Germany's external position: new statistical approaches and results since the financial crisis

Germany's international investment position (IIP) shows its residents' financial assets and liabilities vis-à-vis non-residents, valued at market prices. It documents and illustrates Germany's external position vis-à-vis the rest of the world. Its importance as a macroeconomic account system has grown since the financial crisis because it highlights external interconnectedness and therefore potential channels of contagion. For this reason, the IIP is also part of the G20 initiative to identify and close data gaps. Germany's net external assets, ie residents' assets minus liabilities vis-à-vis non-residents, in relation to the nominal gross domestic product (GDP), grew from just under 20% at the start of 2007 to around 60% by the end of 2017, with external assets standing at €8,346 billion against liabilities of €6,417 billion. The net external asset position in relation to GDP is an indicator in the European Union (EU) procedure for the prevention and correction of macroeconomic imbalances.

This article presents a three-dimensional account system that examines the changes in Germany's net external assets in an income, instrument and sector account, each capturing specific aspects. The income account reveals Germany's current account surpluses to be the driving force for generating net external wealth, though this was partly offset by negative valuation effects and statistical adjustments. This is why growth in Germany's net external assets failed to keep up with developments in the cumulative current account surpluses from 2007 to 2017; nonetheless, growth was still substantial with an increase of €1,457 billion or around 40 percentage points in relation to GDP.

The instrument account considers the IIP's functional categories of financial assets. It demonstrates the significance of portfolio investment in Germany's IIP. For the first time in over 30 years, residents' holdings of foreign securities are larger than non-residents' holdings of securities issued in Germany. On the one hand, German enterprises and households have strongly invested in this asset class. On the other hand, non-residents have been net sellers of German government bonds since 2015, meaning that the stock of German government bonds within foreign portfolios has fallen by just over a quarter. The launch of the asset purchase programme (APP) in particular is likely to have contributed to this turnaround. In the sector account, enterprises and households recorded the highest increase in assets, thereby remaining the most important net creditor vis-à-vis non-residents. This is followed by the Bundesbank, which has now become the second-largest net creditor sector due to increasing TARGET2 claims. The net external position of monetary financial institutions declined by comparison, and government remained the only net debtor.

Finally, the article presents another newly developed approach that links the IIP database with exchange rate information in order to better explain and model the impact of exchange rate effects, namely the indices for exchange rate effects in the international investment position.

The IIP as an external account system in the European and international context

The German economy's net external assets have increased sharply

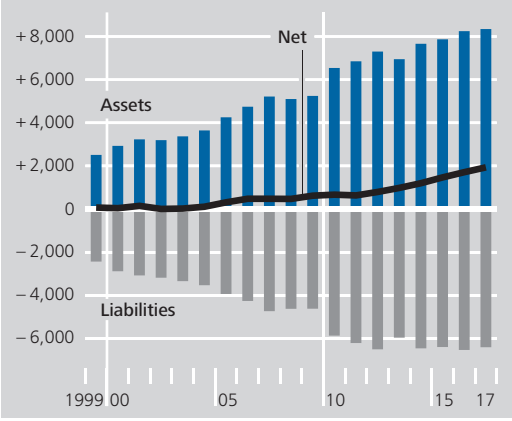
The IIP shows all financial assets and liabilities between residents and non-residents, valued using market prices and exchange rates on the relevant reporting date. This means the IIP is a stock account for which the financial account, as a sub-account of the balance of payments, records the corresponding financial flows.[1] Changes in the IIP are the result of financial transactions with non-residents, which are shown in the financial account of the balance of payments, and valuation effects whenever market prices or exchange rates move.[2] Cross-border holdings of financial assets have risen sharply in recent decades, with claims *vis-à-vis* non-residents significantly outpacing liabilities; on balance, Germany's net external assets rose from just under 20% to around 60% of GDP from the start of 2007 to the end of 2017. When the European monetary union was launched at the start of 1999, Germany had a net foreign liability position.[3]

A high degree of financial openness

In absolute terms, Germany's net external assets stand at €1,929 billion at the end of 2017. A glance at the gross figures indicates that German creditors hold €8,346 billion worth of foreign assets, while Germany's liabilities stand at €6,417 billion. As a result, Germany's external assets and liabilities currently add up to four-and-a-half times its GDP. This ratio, which is also used to describe an economy's financial openness, grew fairly steadily until 2012 and has since remained at a high level.

Germany's international investment position

€ billion, year-end data



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Lower vulnerability to national shocks owing to international diversification

The high level of financial openness also reflects stakeholders' desire for internationally diversified investment. Investors believe that higher external assets reduce a portfolio's vulnerability to national shocks and thereby stabilise earnings prospects. If an ever larger share of German investors' portfolios is made up of foreign investments or denominated in foreign currencies, "home bias" – signifying that the securities portfolios of individual countries usually exhibit a clear preference for instruments of that country[4] – in portfolio investment declines.

Impact of external developments increases with financial integration

At the same time, however, capital market developments in other countries or exchange rate movements are also having a greater impact on the national economy: cyclical stimuli are increasingly being passed on not only via

1 For further information and data on Germany's IIP, see https://www.bundesbank.de/Navigation/EN/Statistics/External_sector/International_investment_position/international_investment_position.html?https=1 For more information on the methodological approach, see International Monetary Fund (IMF) (2009), Balance of Payments and International Investment Position Manual, Sixth Edition (BPM6); and Deutsche Bundesbank, Changes in the methodology and classifications of the balance of payments and the international investment position, Monthly Report, June 2014, pp 57-68.
2 Finally, "other adjustments" also cause changes in the IIP. These mainly comprise conceptual and methodological deviations from the balance of payments and may be of a considerable magnitude. Shifts that occur on account of the reallocation of an investment to another functional category or of an enterprise to another sector, for example, are also documented here.
3 For more on Germany's IIP from 1999 to 2007, see Deutsche Bundesbank, Germany's international investment position since the beginning of monetary union: developments and structure, Monthly Report, October 2008, pp 15-32.
4 For details on its evolution since the start of the monetary union, see Deutsche Bundesbank, Evolution of home bias in portfolio investment, Monthly Report, October 2008, p 24.

conventional channels, such as international trade links, but also through income and wealth effects, which are determined by level and structural shifts in external assets.[5] This was observed during the international financial and sovereign debt crisis.[6] Since the IIP shows not only aggregates and net figures but also the structure of the asset and liability sides, risk and sensitivity analyses can be carried out for the various sectors, for instance by drawing on their capital structure, maturity profile and currency breakdown.[7] This may provide initial indications of a potential change in the value of assets as a result of market price or exchange rate movements.[8]

G20 Data Gaps Initiative calls for deeper classification by currencies and sectors

The resolutions by the finance ministers and central bank governors of G20 countries in 2009 and 2015 on the Data Gaps Initiative also take account of the greater importance of the IIP as a macroeconomic account system.[9] The aim of this initiative is to close gaps in economic and financial statistics that became apparent during the global financial crisis. For the IIP, each of the G20 countries is requested to supply a breakdown of its asset and liability positions in the most important currencies. In addition, domestic sectors are to be broken down into greater detail than before.

The IIP as a stock statistic supplements analysis of balance-of-payment flows

The persistence of unhealthy macroeconomic developments can be evaluated more comprehensively and reliably by using stock variables than by only considering the underlying flows.[10] It is possible, for example, that a current account surplus and the concomitant transaction-related rise in net claims may be more than offset by negative valuation effects; this may be the case especially for strong revaluations on the financial markets.

The net external position is an indicator in the EU's MIP

The EU's Macroeconomic Imbalance Procedure (MIP)[11] therefore includes a limit not only for the current account balance as an external indicator but also for the net external position. If a member state's net external liabilities exceed 35% of GDP, the European Commission will conduct an in-depth analysis. In the past, high net liabilities in particular have proven to be unsustainable. The reason why no limit has been placed on net external assets is that a high creditor position is not considered, *per se,* to be problematic for a member state or for the functioning of the monetary union.[12]

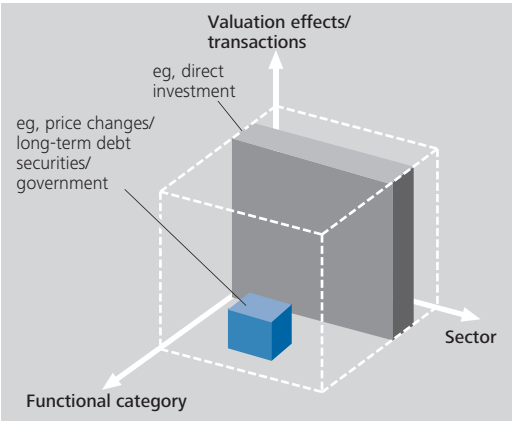
Three-dimensional account system for changes in the net IIP

Income, instrument and sector account each highlight different aspects of the IIP

Between 2007 and 2017, Germany's net assets *vis-à-vis* non-residents increased by €1,457 billion, or just under 40 percentage points in relation to GDP. In order, first, to analyse the factors underlying this growth, and, second, to examine how it is reflected in the respective

5 See J Kearns and N Patel, Does the financial channel of exchange rates offset the trade channel?, in BIS Quarterly Review, December 2016, pp 95-113. The authors point out that the counterbalancing effects of the trade channel may be more than offset by exchange rate effects through high external debt denominated in a foreign currency.
6 An overview can be found in P-O Gourinchas and H Rey (2014), External adjustment, global imbalances, valuation effects, in Handbook of International Economics, Vol 4, pp 585-645; and P R Lane and G M Milesi-Ferretti (2014), Global imbalances and external adjustment after the crisis, IMF Working Paper, 14/151.
7 See G Bruneau, M Leboeuf and G Nolin (2017), Canada's international investment position: benefits and potential vulnerabilities, in Bank of Canada, Financial System Review, June 2017, pp 43-57; and L Berger-Thompson and B Chapman (2017), Foreign currency exposure and hedging in Australia, in Reserve Bank of Australia, Bulletin, December Quarter 2017, pp 67-75.
8 When interpreting the results, it should be borne in mind that investors may fully or partially hedge against market price or exchange rate risks.
9 See IMF and Financial Stability Board (FSB) (2009), The financial crisis and information gaps, Report to the G-20 Finance Ministers and Central Bank Governors, Recommendation No 12; and IMF and FSB (2015), The financial crisis and information gaps, Sixth Progress Report on the Implementation of the G-20 Data Gaps Initiative, Recommendation No II.10.
10 See IMF (2014), Are global imbalances at a turning point?, World Economic Outlook, October 2014, Chapter 4, pp 115-154.
11 Macroeconomic Imbalance Procedure, Regulation (EU) No 1176/2011 of 16 November 2011 and European Commission (2012), Macroeconomic Imbalance Procedure, Scoreboard for the surveillance of macroeconomic imbalances, European Economy, Occasional Papers 92.
12 With regard to the growing net international investment position in certain EU countries, the European Commission has pointed out, however, that these high net positions could entail risks, especially valuation losses. See, for example, European Commission (2016), Alert Mechanism Report 2017.

International investment position data cube



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functional categories of assets and the distribution across domestic sectors, the IIP offers a three-dimensional account system. This consistent framework illustrates changes in the net IIP in an income, instrument and sector account. The income account establishes the link to the balance of payments, the instrument account shows how changes in the net IIP are reflected in the various functional categories of financial assets, and the sector account considers the domestic sectors involved.[13]

Combining the three dimensions provides an analytical data cube

When combined, these three dimensions provide a comprehensive "data cube", from which any number of sections can be examined for a variety of analytical purposes. If several attributes are to be combined, "slices" of the cube can be configured. For example, it is possible to cut out the direct investment "slice" and study how growth in the net external position is distributed across domestic sectors in this functional category or what contribution valuation effects make to the overall change in net direct investment. If attributes from all three dimensions are selected, the focus lies on a single small cuboid or data point, such as examining the extent to which market price effects have impacted on the government's long-term debt securities.

Data cube can be extended

The cube does not necessarily need to include net values; it is also possible to depict the asset or liability side separately. In principle, this data cube for the IIP can be extended by adding extra features – eg, a currency breakdown and partner countries – to make it a hypercube. The provision of the IIP data cube in a system of internationally harmonised time series keys makes it significantly easier to analyse these data in practice.[14]

IIP income account

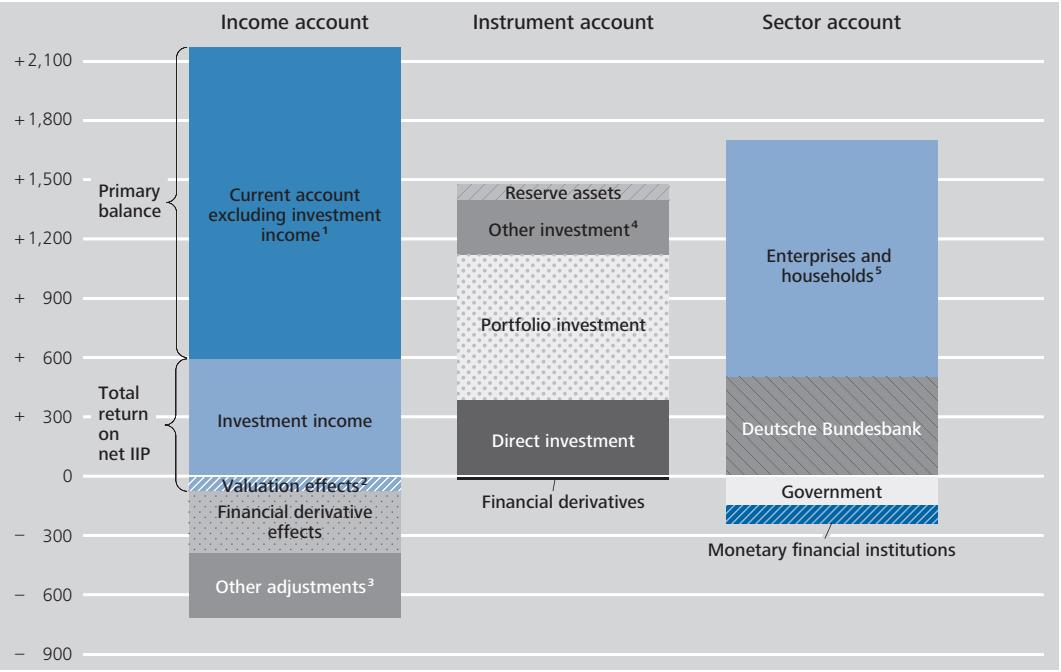
Valuation effects slowed growth in net external assets

The income account allows for the macroeconomic context, dissecting the build-up in external assets into several components. The chart on page 33 shows clearly that the positive current account balance between 2007 and 2017 was the driving force behind the growth in Germany's net external assets. The latter did, however, lag behind the current account surpluses, which added up to €2,173 billion over the entire period.[15] The difference between the cumulative current account surpluses and the rise in net external assets of €716 billion is due to valuation effects,[16] the impact of financial derivatives,[17] and other adjustments, all of

13 For a detailed description of this approach, see U Schipper (2017), Transaction and valuation effects on Germany's international investment position (IIP) – new statistical approaches and IIP trends, IFC Bulletin No 42, pp 99-104.
14 The Statistical Data and Metadata Exchange (SDMX) enables specific information on the underlying time series to be found at a certain place in the code. This makes it much easier for the user to classify the corresponding stocks and flows, as well as to compare data series from different national and international sources.
15 Including the capital account balance.
16 Excluding valuation effects on financial derivatives.
17 Financial derivatives have a special role for technical and conceptual reasons and are therefore shown separately here. Between 2007 and 2017, their negative impact totalled €312 billion. Around half of this occurred between 2007 and 2011, and this was mainly due to the business activities of German special purpose vehicles. See Deutsche Bundesbank, Certificates and warrants in the balance of payments, Monthly Report, March 2008, pp 26-27. Since 2012, however, the net effect has come from the mostly negative cross-border cash flows, which are largely linked to interest rate swaps that domestic credit institutions conclude in order to hedge fixed-income securities against interest rate risk.

Three-dimensional account system presenting changes in the net IIP

Cumulative, start-2007 to end-2017[p], total: €1,457 billion



1 Including capital account balance. **2** Excluding financial derivatives. **3** Including net errors and omissions in the balance of payments. The other adjustments essentially cover conceptual and methodological deviations from the balance of payments, including write-downs and statistical changes. **4** Includes loans and trade credits, currency and deposits and other accounts receivable/payable. **5** Includes financial corporations without monetary financial institutions, non-financial corporations, households and non-profit institutions serving households.

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which have a negative sign.[18] The crisis years of 2007, 2008 and 2011 were particularly striking, when Germany's net external assets declined despite surpluses in the current account because the total of the negative effects exceeded the positive balance of payments transactions.

Differing market price effects before and after 2012 – exchange rate effects almost negligible in cumulative terms

Valuation effects,[19] consisting of market price and exchange rate effects, largely balanced each other out (-€75 billion) in the period under review. The setbacks from the crisis years were followed by a countermovement: immediately after the financial crisis began, from the start of 2007 until the end of 2011, the net external position was hit by valuation losses amounting to €208 billion. This has turned around since the start of 2012 as the financial markets have slowly stabilised, and Germany's external assets recorded valuation gains of €133 billion. The different trends during the two periods are primarily due to market price effects. Exchange rate effects played only a minor role on balance because movements in individual years, albeit considerable, were in opposite directions and thus largely offset each other during the two periods.

Structure of assets and liabilities determines the net effect of valuation adjustments

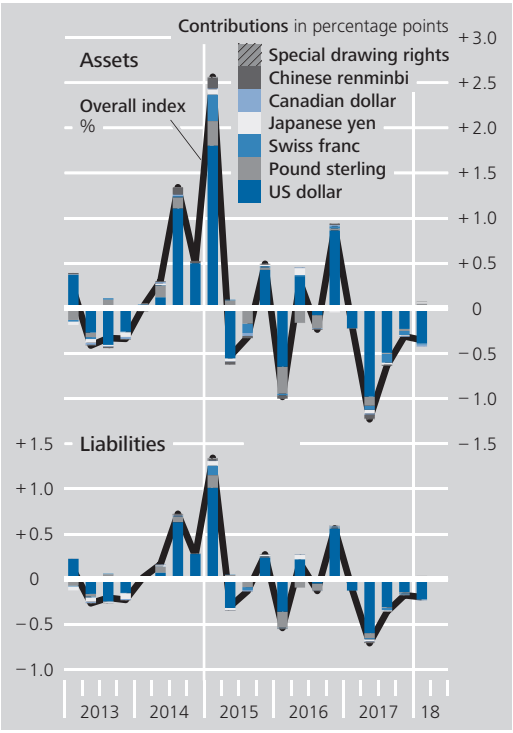
The net valuation effects described here are calculated from the difference between the impact of market prices and exchange rates on external assets and liabilities. An increase in liabilities caused by valuation effects reduces the net external position. If there is a broad-based appreciation of the euro, exchange rate effects will cause foreign currency investments which are converted into euro on the balance sheet to decline in value on both sides of the balance sheet. The net effect of an appreci-

18 This discrepancy was put in the spotlight under the headline "Are Germans bad investors?", prompting charged discussions. See Deutsche Bundesbank, Discrepancy between changes in net foreign assets and the cumulated financial account: an unsuitable indicator of wealth losses, Monthly Report, May 2014, pp 48-50; and R Frey, U Grosch and A Lipponer (2014), Fallstricke bei der Bestimmung von Vermögensverlusten deutscher Anleger im Ausland, Wirtschaftsdienst, 94 (2014) 11, pp 806-812.

19 Excluding valuation effects on financial derivatives.

Indices of exchange rate effects in the IIP

Quarter-on-quarter change



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ation or depreciation therefore ultimately depends on the currency composition of the external assets and liabilities. Since the foreign currency investments on the asset side exceed those on the liability side in Germany's IIP, an appreciation of the domestic currency will result, all other things being equal, in net valuation losses and a decline in the net external position. A similarly nuanced approach, which takes instrument structure into account, has to be taken when considering the net effect of market price changes on the respective asset and liability positions.

Strong euro brought record currency losses in 2017

For example, in 2017, a record-high valuation adjustment of €123 billion due to exchange rate movements was carried out. Last year, the euro recorded significant gains primarily on account of the favourable economic data in the euro area, after having first dropped to its lowest level in 14 years at the end of 2016. The euro closed 2017 with an increase of around 14% on the US dollar, which is by far the most important foreign currency in Germany's IIP.[20] While the euro appreciation resulted in lower valuations of €207 billion on the asset side, downward revisions on the liability side only came to €84 billion, resulting in the aforementioned negative net exchange rate effects which reduced Germany's net external position by over 6% in 2017.

Low foreign currency exposure due to the large euro economic area

This mirrors the high level of foreign currency exposure in absolute terms, which is defined as the difference between foreign currency assets and foreign currency liabilities. Exposure doubled during the period under review and made up almost half of German GDP by the end of 2017, reaching around €1.5 trillion. Nevertheless, Germany's IIP is seeing a long-term trend decline in the share of foreign currency, not least because a single currency area has emerged with the European monetary union, which has opened up investment potential outside of Germany's economy without the need to take up foreign currency positions. On the asset side, the share denominated in foreign currencies has fallen from 45% to 33% from the start of the monetary union to the end of 2017, while on the liability side this figure fell from 21% to 19%.

Indices of exchange rate effects on the IIP

In order to better explain the impact of exchange rate effects, the Bundesbank has developed the indices of IIP-weighted exchange rate effects (IIE), which are expanded on more fully in the box on pages 36 and 37. These indices, which are based on the IIP's currency composition, show the impact of exchange rates on aggregate positions and on individual functional categories of assets and sectors, and can also be used for sensitivity analyses. The data are available immediately after the end of each quarter and therefore have a three-month lead on IIP statistics. For instance, the indices

20 The Bundesbank has published a currency breakdown in euro and foreign currency for Germany's IIP since the 1984 reporting period. Following the requirements of the BPM6 and the Data Gaps Initiative, at the end of 2016 it began to carry out a more differentiated currency breakdown and to list USD, GBP, JPY, CHF, CNY and CAD separately as of the 2012 reporting period.

for the first quarter of 2018 indicate exchange rate losses of 0.35% (around -€29 billion) on the asset side compared to the preceding quarter, and of 0.20% (around -€13 billion) on the liability side. It is therefore already foreseeable that exchange rate effects will reduce the net external position compared to the end of 2017.

Excursus: interpreting valuation effects

Caution is warranted when interpreting valuation effects

As a rule, valuation effects should be interpreted with a degree of caution. Valuations are corrected to comply with the accounting convention that IIP stocks should be reported at market values, where possible. Thus, the values recorded in the IIP do not reflect realised gains or losses. It should also be noted, especially from a sectoral perspective, that net external assets capture only part of the financial assets of that sector. Hedging activities which investors may have used to eliminate valuation risks in full or in part, meaning that open positions are transferred to other domestic or foreign sectors, are not taken into account either. This is information which the IIP either does not collect for conceptual reasons or cannot provide due to the method of data collection. Therefore, the valuation effects shown in the IIP cannot simply be equated with realised losses and gains.

Valuation paradox: if a country is in financial distress, net external assets expand

Particular issues may arise as a result of marking sovereign bonds to market. In the crisis period from 2007 to 2011, the prices of German government bonds increased, which meant that the value of foreign investors' holdings rose by a total of €133 billion. This higher-rated sovereign debt on the liability side alone caused net external assets as reported at the end of 2011 to fall by 5 percentage points in relation to GDP. Meanwhile, the German government's payment obligations remained unchanged as the nominal amount has to be repaid upon maturity. With the opposite sign, this chain of causality can lead to the following valuation paradox in crisis countries. The further a country moves towards insolvency, the better its reported net external position becomes. Given that prices for government bonds at risk of default fall, these liabilities are also given a lower valuation in the IIP, although the crisis country's payment obligations remain unchanged.[21]

Investment income under the IIP income account

Distinction between total return and primary balance

The income account also decomposes the change in net external assets into the current account balance excluding investment income (external primary account balance) on the one hand and the total return on net IIP on the other. The latter is defined as valuation effects plus the balance of cross-border investment income. In order to depict investment income as part of the change in net external assets, the income account uses the correlations in the balance of payments. Instead of defining the changes in net external assets as the sum of the financial account balance, valuation effects, and other adjustments, as per usual, a link is established to the current account balance, with the balance of cross-border investment income contained therein being presented separately.[22]

Feedback loop between external assets and investment income

Investment income is shown separately as it is determined by the volume and structure of outstanding external assets and liabilities. The same applies to valuation effects. Taken together, investment income and valuation effects can be interpreted as the total return on individual IIP positions or net external assets. The income account thus shows the feedback loop between financial stocks and the resulting

21 For debt securities, there is already a recommendation in place that nominal values be reported as supplementary information. See IMF (2009), Balance of Payments and International Investment Position Manual, Sixth Edition (BPM6), p 125.

22 This rearrangement is possible because the following applies to the balance of payments' sub-accounts. Financial account balance = current account balance + capital account balance + net errors and omissions. See the chart on p 33 and the explanations provided there.

New indices of exchange rate effects in the international investment position

A notable percentage of financial assets and liabilities in Germany's international investment position (IIP) are denominated in a foreign currency (see page 34 of the main article). Exchange rate movements therefore have a major impact on trends in the IIP. A newly developed index concept now allows more in-depth analyses. The indices of IIP-weighted exchange rate effects (IIE) show how the value of external assets changes solely as a result of exchange rate movements.

IIE are highly granular and allow conclusions to be drawn about the impact of changes in the prices of individual currencies on asset and liability holdings broken down by sector and instrument. The concept is based on a system of weighted exchange rates. The index system weights are based on IIP stocks broken down by currency, sector and asset class and listed separately for assets and liabilities.[1] The choice of disaggregated weighting units permits aggregation at any level along the dimensions currency, sector and asset class.

The calculation of the IIP-weighted indices of exchange rate effects encompasses the US dollar, pound sterling, Japanese yen, Swiss franc, Canadian dollar and Chinese renminbi. In addition, the weighting matrix must take into account the large percentage of euro on the asset and liability sides, which dampens the effect of exchange rate movements on the aggregate market value of foreign assets.

The weighting matrix further includes the asset classes reported on in the IIP (see page 38). In a sectoral account, the weighting matrix is based on the core sectors outlined in the IIP (see page 39), with financial corporations broken down into the subsectors central bank, credit institutions, money market funds and other financial corporations.

The weighting of the IIE is based on the most recent data available, as abrupt transaction-related adjustments of asset or liability positions in the IIP cannot be ruled out. On the basis of the quarterly IIP data, which has been available broken down by currency since the end of 2012, a chained Laspeyres index for exchange rates is constructed. The chain links are as follows:

$$(1)\quad IE_t = \sum_k \sum_i \sum_s \frac{E_t^k}{E_{t-1}^k} g_{t-1}^{k,i,s},$$

where

$$g_{t-1}^{k,i,s} = \frac{E_{t-1}^k A_{t-1}^{k,i,s}}{\sum_k \sum_i \sum_s E_{t-1}^k A_{t-1}^{k,i,s}}$$

with

IE_t the link of the Laspeyres exchange rate index at the end of the quarter t.

E_t^k the exchange rate of currency k ($k = 1,\ldots, K$) *vis-à-vis* the euro at the end of quarter t. Exchange rates are cited using the direct quotation method (eg US$1 = €0.88). There is no exchange rate conversion for any euro-denominated assets, ie $E = 1$.

1 By contrast, the trade-weighted nominal effective exchange rates that the Bundesbank has been calculating since the early 1970s condense developments in bilateral exchange rates into a single index, which can be used, for example, to measure the impact of exchange rate movements on a country's or a currency area's price competitiveness (see Deutsche Bundesbank, Adjustments in the calculation of effective exchange rates and indicators of price competitiveness in August 2013, Monthly Report, August 2013, pp 50-52; and Deutsche Bundesbank, Recalculated weights for indicators of the German economy's price competitiveness, Monthly Report, August 2017, pp 41-43).

$A_{t-1}^{k,i,s}$ the holdings of asset class i mapped to sector s, denominated in currency k at the end of the previous quarter t–1.

$g_{t-1}^{k,i,s}$ the weight at the end of the previous quarter t–1, where the euro-denominated external assets stand for the respective currency-sector asset class combination in relation to the foreign assets as a whole.

In order to obtain an index (including for developments over several periods), the quarterly links are chain-linked through continuous multiplication:

$$(2)\ IIE_t = 100 \cdot IE_1 \cdot IE_2 \cdot \ldots \cdot IE_t = IIE_{t-1} \cdot IE_t$$

IIE_t refers to the index value at time t, where the value for the fourth quarter of the initial year is made to equal 100 as the reference period (ie 2012 Q4 = 100). The term in equation (2) after the second equals sign indicates that a current index value is created by multiplying the previous value with the current chain link. An increase in the IIE represents a stock-weighted depreciation of the euro and thus an increase in asset or debt levels after conversion into the single currency.

The IIE have similar characteristics to the better-known chain indices of the annual-overlap or monthly-overlap type, which are used, for instance, to calculate price-adjusted gross domestic product or harmonised consumer prices. The chain-linked use of weights may cause statistical distortions in the form of "path dependencies"[2] over the longer term, as a result of which it may no longer be possible to clearly distinguish between exchange rate and structural effects in international assets.

As when analysing other chain indices, there are programmes available for the IIE[3] that allow the growth contributions to the exchange rate-related percentage change in an aggregate to be calculated. For example, the sectors' arithmetic growth contributions to the percentage change in portfolio investment as a whole can be determined.

The IIE allow exchange rate-related wealth effects, which the IIP would only show with a lag of three months, to be approximated in a timely manner based on current exchange rates. Methodologically advanced risk analyses can also be carried out. In addition, sensitivity analyses can be used to identify individual sectors which would, in certain scenarios, be majorly affected by (assumed) changes in the prices of individual currencies. In addition, methods for analysing time series can be applied to the indices, for example to measure the exchange rate-related volatility of the market value of individual asset holdings.

When interpreting the IIE as a measure of risk for changes in the value of assets in individual domestic sectors as a result of exchange rate movements, it should be noted, however, that the hedging operations which financial market players use to reduce their currency risk are not taken into consideration. Moreover, no account is taken of individual enterprises' option of offsetting their exchange rate risk within an international group.

2 See United Nations et al, System of National Accounts 2008 (2008 SNA), No 15.43, p 300.
3 The program KIXCC, which was developed for quarterly chain-linking, is also available for use by non-Bundesbank users.

income-relevant revenue or expenditure. The external primary account balance, which does not depend on the volume and structure of the current IIP, is captured separately. It encompasses the current account balance less investment income plus the quantitatively negligible capital account balance.[23]

Investment income balance

In cumulated terms, the balance of investment income over the reporting period from 2007 to 2017 came to €595 billion. A significant part of the total increase in net assets of €1,457 billion is thus attributable to the remuneration of past current account surpluses. Surpluses thus contain a self-perpetuating element as they are usually linked to the accumulation of yield-bearing assets, and the resulting capital gains, in turn, have a positive effect on the current account. However, since 2012, growth in net investment income has no longer kept pace with that of net external assets. The unchanged positive accumulation effects on net investment income have been offset by negative yield effects.[24] Hence, the downward trend in net investment income as a percentage of net IIP can be explained, first, by the yield level effect, reflecting the global decline in interest rates. Second, the continued positive yield differential has slightly declined as the yields on German external assets fell more sharply than those on external liabilities. This development was particularly pronounced in the case of long-term debt securities, where the countermovement to the previously high spreads on the bond markets as a result of the crisis is likely to have played a role.

IIP instrument account

Portfolio investment exhibits the highest growth …

The IIP instrument account shows which investment and financing instruments account for the net increase, broken down into the five functional categories direct investment, portfolio investment, financial derivatives, other investment, and reserve assets, which are each broken down further. The individual investment categories feature different investment targets, payment obligations and potential return, but also different exposures to loss. Over the entire period from 2007 to 2017, the strongest growth was recorded in portfolio investment (+€738 billion), followed by direct investment (+€382 billion) and other investment (+€273 billion). The expansion in reserve assets (+€82 billion) was mainly due to a higher valuation for gold holdings. The net stock of financial derivatives dropped slightly (-€18 billion).

… and is responsible for the uneven distribution of IIP growth over time

The growth in portfolio investment has been very uneven. Between 2007 and 2011, net portfolio investment initially fell by €330 billion, mainly due to valuation adjustments. In the subsequent period, it recorded a very pronounced increase. With a, mainly transaction-related, increase in the amount of €1,068 billion, portfolio investment accounted for over 80% of the growth in net external assets during this period. Against this backdrop, the balance of portfolio investment moved into positive territory for the first time in more than 30 years during 2015.

The development in portfolio investment is, not least, attributable to changes in the ownership structure of long-term German government

23 The analysis of public budget deficits, too, makes a distinction between interest payments on outstanding debt and the primary balance. This is done, inter alia, in the context of sustainability calculations to determine how high the primary surplus needs to be given a certain interest burden in order to stabilise the debt-to-GDP ratio. The European Commission conducts similar sustainability analyses for IIP and the current account balance, where, in a next step, the current account balance, which is defined as the benchmark, could be broken down further into the balance of investment income and the external primary balance. See European Commission (2017), Alert Mechanism Report 2018, p 7; and European Commission (2016), The macroeconomic imbalance procedure. Rationale, process, application: a compendium, European Economy, Institutional Paper 39, November, p 86.

24 For details on the breakdown of the change in investment income into an accumulation effect and a yield effect, as well as an analysis of investment income from 1999 to 2014, see Deutsche Bundesbank, Effects on the cross-border investment income balance: asset accumulation, portfolio shifts and changes in yields, Monthly Report, March 2015, pp 81-85; and T A Knetsch and A J Nagengast (2016), On the dynamics of the investment income balance, Deutsche Bundesbank Discussion Paper, No 21/2016. For developments at the current end, see Deutsche Bundesbank, German balance of payments in 2017, Monthly Report, March 2018, p 24.

Turnaround: non-residents net sellers of German government bonds

debt securities. Attracted by the excellent credit rating and outstanding liquidity of Federal bonds, non-resident investors have generally been net buyers year after year. However, the statistics show that, since 2015, non-resident investors have shorted Federal securities on balance. As a result, the government's reported external debt through this instrument has dropped by €312 billion, or around one-quarter, over the past three years. Since March 2015, the one-off effect of the Eurosystem's public sector purchase programme (PSPP) has been a major factor in this development.

IIP sector account

IIP sector account looks at domestic sectors

The IIP sector account shows sectoral net IIP growth, broken down into the domestic core sectors government, central bank, monetary financial institutions (MFIs),[25] financial corporations without MFIs, as well as the sector non-financial corporations, households and non-profit institutions serving households.[26] This helps identify both structural changes in the individual sectors' asset and liability positions and sectoral shifts. Here, too, the financial crisis has clearly left its mark.

MFIs reduce their exposures

Since the beginning of 2007, MFIs have reduced their net position *vis-à-vis* non-residents by €95 billion; overall, their net external assets had contracted to €294 billion at the end of 2017. Even more pronounced than the decline in the net position was the drop in gross figures due to the deleveraging process in the wake of the financial crisis, namely by €359 billion on the asset side and €253 billion on the liability side.[27] In recent years, the decline in MFIs' net external assets has been related to the impact of the APP. There was a decline, in particular, in the net position of MFIs in other investment, which reflects deposits of foreign commercial banks domiciled either inside or outside the euro area with credit institutions domiciled in Germany. These deposits increased, *inter alia,* as a result of non-resident investors selling their securities to the Eurosystem – ie not only to the Bundesbank, but also to other national central banks and the ECB – sales which are settled by commercial banks domiciled in Germany.[28]

Bundesbank is now the second-largest net creditor vis-à-vis non-residents

In such cases, the deposits of foreign commercial banks represent a counterpart to the Bundesbank's increased TARGET2 claims on the ECB. All in all, the Bundesbank's net external assets rose by €502 billion between 2007 and 2017, in particular due to the increase in TARGET2 claims. With net external assets worth €471 billion at the end of 2017, the Bundesbank is the second-largest domestic net creditor sector, after it had been a net borrower at the beginning of the reference period.

Enterprises and households sector by far the largest net creditor

The largest net creditor by far, however, is the enterprises and households sector, which saw its net external assets expand by €1,197 billion from early 2007 to €1,981 billion at the end of 2017. At €1,845 billion, the sub-sector financial corporations without MFIs accounts for the bulk of this position, including mutual funds, insurers, and pension funds. In view of the anticipated population ageing in Germany, this position can mainly be attributed to the fact that investors are making provisions for their future financing needs.

Financial corporations are heavy buyers of foreign investment instruments

These corporations are chiefly invested in foreign shares and debt securities. Around 80% of their net external assets are in the portfolio investment category, which is particularly affected by market price developments in the equity and bond markets. By contrast, the second sub-sector, which includes non-financial corporations, households, and non-profit insti-

25 Excluding the central bank.
26 The breakdown into "financial corporations without MFIs" and "non-financial corporations, households and non-profit institutions serving households" was only introduced for the end-2012 report. Previously, these two sectors had been combined under "enterprises and households".
27 Excluding financial derivatives, as these have only been recorded in the IIP since the end of 2010.
28 See Deutsche Bundesbank, The increase in Germany's TARGET2 claims, Monthly Report, March 2017, p 30; and Deutsche Bundesbank, The impact of Eurosystem securities purchases on the TARGET2 balances, Monthly Report, March 2016, pp 53-55.

tutions serving households, mainly acts as a direct investor or represents the destination for foreign equity capital. However, given the high amounts on both sides of the balance sheet (€1,980 billion in assets and €1,844 billion in liabilities), net external assets, at €137 billion, are relatively low.

Government reduced its net debt vis-à-vis non-residents in recent years

The sole net debtor *vis-à-vis* non-residents is the government sector. Although general government increased its liabilities overall during the period starting in 2007 by a further €146 billion to €818 billion at the end of 2017, the picture has changed over the last three years. The combination of rising budget surpluses and the Eurosystem's securities purchases under the APP has caused German government debt to fall significantly *vis-à-vis* non-residents.

Conclusion

As a result of implementing the methodological manual BPM6, the German IIP statistics have matured into a comprehensive database, enabling the Bundesbank to fulfil the reporting requirements of European and international organisations in terms of IIP data. The IIP now provides detailed data relating to the nature of stock changes, functional asset category, sector, currency, and partner country, opening up a broad scope for analyses across a wide range of issues. The three-dimensional concept presented here, and applied by way of example, expands the analytical framework for IIP stock variables by enabling a consistent and comprehensive overview of the changes in external assets and liabilities in terms of their determinants, investment structure, and distribution across the domestic sectors. Furthermore, the indices of IIP-weighted exchange rate effects provide opportunities for data analysis, not least as part of sensitivity analyses.