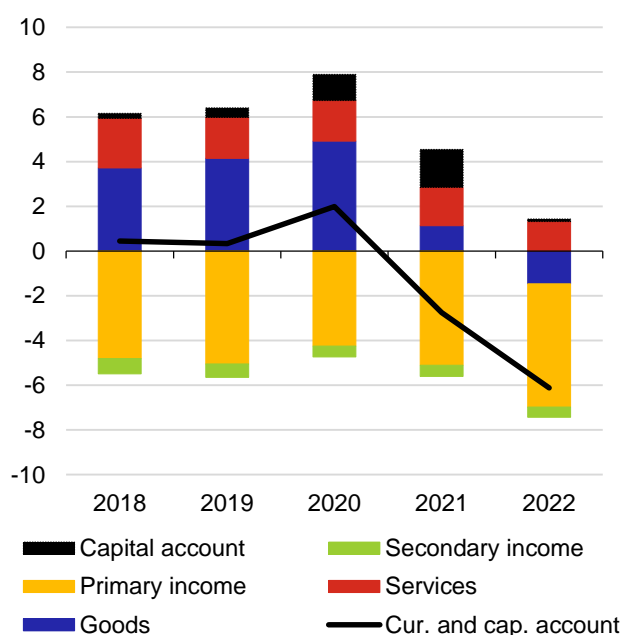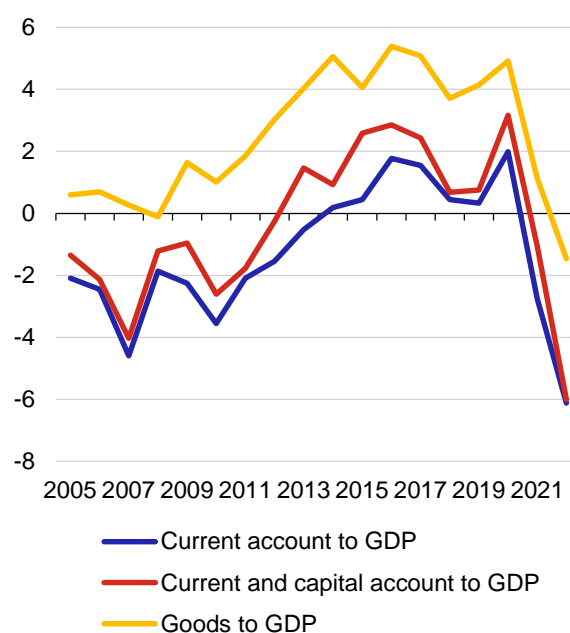(individual external balances of the Czech economy as % of GDP)

Chart 2: The steepest year-on-year fall hit the balance of foreign trade in goods

(individual external balances of the Czech economy as % of GDP)

The overall deficit of the Czech balance of payments with other countries was not mitigated by the usual net income from the EU budget as it was deepened by approximately equal net purchases of emissions allowances. The capital account, which records the majority of such transactions, ended with only a slight surplus of 0.1% of GDP on aggregate in 2022. By contrast, over the previous five years, the capital account increased the overall balance by an average of 1% of GDP.

I.2   DEVELOPMENTS IN THE INTERNATIONAL INVESTMENT POSITION

The Czech Republic's net investment position vis-à-vis other countries was -19.7% of GDP at the end of 2022 (Chart 3).[1] After a reduction in the net negative (i.e. debtor) position in 2020 and 2021, the net position returned to roughly where it was in 2019. The negative investment position continues to reflect the wide-ranging equity capital of foreign investors in the Czech economy, which is however regarded as materially less risky in terms of macroeconomic vulnerability than debt-based indebtedness. After adjusting for the influence of direct investment, the Czech Republic's net position is that of a creditor to the rest of the world.

Chart 3: After adjusting for direct investment, the Czech Republic is a net creditor vis-à-vis other countries

(the Czech Republic's investment position by debtor as % of GDP, end of period)
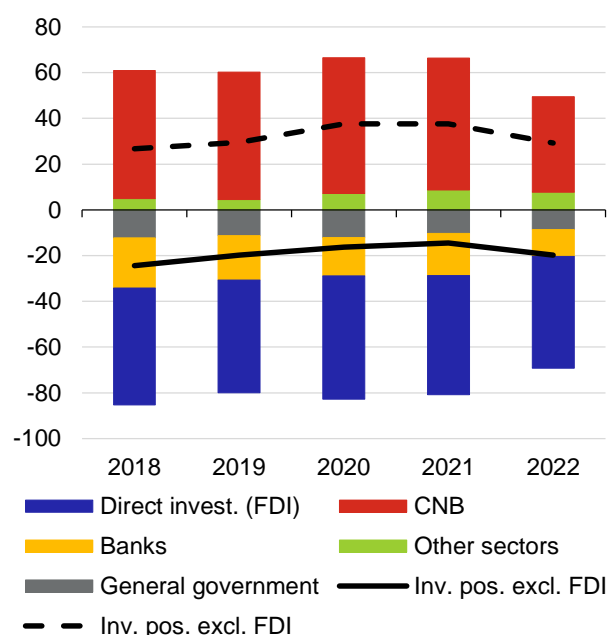
Chart 4: The sale of CNB reserves financed the external imbalance and outflow of short-term capital

(financial account as % of GDP)
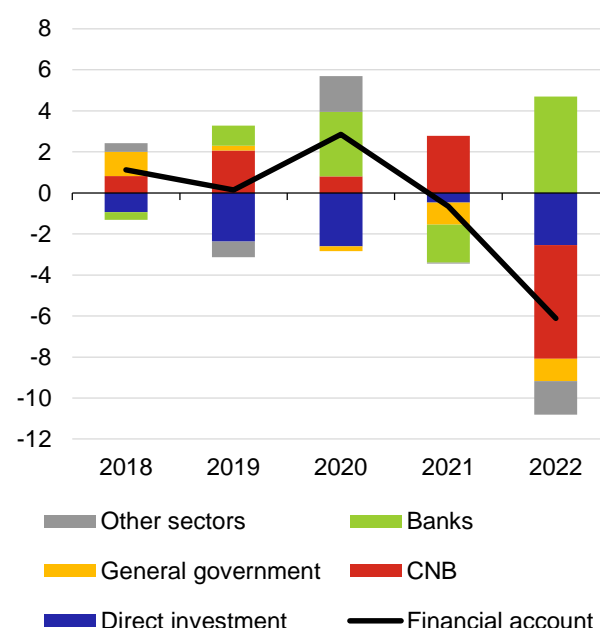
Note: A positive value expresses a net increase in foreign assets/reduction in liabilities (capital outflow), while a negative value expresses a reduction in assets/increase in liabilities (capital inflow), respectively their proportion of GDP.
Source: CNB, CZSO, CNB calculation

Source: CNB, CZSO, CNB calculation

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[1] From the viewpoint of MIP (Macroeconomic Imbalance Procedure) evaluation, a value of up to −35% of GDP is regarded as safe.

The deepening of the Czech Republic's debtor position in 2022 reflects the economy's external imbalance. The current account deficit was financed by the sale of CNB reserve assets and an increase in the general government's and non-financial businesses' foreign indebtedness (Chart 4). The deepening of the debtor position was also to a more modest extent related to the market revaluation of foreign assets and liabilities (by 0.6% of GDP).[2]

> The balance of payments accounts must always **be balanced**. The current and capital account balance is always equal to the financial account balance. However, because they are based on different statistical sources, the values captured may differ due to the influence of exchange rate movements, price trends, or other reasons. The identity must thus be adjusted for errors and omissions: $CA + KA + E\&O = FA$.

A portion of non-residents' short-term debt capital flowed out of the Czech Republic during the year. Sales of CNB reserves did not finance only the economy's external imbalance, but also compensated for an outflow of debt capital of foreign short-term investors from the Czech Republic. Foreign assets and liabilities therefore fell (Chart 3). The new, lower volume of short-term foreign capital reduces the economy's vulnerability to balance of payments and currency crises. Even after the partial outflow in 2022, however, the volume of such capital in the Czech Republic remains significant.

The volume of CNB foreign exchange reserves fell during the exchange rate interventions in 2022, but remains high in an international comparison and comfortably exceeds all prudential indicators for reserve adequacy. The reserve assets would cover, *inter alia*, the economy's annual gross external financing needs even in the broadest sense (the CNB could pay off all foreign debt investments due within 12 months).

> The total balance of the Czech economy in a given year (measured by the balance on the financial account or the balance on the current and capital accounts, adjusted for measurement error) is reflected in the **changes in foreign assets and liabilities**. The international investment position is also influenced by changes in the exchange rate and the prices of financial assets and liabilities.

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[2] On the asset side, there was primarily a reduction in the market value of foreign securities in the CNB reserves, while on the liability side there was a reduction in the market value of government bonds held by non-residents. In both cases, developments resulted from the rise in monetary policy rates, depreciating previously issued, low-interest bonds.

II.   INTERNATIONAL TRADE

The international trade balance in goods and services was in deficit in 2022 (for the first time since 2003). Due to the higher imported energy commodity prices and higher domestic demand for foreign goods, the balance of trade in goods gradually fell from a surplus of 4.9% of GDP in 2020 (and 1.2% of GDP in 2021) to a deficit of -1.5% of GDP in 2022. This substantial deficit was not offset even by the surplus in the balance of services, which was 1.3% of GDP.

II.1   GOODS

The Czech Republic became a net importer of goods for the first time since 2008 (Chart 5)**.** The cause was sharp growth in the prices of raw materials on global markets caused by the war in Ukraine. Another, less important factor, was the ongoing problems with deliveries of components (in particular chips), most visible in the automobile industry. As a consequence, the balance of trade was in deficit for most of the year (Chart 6).

Chart 5: The balance of trade was in deficit for the first time since 2008…

(trends in international trade in goods 1993-2022, in CZK billions and %)
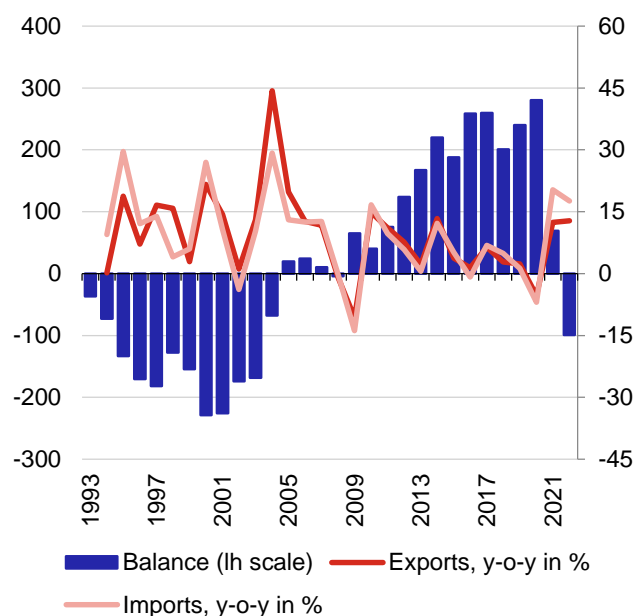
Chart 6: … and remained negative for most of last year

(monthly dynamics in trade in goods in 2022, in CZK billions and %)
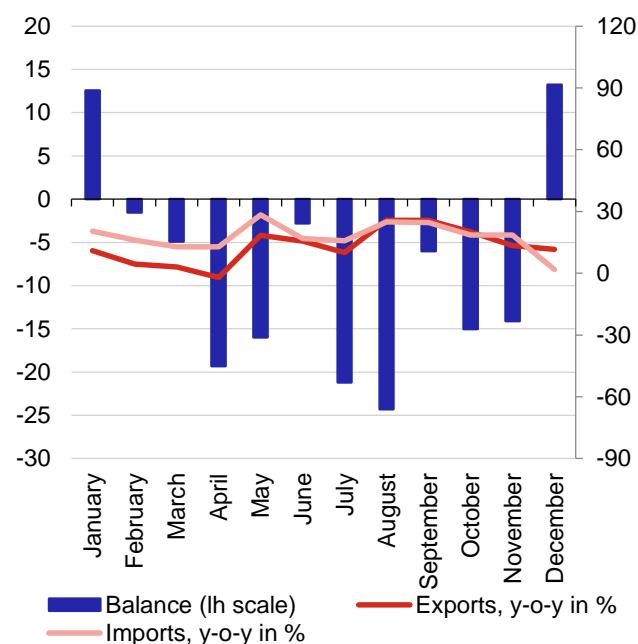
Source: CNB

Source: CNB

The COVID-19 pandemic and the war in Ukraine markedly changed the price dynamics in the goods trade. Whereas in the pandemic year of 2020, the year-on-year fall in prices made imports cheaper compared to 2019[3] (lower fuel prices contributed to the growth of the surplus of the balance of trade), energy prices had the opposite effect one year later. In 2022, the growth in prices of imported goods exceeded price increases by domestic exporters (Chart 7) and the growth in prices of imported energy commodities was

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[3] In the pandemic-hit year of 2020, we paid relatively less for purchased goods than we would have paid for the same quantity in 2019 (Chart 7). Export prices, however, rose compared to 2019 and therefore the overall price contribution increased the surplus of the balance of trade.

therefore the main cause of the deterioration in the trade balance compared to 2019 (Chart 8). This effect, on the other hand, was mitigated by electricity, the pricing of which is linked to that of gas. However, unlike with gas the Czech Republic exports more electricity than it imports.[4] Excluding energy commodities, the price trends in 2022 contributed towards an increase in the balance of trade compared to 2019.

Prices of imported energy and a high demand for foreign goods contributed to the negative balance of trade. Following the sharp fall in volumes of imported and exported goods in 2020, there was a steep revival (Chart 7). The automobile industry, a key export segment of the Czech Republic,[5] has not yet however fully recovered from its supply chain problems, whereas demand for foreign goods, boosted by the previous shutdowns, rose all the more sharply. The problems in the automobile industry were particularly visible in 2020 and 2021, when production shutdowns and the lack of chips and other components caused a fall in production in real terms (Chart 8). The quantity of exported motor vehicles rose in 2022 after falling for two years, but still lags behind the 2019 values. An increased demand for foreign electronics constitutes a new trend. The high volume of imported chemicals and pharmaceutical products did not decline at the end of the pandemic period and lasted until 2022. As a consequence, in 2021 and 2022 the quantity effect contributed to a fall in the balance of trade compared to 2019.

Chart 7: Rapidly rising prices of imported goods primarily contributed to the year-on-year worsening of the trade balance

(left axis: trade in goods in 2019 prices, right axis: index of export and import prices, 2019=100)
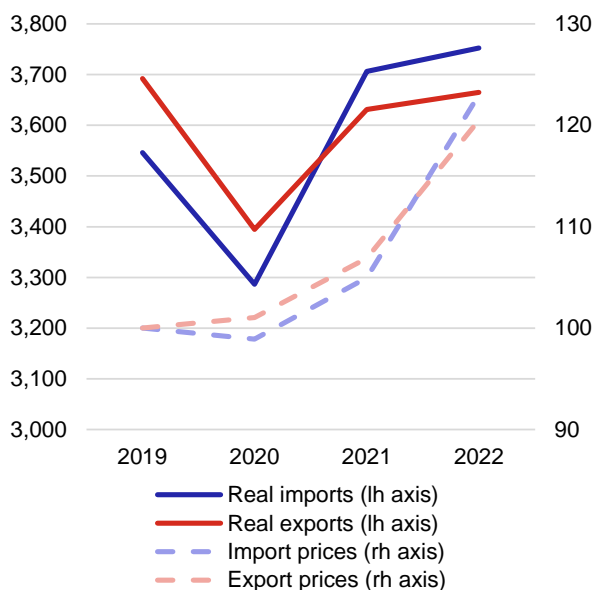
Note: Exports and imports in real terms show volumes changing over time at constant 2019 prices (left axis). The price indexes show how the price of exports and imports changed compared to 2019 (right axis).

Source: CNB

Chart 8: While car exports at constant prices fell only slightly, the negative contribution of imported fuel prices rose by multiples

(breakdown of the change in the balance of international trade in goods compared to 2019 in CZK billions)
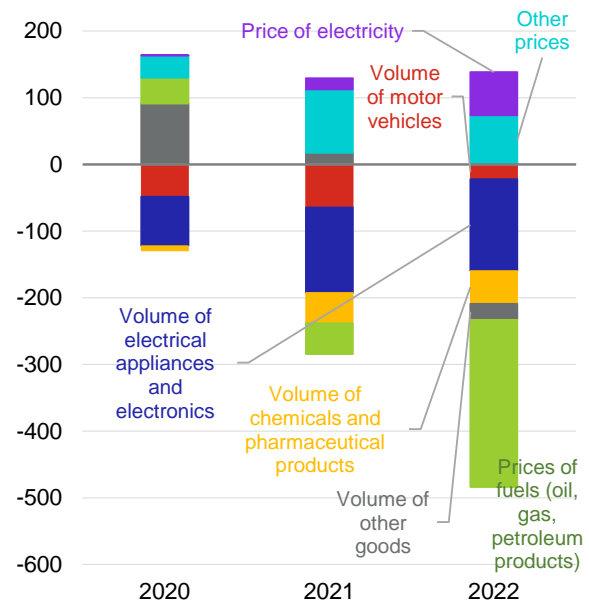
Source: CZSO, CNB calculation

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[4] The interlinked nature of electricity and gas prices is explained in Box 1 in the Monetary Policy Report (winter 2022).

[5] The share of CPA group 29 – Motor vehicles, trailers and semi-trailers represented roughly a quarter of total exports on average in 2018-2022.

The negative impact of the worsening terms of trade was further deepened by the weakening of the Czech koruna against the US dollar. As is shown by Chart 9, the long-term trend of export prices rising year on year at a faster pace than the prices of imported products was interrupted in the first half of 2021. The drastic collapse of the terms of trade was first caused primarily by rising prices of imported energy commodities. The worsening price terms in other groups followed after a short delay. After excluding energy prices, the main contributors to the year-on-year fall in terms of trade were imported chemicals, industrial goods and foodstuffs. Meanwhile, the export prices of machinery and transport equipment rose faster than their import prices and therefore mitigated the impact. Chart 10 shows that an unusually large role in the worsening of the terms of trade was played by the exchange rate. In the Czech Republic, imports and exports have been invoiced in foreign currencies for a long time, but their currency structures differ. In the case of exports, the share of EUR and CZK accounts for over 90% of total exports, whereas the USD share only accounts for 5%. On the other hand, CZK and EUR account for over 80% of imports, and the USD for almost 15%.[6] If both currency pairs move together, the terms of trade are affected equally on both sides, and the exchange-rate-adjusted terms of trade are not much different from the unadjusted ones. In the middle of 2021, however, the koruna weakened significantly against the dollar while the prices of imported energy commodities were rising (some of which are invoiced in dollars). As the dollar plays a significantly smaller role on the export side, the weaker currency temporarily deepened the year-on-year worsening of the terms of trade. This difference disappeared at the end of 2022, when the koruna strengthened again against both the dollar and the euro.

Chart 9: Import prices rose faster than export prices, while the weaker exchange rate against the dollar continued to deepen this worsening

(quarterly terms of trade, i.e. the ratio of export to import prices, year-on-year change in %)
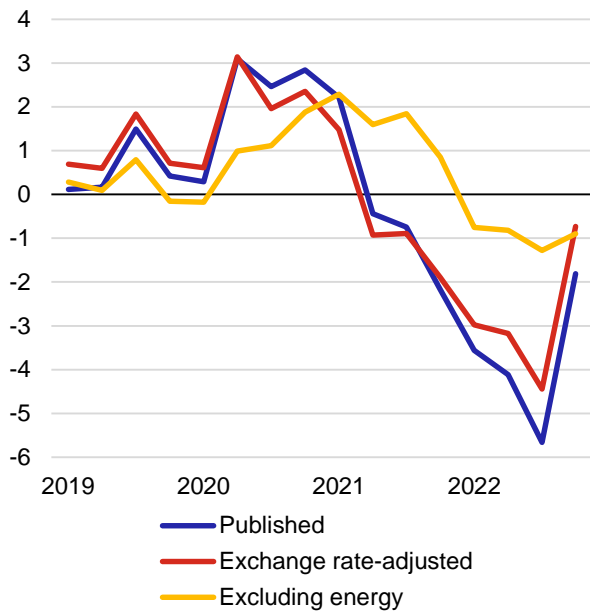
Source: CZSO, CNB calculation

Chart 10: The slow return of real exports in the automobile industry is more than compensated for by rising prices

(car exports, in pcs and EUR billions)
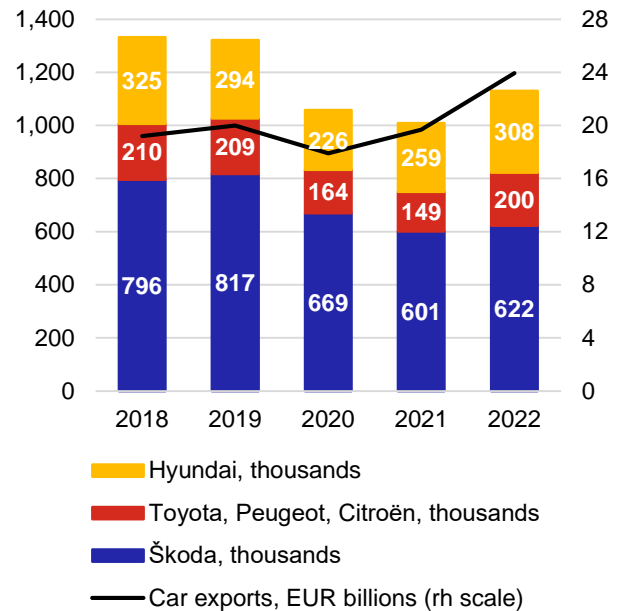
Note: The value of exported cars corresponds to the HS 8703 product group.
Source: Czech Automotive Industry Association, CZSO (cross-border movement of goods)

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[6] Whereas exports are almost solely invoiced in the euro or koruna, imports of Chinese goods and oil, listed on exchanges in dollar, increase the dollar's impact on imports.

The revival of the automobile industry is, in large part, caused by higher prices. Whereas the automobile industry is closing the gap in nominal exports through higher prices, exports are only rising reluctantly in real terms. The slight year-on-year growth of 1.9% is, however, a favourable development in comparison with other global automobile exporters. In Italy, real automobile exports fell 15.8%, while in Belgium and Canada the decline is around 3.5%. Japan and the USA also reported a year-on-year fall. Germany, however, experienced relatively high growth of 6.3%.[7]

The return to normal is stagnating in real terms and future trends may, to a certain extent, be determined by the ability of Czech carmakers to adapt to the transformation of the sector and European demand. After the effects from the production shutdowns, the lack of chips, the initial shock of the war in Ukraine and the energy crisis recede, the electromobility transformation (sparked by ambitious economic programmes in developed economies) [8] will come to the forefront of the automobile industry. According to the International Energy Agency, in 2022 electric automobiles accounted for 14% of total sales (compared to 9% in 2021 and 5% in 2020), while the largest share was accounted for by China, which is also the largest producer. Thanks to generous government subsidies, tax relief and other economic initiatives, China has become the electric vehicle market leader. At the same time, its largest customers are European countries, to which more than 90% of Czech car exports have been going for a long time.

Vehicle exporters will need to participate in the electromobility transformation or face a gradual decline in demand. Czech automobile manufacturers have not yet been able to participate in the electromobility transformation to the same extent as, for example, competing manufacturers in America (Tesla and General Motors) and Asia (Toyota, BYD, SAIC-GM-Wuling Motors and Nissan). At present, electric vehicles are manufactured by all three domestic automakers Škoda, Hyundai and Toyota[9], while the share of electric vehicles in total production has been holding steady at 11% in the last two years. [10] Future trends in the Czech automobile industry are, to a considerable extent, dependent on timely innovations by Czech automakers and the ability to adapt to changing demand.

The impact of the energy crisis on the external balance of the Czech economy was delayed and partly mitigated by exported electricity, long-term import contracts and hedging derivatives. Chart 11 shows how fluctuating trends in energy prices on global markets have influenced the Czech Republic's balance of payments since 2020. A decline in the price and imported quantity of oil at the start of the COVID-19 pandemic increased the balance of goods over the long-term average. However, the subsequent sharp turnaround in the price of oil and, in particular, gas from the middle of 2021 markedly reduced it. As some importers hedged against price fluctuations using financial derivatives concluded with non-residents,[11] the growing energy crisis did not significantly interfere with the external balance of the Czech Republic initially. In addition, electricity, of which the Czech Republic is a net exporter, helped to mitigate the negative effects of rising import prices. Further dramatic growth in oil and gas prices after the start of the Russian invasion of Ukraine and the decision to pay those prices in the spring of 2022 to top up gas storage facilities markedly

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[7] According to the electric vehicle index, which uses three key indicators to compare competitive positions (technology, production and market size), Germany holds second place in electromobility after China.

[8] The European Union Fit for 55 package is aimed at reducing emissions of greenhouse gases by 55% by 2030. This package includes a ban on the sale of new vehicles with internal combustion engines that will come into force in 2035. Manufacturing conditions are also due to be tightened by the forthcoming Euro 7 emissions standard aimed at reducing emissions of exhaust gases and solid particles. The US Inflation Reduction Act provides tax relief for newly-registered electric vehicles.

[9] Škoda has in its portfolio, in addition to the fully electric Enyaq, also hybrid drives for the Superb and Octavia models. Hyundai produces the Kona Electric electric car and the Tucson Plug-in hybrid. Toyota launched the TOYOTA bZ range last year.

[10] According to annual statistics published by the Czech Automotive Industry Association (2021, 2022).

[11] Financial derivatives are contracts with settlement in the future for a pre-set price.

affected the economy's external balance, yet electricity and derivative settlements continued to have a dampening effect. This was assisted to a lesser extent by long-term contracts for gas imports, where the pricing provisions are usually derived from oil prices.[12] Chart 12 shows that whereas until 2021 these contracts increased the realised import prices of gas compared to purchases at the spot rates at exchanges this trend then reversed and the long-term contracts saved the Czech Republic part of the payments for imported gas.

Chart 11: The Czech economy's "energy bill" was mitigated by exported electricity and hedging derivatives

(balance of trade in selected commodities and settlement of commodity derivatives, change compared to the 2017-19 average, in CZK billions)
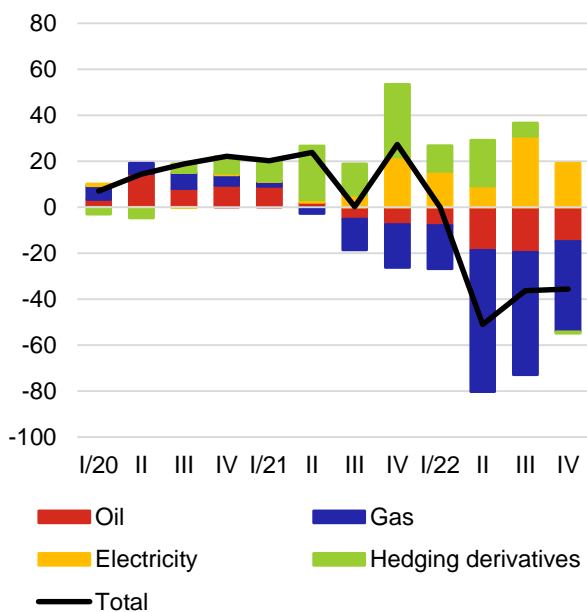
Note: It is not possible to isolate commodity derivatives for non-bank businesses using the data available. An analysis of individual contracts in the EMIR database, however, confirms the key role of commodity derivatives for such businesses. Data for banks are not available for 2020.

Source: CNB, CZSO (cross-border movement of goods), CNB calculation

Chart 12: Increases in the imported gas price were also partially dampened by long-term contracts which, on the other hand, made gas more expensive before the crisis

(EUR/MWh)
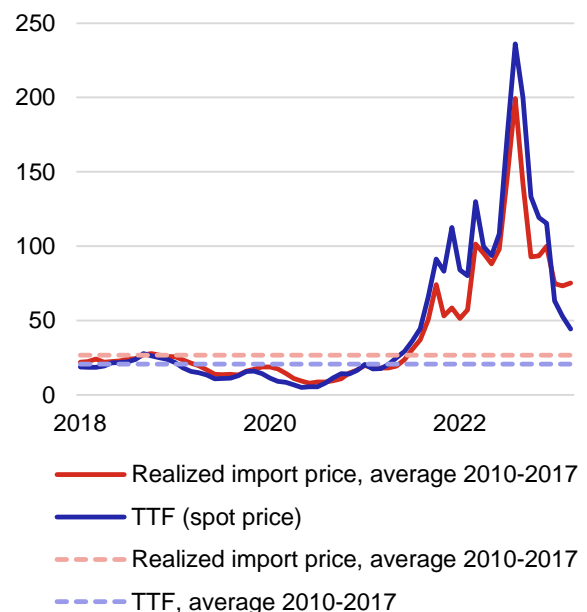
Note: The realised import price is derived from data on the weight and price of imported gas in statistics on cross-border movements of goods. The estimated calorific value of natural gas is 13.6 kWh/kg.

Source: CZSO, Refinitiv, CNB calculations

However, in the same way that these factors dampened the impact of expensive energy on the Czech Republic, in the future they could temper the favourable impact of a fall in energy prices. Hedging using derivatives works both ways and dampens price fluctuations in both upwards and downwards directions. The fall in imported gas prices is also reflected in lower income from exported electricity. Lastly, a sharp drop in gas prices may again favour exchange-linked contracts instead of long-term arrangements linked to the price of oil.[13]

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[12] This type of contract was previously widespread on the European natural gas market, but was gradually replaced by contracts linked to prices quoted on exchanges - see, for example, Focus in the Global Economic Outlook March 2022.

[13] This effect is already visible in the first months of 2023, as shown by Chart 12.

Chart 13: The fall in exports to Russia and Belarus was more than compensated for by exports to countries identified as "transshipment points" for subsequent re-export

(balance of trade in selected commodities with selected counterparties in 2022, change compared to the 2010-2021 long-term average, in CZK billions)
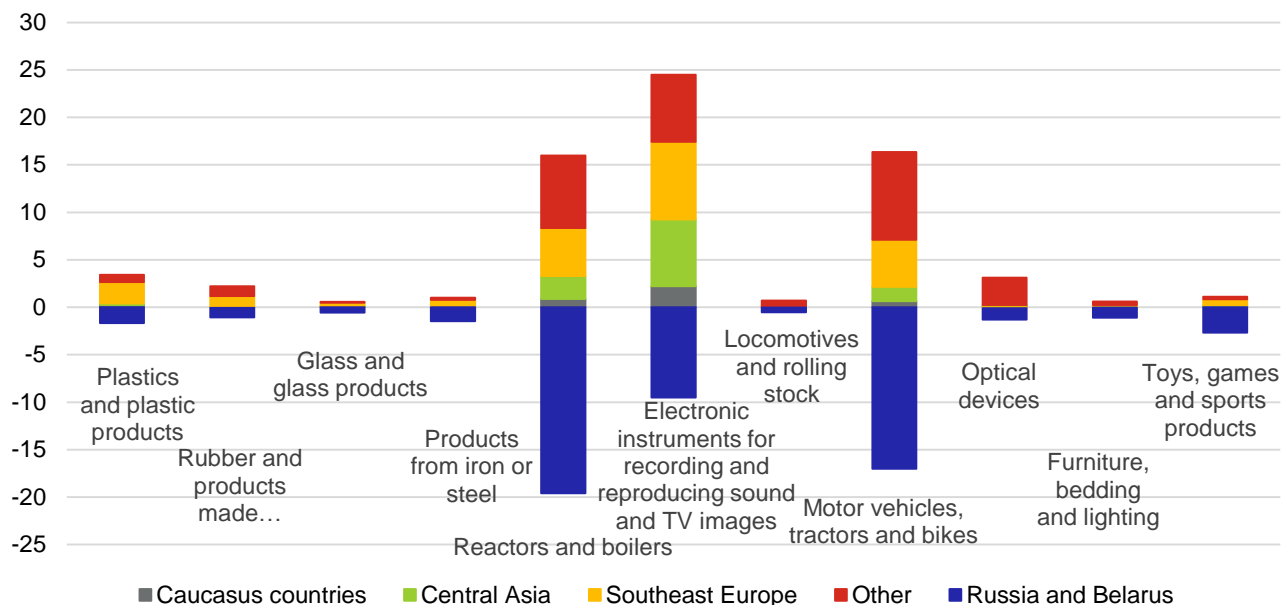
Note: The Southeast Europe group comprises Serbia and Turkey, the Central Asia group comprises Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan, the Caucasus Countries group comprises Armenia and Georgia, and the Other group comprises India, Israel, the United Arab Emirates and Singapore.

Source: CZSO, CNB calculation

The war in Ukraine and the trade sanctions subsequently imposed on Russia (and Belarus) led to a fall in Czech exports to these countries to approximately one third; sanction evasion, however, meant they were compensated for, to a significant extent, by growth in exports to countries that retained full trading links with Russia. In response to the Russian invasion of Ukraine, European Union countries together with other developed economies imposed trade sanctions on the Russian Federation and Belarus. The share of exports to Russia and Belarus on total exports is relatively modest in the case of the Czech Republic (approx. 2% over the long term), yet an examination of the territorial change leads to important implications. Whereas last year Russia's share in Czech exports fell by two thirds (Belarus' share fell by half),[14] this fall was more or less compensated for by increased goods exports to countries that, according to warnings from US government agencies, could be serving merely as "transshipment points" for subsequent re-export to the sanctioned countries.[15] Chart 13 shows the deviation in exports for 2022 from the long-term average[16] of selected HS2 product groups, with exports to the Russian Federation and Belarus showing the greatest falls. Increased exports to countries identified by the US Department of Trade as places

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[14] In nominal terms, there has been a fall in exports to the two countries of CZK 62 billion compared to 2021.

[15] Shortly after the start of the war in Ukraine, FinCEN and the US Bureau of Industry and Security (BIS) issued a warning for increased caution against attempts by Russia and Belarus to avoid export controls, i.e. sanctions imposed on the two countries by the European Union and other advanced economies. This can happen through "transshipment points," i.e. countries through which prohibited goods can flow freely to Russia and Belarus. The following were identified as being among such countries: Armenia, Brazil, China, Georgia, India, Israel, Kazakhstan, Kyrgyzstan, Mexico, Nicaragua, Serbia, Singapore, South Africa, Taiwan, Tajikistan, Turkey, United Arab Emirates and Uzbekistan.

[16] The long-term average is measured as the average between 2010 and 2021.

for subsequent re-export to Russia[17] are clear across all groups, while the nominal value roughly corresponds to the fall in exports to the sanctioned countries.[18]

II.2   SERVICES

Last year, the balance of services was the only item in the current account with a positive contribution to the overall balance. Year on year, however, the surplus in the balance of services fell to just under CZK 90 billion (1.3% of GDP). The situation was similar in the case of goods, with a reduction as a consequence of faster year-on-year growth in imports of services (28.2%) in comparison with exports (21.3%). The structure of the balance by most important trading partner remained similar to last year (Chart 14, right-hand part).[19]

Chart 14: Manufacturing and IT services are progressively replacing transport and tourism in the balance structure

(balance of trade in services by sector and with the most important partners from the viewpoint of the absolute amount of the balance, in CZK billions)
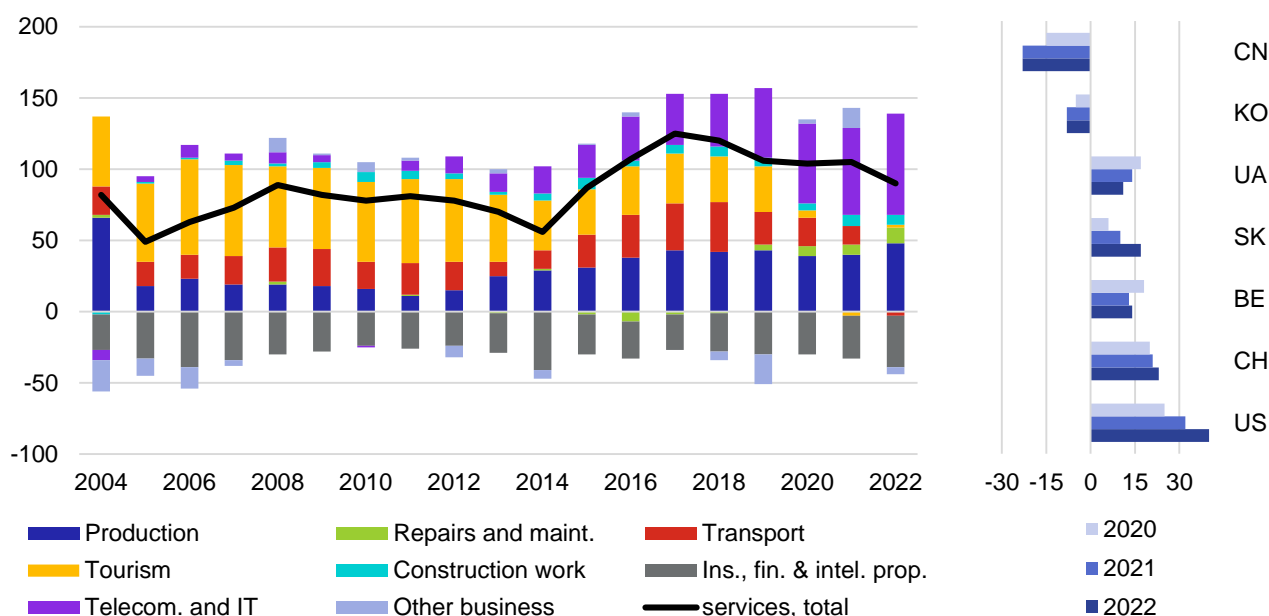
Note: CN – China, KO – South Korea, UA – Ukraine, SK – Slovakia, BE – Belgium, CH – Switzerland, US – USA. The balance with Ukraine in the right-hand chart was reduced in 2022 by expenditure by Ukrainians with a temporary protection visa.

Source: CNB

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[17] Of these places Brazil, China, Mexico, Nicaragua, South Africa and Taiwan are omitted due to their impractical geographical distance.

[18] Across all categories, the deviation in exports to Russia and Belarus from the long-term trend is a decrease of CZK 61 billion, whereas the deviation in exports from the long-term trend to the aforementioned countries is an increase of CZK 74 billion.

[19] The balance structure reflects an asymmetry in export and import flows: the larger the differences between them, the higher the balance in absolute terms. In the structure of trade in services turnover, the most important item is transport (CZK 402 billion) followed by other business services (CZK 345 billion). There is also a significant contribution from tourism and telecommunications and IT services. From the viewpoint of the territorial structure of services turnover, the Czech Republic's most important business partner remains Germany.

There have been marked changes in the sector structure of the balance of services in recent years. Whereas the positive contribution from computer, telecommunications and production services is increasing over time, the positive balance of transport and the formerly significant tourism fell to zero last year (Chart 15, left-hand part), while the tourism balance adjusted for one-off influences related to the war in Ukraine was actually markedly negative.[20]

IT and telecommunications services had the most significant contribution to the overall surplus in the balance of services in 2022. The positive balance in this category has been growing smoothly since 2011, and has increased tenfold since then to a record CZK 70.8 billion thanks to the increase in IT services. At present, the balance comprises almost entirely the provision of services in computer software programming and IT consulting, which contribute approximately the same amounts to the overall surplus (Chart 15).

By contrast, the contribution from transport turned negative for the first time last year. There was a fall in the transport balance in 2021 due to the faster growth of expenditure over income. This gap increased even more last year. The increase in transport costs was partially due to the rise in fuel and transport-related services prices, for example the rising prices of container transport. The war in Ukraine and subsequent sanctions against Russia and Belarus led to longer routes and delivery times for some goods, automatically leading to increased transport costs (in the case of services provided by foreign carriers). The business partners of some businesses also changed. The increase in expenditure on transport was additionally increased by the need to search for alternatives to imports of natural gas and an increase in the share of this commodity in liquefied state.

Chart 15: Computer services are the dominant item in telecommunications services

(telecommunications services: detailed breakdown of balance in CZK billions – left-hand chart and structure of turnover in 2022 as % - right-hand chart)
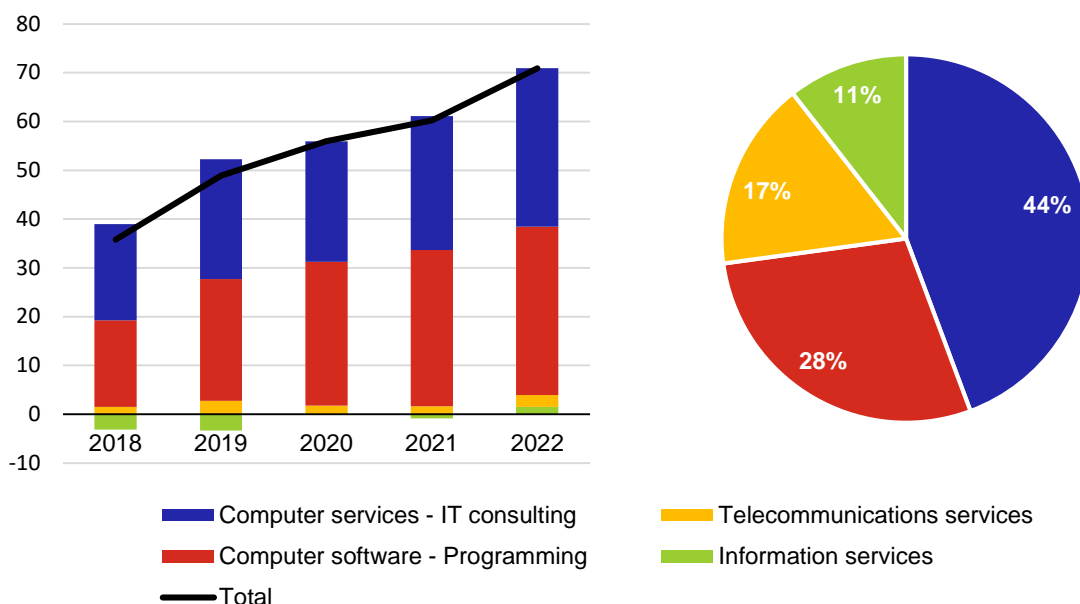
Source: CNB and CZSO

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[20] In the first three quarters of 2022, income from tourism included expenditure by foreigners (predominantly Ukrainian citizens) with a temporary protection visa introduced by the Czech state for war refugees from Ukraine. The deviation from the 5-year average in income from business trips in the balance with Ukraine last year exceeded CZK 28 billion. After an alteration of CZSO methodology, the changed expenditure from the fourth quarter of 2022 was moved to consumption by Czech residents and removed from the balance of payments for this reason (an analogical change also took place for reimbursements to employees in the current account income item, see part III.2 Cross-border Work).

Table 1: Outgoing tourism is recovering faster than incoming tourism

(share of indicator as %)

	2020	2021	2022
average spending per trip, ratio compared to 2019			
longer	88	104	116
shorter	90	113	110
Share of tourism expenditure, ratio compared to 2019	58	52	86
household cons	3.1	2.6	3.7

Table 2: Although the recovery in incoming tourism exceeds the global average, it is behind Europe

(share of indicator as %)

	2020	2021	2022
number of foreign tourist arrivals, ratio compared to 2019			
World	28	31	63
Europe	32	41	79
CR	26	24	67
adjusted tourism income, ratio compared to 2019[b]			
CR	50	40	70

Note: the number of arrivals to the Czech Republic reflects the number of guests in accommodation facilities and differs methodologically from data for other UN-WTO countries. (a) Income in 2022 is adjusted for consumption by Ukrainians with a temporary protection visa. (b) In 2019, the ratio of expenditure by Czech residents abroad during private trips to expenditure on final household consumption was 5.1%. The tables show a combination of data from balance of payment statistics (tourism income and expenditure) and CZSO research (other indicators). Methodological differences mean the data are not fully comparable.

Source: CNB, CZSO and UN-WTO

2022 primarily saw growth in expenditure related to increased private trips abroad. Extraordinary interest in a summer holiday abroad was supported by the cancellation of the anti-epidemic restrictions and the renewal of air transport (passengers transported reached 61% of the 2019 level). Czech residents' expenditure abroad on private trips almost doubled year on year and reached 84% of the 2019 level. The year-on-year change in expenditure on business trips was also positive. On the other hand, trends in tourism income were more dampened compared to expenditure. Increased geopolitical risks may have put off some foreign visitors from visiting the Czech Republic. As a result, the tourism balance adjusted for expenditure by Ukrainians with a temporary protection visa fell into negative values.

III.   OTHER REAL FLOWS

Other current flows further deepened the year-on-year slump in the Czech economy's external balance.[21] Despite the war and the energy crisis, net investment income of foreign investors in the Czech Republic returned to the pre-pandemic level. On the other hand, residents' net income from cross-border work and net income from the EU budget fell year on year. The balance of the current and capital account was also compressed by net payments for emissions allowances.

III.1   INVESTMENT INCOME

Despite the energy crisis and the continuing problems in global supply chains, the profits of businesses under foreign control rose. After the less profitable period of the pandemic, the annual yield on foreign direct investment in the Czech economy returned to approximately 10% of invested capital (7.5% of GDP, Chart 16).[22] Investment returns of domestic investors abroad also returned to their long-term average, but these are five times lower than the profits of foreign investors in the Czech Republic (1.5% of GDP). This is related to a markedly lower volume of Czech direct investment abroad (than foreign investment in the Czech Republic), and the lower profitability of foreign markets (revenues represent only approx. 5% of the capital invested).[23]

Chart 16: Foreign ownership of domestic businesses markedly exceeds investment by residents abroad and revenues from them

(direct investment – left axis and revenues as % of GDP – right axis)
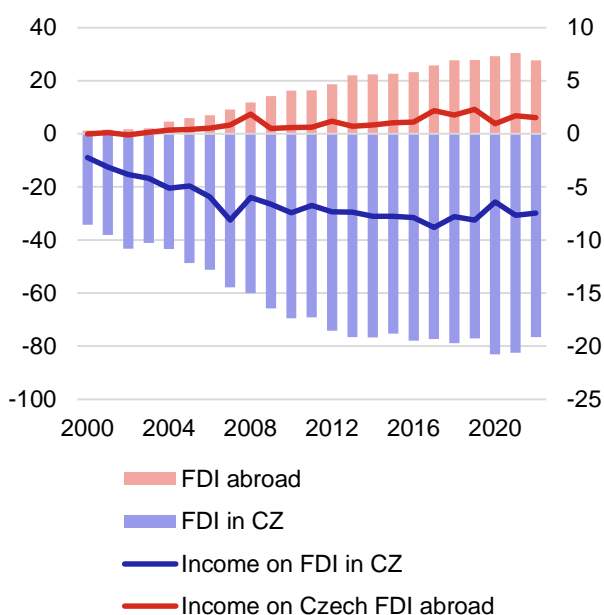
Chart 17: During the pandemic, the rate of return on direct investment fell in the Czech Republic more than anywhere else in the region, but subsequently recovered

(investment income as a share in total inward FDI, as %)

Source: CNB, CNB calculation
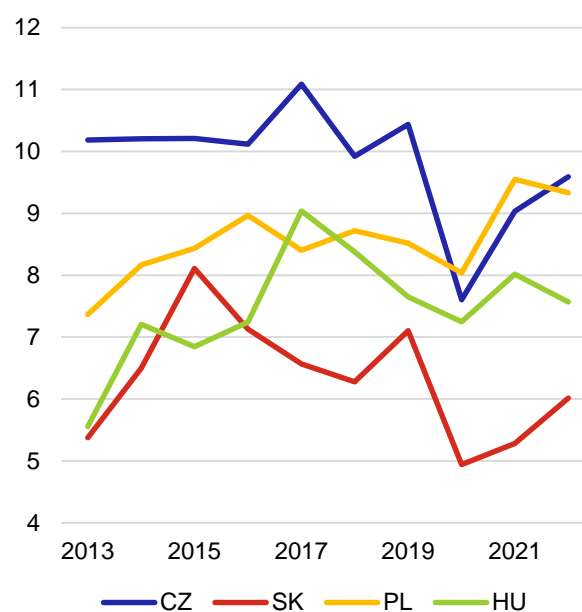
Source: CNB, CNB calculation

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[21] These include cross-border payments for capital and labour (primary income), unilateral transfers (secondary income) and transactions of another nature (capital account).

[22] The data are preliminary and could be markedly influenced by a data revision next March based on the results of the regular annual survey by the CNB on the state of foreign direct investment in the Czech Republic.

[23] The reported rate of return on investment is the average annual profit from all previously made investments. It is not a measure of the attractiveness of new investment in the Czech Republic or abroad. The lasting low level of interest in making new investments in the Czech Republic signals that the rate of return on new investments in the Czech Republic has evidently also fallen significantly.

Direct investment in the Czech Republic returned to the highest profitability levels in the Central European V4 region. The earnings of non-residents from direct investment expressed as a share of invested capital fell in the Czech Republic, Slovakia, Poland and Hungary in 2020. The fall in the profitability of investment in the Czech Republic was, however, the deepest. The Czech Republic therefore briefly lost its position as the "most profitable" country in the region (measured by the average income for foreign investors in the relevant year). The estimate of revenues for 2022, however, indicates that the Czech Republic has returned to this position (Chart 17).

**The year-on-year growth in earnings from direct investment in the Czech Republic was driven by services, whereas earnings from manufacturing experienced a year-on-year decline** (Chart 18)**.** The growth in profits from investment in the Czech Republic was mainly driven by wholesale and retail trade, information and communication services, and financial and insurance activities. On the other hand, after the record year of 2021 foreign investors saw a marked fall in earnings from real estate services. In 2022, there was also a year-on-year fall in earnings for investors in manufacturing, likely related to the continuing problems in global supply chains. The automobile industry was an exception and, after the production shutdowns in 2020 and 2021, last year saw a gradual revival of earnings, which however remained markedly lower compared to the pre-pandemic level.

Chart 18: The share of services in foreign investors' earnings in the Czech Republic rose from half in 2016 to two thirds in 2022

(revenues from FDI in the Czech Republic, % of GDP)
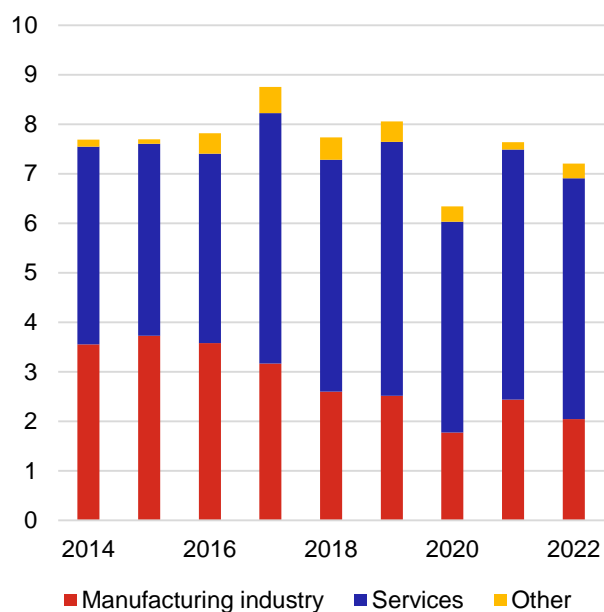
Note: Revenues include dividends paid out, reinvested profits and loan interest.

Source: CNB, CNB calculation

Chart 19: Extraordinary dividends further increased banks' high share in total dividend outflows from the Czech Republic

(the industry structure of dividends from foreign direct investment in the Czech Republic, shares of the most important NACE sectors in %)
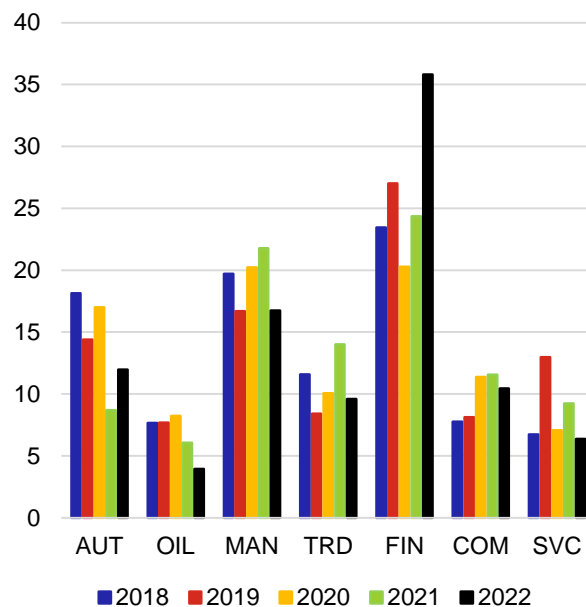
Note: Note: AUT = automotive production, OIL = oil, chemical, pharmaceutical, rubber and plastic products, MAN = other manufacturing (everything excluding AUT and OIL), TRD = wholesale, retail trade, FIN = financial and insurance activities, COM = information and communication activities, SVC = other services (everything excluding TRD, FIN, COM)
Source: CNB, CNB calculation

A narrower view only of dividend income shows the extraordinary effect of the delayed payout of withheld dividends in the banking sector (Chart 19). In addition to the usual dividends that distributed profits for 2021, withheld dividends from the profits of the banking sector made in 2019 and 2020 were paid out last year. Banks' profits were further helped by higher CNB rates that were only partially reflected in increases in client rates at commercial banks, therefore increasing banks' profits from free liquidity.[24] As Czech banks are mostly owned by foreign owners, their profits are reflected in outflows of dividends from the Czech Republic. The financial sector's share in total dividend outflows from the Czech Republic exceeded 35% last year (although the sector's share in foreign investors' equity capital in the Czech Republic is approx. 20%).

III.2   CROSS-BORDER WORK

The steep growth in the number of Ukrainians working in the Czech Republic after the Russian invasion of their country reduced the Czech Republic's net income from cross-border work. At the start of the war, European countries altered their migration regime in relation to war refugees from Ukraine. Highly simplified conditions for access to the Czech labour market for holders of temporary protection visas enabled Ukrainians to almost immediately start work in the Czech Republic, leading to an increase in the expenditure for compensation of employees (classified as non-residents' expenditure in the statistics until September 2022). At the end of September 2022, approximately 100,000 people worked with this residence permit in the Czech Republic. As a result, wages paid by Czech businesses to Ukrainians more than doubled year on year to reach 0.6% of GDP (a change from CZK 19 billion in 2021 to CZK 42 billion in 2022). As these were people with long-term residence in the Czech Republic, it can be assumed that the decisive majority of expenditure from such wages was also in the Czech Republic, having a mirror impact on the tourism balance (see Part II.2 Services). As of the cut-off date for data for this publication, people with a temporary protection visa are regarded from the fourth quarter of 2022 as residents and are no longer included in the balance of payments statistics. As this is an unprecedented situation, further methodological alterations and the related revisions to historical data cannot be excluded.

Expenditure for work by Slovaks in the Czech Republic and income from the work of Czechs in Germany and Austria have returned to their long-term averages. Slovak residents, who, after the exclusion of Ukrainians, account for 40% of wage expenditure for cross-border workers, earned CZK 11.5 billion (0.2% of GDP) in the Czech Republic last year. After last year's almost double this value, this represents a return to the levels common before the pandemic (Chart 20). The income of Czech residents from work in Austria and Germany did not change markedly and also remained close to the long-term average of CZK 56 billion (0.8% of GDP) in the Czech Republic last year. The total balance of compensation of employees for 2022 was approximately balanced. After excluding the influence of Ukrainian refugees, the balance returned to the values common before the pandemic (approx. 0.3% of GDP).

III.3   FINANCIAL RELATIONS WITH THE EUROPEAN UNION

Net transfers from the EU budget reached 0.9% of GDP, therefore remaining behind both pandemic years (Chart 21). Investment subsidies, recorded on the balance of payments capital account, contributed in particular to the net position vis-à-vis the EU as is usual. These include new funds from the Next Generation EU (NGEU) recovery plan; yet contrary to the original plans the Czech Republic failed to comply with the conditions for the payment of an additional tranche of such funds in 2022.[25] There was therefore a year-on-year decline in the volume of investment subsidies. The volume of subsidies received to support

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[24] There has long been a considerable liquidity surplus in the Czech financial market. Banks deposit their free funds with the CNB at the monetary policy rate. However, they pay their clients markedly lower interest on the money deposited with them. This difference is profit for them. Its amount is estimated, for example, in the Financial Stability Report, December 2022.

[25] The payment occurred in March 2023. Additional tranches may also be delayed. More information about the Recovery Plan for Europe is provided by the Balance of Payments Report 2020 and the Global Economic Outlook, December 2021.

agriculture and rural development was also lower. On the other hand, the volume of non-investment subsidies from the EU structural funds did not change markedly. Czech payments to the EU budget also remained roughly stable.

Chart 20: Residents working in Germany and Austria and non-residents from Slovakia and Ukraine are behind the vast majority of flows related to cross-border work

(payments to employees and secondary income in 2022, CZK billions)

Chart 21: Net transfers of funds from the EU fell in 2022

(current flows and capital transfers between the Czech Republic and EU institutions as % of GDP)
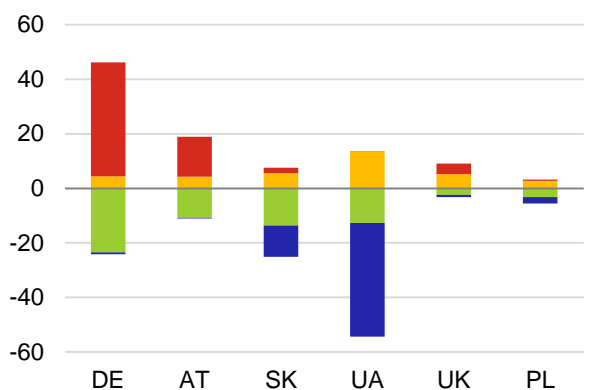
- Payroll receipts
- Payroll expenditure
- Receipts on taxes and levies on work, remittances of expats
- Expenses on taxes and levies on work, remittances of expats

Note: The yellow and green columns show all secondary income, which could, to a limited extent, include other transactions.

Source: CNB, CNB calculation
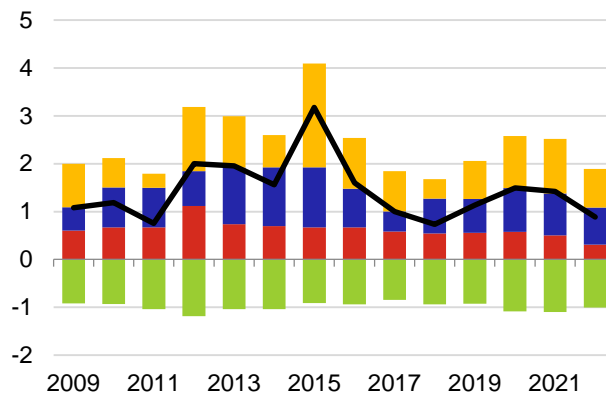
- Payments to EU budget
- Investment subsidies
- Non-investment subsidies
- Agricultural subsidies
- Balance vis-à-vis EU

Source: CNB, CNB calculation

The Czech Republic continued to borrow funds from the EU. Due to their debt nature, these transactions belong on the financial account of the balance of payments and so are dealt with in Chapter IV.2 below.

III.4   OTHER FLOWS

Emission allowances further deepened the Czech economy's negative balance vis-à-vis other countries. In 2021, net purchases of allowances increased the capital account balance by 0.5% of GDP. [26] In 2022, on the other hand, trading in allowances led to a reduction in the balance by 0.7% of GDP.

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[26] In addition to activities related to non-produced non-financial assets (emissions allowances in particular), investment subsidies from the EU and some one-off operations are also recorded on the balance of payments capital account, such as the past write-off of external debt and payments ensuing from international arbitration decisions.

IV.   CAPITAL FLOWS

The main channels for financing the extraordinary external imbalance of the Czech Republic in 2022 were foreign currency interventions by the CNB and increased net direct investment inflow. The outflow of short-term capital and the external imbalance of the economy created pressure for the weakening of the koruna over the course of the year.[27] The fear that a weaker koruna could boost already high inflation led to a decision by the CNB Bank Board to intervene directly in the foreign exchange market. This was enabled by its extraordinarily high foreign exchange reserves that, in addition, had a calming effect on domestic entities and the majority of foreign investors. The situation was also made more simple by the high, albeit declining, positive interest-rate differential between the koruna and the decisive global currencies, which motivated domestic businesses and, to a certain extent, also the government, to make use of foreign financing. The interest rate differential also led to a notable change in debt capital flows recorded under direct investments (a strong outflow was replaced by a smaller inflow). The external imbalance was partially dampened by transactions in financial derivatives (in particular those related to earlier purchases of energy raw materials), which are also reported on the financial account.

IV.1   DIRECT INVESTMENT

Compared to 2021, the net inflow of foreign direct investment to the Czech Republic rose markedly (by a multiple of six) to more than CZK 170 billion (2.5% of GDP). The main factor was the significantly lower debt investment made by residents abroad. The structure of the capital inflow does not indicate that non-residents have a renewed interest in making new investments in the Czech Republic. The decisive part of the net inflow, with almost a two-thirds share, is the estimated balance of reinvested earnings. Debt capital is the second-most-important element of the inflow, with an approximately 30% share. The vast majority of this capital inflow was concentrated in December, when the relative stabilisation of the external balance was already evident, pressure on the koruna had weakened, and it was clear that the CNB was no longer intervening. Three multinational companies have a dominant share in the inflow, and in two cases we assume that the financial transactions merely represent the placement of free liquidity into korunas. (Chart 22). The net inflow of equity capital other than profit reinvestment was only CZK 12 billion (0.2% of GDP)[28].

New foreign investments in the Czech Republic continue to be insignificant. However, there was a year-on-year improvement, as in 2021 there was a slight decline, as the decrease in equity capital exceeded new investments). The inflow of capital to the Czech Republic reached just under CZK 22 billion.

IV.2   PORTFOLIO AND OTHER INVESTMENT

Trends in investment other than direct investment were, to a decisive extent, influenced by a relatively sharp change in the monetary policies in the Czech Republic and in key territories for capital movements (the USA and the Eurozone) and in some segments also by the war in Ukraine and measures related to it (Chart 23).

In an environment of higher interest rates, foreign equity markets attracted less domestic capital than in previous years. In foreign equity markets, residents initially reduced their exposure owing to the increased attractiveness of new bonds both domestically and abroad, and also out of concerns about corporate profitability under conditions of high interest rates. At the end of the year, however, there was again more interest in purchasing "new, currently cheaper" shares. The still very limited domestic stock

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[27] Short-term capital movements in 2022 are dealt with by a thematic article in Chapter VI.2 of this publication.

[28] A significant part of investments by residents abroad is not, however, reported in direct investments at all, as it is usually implemented through foreign entities (parents or subsidiaries). The complicated structures of multinational companies are dealt with more thoroughly in a thematic article in Chapter VI.2 in the Balance of Payments Report, 2021.

market significantly contributes to decisions to purchase foreign shares. The total outflow of capital placed in foreign shares reached almost CZK 25 billion (0.4% of GDP).

Chart 22: New inward investment in the Czech Republic continues to be insignificant

(direct investment structure, as % of the Czech Republic's GDP)
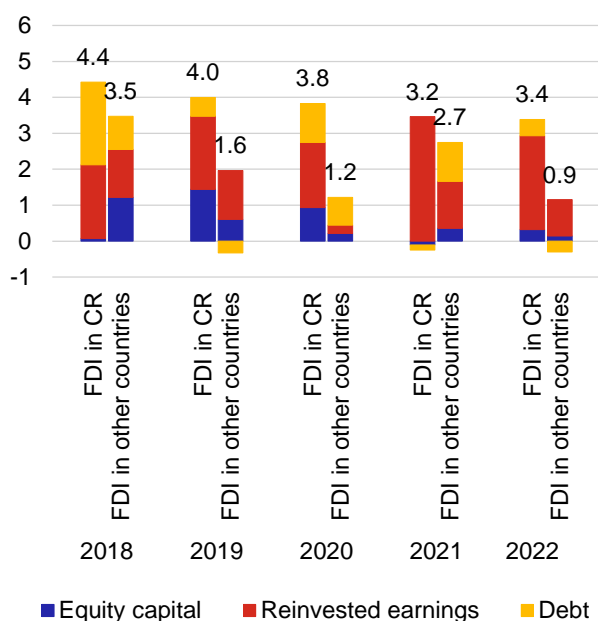
Source: CNB, CZSO, CNB calculation

Chart 23: Faster growth in interest rates in the Czech Republic than abroad motivated businesses to move to foreign-currency loans

(liabilities of domestic non-financial businesses, transactions in the relevant year, in CZK billions)
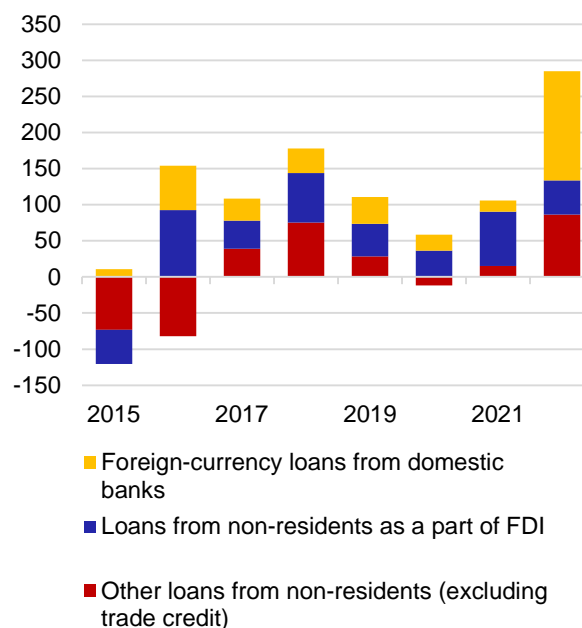
Source: CNB

Interest rates that were higher in the Czech Republic than abroad motivated the business sector to favour foreign-currency loans. The majority of foreign-currency loans were drawn by Czech businesses from Czech banks – their volume rose in 2022 by CZK 151 billion (2.2% of GDP, Chart 23). Some of the new indebtedness, however, was agreed directly with foreign counterparties. The foreign indebtedness of the business sector (excluding intra-group and business loans) therefore rose by an additional CZK 86 billion (1.3% of GDP), while approximately three quarters was comprised of loans and a quarter of bond issues.

The general government also increased its foreign indebtedness, but its share of total general government debt did not change significantly. The general government, however, replaced the vast majority of international foreign-currency bonds with more stable and somewhat cheaper loans from the European institutions. Loans totalling EUR 2 billion drawn in 2021 were increased by the general government taking an additional loan of EUR 2.5 billion (0.9% of GDP), drawn as a part of EU assistance to Member States for the fight against the pandemic.[29] Additional loans from the EU can be expected in the future, this time as a part of the post-pandemic Recovery Plan for Europe.[30]

Although there was a net drawing of debt funds from non-residents, the value of the general government's foreign debt fell. This is because the value of the general government's debt is expressed

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[29] The programme of advantageous SURE loans aimed at enabling EU Member States to finance national programmes to sustain employment during the pandemic (in the Czech Republic this included, for example, the Antivirus programmes).

[30] The government indicated to the European Commission its interest in a loan from this instrument in March 2023. According to a government statement, the minimum expected drawing is EUR 2.9 billion.

at market prices. The increase in interest rates meant that the market value of older bonds bearing interest at lower rates fell significantly. Overall, the general government's foreign indebtedness (at market rates) fell to CZK 588.6 billion (a year-on-year change from 10.3% of GDP to 8.7%, Chart 24).

Chart 24: In 2022 there was an outflow of short-term debt capital...

(trends in the balance of portfolio and other investments by sector as % of GDP)
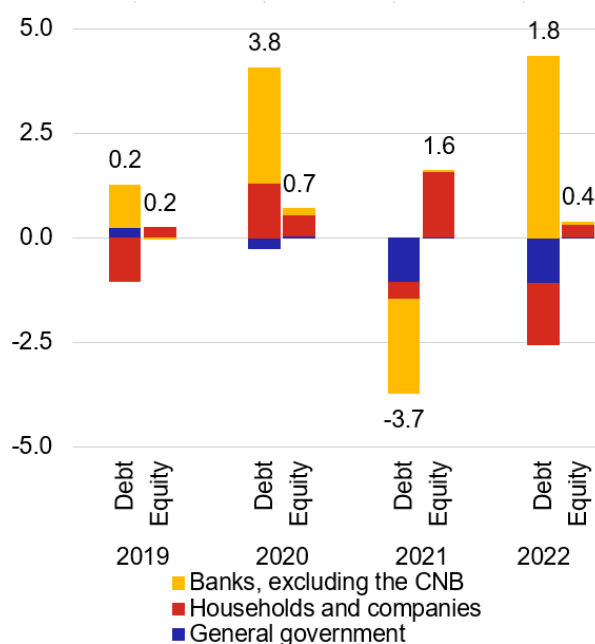
Chart 25: ... leading to a marked reduction in the net foreign indebtedness of banks

(balance of portfolio and other investments by sector as % of GDP)
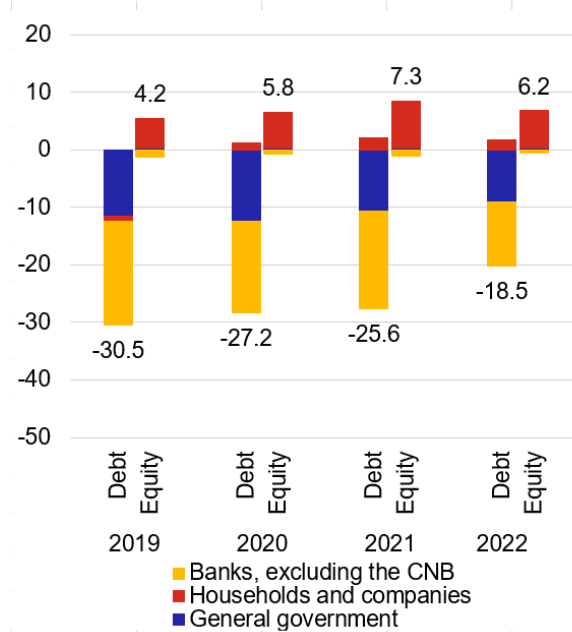
Note: Here, debt capital includes debt securities, deposits, loans and credits. Equity capital includes interests and units in investment funds (equity securities).

Source: CNB, CZSO, CNB calculation

The net indebtedness of the banking sector vis-à-vis other countries markedly fell (by almost CZK 330 billion to 11.7% of GDP, Chart 25). The fall in the banking sector's indebtedness in 2022 was related to an outflow of foreign investors' short-term capital and the CNB's decision to finance this outflow and the external imbalance of the economy by selling its reserves. The aim was to prevent the extraordinary and temporary influences weakening the koruna.[31] There was a diametrically opposite trend in koruna and foreign-currency bank foreign liabilities. The sharp fall in net foreign indebtedness was linked solely to a fall in short-term koruna deposits of non-residents with domestic banks (by almost CZK 380 billion, i.e. a reduction of approx. 40%). Even after the reduction, banks' koruna indebtedness to non-residents is approx. three quarters of the banks' foreign indebtedness. Its extent is reflected by the influence of interest-rate differentials and expectations of their future changes, as well as expectations regarding future exchange rate trends. On the other hand, the banking sector's foreign-currency indebtedness vis-à-vis other countries rose slightly; this was concentrated in the last quarter, when the CNB was no longer intervening in the market yet the external imbalance continued, albeit to a lesser extent.

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[31] A large part of the CNB's high foreign exchange reserves was created in the past by the marked inflow of foreign short-term capital and the CNB's fear that the koruna would strengthen too much without an appropriate increase in the external competitiveness of the Czech economy.

V.   CNB RESERVES

The fall in reserve assets reflected the CNB's foreign exchange interventions in the financial market and losses from the revaluation of assets and the strengthening of the koruna against the euro. It was partly mitigated by net drawing of EU resources and investment income from reserves. The CNB was present in the foreign exchange market from January to the start of October 2022, with the most significant interventions taking place from May to September. Their total volume was EUR 26.14 billion. The total fall in foreign exchange reserves, excluding the revaluation influence, was CZK 307.1 billion (4.5% of GDP).
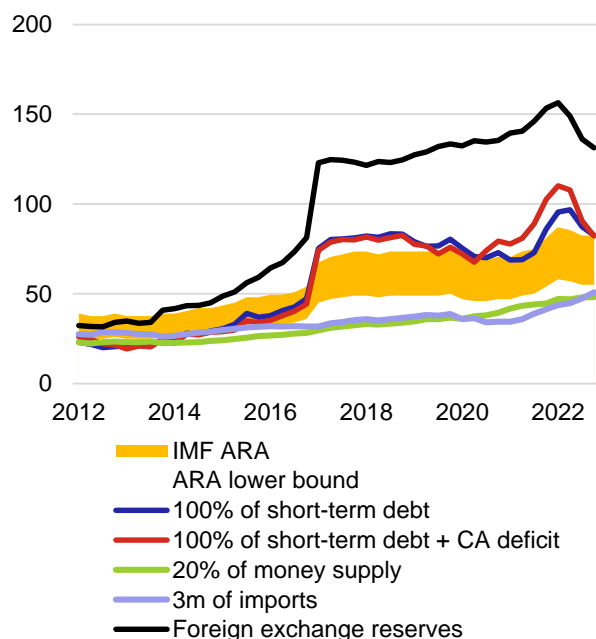
The reduction in the market value of the bond and equity portfolio and the slight strengthening of the koruna against the euro meant the value of reserve assets experienced a year-on-year fall as of the end of 2022 by an additional CZK 207 billion (3.0% of GDP) to CZK 3.17 trillion (i.e. 46.7% of GDP). This is still a very high volume of foreign exchange reserves compared to other countries. After adjustment for foreign liabilities, the CNB's net creditor position vis-à-vis other countries fell by CZK 682.3 billion (10.0% of GDP) to CZK 2.84 trillion (41.8% of GDP).

Chart 26: Reserves fell in 2022, as however did key adequacy indicators

(CNB reserve assets and adequacy indicators, EUR billions)

IMF ARA
ARA lower bound
—— 100% of short-term debt
—— 100% of short-term debt + CA deficit
—— 20% of money supply
—— 3m of imports
—— Foreign exchange reserves

Note: The IMF ARA metric is a weighted average of exports, money supply, short-term and long-term liabilities. Short-term external debt is shown here according to original maturity and without intra-group loans (the grey part of the column in Chart 27 on the right). The current account deficit is the aggregate of the following four quarters, while for the last quarter of 2022 we use the CNB's spring forecast for 2023. Source: CNB, CNB calculation

Chart 27: The CNB's reserves more than cover the Czech Republic's external gross financing needs even in the broadest sense

(reserve assets and liabilities of residents due within 12m, EUR billions)

Balance of foreign exchange reserves (EUR 131 billion)

Gross external borrowing requirement (EUR 119 billion)

■ Short-term foreign debt (excluding FDI)

■ Short-term intra-company loans in FDI

■ Long-term debt due within 12m (excluding FDI)

■ Long-term intra-company loans due within 12m

■ Expected current and capital account deficit in 2023 (MP Report, spring)
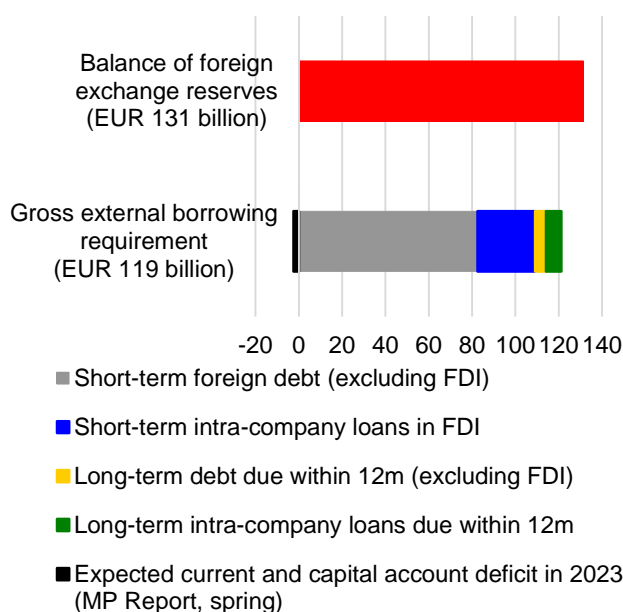
Note: The expected deficit of the current and capital account in 2023 is taken from the CNB's spring 2023 forecast.

Source: CNB, CNB calculation

During the intervention, reserves were used to stabilise the koruna exchange rate in conditions when the economy was facing extraordinary external influences. The prudential requirements for the size of reserves remained almost unaffected after the sale. Central bank reserves serve primarily to prevent and deal with balance of payments crises, such as sharp outflows of foreign capital and temporary external imbalances of the economy. The requirements for the size of reserves, known as adequacy indicators, are therefore derived from the extent of balance of payments risks in an economy. For example, according to

the Guidotti-Greenspan rule, a central bank should hold reserves that can fully cover the economy's short-term foreign indebtedness. Other indicators include coverage of three months of imports, a fifth of the money supply (this roughly corresponds to funds that residents could, in the event of loss of confidence in the domestic currency, rapidly move abroad), or various combinations of these indicators. The CNB's intervention in 2022 was a response to two risks: an outflow of short-term foreign capital and a short-term shock to the terms of trade (imported energy becoming more expensive). The resulting lower volume of foreign capital in the Czech Republic in 2023 and the expected return to an external equilibrium also means a smaller volume of reserves are required. The new, lower level of reserves therefore not only comfortably exceeds all the adequacy indicators, but the use of the reserves did not actually significantly reduce this prudential cushion (Chart 26).

VI. THEMATIC ANALYSES

VI.1   IS IT ENOUGH TO FOLLOW THE MONEY? EXTERNAL CASH FLOWS AND THE EXCHANGE RATE [32] [33]

This article examines the influence of external economic imbalances on exchange rate movements. An estimate of such an imbalance using the current account balance provides an over-simplified view of the exchange-rate-relevant items in the BoP and cannot capture the reality of a modern foreign exchange market. In this context, we may be better served by an alternative indicator – the external monetary flows, the use of which is illustrated using Czech data. The indicator is based on the currently lesser-known concept of the "monetary presentation of the balance of payments" – a tool to assess the impacts of balance of payments transactions on monetary developments.[34] This is a wider concept than the current account balance and enables more precise conclusions regarding excess supply and demand for foreign exchange, and therefore expected pressure on the exchange rate. In other words, it could potentially be a more precise indicator for analysing exchange rate movements.

1. THE CURRENT ACCOUNT IS AN INCOMPLETE INDICATOR OF IMBALANCES IN THE FOREIGN EXCHANGE MARKET

Estimating pressures on the exchange rate from balance of payments statistics is not an easy task. The basic view of the balance of payments distinguishes between horizontal and vertical breakdowns. Using a horizontal breakdown, we can divide the balance of payments into autonomous and accommodating items. Autonomous items are driven by profit-seeking economic agents, and they are independent of the other items in the balance of payments as such. An example of an autonomous item could be the sale of goods and services, or investments in financial assets. Accommodating items, by contrast, only equalise the balance of payments and therefore show how the autonomous items are financed. The second view, using a vertical breakdown, is also based on the necessity of maintaining the identity of the balance of payments, but in this case it's based on the principle of double-entry bookkeeping. The debit-credit methodology captures the dual essence of every transaction. The counterpart to the export of an automobile on the current account is a payment received from a non-resident on the financial account. Similarly, an increase in financial assets due to a purchase of foreign government bonds is balanced on the financial account by outgoing payments. This fact markedly complicates the use of the balance of payments to explain exchange rate movements. The division between transactions brought about autonomously, i.e. that are exchange-rate-relevant, and those that only reflect the method of payment, is not evident. This principle is shown in Chart VI-1.1.

For many years, the current account has therefore been used as a proxy variable to approximate the demand for and supply of foreign exchange. Adopting the vertical division, the current account can be viewed as one side of the coin that shows us all the exchange-rate-influencing transactions. If imports of goods and services exceed their exports, the current account balance will be negative and signal that the demand for foreign exchange exceeds its supply, and thus a pressure on currency depreciation. If the economy works on the principle "buy and pay immediately," the current account will indeed reflect all payments actually made that go through the foreign exchange market. Nothing would therefore prevent

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[34] Using a monetary presentation, the European Central Bank assesses the contribution of net external assets to the development of the M3 aggregate in the Eurozone. This concept is further developed in BOX VI-1.1

us from using the current account to gain an approximation of the imbalances on the foreign exchange market.

Globalisation and technological progress have facilitated international trade. However, they have also increased the complexity of the balance of payments and this simplified view can therefore often depart from reality. Although the current account proxy could work in the 1980s, when the options for trade financing were limited, globalisation and the increasing complexity of international trade brought about the development of new financial products and services designed to facilitate the financing of international business activities. Today, it is normal for companies to finance their purchases with trade credit, i.e. to purchase goods with a deferred due date.[35] Meanwhile, other companies require advance payments for their goods and services. Some business partners also use "netting", i.e. the ongoing settlement of receivables and liabilities with the relevant counterparty, leading to a lump-sum payment at the end of every period. Other items that distort the applicability of the current account for explaining foreign exchange transactions are, for example, the earnings of foreign investors reinvested in the domestic economy. Although these are recorded as expenses on the current account, no payments are made abroad and the reinvested koruna do not enter the foreign exchange market at all. Transactions recorded on the current account therefore may not always reflect payments actually made and therefore pressures on the exchange rate.

Chart VI-1.1: In the standard balance of payments presentation it is not possible to distinguish between exchange rate-relevant items and those that only mediate a payment

(individual balance of payments items in the Czech Republic between 2005 and 2023, 12m moving aggregate, in CZK billions)
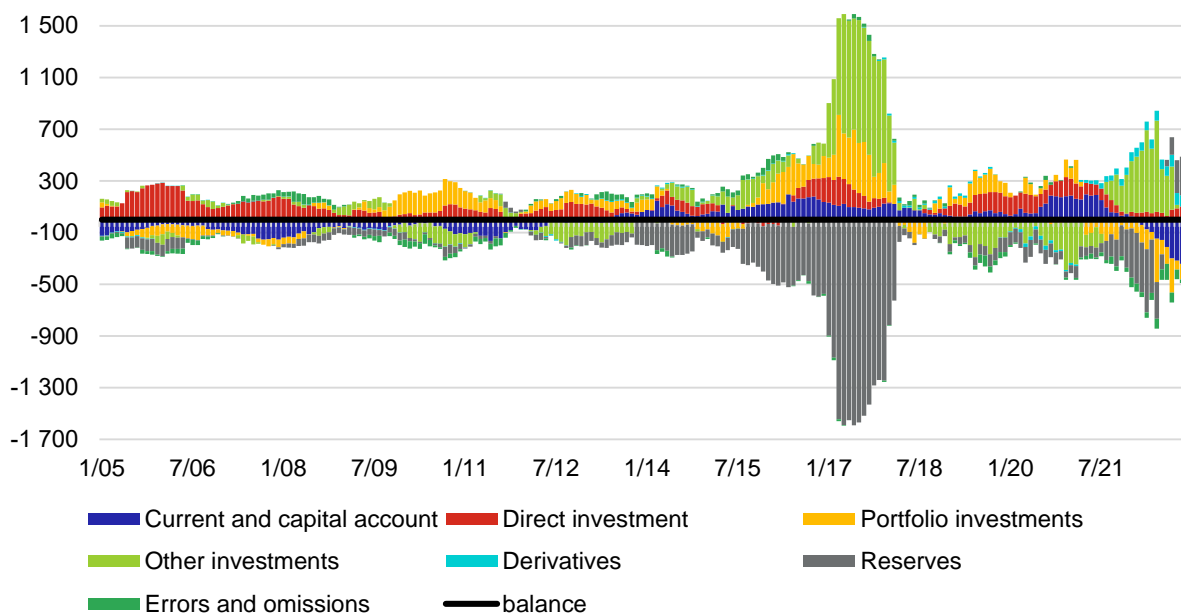
Note: Financial account items are entered with a minus sign in order to clearly show the dual essence of all entries: the balance of payments sum must equal zero.

Source: Public CNB BoP database, author's calculation.

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[35] This "buy now pay later - BNPL" phenomenon is currently spreading also at the level of individual consumers, see Twisto ("Buy using Twisto and pay later") and PayU ("Deferred payment").

Nevertheless, the most important weakness in the existing balance of payments approach to the exchange rate is that cross-border capital movements that influence the exchange rate are ignored because they do not appear on the current account. The liberalisation of capital flows in the 1990s, the growth of business integration and the rising interconnectedness of global financial markets gradually introduced increased complexity to the financial account and emphasised its significance.[36] In contrast to the restrictive measures of the last century[37] aimed at maintaining currency stability, relaxing capital controls presented new investment opportunities, primarily in developing markets. The result was a rising importance of the financial account and its implications for the exchange rate.

The importance of the financial account can be shown using the example of the Czech Republic, which experienced the strongest koruna appreciation at a time when the current account was in deficit. Two opposite effects affected the Czech economy in the first decade of this century. Against the inflow of capital in the form of foreign direct investment (FDI)[38] there was an outflow of capital in the form of returns from such investments. Nevertheless, only one of these groups is recorded on the current account - the outflow of dividends. The current account deficit therefore only reflects a fraction of reality, as it ignores the inflow of capital in the form of FDI.

The balance of payments can be rearranged in such a way as to highlight the different aspects of its financing. In addition to the standard presentation of the balance of payments, there is also the concept of an "analytical presentation" (IMF, 2009) that, with the help of the horizontal breakdown, differentiates between autonomous and accommodating items.[39] This approach places exports and imports of goods and services, payments for cross-border work, incoming and outgoing foreign investment and income from them among the autonomous items.[40] These are countered by the accommodating item of the change in the central bank's reserve assets.

The analytical presentation can be a useful tool, in particular for countries with a fixed exchange rate regime, as it shows how the central bank finances other autonomous items. In the market, a discrepancy between supply and demand is always equalised by a change in the price – if the demanded quantity exceeds supply, the price rises. The situation is similar in the foreign exchange market, where the relevant price is the exchange rate. Therefore, if an economy imports more than it exports, it also has to attract more foreign capital to "pay for" the difference. If equality is not achieved, the imbalance will result in the weakening of the exchange rate. This makes exports more competitive and imports more expensive. In addition, cheaper domestic assets attract more foreign investors. The external imbalance is corrected by both these channels. If this pricing mechanism is not allowed to perform its function, any imbalances in the foreign exchange market have to be dealt with by the central bank through changes in its foreign exchange reserves. In the event of excess demand for foreign exchange, the market is provided with sufficient liquidity through the sale of reserve assets, and vice versa – if the supply of foreign exchange on the market is higher, it buys the excess into its reserves. The analytical presentation of the balance of payments shows us the change in foreign reserves that is necessary to balance the foreign

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[36] In 2010, the average daily turnover on the foreign exchange market was 36 times the balance of trade, measured for the 35 largest economies. (King, M. R. et al., 2012).

[37] In the 20th century, a large part of global capital flows were limited by a whole series of measures, in particular capital and the exchange rate controls, and restrictions on cross-border investments.

[38] During the transformation period, when the Czech Republic was moving from a centrally planned economy to a market economy, favourable conditions were created especially for investors from Western Europe. In addition to the privatization of state property, "greenfield" investments, i.e. the establishment of new companies from scratch, were also abundant. The inflow of foreign investment was also boosted by the Czech Republic's strategic position in the heart of Europe and its connections with leading European cities. The significant inflow of FDI to the Czech Republic continued until the economic and financial crisis in 2008.

[39] This breakdown method is also consistent with the original BPM5 accounting methodology.

[40] In the balance of payments accounting, this is the sum of current account balances (goods and services, primary and secondary income), the capital account, direct, portfolio and other investments.

exchange market and therefore to maintain a stable exchange rate. Nevertheless, this presentation does not provide us with information about exchange rate pressures in the event the central bank is not actively intervening to equalise an imbalance on the foreign exchange market.

Other presentations are possible thanks to a detailed breakdown of the balance of payments. A sectoral breakdown will make it possible to analyse the external imbalance of individual domestic sectors, while the division of the balance of payments by partner economy can help identify potential vulnerabilities stemming from geographical concentration and interdependence.

2. THE MONETARY PRESENTATION CAN HELP DETERMINE EXCHANGE RATE PRESSURES IN A FREE-FLOATING EXCHANGE RATE ENVIRONMENT

The monetary presentation (Be Duc et al., 2008) was developed as a supplement to a more detailed analysis of elements of the monetary aggregate, and its use is discussed in BOX VI-1.1. This presentation has been compiled on a monthly basis and published by the European Central Bank since 2003. Monetary presentation statistics for the Czech Republic are also compiled by the Czech National Bank.

The monetary presentation of the balance of payments could help better capture the current supply of and demand for foreign exchange. In a floating exchange rate environment, an imbalance in the foreign exchange market is handled primarily by commercial banks[41] and the price correction therefore occurs through the exchange rate. The monetary presentation of the balance of payments, which separates the financial account of monetary financial institutions from other items, can serve as a more suitable indicator of exchange rate pressures than the current account, as it detects the supply and demand for foreign exchange that monetary financial institutions are facing.

BOX VI-1.1: THE MONETARY PRESENTATION WAS FIRST USED FOR A MORE DETAILED EXPLANATION OF THE M3 AGGREGATE

The concept of a monetary presentation was originally used for a more detailed analysis of the M3 monetary aggregate. This more detailed breakdown is possible thanks to the intersection of two different sets of statistics: the balance of payments statistics and the consolidated financial balance sheets of commercial banks. The M3 aggregate is obtained from the consolidated balance sheet of commercial banks as the sum of credit, net external assets and other net assets, from which deposits by government institutions and long-term financial liabilities are deducted. This relationship is shown by the BOX 1 table and the corresponding equation 1.

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[41] Whereas in a fixed exchange rate regime any imbalance between supply and demand on the foreign exchange market must be dealt with by the central bank through reserve assets, in the case of a free-floating exchange rate there is no actor that would perform this function. Equilibrium arises through the exchange rate and for an approximate determination of market imbalances it is therefore possible to look at commercial banks, which act as intermediaries for all payments. Whether this concerns a payment for goods delivered, pensions paid out to non-residents or investments in portfolio assets — payment settlement takes place through banking institutions and their balance sheets can therefore be understood as an accommodating item reflecting all autonomously-induced transactions.

BOX-1 Table: Representative consolidated financial balance sheet of monetary financial institutions

ASSETS	LIABILITIES
Credit	Money supply
Net external assets	Government deposits
Other net assets	Long-term financial liabilities

$$M3 = CR + NEA - GD - LFL + ONA^{[42]} \qquad (1)$$

A sectoral breakdown of the balance of payments enables matching it to the consolidated financial balance sheet of commercial banks. From the perspective of resident sectors, we can divide the balance of payments into two broadly defined groups: monetary financial institutions (MFI) [43] and other sectors. A change in net external assets (NEA) conceptually corresponds to the MFI financial account. The substitution of this account into equation 1 enables us to better understand what is behind changes in the M3 aggregate, specifically from the viewpoint of a change to external assets. The balance of payments is arranged into equation 2:

$$CA + KA + E\&O - FA_{excl.MFI} = FA_{MFI}.^{[44]} \qquad (2)$$

And we can substitute:

$$M3 = L + CA + KA + E\&O - FA_{excl.MFI} - GD - LFL + ONA. \qquad (3)$$

The reason for the conceptually identical statistics is the double-entry bookkeeping in the balance of payments. Monetary financial institutions act as an intermediary for an exchange between a resident and a non-resident. If a resident executes a transaction, for example by purchasing a foreign government's bond, the financial account of other sectors rises due to an increase in financial assets (purchased bonds) but falls due to an outgoing payment in the MFI sector. Commercial banks broker the payments. In a bank's balance sheet, this transaction looks like a reduction in net external assets (a payment abroad), but also like a reduction in the short-term deposits of residents and therefore a reduction in the M3 aggregate. The accounting identity is retained in both cases and the same transaction (bond purchase) is captured in the two different sets of statistics. The MFI financial account therefore shows all the mediated payments to other countries and for this reason reflects the change in net external assets. We can see a comparison of these two different sets of statistics on Chart VI-1.2.

[42] M3 - M3 monetary aggregate, CR – credit, NEA – net external assets, GD – general government deposits, LFL – long-term financial liabilities, ONA – other net assets.

[43] MFI includes the CNB and other monetary financial institutions.

[44] CA – current account, KA – capital account, E&O – errors and omissions, $FA_{excl.MFI}$ – financial account excluding MFI, FA_{MFI} – MFI financial account.

Chart VI-1.2: The change in net external assets on the balance sheet of commercial banks is conceptually identical to the MFI financial account in the balance of payments

(the change in net external assets against the M3 aggregate and the MFI financial account in the Czech Republic between 2005 and 2023, 12m moving sum, in CZK billions)
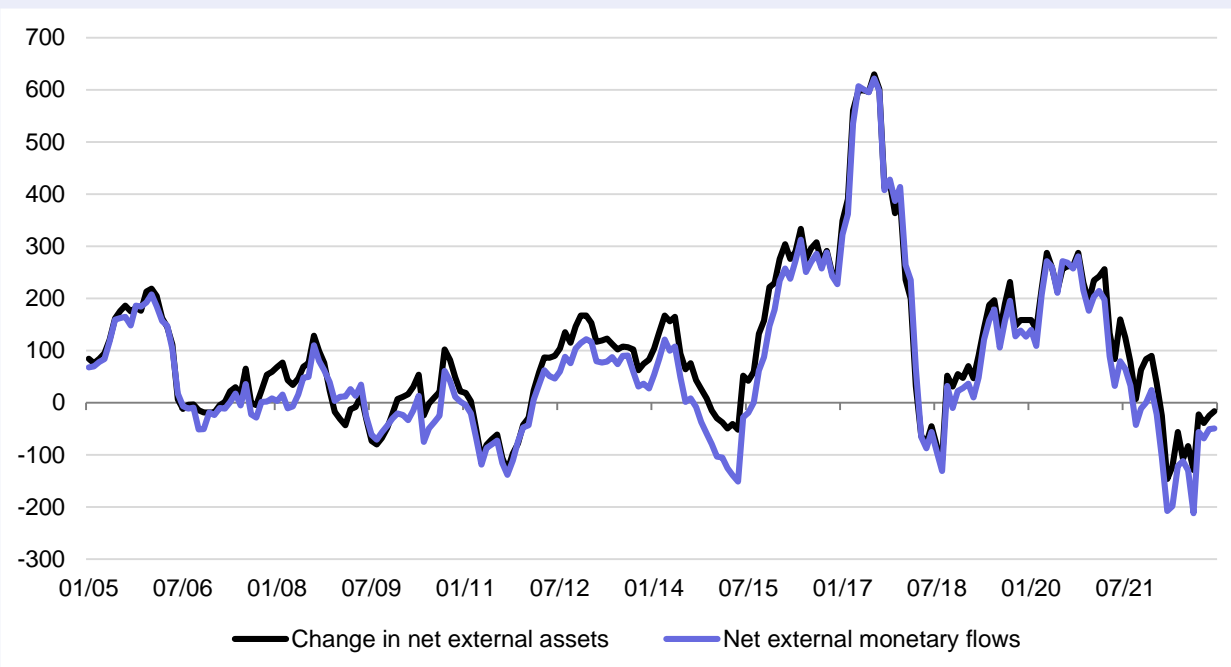
Note: NEA – change in net external assets, FA$_{MFI}$ – financial account of monetary financial institutions

Source: public CNB database Monetary Presentation of the BoP and monetary aggregates, authors' calculation.

An explanation of exchange rate movements through the lens of the monetary presentation of the balance of payments relies on the fact that transaction settlement takes place through monetary financial institutions (MFI). By taking them out of the balance of payments, we obtain payments made as an accounting counterpart to all exchange-rate-relevant transactions on the left-hand side (exports of goods, payments to employees, purchases of foreign shares, etc.). The monetary presentation identifies these payments as net external monetary flows (Chart VI-1.3 and equation 2).

The monetary presentation differentiates between the current and future demand for foreign exchange. We can see that the whole current account is on the left-hand side of equation 2. If a domestic company sells goods using a trade credit, the payment is deferred to the future and the financial account grows due to the company's increased receivables – i.e. the sector without MFI. Both transactions are on the left-hand side, as they did not have any real impact on the M3 aggregate or on the foreign exchange market. If, on the contrary, the payment for the goods is made immediately, a transaction is entered on the left-hand side under the current account and on the right-hand side as a payment received on the MFI financial account.

Transactions not entering the foreign exchange market are not reflected in the monetary presentation. This concerns, for example, reinvested earnings recorded on the current account. Reinvested earnings are earnings of foreign-owned domestic companies reported in the domestic currency that were not distributed as dividends to the foreign owner but reinvested in the same company in the domestic currency. They do not enter the foreign exchange market at all and we can see that they are netted out in the monetary presentation. Debit transactions on the current account are accompanied by an increase in foreign liabilities in direct investments on the financial account excluding MFI.

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The monetary presentation takes the financial account into consideration. After removing all MFI transactions from the financial account on the left-hand side there are again only autonomous impulses, such as purchases of shares and bonds or direct investment. The way these items were financed is on the right-hand side of the equation. When analysing the influence of the balance of payments on the exchange rate, the monetary presentation enables us to take into consideration the significant role of the financial account.

Chart VI-1.3: The monetary presentation identifies net external monetary flows in the balance of payments

(monetary presentation of the balance of payments, 12m moving sum, in CZK billions)
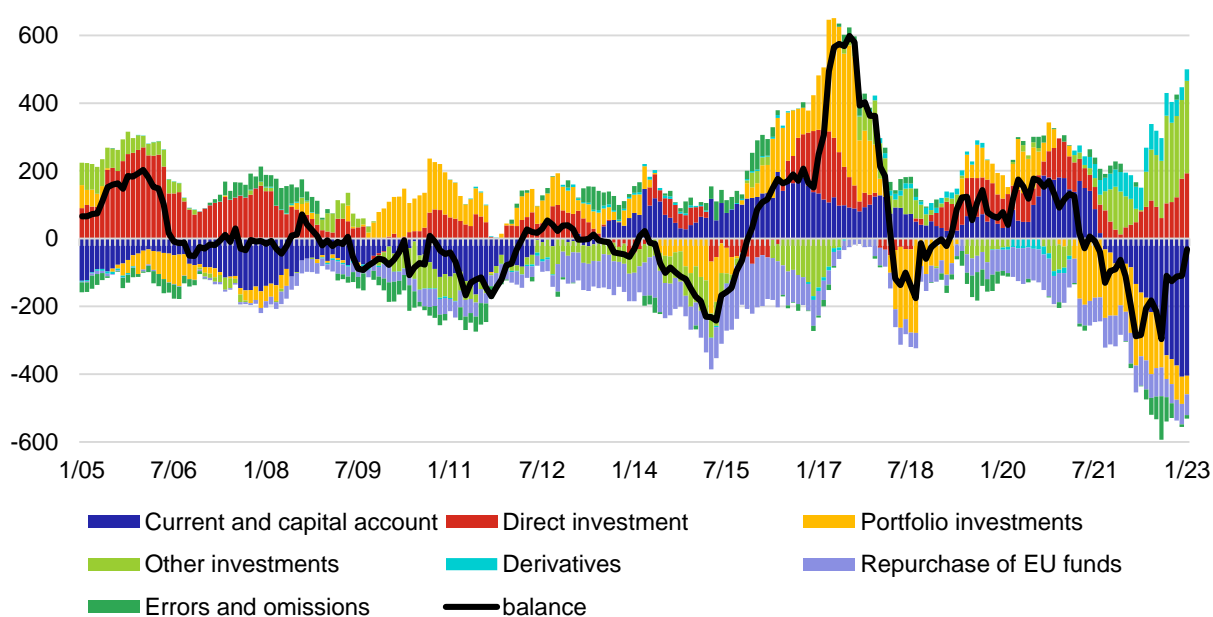
Note: Positive balances represent an inflow of capital into the country, negative balances an outflow. A negative balance on the current and capital accounts in the first half of the relevant period therefore indicates an outflow of capital from the country, while a positive balance of direct investments in the same period reflects investment opportunities in the Czech Republic and therefore an inflow of foreign capital.

Source: public CNB database Monetary Presentation of the BoP, internal CNB database of EU funds, authors' calculation.

For a better understanding of exchange rate movements, it is necessary to subject the monetary presentation, originally intended for a more detailed analysis of the M3 aggregate, to additional adjustments, as not all external monetary transactions are flowing through the foreign exchange market. This can be illustrated using the example of income from the European Union structural funds, which is recorded on the current or capital account in the balance of payments. Euro-denominated income from the EU budget is purchased by the CNB into its reserves based on an earlier agreement with the government of the Czech Republic that seeks to prevent the EU funds from influencing the koruna exchange rate. Such newly created koruna are then credited to the account of government institutions. This transaction increases the monetary aggregate but does not enter the foreign exchange market. The monetary presentation should therefore be adjusted for such influences (Chart VI-1.3). A similar approach

should be applied to returns on reserves that the central bank adds to its reserve assets and does not sell on the foreign exchange market.[45]

The benefit of the monetary presentation compared to the original diagnostics using the current account can be seen during the entire observation period. In Chart VI-1.4 we can see that, although the current account was in deficit until 2013, net external monetary flows reflected the FDI inflow, and the demand for koruna therefore exceeded demand for foreign currency. As a consequence, the exchange rate strengthened. The proposed indicator also explains the currency pressures in the first half of the currency cap regime of 2013-2017. Finally, it is clear that, although the current account deficit in 2022 was substantial, the financial account mitigated the deficit. Despite this, monetary flows in 2022 indicated pressures for a weakening of the koruna, while the koruna actually strengthened.

The strengthening of the koruna in 2022 illustrates the lower reliability of the exchange-rate signal from the monetary presentation in a situation where the central bank is actively intervening of the foreign exchange market. The problem is that any intervention by the CNB is automatically offset on the right-hand side of the equation, as both entries are under the MFI sector. This is visible, in particular, in the period of the currency cap regime in 2013–2017, when the CNB combatted the inflow of foreign speculative capital through massive purchases of foreign assets using newly-created koruna liquidity. The net inflow of capital to the Czech Republic was therefore not as large as is shown by Chart IV-1.4, which is also the reason why the nominal effective exchange rate of koruna did not markedly fluctuate in this period.

Chart VI-1.4: Net external monetary flows can explain the periods of exchange rate changes that the current account cannot

(in %)

— Net external monetary flows as a share of GDP
— Current account as a share of GDP
— year-on-year NEER, right axis
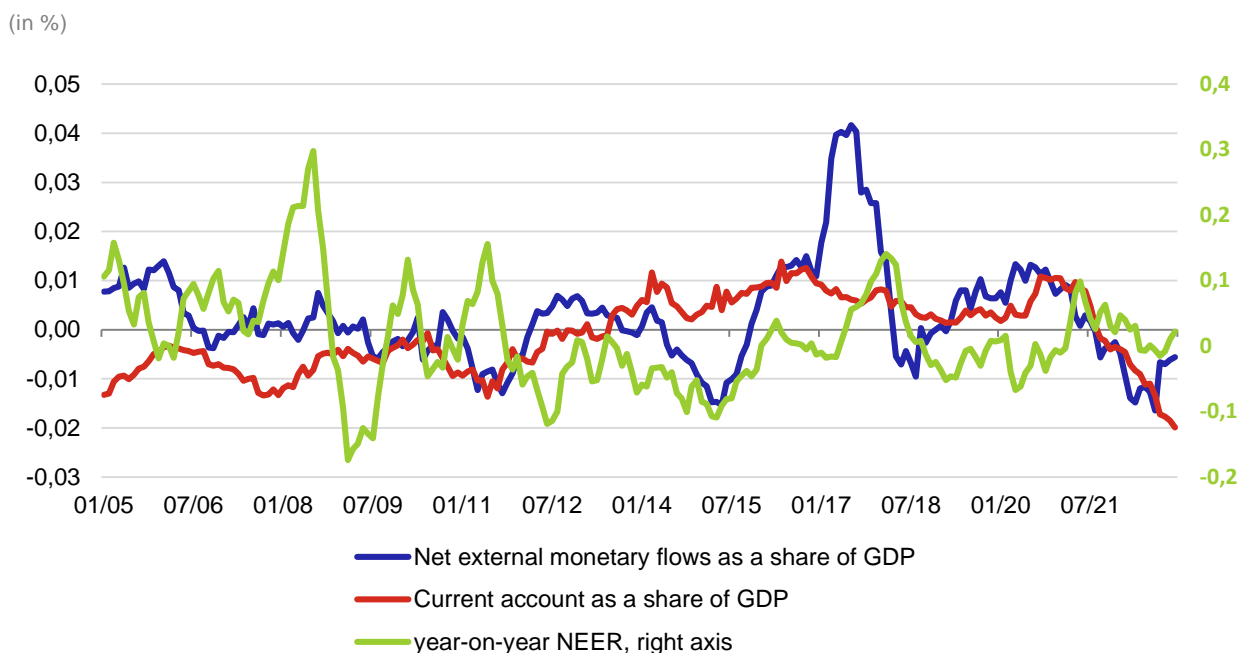
Note: Positive NEER index values indicate year-on-year appreciation of the domestic currency, negative values its depreciation. Similarly, positive current account values (net external monetary flows) reflect an inflow of money to the country and vice versa. The balance of net foreign monetary flows is the 12m moving sum. The NEER index is calculated using the turnover of individual currencies on the foreign exchange market over spans of years. The weights are changed every three years. Weights at the last observation – USD 0.28 and EUR 0.72. The last observation was in February 2023.

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[45] Net external currency flows, as shown on Chart VI-1.3, were further adjusted by income from the sale of the government interest in Telecom in 2006 to other countries. This foreign exchange income was immediately converted into CNB reserves and did not enter the foreign exchange market. (CNB, 2005)

Source: CNB BoP database, authors' calculation.

The link between external monetary flows and the exchange rate is generally weaker when banks are not acting only as transaction brokers. The central bank's intervention is only one example where autonomous, exchange-rate-relevant transactions do not appear in the monetary presentation because the initiator is a monetary financial institution. Regardless of the monetary-policy regime, this includes transactions by commercial banks themselves. Financial transactions by monetary institutions, such as acquisitions of domestic banks by foreign entities, appear on the right-hand side of the equation. An increase in liabilities in the category of foreign direct investment corresponds to an increase in assets due to payments received. Both transactions are recorded on the financial account under the MFI sector and therefore offset each other on the right-hand side. While this method of recording is suitable when examining the influence of external capital on the money supply[46], it can create certain distortions when explaining exchange rate movements. This weakness was especially visible towards the end of the currency cap regime in 2017, when commercial banks played an important role. In this period, they themselves were active in the foreign market, in addition to performing their role as payment intermediaries. In this period, non-residents were making koruna deposits in the Czech Republic in the expectation that after the end of the exchange rate commitment the koruna would strongly appreciate. Such transactions again appear in an increase in financial MFI assets and liabilities that offset each other on the right-hand side.

The weaknesses of the monetary presentation can be partially resolved. The above makes it clear that it is extremely hard to identify what elements of the MFI sector financial account are autonomous (exchange-rate-relevant) and should therefore be moved to the left-hand side of the equation in the monetary presentation. The indicator of external monetary flows, which relies on a simple sector cross-section, can then be markedly distorted in particular at times when MFI figure in autonomous transactions, i.e. not only as payment intermediaries. One solution could be a careful identification of autonomous elements in the MFI financial account and their subsequent removal (in the case of the Czech Republic, for example, the foreign direct investment mentioned). Nevertheless, the structure of the financial account often does not enable us to perform such individual separation.[47]

The solution for capturing exchange-rate-influencing central bank transactions can be an "Exchange Market Pressure (EMP) index". An EMP index combines the knowledge from the monetary and analytical presentations of the balance of payments: Any imbalances in the foreign exchange market must be settled by the exchange rate, interventions by the central bank in the foreign exchange market or a combination of the two. The EMP index combines both these equalising forces as the sum of their weighted changes: $EMP_t = w_e * \Delta e_t / e_{(t-1)} + w_R * \Delta R_t / S_t$.[48] This equation makes it clear that the inflow of foreign capital can be reflected in the index in two ways. If we are in a free-floating exchange rate regime, the capital inflow will increase the effective exchange rate of koruna, the currency appreciates and the index rises. If, on the other hand, the central bank attempts to maintain a fixed exchange rate, it will buy the excess foreign exchange liquidity into its reserves which, as a consequence, will rise together with the

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[46] On a bank's balance sheet this transaction appears as an increase in assets (payments received), but instead of a dual debit entry to residents' deposits (and therefore higher money supply), the bank increases its external liabilities (interest in a company). The change in net external assets therefore remains zero, as does the change in the money supply. Therefore, in order to explain the M3 aggregate it is appropriate for the transactions to be set off on the right-hand side of the equation.

[47] In the Czech Republic's case, the most marked problem was the inflow of koruna deposits towards the end of the currency cap regime. As this transaction is written from both sides on the other investments financial account, it is statistically impossible to take this fact into consideration during the construction of external monetary flows.

[48] w_e, w_R stand for the weights that the exchange rates and reserves contribute to the whole index, Δe_t stands for a change to the exchange rate for periods t and t-1, $e_{(t-1)}$ stands for the exchange rate in period t-1, ΔR_t stands for the central bank's intervention in period t, and S_t stands for the level of overall reserve assets in period t.

EMP index. A higher EMP index value therefore corresponds to the inflow of capital to the country and thus pressure for the domestic currency to appreciate.

Chart VI-1.5: Net external monetary flows can explain the EMP index in periods in which the central bank intervened in the market

(12m moving sum, balance of net external monetary flows as a share of GDP in the Czech Republic and the year-on-year change in the "exchange market pressure" index, January 2005 - January 2023)
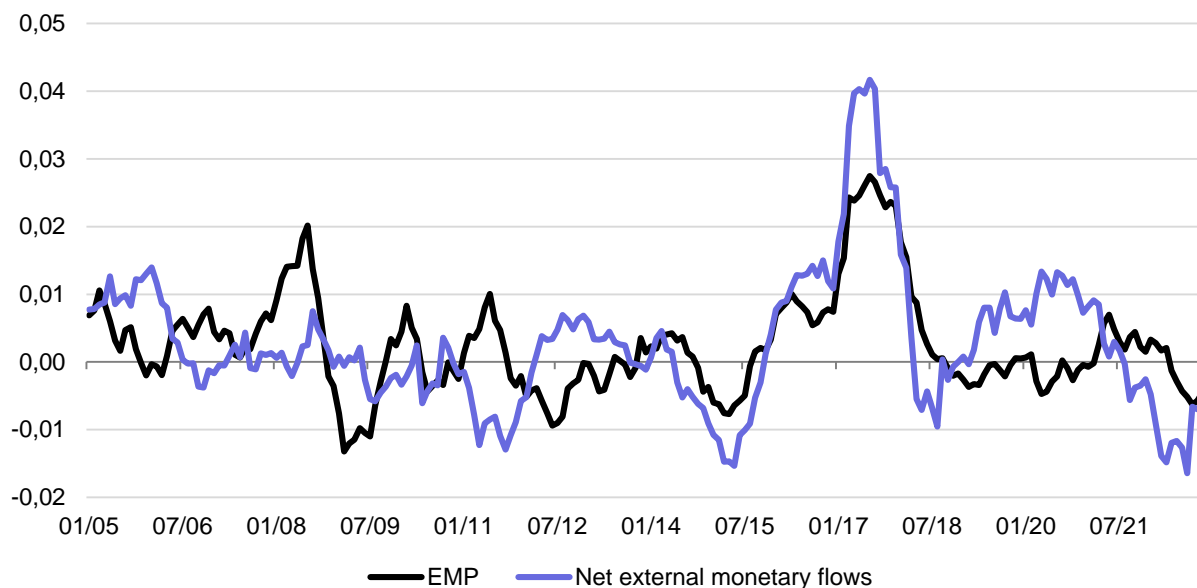
Note: Positive EMP index values indicate year-on-year appreciation of the domestic currency, negative values its depreciation. Similarly, positive values of net external monetary flows reflect capital inflow to the country and vice versa.

Source: CNB BoP database, authors' calculation.

The EMP index better captures exchange rate pressures in periods when the central bank is actively intervening in the market. As can be seen from Chart VI-1.5, the EMP index can better capture the situation of the 2013-2018 currency cap regime and the intervention in 2022. In the second half of the currency cap regime, the positive EMP index reflects the appreciation pressures on the koruna that were stimulated by an inflow of foreign capital. Contrastingly, in 2022 the central bank's intervention offset depreciation pressures (the EMP index was negative) caused by the current account deficit and the outflow of capital through portfolio investments (Chart VI-1.3). This explains why the exchange rate strengthened (Chart VI-1.4). The EMP index therefore captures exchange rate pressures, including those that the central bank eliminated and which thus did not actually influence the exchange rate. This relationship is less robust in periods with higher uncertainty. The reason for this could be changing sentiment on financial markets that causes smaller capital flows to have a more pronounced exchange rate impact.[49] This could be observed, for example, during the pandemic.

CONCLUSION

The impact of an external economic imbalance on the exchange rate is a greatly discussed topic, in particular in 2022 when the current account deficit in the Czech Republic reached record values.

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[49] Benecká and Polák, 2023, show that exchange rate trends are not determined only by macroeconomic fundamentals, but to a certain extent also by regional sentiment.

Despite the marked deficit, however, the nominal effective exchange rate of koruna at the start of 2023 strengthened year-on-year.[50] In this article, we show that to explain the exchange rate, it is not sufficient to analyse the current account, but it is important to view developments in the balance of payments comprehensively. The monetary presentation of the balance of payments, in combination with the EMP index, which takes into account central bank interventions, enables us to better capture balance of payments pressures on the exchange rate in the environment of a mixed exchange rate regime.

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[50] The bilateral CZK/EUR exchange rate has been strengthening since 2021, whereas the koruna exchange rate against the dollar started to strengthen at the end of 2022 after previous marked depreciation. As the dollar is part of the NEER index calculation with a weight of almost 30%, the overall strengthening of the effective exchange rate is not that marked, while its effect has been gradually increasing since the start of 2023.

VI.2 DEBT CAPITAL FLOWS FROM AND INTO THE CZECH REPUBLIC IN THE TURBULENT YEAR OF 2022 [51]

The year 2022 was a year of significant economic and, primarily, geopolitical events. Due to the sharp rise in inflation in most developed countries, monetary policy rates have been gradually rising in a number of them, including the Czech Republic. In addition, inflation in Europe markedly increased as a consequence of the Russian aggression in Ukraine, in a region not that far away and that is connected with our country (primarily Russia) by relatively strong economic links, in particular in terms of energy supplies. The war, the energy crisis, problems in global supply chains, the progressively implemented EU sanctions against Russia and Russia's retaliatory measures interfered quite strongly with the external balance of the Czech Republic. These facts could potentially have a significant impact on debt capital flows from and into the Czech Republic. This article focuses on what changes actually occurred in 2022 and how they affected the balance of payments.

1 MOVEMENTS IN SHORT-TERM FOREIGN CAPITAL PLACED IN KORUNA ASSETS

1.1 Short-term koruna liabilities – non-residents' deposits in Czech banks

The most sensitive reaction by debt capital items to the marked external stimuli (increased interest rates, the war in Ukraine) was displayed by short-term koruna deposits of non-residents in domestic banks. The cause was the hurried and possibly slightly belated increase in interest rates in developed countries, in particular in the USA, including expectations of further increases. From February 2022, capital flows were influenced by the negative expectations of short-term investors linked to the impact of the war in Ukraine on the Czech economy and its worsening external balance[52].

The outflow of this short-term debt capital culminated in November 2022, when its cumulative volume from the start of the year slightly exceeded CZK 400 bn. Chart VI-2.1 shows that short-term koruna deposits of non-residents in domestic banks – after a growth in 2021 – declined sharply in 2022. Sharp outflows were evident from the start of the year, as in January and February there were reductions in the volume of koruna deposits of non-residents at domestic banks of approx. CZK 200 bn. First, some foreign investors probably moved their assets into US dollars in expectation of the dollar's future strengthening influenced by the rising interest rates in the USA. In February, the outflow of short-term capital may have been influenced to some extent by the outbreak of war in Ukraine. The flow into dollar assets was motivated by the dollar's status as a "safe harbour," a status that the dollar enjoys as the most widespread global reserve currency. In the rest of the year, the volume of such deposits fell much more slowly (by a further CZK 200 bn). A slow turnaround was already visible in December and at the start of 2023, however.[53] At the end of 2022, the volume of koruna deposits by non-residents in domestic banks was approx. CZK 0.59 tn. They primarily consist of funds of foreign banks (to a significant extent parents of domestic banks), while deposits by non-bank entities are less important in volume terms. The continued presence of this highly flighty capital in Czech banks will depend, in particular, on trends in the interest-rate differential between key currencies and investors' trust in the stability of the Czech Republic or the whole of Central Europe, including confirmation that the extraordinarily deep imbalance of the Czech Republic in 2022 was only a one-off episode.

Capital outflows were dampened by a high, though slightly falling from the middle of the year, interest-rate differential between the koruna and the main global reserve currencies (in particular

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[51] The author is Vladimír Žďárský (Czech National Bank). The views presented here are those of the author and do not necessarily reflect the official position of the Czech National Bank.

[52] The negative expectations strongly affected other countries in Central and Eastern Europe in addition to the Czech Republic, particularly those with their own currency.

[53] A temporary and much smaller decrease of several tens of billions of koruna was also evident in holdings of government koruna bonds by non-residents.

the USD and EUR). It also managed to ensure a net inflow of debt capital in "more stable items" of debt flows in particular for the corporate sector (totalling almost CZK 100 bn). The negative impacts of the war in Ukraine (and the related sanctions) on the Czech Republic's external balance were to a considerable extent alleviated by net income from financial derivatives, which last year reached a record value of almost CZK 60 bn. These related, in particular, to earlier purchases of oil and gas by domestic entities with deferred delivery dates. The overall "relatively calm" behaviour of debt capital in such extraordinary conditions (war nearby, visible external imbalance of the Czech Republic) was primarily due to the CNB's unusually high foreign exchange reserves and its demonstrated willingness to use them.

Chart VI-2.1: Foreign deposits in Czech banks sharply declined in 2022

(in CZK billions)
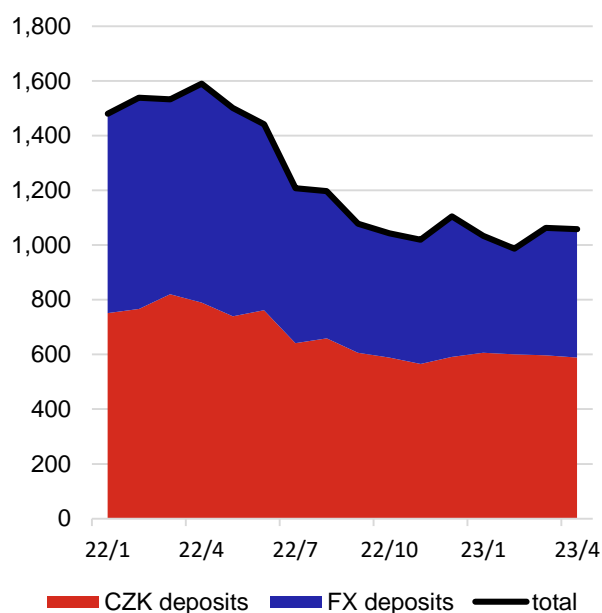
Chart VI-2.2: The government's foreign indebtedness

(flows, in CZK bn)
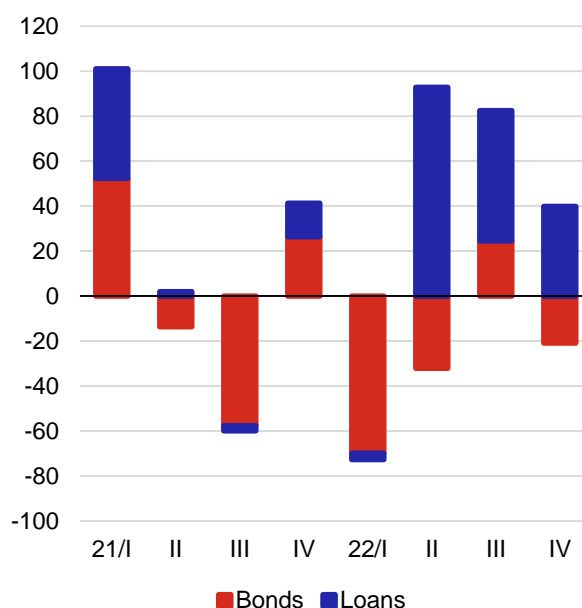
Source: CNB

Source: CNB

1.2 Short-term koruna funds of residents/domestic banks abroad

Alongside the outflow of non-residents' short-term capital from domestic banks, last year there was a slightly increased outflow of residents' koruna assets. Short-term koruna assets of domestic banks abroad rose during the year by a multiple of 2.5 to approx. CZK 50 bn. Although this was the highest value since 2015, their volume in comparison with short-term koruna liabilities remains negligible, and usually only between CZK 15 and 30 bn.

1.3 Government koruna bonds held by non-residents

In addition to deposits, in recent years government bonds have also been a relatively popular instrument used by non-residents for investment "in the koruna." At the start of last year, non-residents owned Czech koruna government bonds with a market valuation of approx. CZK 470 bn[54]. In

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[54] According to CNB statistics that, in contrast to data from the Ministry of Finance of the Czech Republic (based on legal ownership), work with the economic ownership of bonds (i.e. they take into consideration who collects the interest-rate revenues and bears the exchange-rate risk). Government bonds in the legal ownership of residents are used as collateral

the first quarter of 2022, there was a relatively sharp fall in their holding, probably mainly tied to the outbreak of war in Ukraine.[55] In the next two quarters, the mood of foreign investors turned round and the popularity of government koruna bonds started to rise again, almost returning to the level at the start of the year. In the last quarter, the popularity of such bonds again fell slightly (in cumulative terms, holdings fell by almost CZK 30 bn). Any rapid departure by non-residents from these assets is primarily linked to the perception of the exchange-rate risk for the koruna. The holdings of existing bonds could fall in the event of expectations of further significant increases in interest rates abroad over the current (expected) level.

1.4 Financial derivatives

With high volumes (income of CZK 408 bn, expenditure of CZK 348 bn) in 2022 the Czech Republic received net income from transactions in financial derivatives totalling CZK 60 bn. To a decisive extent (more than 95%), the net inflow of capital from these transactions was provided by the business sector and the transactions primarily related to purchases and sales of raw materials (oil, gas, electricity and emissions permits) with a deferred date of delivery of the underlying asset. The earlier purchasing of oil and gas (at lower prices) led in 2022 to a sharp increase, in particular in the price of natural gas and, to a lesser extent, that of oil, and significant net income from the settlement of derivatives. On the other hand, the earlier sale of electricity markedly reduced net income this year. The remaining part was accounted for by bank and CNB transactions. These were primarily interest-rate and currency derivatives, with the banks being net payers and the CNB the beneficiary of fees.

2 FLOWS OF OTHER DEBT CAPITAL

In other capital flows, the war in Ukraine and fears for the stability of the koruna had an evidently much smaller influence, while the expanded positive interest-rate differential of the koruna against the decisive world currencies had a greater influence.

2.1 Debt capital movements as part of direct investment

Opposing movements by individual debt capital items falling under direct investment practically compensated for each other for most of the year. Despite the relatively high turnover, in the tens of billions of koruna, and frequent changes in the direction of transactions in both assets and liabilities, the overall impact of debt capital as part of direct investment on the supply and demand for foreign exchange was negligible for most of the year. The net inflow of capital in the first 11 months of the year reached approx. CZK 5 bn, caused solely by the withdrawal of residents' debt assets from other countries. In December, when it was already clear that the pressure for the weakening of the koruna had passed, there were marked net inflows exceeding CZK 42 bn. These inflows were, however, from approx. ¾ influenced by the movement of debt assets of two large multinational companies to the accounts of their Czech subsidiaries.

2.2 Government's financial transactions

In addition to the aforementioned koruna bonds held by non-residents,[56] last year the government executed direct transactions with non-residents. In the second quarter of last year, the government paid off almost all foreign-currency bonds held by non-residents (paying almost CZK 70 bn; its liabilities are now only a little over CZK 5 bn). These bonds were essentially replaced by long-term loans of a similar value (Chart VI-2.2). Long-term loans from European financial institutions are cheaper and more stable

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for repurchase transactions with non-residents (in particular transactions between domestic banks and foreign parent companies).

[55] Evidently, primarily a movement to subsidiary banks as a part of repurchase transactions, as their volume is constantly growing, according to data of the Ministry of Finance of the Czech Republic.

[56] the holding of which by non-residents the government does not actually influence.

(there is no risk of a premature sell-off) compared to bonds placed on financial markets. In addition, in an unusual move the government drew short-term loans abroad that served as temporary financial assistance to bridge the huge costs of energy companies (ČEZ, Sev.en Energy) for margin calls related to arranging the sale of electricity through the Leipzig Energy Exchange. In addition, the government provided long-term funding to other countries of CZK 7.5 bn. In the fourth quarter, it drew additional long-term loans of CZK 35 bn. In total, last year the government increased nominal indebtedness to non-residents by approx. CZK 75 bn. At a market valuation,[57] however, the total debt to non-residents fell by approx. CZK 43 bn to CZK 0.59 tn.

Overall, however, we can understand the Czech government's foreign indebtedness as relatively stable given its sharp overall growth in the last three years. The Czech state remains in a position that continues to enable financing on the domestic market without any problems, while last year's changes in foreign indebtedness are related more to interest-rate optimisation.

2.3 Financial operations by the business sector

The net inflow of debt capital to the business sector reached almost CZK 100 bn last year. In the area of bonds, the net capital inflow (just under CZK 40 bn) was linked, at approximately the same amount, with an increase in the holding of domestic corporate bonds (mostly foreign-currency ones) by non-residents and a fall in the holding of foreign bonds by residents. In the area of loans, the net capital inflow was almost CZK 60 bn, as loans received slightly exceeded loans provided. The growth of net foreign indebtedness reflects the influence of monetary policy (respectively an interest-rate differential in favour of the koruna). We can assume the net inflow of debt capital will continue in the future, until the interest-rate differential falls to a low level.

2.4 The banking sector and the CNB

The banking sector, which usually balances supply and demand for foreign exchange, increased its foreign-currency indebtedness in 2022 by approx. CZK 60 bn.[58] At the same time, the aggregate current and capital account deficit last year exceeded CZK 400 bn. In addition, the outflow of non-residents' short-term capital exceeded the inflow of capital as a part of other financial flows. The banking sector therefore contributed less towards the balancing of the excess demand for foreign exchange over supply. It mostly played this role only in the last quarter of the year, when the CNB practically did not intervene on the foreign exchange market. It was reflected in the growth of foreign-currency liabilities in the banking sector, both short-term and long-term.

The predominant part of the excess of foreign exchange demand over supply, i.e. pressure weakening the koruna, was financed in 2022 by the CNB in the form of foreign exchange intervention using its reserves. In total, the CNB's intervention in the foreign exchange market totalled approx. EUR 26 bn. In addition to the previously-mentioned outflow of non-residents' short-term capital from koruna deposits in the banking sector, the invention mostly financed the external imbalance of the economy on the current account related primarily to the sharp worsening of the balance of trade (in particular due to the influence of energy price inflation)[59]. Total foreign exchange reserves fell by approx. EUR 24 bn, i.e. to a lesser extent than would correspond to the aforementioned interventions, and they fell to the still high value of EUR 129.3 bn due to the influence of net income from the EU and revenues from foreign exchange reserves.

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[57] The market value of previously issued bonds (in a period of low interest rates) fell.

[58] Its indebtedness to non-residents markedly fell due to the influence of the aforementioned marked fall in short-term koruna deposits by non-residents.

[59] The increase in dividends paid out to non-residents, which reached a record volume, was another significant factor.

CONCLUSION

The Czech Republic's external imbalance markedly deepened last year. The complicated situation, linked to the confluence of extraordinary negative influences (continuing problems with the COVID-19 pandemic and the Czech Republic's active economic involvement in the conflict in Ukraine, energy price inflation and the government's expansive fiscal policy) and the negative impacts of the progressive transformation of a strongly industrial economy to a low-carbon one had marked negative impacts on the Czech Republic's external balance in 2022 (a current account deficit of CZK 415.3 bn, i.e. 6.1% of GDP, and an decline in the Czech Republic's international investment position by more than 50% in one year).

Such a situation usually causes significant pressure for an outflow of debt capital and a marked weakening of the domestic currency. In the Czech Republic, however, such accompanying phenomena occurred only to a very limited degree regarding capital movements, while the domestic currency actually strengthened slightly against the euro. This development is extraordinary, particularly when comparing the koruna's exchange rate against the Polish zloty and the Hungarian forint at similar or significantly higher interest rates in Hungary, against which the koruna appreciated by 4.7% (PLN) and 10.7% (HUF) respectively.

The much smaller outflow of capital and pressure for the weakening of the koruna were influenced by the Czech Republic's markedly better starting position (in particular the foreign exchange reserves, and lower (net) external and government indebtedness). The different trends were, however, primarily influenced by the CNB's active participation in the foreign exchange market (massive foreign exchange intervention totalling CZK 620 bn) and the CNB's declared willingness to "defend against excessive fluctuations in the koruna exchange rate." This initially led to a stabilisation and then the progressive return of short-term foreign capital to koruna assets and the banking sector's re-assumption of the role of balancing demand and supply for foreign exchange in the fourth quarter of 2022.

VI.3   NOWCASTING OF TOURISM USING TEXT MINING [60]

This article presents a way to use text mining for nowcasting tourism receipts and expenditures in the balance of payments statistics. This is quite a new forecasting approach for a shorter timescale that is based on analysing text information available on the internet without a time delay. As balance of payments data and also most economic determinants are only available with a time lag of several months, it is possible to use text mining to obtain information about current (but as-yet unobserved) trends in tourism using alternative data. The alternative data are represented here by Google reviews, which are analysed both for outbound tourism from the Czech Republic and inbound tourism to the Czech Republic. Based on a subsequent econometric analysis, the article concludes that application of text mining to nowcast tourism receipts and expenditures is a promising approach with strengths as well as risks, and could be a suitable supplement to established data sources. In general, the significance of nowcasting is growing, in particular in turbulent times such as the global COVID-19 pandemic, which brought, among other things, an unprecedented crippling of tourism throughout the world.

1. FORECASTING TOURISM UNDER EXTRAORDINARY ECONOMIC CONDITIONS

Nowcasting is a set of methods that serve to provide estimations for the very recent past, present and very near future for quantities for which official data are not yet known at the relevant time. Nowcasting methods use a wide range of indicators that are available earlier than the official data, and these indicators are processed using selected econometric techniques. Nowcasting is therefore an important part of creating any forecast.

Turbulent periods markedly complicate future economic trend prediction, increasing the significance of nowcasting. In these dynamic times, the predictive ability of standard models could be downgraded for a number of reasons, such as breaks in trends, a weakening of the link between economic quantities and more noise in the data. Nowcasting techniques can therefore help anchor a forecast and provide an additional view of near-future trends.

The tourism balance of the Czech Republic in value terms is one of the variables that the CNB regularly estimates as part of its quarterly balance of payments forecast.[61] The CNB's current account forecast model estimates the values of nominal receipts (credit) and nominal expenditure (debit), where credit includes income from non-residents, usually foreigners, coming to the Czech Republic (i.e. their consumption in the Czech Republic) and debit represents spending by Czech citizens abroad.[62] In contrast to the national accounts, the data in the balance of payments are always stated at their nominal value and without seasonal adjustments.

Tourism volume indicators are provided by the Czech Statistical Office (CZSO). Here it is possible to obtain data about tourism income in real terms: capacities and use of mass accommodation facilities,

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[60] The authors are Oxana Babecká Kucharčuková, Jan Brůha and Petr Štěrba (all CNB). The views presented here are those of the authors and do not necessarily reflect the official position of the Czech National Bank.

[61] Before the outbreak of the COVID-19 pandemic, the tourism balance significantly contributed to the total current account balance. At that time, the tourism balance contributed almost a third to the total balance of services and roughly a tenth to the balance of trade and services (see the annex to the whole document on p. 49). Due to the influence of constantly increasing outflows of dividends, the current account surplus was low and the positive tourism balance was beneficial in this sense from the viewpoint of the external balance. The anti-epidemic measures strongly impacted both the income and expenditure sides of tourism, with incoming tourism falling more significantly than outgoing (Czechs going on holiday to other countries). Given the different territorial structure of tourism income and expenditure, this was due in large part to the cancellation of long-distance air transport (see Babecká Kucharčuková and Žďárský, 2021). As a consequence, the marked positive contribution by tourism evaporated in the first year of the pandemic and is currently around zero.

[62] The general principles of the current account prediction model are described by Babecká Kuchačuková and Brůha (2020).

including the numbers of longer and shorter trips, the numbers of business trips, the numbers of overnight stays and average spending per trip. Data are also available about the numbers of people carried by air transport and the numbers of flights. Statistical data are available in a resident/non-resident breakdown, important for balance of payment statistics, and by individual country. For tourism income, it is possible to obtain these data from accommodation facilities in the Czech Republic such as hotels, bed-and-breakfast facilities, camps and other tourist accommodation facilities. Nevertheless, these data only become available after an even longer delay than balance of payments statistics, which makes them unusable in nowcasting, where the explanatory variable is a leading indicator, i.e. a quantity correlated with the explained variable, but in contrast to it available with a smaller delay.

2. USE OF TEXT MINING AND ALTERNATIVE DATA IN TOURISM

One way to deal with the problem of often incomplete or delayed data is to use text mining and alternative data.[63] Text mining is the process of analysing a large quantity of text data to obtain useful information and knowledge. This process includes data extraction, transformation and visualisation, and is often used in the machine-learning and artificial-intelligence fields.

Central banks have started to use the text mining technique to analyse business and financial news, macroeconomic indicators and social media. For example, the European Central Bank uses text mining to analyse newspaper articles and to obtain information about inflationary trends and other macroeconomic factors.[64] The Fed also uses text mining to analyse social media and market reports and to obtain information about investor mood and market trends.[65]

Chart VI-3.1: Procedure for the analysis of Google reviews and tourism receipts and expenditures in the balance of payments
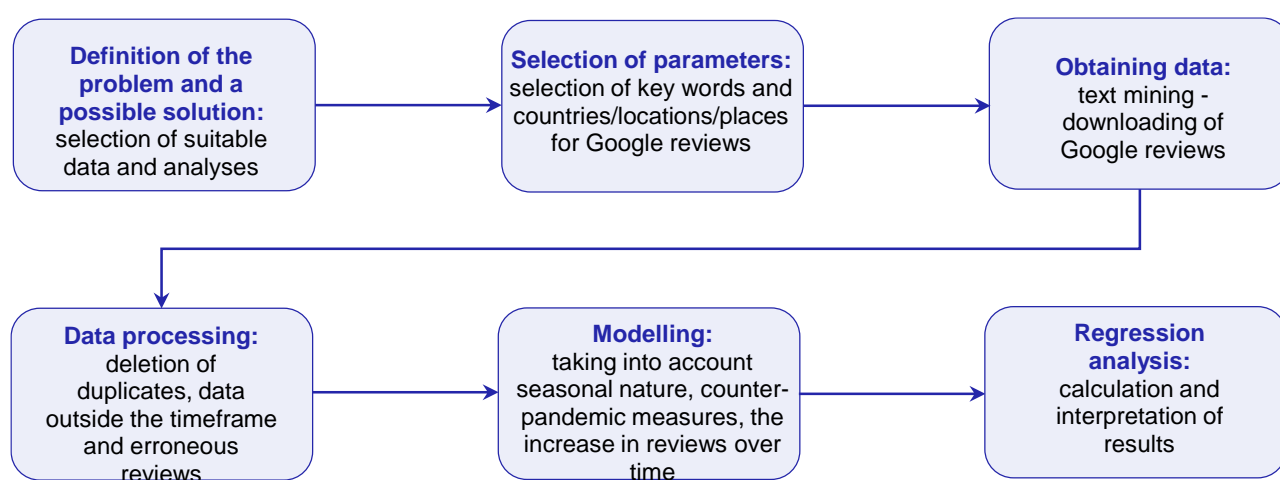
Source: Authors' own processing.

The aim of this study is therefore to ascertain how to capture, statistically and in real time, short-term outbound and inbound trips from/to the Czech Republic. In other words, to determine criteria to separate Czech citizens traveling to other countries for a short period from other tourists, as well as

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[63] Alternative data are defined here as data that are not used as standard for analyses in prediction models.

[64] See Ciccarelli et al. (2019).

[65] See Palladino et al. (2019) or Lucca et al. (2014).

citizens of other counties that stay in the Czech Republic for less than 12 months.[66] The general condition for the use of text mining is the availability of information over a series of days and its sufficient quantity both for trips to the Czech Republic and for trips abroad by Czech citizens. All data come from open sources. The procedure for the study is summarised using a diagram, see Chart VI-3.1.

There are several data sources for such alternative data. For example, the Tripadvisor, Airbnb, Booking.com, Uber, Mapy.cz platforms and many others. Nevertheless, Google Maps[67] was chosen as the most suitable platform for source analysis as it met all the basic criteria: it provided sufficient data for assets and liabilities and also offered the availability of new data from open sources over a series of days. The lack of reviews by foreigners was a problem with the Mapy.cz platform. Data from Airbnb and booking.com were not easily accessible. Tripadvisor did not provide sufficient reviews from Czech users.

The data were obtained for the period from 1 January 2017 to 31 December 2022. This time period was selected for several reasons. The first was the importance of "covering" the period before the COVID crisis, the crisis period and the following period. Going further into the past would have raised the issue of a lack of data for certain locations and places, primarily regarding reviews in Czech for places in foreign countries not that frequently visited by Czech tourists. The key data for the analysis was reviews from Google Maps. Such reviews are written by people about specific places and are assessed with the help of symbols (stars) or assessments in words. Google Maps contains millions of reviews for millions of places around the world.

Outscraper.com was used for the actual text mining and scraping process.[68] This application obtained individual reviews and additional related data, such as the text of the review, the review id, the place of the review, the user id and much more other metadata.[69] The aim here was not to download all the reviews that exist in the Czech Republic or other countries but, based on a sufficient quantity of data, to detect trends and changes in them during sudden and extraordinary situations. It is therefore not important whether the reviews are positive or negative, but rather their quantity over a given period.[70]

The criteria and workflow for selecting reviews for analysis depended on whether they were reviews by foreigners in the Czech Republic or by Czech citizens abroad. In the case of foreign tourists, some of the most visited places in the Czech Republic were selected.[71] Only reviews that contained text with an assessment of the place were gathered and analysed. The main reason for this criterion was to ensure it was possible to recognise the language of the reviews from the Czech Republic and to remove reviews written in Czech.

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[66] For the purpose of this analysis, we assume that "citizen" and "resident" are synonyms.

[67] The platforms mentioned here can be found on their respective websites: https://www.tripadvisor.com/, https://www.airbnb.cz/, https://www.booking.com/, https://www.uber.com/, https://mapy.cz/ and https://www.google.com/maps/

[68] https://outscraper.com/

[69] Something crucial for this analysis was the query (query), place name (name), ID of the place the review was about (place_id), the review ID (review_id), the text of the actual review (review_text) and the time and date of the specific review (review_datetime_utc). Here is a complete summary of the data obtained for the individual reviews for metadata: query name, google_id, place_id, location_link, reviews_link, reviews_per_score, reviews, rating, review_id, author_link, author_title, author_id, author_image, review_text, review_img_url, review_img_urls, owner_answer, owner_answer_timestamp, owner_answer_timestamp_datetime_utc, review_link, review_rating, review_timestamp, review_datetime_utc, review_likes, reviews_id.

[70] Additional research options open up based on the data gathered.

[71] Individual places with the highest numbers of reviews were selected. Due to limited resource capacity, there are no reviews for Charles Bridge and Prague Castle.

In the case of reviews outside the Czech Republic, reviews with text were selected to ensure it was possible to find key words in them, therefore getting reviews written in Czech. The key words were "místo" ("place") and "jídlo" ("food"); these words were chosen because they appeared most frequently in reviews written in Czech. This procedure was chosen due to the limited financial and capacity resources and the technological demands.

The locations were chosen based on where Czechs most frequently go on holiday.[72] Unsurprisingly, these were nearby countries, i.e. Slovakia, Croatia and Italy, but Bulgaria, Egypt and Greece were also included (Chart VI-3.2). Nevertheless, many additional countries and locations were included in order to capture trips by Czech tourists outside the summer tourist season. This means that there was an analysis of reviews from winter resorts, exotic destinations and the largest European cities.

Chart VI-3.2: Number of Google reviews by country

(number of total Google reviews for the period from 1 January 2017 to 31 December 2022)
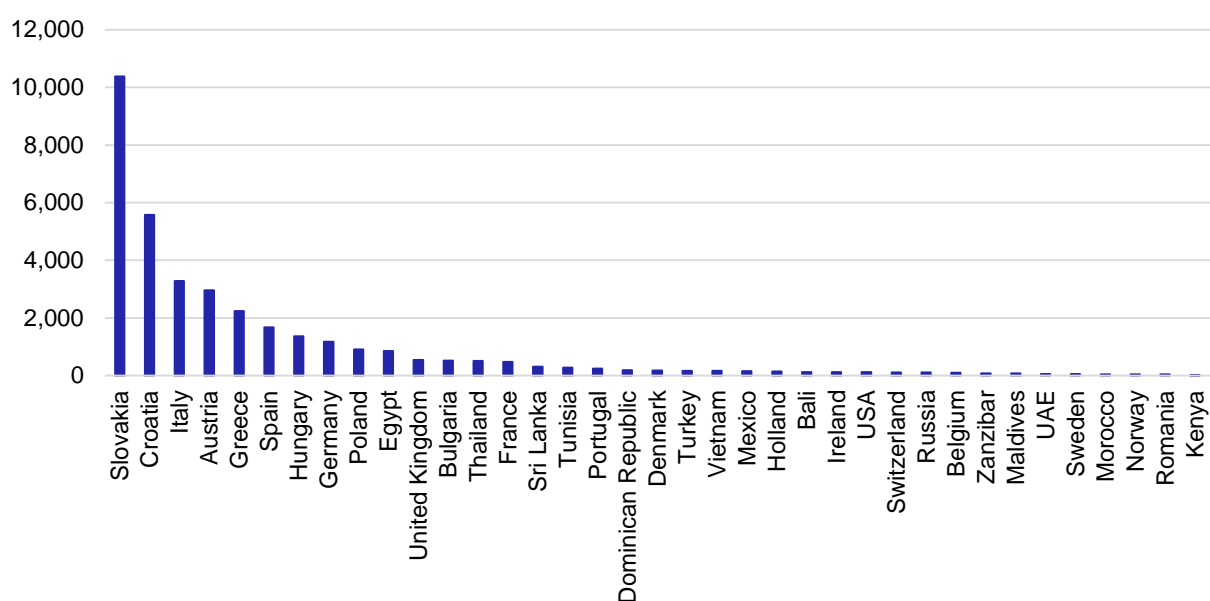
Note: The countries selected were those most frequently visited by Czechs according to CZSO data, while countries and destinations and popular places for Czech citizens were also selected. A total of 37 countries, 339 locations and 8,503 specific places were selected, for which 35,505 reviews were obtained using the key words. Here, a location is understood to be, for example, London, while a specific place is, for example, the Tower of London, for which reviews were written in Czech using key word "místo" ("place").

Source: Authors' calculation

Twenty-one specific places with a total of 87,124 reviews in languages other than Czech were selected for the Czech Republic (Chart VI-3.3).[73] Here, we can assume that the vast majority of reviews written in the Czech Republic in languages other than Czech will not be written by residents of the Czech Republic. In the case of foreign reviews in the Czech Republic, hotels, restaurants and tourist attractions

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[72] The data were obtained from the CZSO. For more details: Czech Statistical Office. *Přehledné výsledky statistiky cestovního ruchu za rok 2021* (*Easy-to-Use Tourism Statistics for 2021*). Available from: https://www.czso.cz/csu/czso/prehledne-vysledky-statistiky-cestovniho-ruchu-za-rok-2021.

[73] Specifically, this concerns the following places: Café Imperial, Café Louvre, Grand Majestic, Hotel Prague Grandium, Hotel Prague, Hard Rock Cafe, Havelská Koruna, ibis Praha Old Town, James Dean Prague, Karlštejn Castle, Kozlovna Apropos, Lokál, Majestic Plaza Hotel Prague, Marina Ristorante, Petrin Tower, Prague Zoo, Residence Bologna, U Vejvodů, St Barbara's Cathedral, State Castle and Chateau Český Krumlov, U Fleků, Václav Havel Airport Prague.

with the largest number of reviews were selected, primarily in Prague but also in Kutná Hora and Český Krumlov. For two specific places,[74] there was a lack of necessary data for the period from 1 January 2017 to 11 August 2018 and from 1 January 2017 to 5 August 2017. This problem was resolved by imputation of the missing data.[75] Nevertheless, the number of imputed reviews was 2,923 out of the total of 86,757 for the Czech Republic, so the influence of the imputed data was not key for the overall analysis.

Chart VI-3.3: Number of Google reviews per individual place in the Czech Republic

(total number of Google reviews for the period from 1 January 2017 to 31 December 2022 in the Czech Republic)
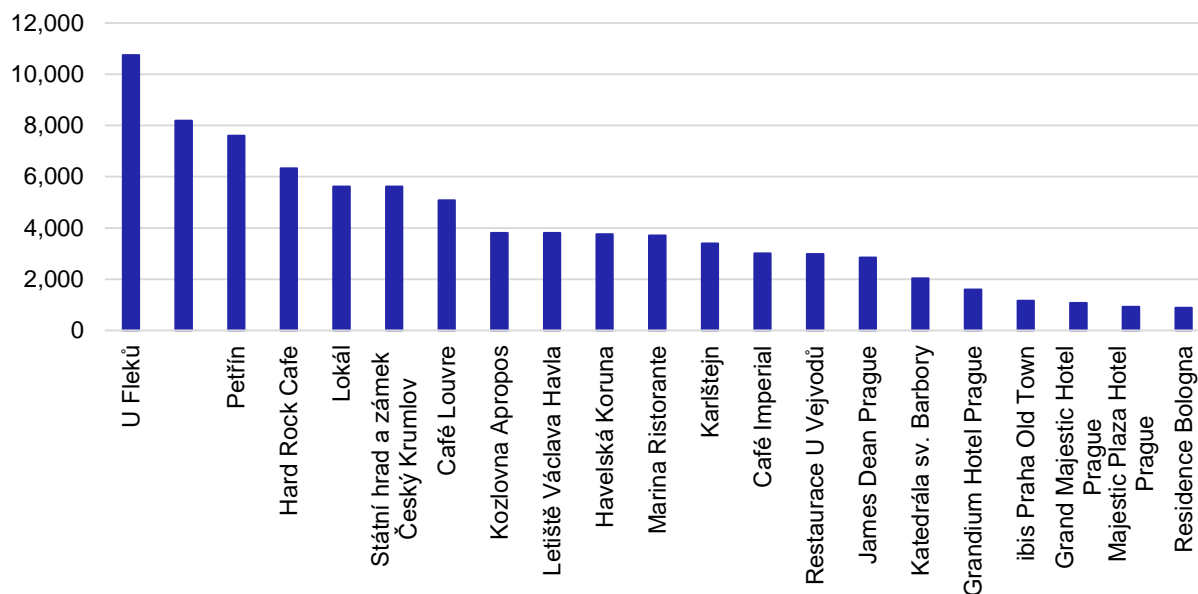
Note: A total of 21 places (restaurants, hotels, tourist attractions) were selected according to the largest numbers of restaurant reviews. Due to the large quantity of data and reviews, places such as Prague Castle and Charles Bridge were left out.

Source: Authors' calculation

3. NOWCASTING MODEL

We used the aforementioned method to obtain time series of the number of reviews that should be related to official time series for tourism receipts and expenditures. There are several reasons why raw numbers of Google reviews is unsuitable as a predictor of official time series in the balance of payments. One of these was the increase in the numbers of Google reviews over time, i.e. the fact that people started to post reviews in greater and greater numbers as smartphones and other devices became more widespread. In other words, in the time series of the numbers of reviews, there is a clear trend that is not related to tourism numbers. Another important factor is the seasonal aspect, i.e. the need to adjust for seasonal factor in tourism that may not match the seasonal nature of the numbers of reviews. The

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[74] U Fleků and Prague Zoo.

[75] The imputation was straightforward based on the numbers of reviews for the aforementioned places and the percentage change for all the other places in the relevant period. Therefore, the missing data in specific months were calculated as the number of reviews multiplied by the proportion of the number of reviews for the previous period. For example, 38 reviews were imputed for U Fleků for January 2017. This was based on the number of reviews for January 2018 and multiplied by the year-on-year change (0.38) for all reviews for all places in the same period.

third reason is the counter pandemic measures in the various countries, where the degree of restrictions can be measured using the Stringency Index.

This is why regression analysis was used to design the nowcast model. This forecasts tourism receipts and expenditures in the relevant month using the number of reviews downloaded in the relevant month, the time trend, the product of the time trend and the number of reviews (which deals with the aforementioned problem of autonomous growth in the number of reviews due to the rise of smartphones), the Stringency Index[76] and seasonal dummy variables. The estimated coefficient signs are intuitive and the determination coefficient is high. With regard to the markedly rising inflation since 2022, the explanatory variable, i.e. tourism income and expenditure, was adjusted for inflation using the CPI index for hotels and restaurants, on both the receipts[77] and expenditures sides.[78] For the actual nowcast, both quantities are adjusted back to their nominal values.

Numbers of reviews are crucial for nowcasting tourism receipts and expenditures. To illustrate this, we use the two most common information criteria used to compare models: the Akaike information criterion (AIC) and the Bayesian information criterion (BIC), see, for example, Burnham and Anderson (2002). In the case of receipts, the values for both criteria for the model without reviews are AIC = 1.2716 and BIC = 1.3035, whereas for the model with reviews they are AIC = 1.2578 and BIC = 1.2919. Both criteria therefore jointly and strongly indicate that the preferred model is the one with reviews (the difference between the criteria for the model with reviews and without reviews is higher than 10, usually regarded as very strong evidence in favour of the model with the lower criterion value). In the case of expenditures, the results are as follows: for the model without reviews the values are AIC = 1.2320 and BIC = 1.2661, while for the model with reviews they are AIC = 1.2285 and BIC = 1.2603. In this case as well, the difference between the models is relatively high (models are regarded as equivalent if the difference between the statistics is less than 2). From the economic viewpoint, the non-inclusion of reviews would reduce the predictive power of the model after 2021 and lead to an overestimation of both receipts and expenditures. In the future, however, it will be important to monitor and evaluate the functional form of the nowcast model and, if necessary, modify it.

The resulting model is robust and can be a useful tool for nowcasting credit and debit of tourism in the balance of payments. As can be seen in Charts VI-3.4 and VI-3.5, the time series of the resulting model have a very similar path to the official series of tourism receipts and expenditures from the balance of payments that are however only available with a time delay of several months. Furthermore, the charts clearly show a trend in the number of Google reviews that are not related to tourism but the aforementioned autonomous trend.

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[76] For more details see: Blavatnik School of Government (2023)

[77] More specifically, Consumer Price Index Restaurants and Hotels in accordance with the ECOICOP classification. Data source: CZECH STATISTICAL OFFICE. Summaries of Trends in Household Expenditure and Income 2014-2021. [online]. 2022 [cit. 19 March 2023]. Available from: https://vdb.czso.cz/vdbvo2/faces/cs/index.jsf?page=vystup-objekt&pvo=CEN083A&z=T&f=TABULKA&skupId=2218&katalog=31779&pvo=CEN083A&evo=v2504_!_CEN-SPO-BAZIC2015-EM_1.

[78] This concerns the CPI: 11 - Restaurants and Hotels for the 27 EU Member States. Data source: ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT. OECD Data. [online]. [cit. 19 March 2023]. Available from: https://stats.oecd.org/index.aspx?queryid=82187#

Chart VI-3.4: Google reviews, estimated model and tourism expenditures

(left axis: in CZK millions, right axis: number of reviews)
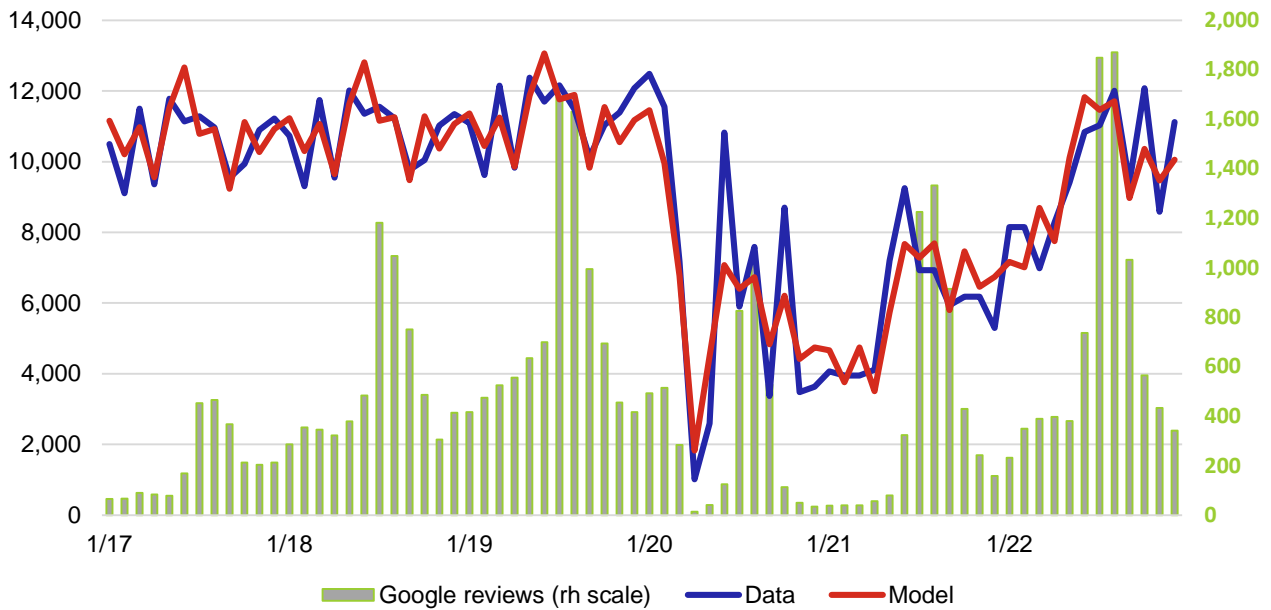
Note: A comparison of the total number of Google reviews and tourism expenditure on a monthly basis for the period from 1 January 2017 to 31 December 2022, where the left axis shows the values for expenditure (liabilities) and the right axis values for the number of Google reviews.

Source: Authors' calculation

Chart VI-3.5: Google reviews, estimated model and tourism receipts

(left axis: in CZK millions, right axis: number of reviews)
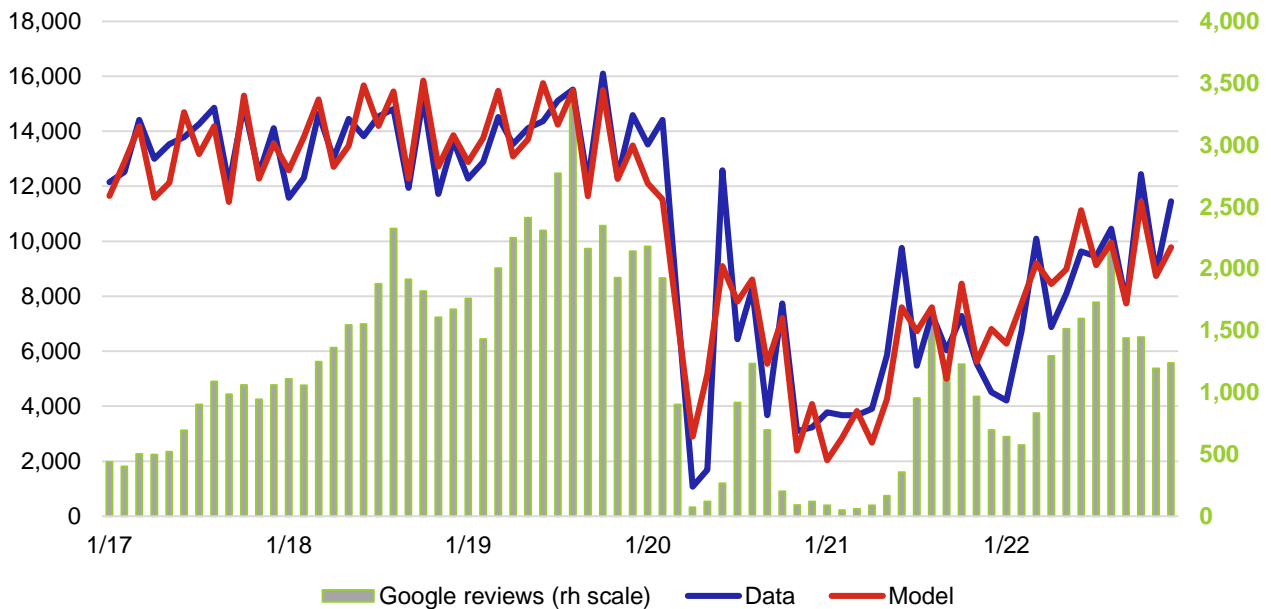
Note: A comparison of the total number of Google reviews and tourism income on a monthly basis for the period from 1 January 2017 to 31 December 2022, where the left axis shows the values for income (assets) and the right axis values for the number of Google reviews. Approx. CZK 26 m was deducted from assets in 2022 due to the inclusion of expenditure in the Czech Republic by foreigners with a temporary protection visa (see Chap. II).

Source: Authors' calculation

CAVEATS

Despite the promising results, nowcasting with alternative data needs to be taken with caution. There are some risks that could jeopardize the usefulness of this approach. One of these is the incorrect selection of places for obtaining reviews. If the places selected are incorrect, there may be no representative Czech or foreign reviews, and this could markedly distort the whole resulting analysis and the relationship to the assets or liabilities.

Another challenge is to correctly select the key words for reviews written in Czech about things in other countries. One solution would be to obtain all the reviews outside the Czech Republic in Czech, but this procedure would be fairly demanding in time, technology and financial terms. Nevertheless, if there is a sufficient number of reviews (data), it is possible to reliably replace this "aggregate" approach with statistical methods.

Another problem could be the commercial reviews of individual places, in particular prepared by individual companies for the purpose of advertisement. This means, for example, that a restaurant owner has a review written about their restaurant in order to increase its rating and generate more customers. Such reviews are written to order and are not created by authentic restaurant customers. This problem affected approximately 10% of all reviews in 2023.[79] If this problem gets worse in the future, it could loosen the statistical relationship between the numbers of reviews and nowcasting over time series. The seriousness of this problem can be tested by examining the stability of the nowcasting model coefficients over time and possibly using a model with time-variable coefficients, which would alleviate this problem.

CONCLUSION

In this article, we showed that the analysis of alternative data obtained by text mining is usable for forecasting selected payment balance items that are published with a delay of several months. The greatest benefit of the alternative data obtained by analysis of Google reviews is their instant availability. They are available almost immediately, they can be called real-time data, and it is possible to work with them in nowcasting. The significance of such data increases, in particular, in turbulent periods when relationships between commonly used macroeconomic indicators may be loosened.

The use of alternative data, however, brings its own risks, but these can be addressed through the suitable specification of the nowcast model. These risks might be mistakes in a review, fake reviews or autonomous trends in the number of reviews due to the increased use of smartphones and the Google Maps application. The presented results of the project, which is the pilot use of text mining at the Czech National Bank for nowcasting economic variables, also show that it is possible to overcome these challenges.

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VII. STATISTICAL ANNEX: BALANCE OF PAYMENTS 2017–2022

CZK billions	2018	2019	2020	2021	p.s. 2022
A. Current account	24.1	19.2	113.7	-168.0	-415.3
Goods	200.9	239.8	280.3	69.0	-99.3
Exports	3,497.4	3,579.1	3,388.7	3,809.5	4,298.5
Imports	3,296.5	3,339.2	3,108.4	3,740.5	4,397.8
Services	120.0	106.0	103.5	105.0	89.9
Manufacturing and repair services	41.3	47.3	45.7	47.5	58.7
Transport	34.8	23.3	20.2	12.5	-2.9
Travel	32.1	32.4	5.0	-3.1	2.0
Other services	11.8	3.0	32.5	48.1	32.0
Total credits	665.5	698.3	603.5	647.5	785.4
Total debits	545.6	592.3	499.9	542.5	695.6
Primary income	-260.2	-292.2	-242.2	-312.0	-374.8
Compensation of employees	30.5	16.3	24.1	13.0	4.3
Investment income	-313.3	-333.6	-292.8	-347.8	-390.4
Other primary income	22.6	25.1	26.5	22.8	11.3
Total credits	258.8	304.9	231.1	279.4	300.8
Total debits	519.0	597.1	473.4	591.4	675.5
Secondary income	-36.6	-34.4	-28.0	-30.0	-31.1
Credits	81.0	91.4	108.4	113.0	118.6
Debits	117.6	125.8	136.4	143.1	149.8
B. Capital account	12.7	24.5	66.8	103.8	7.4
Credits	61.5	104.3	165.6	328.9	345.2
Debits	48.9	79.8	98.8	225.2	337.8
C. Financial account	60.8	8.4	163.3	-40.0	-415.1
Direct investment	-51.0	-137.1	-149.1	-28.5	-172.4
of which: net reinvested earnings	-38.9	-39.4	-89.8	-131.7	-108.8
abroad	132.3	109.0	44.2	251.5	74.1
in the Czech Republic	183.3	246.2	193.2	280.1	246.4
Portfolio investment	30.1	-104.7	-135.7	75.2	331.3
Assets	-9.8	-4.1	50.8	107.1	5.9
Equity and IF shares (equity securities)	19.3	10.2	41.1	95.6	21.6
Debt securities	-29.1	-14.3	9.7	11.5	-15.8
Liabilities	-40.0	100.6	186.5	31.9	-325.5
Equity and IF shares (equity securities)	2.4	-2.4	3.0	-1.5	-3.0
Debt securities	-42.4	103.0	183.5	33.4	-322.4
Financial derivatives	-15.3	1.0	10.8	-58.2	-37.7
Other investment	47.0	138.9	389.4	-324.5	-229.2
of which: general government	-31.2	34.6	19.8	-58.4	-172.9
corporations	36.5	-3.8	55.0	-67.6	-58.9
banks	41.6	108.2	314.6	-198.5	2.6
Reserve assets	50.0	110.2	47.8	296.1	-307.1
D. Balance from current and capital account	36.8	43.6	180.5	-64.3	-407.9
Balance from fin. acc. (+ lending / - borrowing)	60.8	8.4	163.3	-40.0	-415.1
Errors and omissions	24.0	-35.3	-17.2	24.2	-7.3

ABBREVIATIONS

AUD   Australian dollar

tr   trillion = a million million (10^{12})

BPM6   Balance of Payments Manual, 6th edition

CAD   Canadian dollar

CZ-CPA   classification of products

CNB   Czech National Bank

CR   Czech Republic

CZSO   Czech Statistical Office

VAT   value added tax

ECB   European Central Bank

EIB   European Investment Bank

EU   European Union

EUR   euro

GDP   gross domestic product

GNP   gross national product

IFO   Leibniz Institute for Economic Research, University of Munich

JPY   Japanese yen

CZK   Czech koruna

MIP   Macroeconomic Imbalance Procedure

mil   million (10^{6})

bn   billion = a thousand million (10^{9})

NACE   classification of economic activities

DI   direct investment

p.p.   percentage point(s)

p.o.   preliminary outcome

SEK   Swedish krona

SITC   Standard International Trade Classification

USA   United States of America

USD   US dollar

V4   Czech Republic, Hungary, Poland and Slovakia

AT	Austria	IT	Italy
AU	Australia	JP	Japan
BE	Belgium	KO	Republic of Korea
BG	Bulgaria	KY	Cayman Islands
CA	Canada	LT	Lithuania
CY	Cyprus	LU	Luxembourg
CZ	The Czech Republic	LV	Latvia
DE	Germany	MX	Mexico
DK	Denmark	NL	The Netherlands
EE	Estonia	PL	Poland
ES	Spain	PT	Portugal
FI	Finland	RO	Romania
FR	France	SE	Sweden
HR	Croatia	SI	Slovenia
HU	Hungary	SK	Slovakia
CH	Switzerland	TR	Turkey
IL	Israel	UK	The United Kingdom
IS	Iceland	US	USA