Measuring Spreads in the National Accounts

Dirk van den Bergen
Warner van der Wal

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1. Introduction

Trade margins on goods are a well-known phenomenon in the national accounts. Traders buy goods and sell them for a higher price. The price difference is the trade margin and is included as output in the national accounts. Less well known –at least for national accounts purposes- are trade margins on financial assets. Just like with goods, traders may buy financial assets and sell them for a higher price. And just like with goods, this generates a trade margin (or spread). This spread can be seen as an implicit payment for a service: the service of helping to buy or sell a financial asset. In paragraph 3.68, ESA 2010 explicitly includes this service in the output of financial enterprises:

> *3.68 Financial services may be paid for directly or indirectly. Some transactions in financial assets may involve both direct charges and indirect charges. Financial services are provided and charged for in four main ways:*
>
> *(a) financial services provided for direct payment;*
>
> *(b) financial services paid for through loading interest charges;*
>
> ***(c) financial services in acquiring and disposing of financial assets and liabilities in financial markets;***
>
> *(d) financial services provided in insurance and pension schemes, where the activity is financed by loading insurance contributions and from the income return on savings.*

It further explains in paragraph 3.73:

Financial services consisting of acquiring and disposing of financial assets and liabilities in financial markets

3.73 When a financial institution offers a security (e.g. bill or bond) for sale, a service charge is levied. The purchase price (the ask price) is equal to the estimated market value of the security plus a margin. Another charge is levied when a security is sold, the price offered to the seller (the bid price) being equal to the market value minus a margin. Margins between buying and selling prices apply also to equities, investment fund shares and foreign currencies. These margins are for the provision of financial services.

The Balance of Payments Manual (BPM6) also explicitly mentions spreads and makes in paragraph 10.122 the comparison with trade in goods:

> *10.122 Dealers or market-makers in financial instruments may charge, in full or part, for their services by having a spread between their buying and selling prices. Dealers, market-makers, foreign exchange bureaus, and other intermediaries producing this kind of service are distinguished from other traders by the existence of a buy-sell spread, which shows that they serve the market in a somewhat similar way to a wholesaler, by providing liquidity and inventory. Foreign exchange, shares, bonds, notes, financial derivatives, and other financial instruments are often bought and sold in this way.*

The fact that ESA 2010 and BPM6 state that spreads should be included in national accounts and the balance of payments does not mean that it is easy to make estimates for spreads. In fact, it did not even mean that all countries included spreads in their figures. When the GNI

Expert Group (then still named GNI Committee) compared the GNI data of the European member states in their 2016-2019 verification cycle[1], they found that many countries, including the Netherlands, did not include spreads in their national accounts.

In reaction to this, Statistics Netherlands included an estimate for spreads in their 2015 benchmark revision. However, as international guidelines of how to measure spreads did not exist, large differences existed between the methods used in the different member states. The GNI Expert Group therefore concluded that for spreads the data for the different member states were not sufficiently harmonized to allow the resulting GNI to be used for determining the EU own resources. As a consequence, the European Commission placed a transversal reservation on the measurement of spreads.

This transversal reservation obliged all EU member states to show that their methods are in line with ESA paragraph 3.73 above:

> *Member States should ensure that output from financial services in acquiring and disposing of financial assets and liabilities in financial markets is included in their national accounts and that it is valued in accordance with the ESA2010 paragraph 3.73, i.e. as a margin between buying and selling prices. Furthermore, Member States should ensure that this output is adequately allocated to uses.*

Furthermore, the reservation stated that the methods used should be in line with guidelines provided by the Working Group on Economic Statistics (WGES).

> *To this purpose Member States should develop or modify (where appropriate) their methods for estimating these flows in line with the upcoming guidance from the Working Group on External Statistics (WGES). This concerns also those Member States that during the 2016-2019 GNI verification cycle introduced revisions to their national accounts in order to address the issue of margins on trading financial assets and liabilities.*

This report describes the methods Statistics Netherlands used to estimate spreads in the national accounts for the period from 2010 onwards. If the GNI Expert Group approves the method, this method and data will be used to replace the method currently used by Statistics Netherlands, in order to lift the transversal reservation for the Netherlands.

This report is structured as follows. Section 2 describes the guideline from the WGES. In sector 3, data sources are explained. Section 4 presents the methods and results of the estimation of spreads. Section 5 provides a sensitivity analysis, including a comparison with the current data in the Dutch national accounts. Section 6 summarizes the main conclusions.

[1] The years 2016 – 2019 refer to the years in which the verification took place, not the years for which data were verified.

2. Existing Guidelines

The GNI reservation explicitly states that the method used for estimating spreads should be in line with the guidance from the Working Group on External Statistics (WGES). For providing guidance, the WGES has set up a Virtual Group on the estimation of margins on buying and selling transactions. This Virtual Group is further referred to as the VG on spreads. In December 2020, the VG on spreads produced their final report. This final report includes among others compilation approaches and estimation methods.

As a subgroup of the WGES, the VG on spreads focusses on cross-border flows of spreads. The goal of this report is to estimate not only cross-border flows, but all transactions within the Dutch economy. Therefore, these guidelines do not cover the whole spectrum of transactions required. In practice however, these guidelines can be extended to transactions between residents as they are often based on general principles.[2]

The guidelines of the VG on spreads can be split into several categories. First, their report advises on which instruments spreads could or should be estimates and what companies are involved in the generation of spreads. Second, it provides guidance on data sources. Third, it provides assumptions that could be made in absence of information, to arrive at an estimation method. These guidelines (1) are summarized in the next paragraphs.

2.1 Market participants

Three different kinds of actors can be distinguished.

- Traders are natural or legal persons that engage in trading in financial instruments on own account. Their aim is to make a profit by receiving property income and / or holding gains on these instruments.
- Brokers are natural or legal persons that conduct transactions for a client and are paid a fee for this service.
- Dealers or market makers are natural or legal persons that engage in trading in financial instruments on own account. The difference with traders is that the main way to make profits is not through property income or holdings gains, but primarily by providing liquidity to the market. They offer to be counterpart of a trade immediately but at slightly worse terms than ideally would be possible within a longer time frame.

According to the VG on spreads, only dealers and market makers may generate trading margins. Key element to generate trading margins is that the origin of profit is based in providing liquidity to the market.

In practice, the distinction between dealers and traders is not always clear-cut. Dealers may also act as trader in part of their actions. Only with their activities as a dealer, they may generate margins. For companies that act both as dealer and as trader, it is therefore important to distinguish between different types of income. Income generated because of having a spread

[2] For example, a guideline to estimate spreads based on transactions and an average spread can be used for both imports and domestic use of spreads, even if the guideline itself only explicitly names imports.

between the buying and selling price should be included in the margins. Wealth generated by holdings gains or property income received while holding the financial instruments must be excluded.

The VG on spreads more or less assumes that the major players in producing spreads are usually monetary financial institutes (MFI's), who are dealers as one of their activities. It does however state that other players may be around.

In the Netherlands, apart from MFI's some large "pure" market makers are operational. These market makers are classified in the sector S.125 (other financial intermediaries, except insurance corporations and pension funds). Therefore, in the Netherlands, spreads may be generated in sectors S.122 (deposit taking corporations except the central bank) and S.125.

2.2 Instruments and transactions

Although spreads can be produced in the buying and selling of all financial instruments, not all instruments are equally likely to induce large amounts of spreads.

The following instruments are distinguished by the VG on spreads.

- Equity. For transactions in equity, explicit fees or commissions are almost always charged for transactions. This is the case for both Initial Public Offerings (IPOs), where the issuing company pays the broker, usually an investment bank to market, to gauge demand and to set the IPO process, and for trading in secondary equity where buyers and sellers pay financial auxiliaries for their transaction. Therefore, according to the VG on spreads, it can often be assumed that no spreads on equity are generated as explicit fees or commissions are already in place.
- Bonds. Primary bond issuances work similarly to IPOs, where the issuer pays the investment bank for finding buyers. Therefore, as a general rule it can be assumed that no spreads on primary bond issuances are generated. On the secondary market however, a small set of recognized dealers are usually involved, through which bonds are bought and sold. It is therefore expected that secondary trade in (both government and corporate) bonds generates margins.
- Foreign exchange in currency. Generally speaking, foreign currency markets are very large and will therefore have strong competition. This will lead to relatively small margins. As the trading volumes are high, this may still lead to a substantial amount of spreads. The VG on spreads however expects the spreads to be smaller than the spreads on bonds.
- Financial derivatives. Financial derivatives can be traded in formal markets and over the counter (OTC). OTC markets usually have dealers providing their services. Although not all transactions in financial derivatives generate margins, many OTC markets are these days formalized markets where market makers list quoting prices to buy or sell assets and on which spreads are generated.

In general, it can be concluded that spreads may be generated on all assets traded in equity, bonds, foreign exchange currencies and financial derivatives. However, the VG on spreads expects very small or no spreads on equity.

2.3 Data sources

2.3.1 Exports and production

On the side of exports and implicitly also on the side of production, data gathering starts by finding the major players in the field. For MFIs, the Triennial Central Bank Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets (henceforth named as the BIS Triennial Survey) can be used as a starting point for identifying the major players. A second starting point may be lists made available by professional associations or prudential supervisors of dealers/market makers in the statistical territory.

With these lists as a starting point, the VG on spreads advises to gather direct information from the main producers of spreads, by either surveys or interviews. Interviews may be used to assess whether these corporations are actually involved in generating spreads and to get a clear understanding how the business model of these companies works.

Surveys can be used to gather actual quantitative data on spreads. For example, data can be asked on margins, bid / offer process, market prices, residency of counterparts and scope of financial instruments.

2.3.2 Imports and uses

For imports and implicitly also for (intermediate) use, getting data and information is much harder. Unlike with production where a few players usually make up the market in a country, in principle every natural or legal person may be the user of the generated spreads. A second problem is that quantitative data is hard to get, as users of spreads will not record any use of spreads in their accounts. The use of spreads will be included in their holding gains and losses, as they will record the actual financial transactions with the market makers in their account.

The interviews and surveys of producers of spreads can be used to evaluate whether they are next to producers of spreads also user of spreads.

For the remaining potential users of spreads the guidelines of the VG on spreads mainly focuses on indirect measures to evaluate whether the imports of spreads are relevant in a country. These indicators, like measures of financial openness or foreign securities held by countries, may provide information on the likelihood of large margins. These measures do however not give any quantitative information on the size of the use of spreads.

As advised, considering the complexities to collect data the most reliable way to evaluate the imports (and use) of spreads is a survey to potential users of spreads to reveal how the

potential users buy or sell their financial instruments. Again, this will not provide any quantitative data.

3. Data sources in the Netherlands

In the Netherlands, dealers are found in S.122 (banks with market making as one of their activities) and S.125 (corporations with market making as main activity). The largest market makers are found in S.125. Therefore, the presentation of data sources begins with this sector.

3.1 Survey profit and loss accounts S.125

For market makers in S.125, the Dutch Central Bank (DNB) has started a survey from 2020 onwards. The population of this survey are those (non-bank) corporations that are on a supervision list of DNB for investment corporations allowed to trade in financial assets for their own profit. For this survey, a questionnaire is send to the eight of the largest corporations. In 2020, these corporations make up 93% of the total assets of the total market maker population.[3]

The corporations that do not receive a survey are not constant over time. The Brexit has led to an increased number of corporations registered in the Netherlands. For example, in 2015, the eight corporations in survey would probably have a larger share of total assets than 93%.

In the survey, the corporations are asked on their profit and loss account. As secondary activities are asked separately (in a question *other income not otherwise specified*), the trading income of these corporations can be derived from these profit and loss accounts. In using these data however, two problems arise.

First, not all companies present the trading income the same way. Some companies show the gross trading income, others the net trading income. The difference between these are fees and commission cost the market makers themselves pay when trading. The gross trading income is their gross margin on trading assets. The net trading income is the margin they earn after deducting intermediate cost directly related to trading assets, like fees to be allowed to trade on markets. For estimating spreads, the gross trading income is required, because this is the total amount that users pay in excess to the market price. For corporations that provide the net trading income, an adjustment is required. These corporations can be identified by their relatively small operating cost.

The second problem is that the trading income included both the income from spreads and "real" holding gains from holding the asset for a longer period in time. The corporations in the survey are not able to make a distinction between income and holding gains/losses. Generally speaking however, it is not their intention to hold the assets for a longer period for holding gains. When holding assets, this is because they cannot sell the asset directly or because they do not want to flood the market. In these cases, "real" holding gains and losses may appear as a side effect. In practice, assuming that all gross trading income consists of spreads is therefore probably a reasonable assumption, especially as these holding gains may be either positive or negative.

[3] This is based on supervisory data.

Next to using this survey for output of spreads, it can also be used in combination with the survey on financial transactions to generate an average spread. More details are given in section 3.2, where the latter survey is described.

3.2 Survey financial transactions

Surveys of financial assets and transactions by DNB provide for most sectors data on the total value of financial transactions by category in the surveyed period. Purchases and sales of assets are recorded separately. These data can be used in three ways:

First, data from market makers in S.125 can be combined with the gross trading income from other data sources. By dividing the gross trading income by the total value of transactions is assets, both purchases and sales, a margin percentage can be obtained. As the trading income is not divided into different categories, this margin percentage cannot be calculated for individual asset categories, but only for all categories combined.

Second, the data on the transactions in assets by banks (S.122) can be combined with a margin percentage to arrive at an estimate for the gross trading income for these banks. The main drawback in using the data for this purpose is that it is not known what part of the transactions are made by banks in their role as market maker.

Third, the data on the transactions by other sectors can be combined with a margin percentage to arrive at an estimate for the use of spreads. The main problem with this data is that it is not possible to distinguish between transaction that are made through market makers and which are not. For investment funds, insurance corporations and pension funds, this poses problems since they may purchase directly from the issuer and not from market makers, for example when purchasing bonds when they are issued. For other companies, especially the captive financial institutions, many transactions are intra company. Assets are in these cases bought or sold within a multinational enterprise. Therefore, no margins are paid on these transactions. Further assumptions are therefore required to arrive at the sales and purchases of assets for which a spread is paid.

Data from these surveys are available from 2010 onwards for most sectors. Exceptions are

- Non-financial corporations, where data are available from 2010 until 2018.[4] Furthermore, only transactions in assets with a foreign counterparty are included.
- For some parts of the financial sector, including the market makers in S.125, data are only available for 2020 onwards. [5] The major sectors in S.12 (banks, investments funds, insurance corporations and pension funds) are included from 2010 onwards.

3.3 Supervisory data S.125

For the period from 2014 onwards, financial auditors from DNB collect data on the largest market makers in S.125. These data are comparable with the profit and loss account from the

[4] For later years, surveys on non-financial corporations are only made by Statistics Netherlands. In these surveys, only the balance of purchases and sales of assets in recorded, not the total purchases and sales separately.

[5] One of the three largest market makers in sector S.125 is included in this survey from 2011 onwards instead of from 2020 onwards.

survey on S.125 described above. They have the same drawbacks and can be used in the same way as the survey.

3.4 Annual reports S.125

Next to the survey and data from financial auditors, annual reports can also be used for data on the gross trading income. For the largest corporations, annual reports are available from 2010 onwards. In principle, these data can be used for estimating spreads.

The main problem is that the three largest corporations have their international headquarters in the Netherlands, due to which the annual reports generally present income generated by the company worldwide, whereas for estimating spreads only the income generated by the Dutch part of the company is required.

For one of the three largest corporations, the annual reports provide data by geographic area. This can be used for the trading income generated in the Netherlands. For this company for the first half of 2020 both the DNB survey and a semi-annual report are available. Comparison between the two shows that the net trading income according to the survey exactly matches the net trading income from the semi-annual report. For this company, trading income is available for the entire time series.[6]

For the other two largest corporations, a geographic breakdown is unfortunately not available. Further assumptions are needed to arrive at the trading income generated in the Netherlands, for example by comparing the annual reports for 2020 to the survey outcome, and extrapolate the income generated in earlier years based on the fixed ratio.

For some of the smaller corporations, annual reports for only the Dutch part of the corporation are available for some years. Most annual reports for smaller corporations however only show financial assets. Data on profit and loss, including the (gross or net) trading margin are not included.

For the period from 2012 onwards, one of the three largest market makers also provides the total value Exchange Traded Products (ETP) from the Netherlands. By combining this data with the worldwide gross trading margin, an average margin percentage can be obtained in a similar way with the survey on the profit and loss accounts and the survey on financial transactions. As with these surveys survey, data on the margin percentage by category cannot be derived from this data source.

3.5 BIS Triennial survey

The BIS Triennial Survey can be used to evaluate proprietary and commissioned business of banks. As an ad hoc additional question to the survey, the five largest banks in the Netherlands were asked about own account trading in financial derivatives. Two of these banks are created solely to facilitate the Dutch government and are therefore expected not to trade on own

[6] The annual report shows both net and gross trading income by geographic territory, adjustments from net to gross trading income are therefore not necessary.

account. Indeed, these banks are not even on a list of authorized market makers and primary dealers using exemptions from the ban on short selling from the European Market and Security Authority [(2)]. This exemption would be expected when being a (significant) market maker.

The other three banks were asked on their market making activities. Of these three corporations, two responded that they did little to no trading on own account. The third responded that they did trade on own account. Banks however did have problems understanding and filling in questions on this topic. The response of these banks in the survey alone can therefore not be taken as proof that they indeed do not trade on own account as annual reports show that these three banks do have market making activities. For this reason, the data from this survey is not used.

3.6 Annual reports S.122

For the large banks, annual reports are also available. These annual reports are however more difficult to use that the annual reports of S.125. This is because for banks market making is just one of many activities, whereas for the market makers in S.125 it is their main activity. This results in the following:

- In annual reports, only net trading income is reported. Gross trading income is not reported.
- Geographical breakdowns are not available.
- It is not clear what part of the net trading income is generated with market making activities and what part is the result of holding gains and losses from trading activities. The annual reports show in some years large negative trading income in some financial assets, as well as very large fluctuations. Moreover, the explanations on the net trading income in the annual report often points to non-market making activities explaining major gains or losses, although it is for two banks explicitly mentioned that market making activities are included. It seems therefore very likely that trading activities are substantial. As no additional information is available on the split of income from trading or market making activities, this information cannot be used to estimate the production of spreads.

It is therefore concluded that annual reports cannot be used to estimate the production of spreads.

3.7 Survey S.122

The financial auditors from DNB have a survey on the profit and loss account of banks. One of the items in this survey is “Gains and losses of financial assets and liabilities held for trading, net”. Spreads should be included in this item.

This survey however has the same drawback as the use of annual reports, namely that this item seems to be dominated by trading activities over market making activities. Indeed, the total over all banks is for some years negative, which is unlikely for market making activities. Moreover, sentiments in stock markets are reflected in the results. For example, the first quarter of 2020 shows large losses, just like the stock market. In contrast, market makers in S.125 show large profits in the first quarter of 2020 as large volumes were traded.

For this reason, it is concluded that this survey cannot be used to estimate the production of spreads.

Table 1 summarizes the way the data sources can be used for the estimates on spreads.

Table 1. Use of data sources

Data sources	Uses
Survey profit and loss S.125	1. Output of spreads S.125 from 2020 onwards
	2. Average spread
Survey financial transactions	1. Average spread
	2. Output of spreads S.122
	3. Use of spreads
Supervisory data S.125	1. Time series of output of spreads S.125
Annual reports S.125	1. Time series of output of spreads S.125
BIS Triannual survey	None
Annual reports S.122	None
Survey S.122	None

4. Method and results

4.1 Production

4.1.1 S.125 – Market makers

Three large companies dominate the market making activities of sector S.125. These three companies are not only large players in the Netherlands, they are large players worldwide. All three of these companies are included in various lists of the 10, 12 or 15 largest high frequency traders worldwide. Although the way these lists are made is often unclear, it shows that these companies are large.

For one of these three companies, the gross trading income from the annual reports (see section 3.4) is taken as measure for the production of spreads. This company shows in their annual report in which country the gross trading income is generated, giving directly the production of spreads in the Netherlands.

For the other two companies, the supervisory data (see section 3.3) on the net trading income is taken as starting point. From the annual reports of these companies, the ratio between the gross trading income and the net trading income worldwide is taken. This ratio is used to arrive at the gross trading income in the Netherlands. As the data from the financial auditors is only available from 2014 onwards, a separate estimate is made for the period before 2014. This is done by assuming that the share of their gross trading income produced in The Netherland is constant in the period 2010-2014. With this assumption, the gross trading income in the Netherlands can be calculated from the gross trading income worldwide from their annual reports.

For the other five companies in the survey for S.125 and in the supervisory data[7], data from the financial auditors and data from annual reports (when available) are used. Data from annual reports are used when gross trading margins are reported as well as for the period before 2014. Data from the financial auditors are used otherwise. In some periods, for some companies, extrapolation techniques are required as neither of the two data sources are available. As figures are small, this has no large impact on the overall results.

Next, grossing up is done for the companies not in the survey of S.125. For 2020, there are 42 market makers not included in the survey. As stated in section 3, these companies in 2020 have 7 percent of the total assets of all market makers in S.125. The business register shows that in 2020 they have 20 percent of the employed persons of all market makers[8]. As market making is an activity where larges firms have a competitive advantage, often through better and faster IT, the ratio of employed persons is for these companies probably higher than the ratio of gross trading surplus. On the other hand, the (very sporadic) data from annual reports gives some indication that using the ratio of total assets may be an underestimation.[9] For grossing up, the average of the ratios of employed persons and total assets is used. In the sensitivity analysis in

[7] The population for these two data sources are the same

[8] This includes supporting staff working for example on IT-support.

[9] Unfortunately, the data from the sporadic annual reports in not enough to use it to make direct estimates on the output of spreads.

section 5, the differences when choosing the ratio of employed persons or total assets for GDP is presented.

For the time series, the ratio of employed persons is used. This data is available in the business register from 2014 onwards. For the years 2010 until 2013, only additional data on the year these companies were first established is used. As many market makers moved to the Netherlands in 2017 or later as a result of the Brexit[10], the grossing up in 2017 is substantially lower than in 2020. For 2010, grossing up equals 6 percent of gross trading income.

4.1.2 **Margin percentage in S.125**

For estimating the production of spreads by banks (S.122) and the domestic use of spreads, the average spread from market makers in S.125 is used. For this purpose, the survey on the profit and loss accounts are combined with the survey on financial transactions (see section 3.2).

For 2020, the survey on market makers in sector S.125 can be used to calculate an average spread. Data from this survey of the gross trading income is divided by the total transaction value of traded instruments in debt securities (F.3), equity (F.511) and derivatives (F.7). For companies that report net trading income in the survey, the ratio between net trading income and gross trading income in 2019 is used to arrive at the gross trading income.

It should be noted that equity is included in the transactions on which spreads are estimated, even though the VG on spreads assumes these spreads small. Data from the largest Dutch market makers show that spreads are also generated on equity.

Table 2. Relative spread by market makers

	Relative spread
2020-Q1	0.141%
2020-Q2	0.084%
2020-Q3	0.065%
Average 2020 Q2 and Q3	0.074%

Results are shown in table 2. The table presents the relative spread on a single transaction (buying or selling) of an asset by the market maker. In the first quarter of 2020, markets were extremely volatile due to the corona crisis. As a result, the relative spread was very high in this quarter, almost twice the relative spread in the second and third quarter. Data for this quarter are therefore considered not realistic for other periods. The relative spread in the second and third quarter are therefore taken as our estimate for the relative spreads in 2019.[11]

A breakdown of the relative spreads into instruments is not available, as only the total trading income is available. Data on individual market makers however provides some indication that derivatives have higher relative spreads and equity has lower relative spreads. This is because the individual market makers with the highest relative spreads tend to have more transactions in derivatives, whereas market makers with lower relative spreads have more transactions in equity. Furthermore, as stated in section 2 the virtual group on spreads expects spreads on

[10] Of the 42 companies, 21 were established in 2017 or later.

[11] From 2020 onwards, this method can be used to estimate an average spread for each quarter.

equity to be lower than on other instruments. Therefore, it is assumed that relative spreads on equity are half the average spread, whereas spreads on derivatives are double the average spread.

Furthermore, relative spreads on debt securities are also set at half the average spread. For the market makers in S.125, trade in short term debt securities in negligible. Therefore, the relative spread from these market makers is not necessarily a good indicator for the short-term debt securities. As these short-term debt securities are much less volatile than the other instruments[12], it is assumed that the relative spread on short-term debt securities is half the spread on other instruments. Together, this results in the spreads as presented in table 2. In section 5, a sensitivity analysis is made with different distributions of the spreads over the instruments.

Table 3. Relative spread by instrument

	Relative spread
AF.31	0.037%
AF.32	0.074%
AF.511	0.037%
AF.711	0.149%
AF.712	0.149%

The average spread can only be calculated for 2020, and the average of the second and third quarter is taken as an estimate for 2019. However, for two of the largest market makers, a time series can be constructed from 2014 onwards. For one, survey data on the total transaction value from 2011 onwards is available[13], which allows us to create a time series. For the second, annual reports provide from 2012 onwards a time series of total value of exchange-traded products. This latter data is not fully consistent with data from the survey form 2020, but can be used to extrapolate a time series.

These two companies show a varying relative spread over time, without a structural direction upwards or downwards. For this reason, it is decided to keep the relative spread constant for the whole time series 2010 to 2019 at 0.074%. In section 5, a sensitivity analysis is made with a time dependent average spread, based on the data from these two market makers.

4.1.3 S.122 – Banks with market making activities

In the Netherlands, three banks have substantial market making activities.[14] An estimate of the gross trading income is based on the total transactions in assets for debt securities (F.3), equity (F.511) and derivatives (F.7) these bank have. These data are taken from the survey on financial transactions. For all asset categories except government debt securities (F.32 with counterpart sector S.13), it is assumed that all transactions generate spreads. The spreads are calculated as the transaction in assets multiplied by the relative spread.

[12] Relative spreads are higher when markets are more volatile.
[13] However, as data on gross trading income in the Netherlands has needed to many assumptions for the years 2011 till 2013, only gross trading income in the period from 2014 onwards is considered reliable enough for this purpose.
[14] At least one other bank has market making activities. As figures are very small however, only the three large banks are included.

For government debt securities, these banks act as primary dealer, for both debt securities from the Dutch government as well as for other governments. Primary dealers are (usually) the only parties that can directly purchase newly issued government debt securities, which they can sell to other parties. Although spreads can be earned on these issuances, these issuances are usually structured in a way to allow for limited spreads. In the Netherlands for example, primary dealers have to provide a bid to the government, which subsequently sells the debt securities to the highest bidders only after all bids are received. This allows the government to get the maximum price and lowers the possibility for banks to generate spreads. Primary dealers however receive a direct fee based on their purchases of the debt securities, compensation (at least partially) for lower spreads. Therefore, it is expected that the relative spreads on newly issued government debt securities are lower than the relative spreads on other instruments, including secondary trade in government debt securities.[15] Unfortunately, no distinction can be made in the data between trading government debt securities on the primary market and trading on the secondary market. Therefore, a general discount of regular margins is applied for transactions in government debt securities by banks. This discount is set at 40%. In section 5, a sensitivity analysis is made with different assumptions.

For issuances of corporate debt securities, it is assumed that the amounts involved are small. Therefore, no discount is applied to trade in corporate debt securities.

4.1.4 Production estimate

Table 4. Production of spreads in the total economy, million euros

Year	S.122	S.125	Total
2010	787	446	1233
2011	775	730	1505
2012	569	528	1097
2013	539	600	1140
2014	535	720	1255
2015	538	1015	1553
2016	493	957	1450
2017	408	713	1121
2018	206	1031	1236
2019	151	991	1142

The results for the total output of spreads are shown in table 4. Total production is relatively stable since 2010. Output in S.122 is however strongly decreasing whereas output in S.125 is strongly increasing. The large decrease of the output of S.122 is partly caused by the movement of market making activities to other countries. Apart from this, there is also a trend in the Netherlands in which banks are decreasing their market making activities and “pure” market makers are increasing their activities. Banking regulations may play a role in this shift, for example additional regulations on required capital reserves.

[15] It should be noted that no market maker in S.125 act as a primary dealer. The calculated average spread in S.125 therefore excludes the primary market in government debt securities.

4.2 Domestic consumption and foreign trade

The calculation of domestic consumption is based on the total transactions from surveys from DNB multiplied by the relative spread per asset category as presented in table 3.

For the total transactions, transactions in debt securities (F.3), listed shares (F.51) and derivatives (F.7) are taken from the survey on financial transactions. Furthermore, data are taken for non-financial corporations (sector S.11), most financial corporations (S.12), and households (S.14). Data for government (S.13) and nonprofit institutions serving households (S.15) are assumed negligible. Within the financial corporations, data from banks (S.122) and market makers (S.125) are excluded as it is assumed that they always trade directly on the market.[16] Furthermore, data from most captive financial institutions (S.127) are excluded as investigation of the institutions with the largest assets showed that all assets where positions with the multinational enterprise (MNE) they are related to. It is assumed that these transactions were made without a market maker in between. Only captives that are the controlling parent of the MNE are included in the calculation of spreads.[17] For households, it is assumed that the whole use of spreads is household final consumption expenditure and that there is no intermediate consumption.

In the calculation of the spreads, for money market funds (S.123) investment funds (S.124), insurance companies (S.128) and pension funds (S.129) only 80% of the spreads are included. As these are all professional investors, it is assumed that they pay on average a smaller spread, because A) a part of their trade is directly paid for ("over the counter") instead of purchased from market makers, B) they purchase a new issuance of for example government debt securities directly where spreads are lower, or C) the duration of an asset (debt security or some derivatives) expires and the "sale" of the asset is the final settlement which does not involve a market maker. Section 5 provides a sensitivity analysis on this choice.

To estimate export, an expert guess is that 85% of all domestic production is exported. This is based on an estimate from the largest markets makers that 80% to 90% of their transactions have a foreign counterparty. Imports are determined as a residual. It should be noted that the chosen ratio of export has no impact on GDP and GNI, as with this method every adjustment on exports is compensated by an equal adjustment on imports.

Together, these data and assumptions lead to the data in table 5.

[16] For market makers, the respondents explicitly confirm this.

[17] In practice, this means captives that are listed directly on a stock exchange.

Table 5. Main aggregates for spreads, million euros

Year	Production	Export	Import	Int. Cons.	HFCE
2010	1233	1048	889	1038	35
2011	1505	1279	700	891	34
2012	1097	932	658	799	23
2013	1140	969	619	766	24
2014	1255	1067	625	785	28
2015	1553	1320	682	888	27
2016	1450	1232	747	942	22
2017	1121	953	803	947	25
2018	1236	1051	822	978	30
2019	1142	971	889	1031	30

From the use side, it is possible to make a broad check on the plausibility of the value for intermediate consumption. For this, annual reports from pension funds can be used. From 2017 onwards, insurance companies and pension funds are required to include the spreads on transactions in financial assets as cost in their annual reports.[18] This requirement is also included in the surveys by DNB. As this is just part of the cost of their investments, the annual reports (and the surveys from DNB) cannot directly show the intermediate use of spreads. However, for the year in which they included this requirement in their annual report, both old and new definitions of costs are available. This makes it possible to estimate the spreads for this year.[19]

For the check, the use of spreads on debt securities and listed equity by two of the largest pension funds is multiplied by their share in the total asset of debt securities and listed equity for pension funds (S.129) and investment funds (S.124).[20] [21] These two pension funds own (directly and indirectly through the investment funds) 40% of all debt securities and 45% of all listed equity of Dutch investment funds and pension funds together. This results in an estimate for spreads that is for both debt securities and for listed equity within 20% of the value of spread calculated for S.124 and S.129 together with the method using transactions and relative spreads. The comparison thus validates the plausibility of the results on intermediate consumption.

4.3 Impact on GDP

The impact of including spreads within output on the aggregates of the national accounts is different from the direct estimate of spreads. The reason for this is that the output of some of the users of spreads is based on their cost. This is the case for the central bank (S.121), money-market funds (S.123), investment funds (S.124), life insurance services (part of S.128) and pension funds (S.129). For all of these sectors, including the use of spreads leads to an increase

[18] The requirements are in line with the definition of spreads in ESA 2010. See *Aanbevelingen Uitvoeringskosten* (in Dutch), section 7.4 for details.

[19] These data are not available on a structural basis and therefore cannot be used in general method for estimating spreads.

[20] For derivatives, no adequate data was available.

[21] The requirements for the annual reports include spreads on transactions made by investment funds in which the pension funds have invested. Part of the recorded spreads are therefore spreads paid by the investment funds.

of intermediate consumption, which will in turn lead to an increase in output. The additional output is ultimately household final consumption expenditure and / or export.[22]

As insurance companies and pension funds, either directly or indirectly, consume most of the spreads, the overall impact on main aggregates is much larger. Table 6 shows the results. The impact on GDP in table 6 is much higher than the impact without additional adjustments on supply and use as presented in table 5. Differences are especially large for household final consumption. HFCE of spreads in 2019 is only 30 million euros, but after including additional HFCE of the output of investment funds, and insurance companies and pension funds, HFCE is 894 million euros.

Table 6. Main aggregates for spreads, including additional adjustments on supply and use, million euros

Year	Production	Export	Import	Int. Cons.	HFCE	GDP
2010	2637	1069	889	1553	904	1084
2011	2675	1296	700	1300	779	1376
2012	2086	945	658	1110	689	976
2013	2093	981	619	1073	657	1020
2014	2262	1080	625	1116	690	1146
2015	2690	1336	682	1269	767	1421
2016	2617	1248	747	1347	769	1270
2017	2298	970	803	1355	776	943
2018	2407	1066	822	1331	832	1076
2019	2418	989	889	1424	894	994

[22] This may take several rounds of increasing output and use. Adding intermediate use for investment funds leads to an increase in output. This output is in turn largely used by pension funds, leading to an increase in output of pension funds. Households subsequently consume this. The use of spreads of 100 by investment funds leads in this case to almost 200 in addition output (100 by S.124, almost 100 by S.129).

5. Sensitivity analysis and difference with current national accounts

5.1 Sensitivity analysis

The sensitivity analysis presented in this section consist of two parts. First, for a single year (2019), differences in output, intermediate consumption, export, imports, household final consumption expenditure and GDP are shown. Second, the impact on GDP is shown for the time series 2010 until 2020.

For the sensitivity analysis, nine different scenarios are used.

- A1. For the grossing up of sector S.125, the ratio of total assets is used instead of the average of the ratio for total assets and the ratio for employed persons.
- A2. For the grossing up of sector S.125, the ratio of employed persons is used instead of the average of the ratio for total assets and the ratio for employed persons.
- A3. It is assumed that the relative spread for equity and derivatives are equal to the average spread of market makers, instead of half this average for equity and double this average for derivatives.
- A4. A more pronounced differentiation of the relative spreads is used. Relative spreads on short-term debt securities (F.31) are set at 1/4th of the average spreads, relative spreads on long-term debt securities (F.31) and equity (F.511) are set at half the average spread and relative spreads on derivatives (F.7) are set at three times the average spread.
- A5. In the base scenario, a 40% discount is used for produced spreads by banks (S.122) on government debt securities (F.32). In this alternative, no discount is used.
- A6. In the base scenario, a 40% discount is used for produced spreads by banks (S.122) on government debt securities (F.32). In this alternative, a discount of 70% is used.
- A7. In the base scenario, for S.123, S.124, S.128 and S.129 a discount of 20% is used in the calculation of their intermediate use of spreads. In this alternative, no discount is used.
- A8. In the base scenario, for S.123, S.124, S.128 and S.129 a discount of 20% is used in the calculation of their intermediate use of spreads. In this alternative, a discount of 40% is used.
- A9. In this alternative, a time dependent average spread is used, a described in section 4.1.2.

It should be noted that changing the ratio of output that is exported has no impact on GDP, as all adjustments on exports are compensated by an adjustment on imports. For this reason, no sensitivity analysis on this ratio is made.

Table 7. Output, Imports and final use of spreads for alternative estimates, 2019, million euros.

	Base	A1	A2	A3	A4	A5	A6	A7	A8	A9
Output	1142	1088	1196	1130	1091	1164	1125	1142	1142	1142
Intermediate Consumption	1031	1031	1031	1115	782	1031	1031	1262	799	1031
Exports	971	925	1017	960	927	989	957	971	971	971
Imports	889	897	881	1000	646	886	892	1121	658	889
HFCE	30	30	30	55	28	30	30	30	30	30

Table 8. Effects of alternative scenarios on main aggregates for altenative estimates, 2019, million euros

	Base	A1	A2	A3	A4	A5	A6	A7	A8	A9
Output	2418	2364	2472	2598	2059	2440	2402	2731	2106	2418
Intermediate Consumption	1424	1424	1424	1603	1084	1424	1424	1747	1101	1424
Exports	989	943	1035	983	941	1007	975	993	984	989
Imports	889	897	881	1000	646	886	892	1121	658	889
HFCE	894	894	894	1013	681	894	894	1111	678	894
GDP	994	940	1048	996	976	1016	977	983	1005	994
GDP difference with base estimate		-54	54	2	-18	22	-17	-11	11	0
As percentage of GNI		-0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7 and 8 show the results for 2019. Table 7 shows only the supply and use of spreads, whereas table 8 also includes additional adjustments on supply and use. As seen in table 7, the largest difference for spreads are for alternatives A7 and A8, where intermediate consumption is around 230 million euros higher (A7) or lower (A8) than the base scenario. However, most of these spreads are consumed by investment funds, insurance companies and pension funds. The increase (decrease) of intermediate consumption leads to an almost equal increase (decrease) of output and household final consumption expenditure. As a result, GDP for alternatives A7 and A8 is hardly different from the base scenario.

For 2019, the largest difference in GDP occur in scenarios A1 and A2. In these scenarios, output of S.125 is adjusted, which directly impacts GDP. Scenarios A3 and A4, where the relative spreads are distributed differently over the different instruments has little impact on GDP. Scenarios A5 and A6 have little impact on GDP as the produced spreads on government debt securities by Dutch banks are low in 2019. For A9 the results for 2019 are exactly the same as for the base scenario, as only the time series 2010-2018 for the relative spreads is changed.

Many of these alternatives (A3, A4, A7 and A8) lead to different intermediate consumption by investment funds (S.124) and pension funds (S.129). The validation of the results with the data from the annual reports of pension funds (see section 4.2) can be replicated for these alternative scenarios. The results are shown in table 9. As can be seen, for none of these alternatives, use of spreads for S.124 and S.129 is near the method based on annual reports. Considering crudeness in the method based on annual reports however, results for A7 an A8 may possibly still be called plausible.[23]

Table 9. Differences between calculated spread S.124 and S.129 with broad estimate based on annual reports

	Base	A3	A4	A7	A8
F.3					
2017	-5%	-5%	90%	-24%	27%
2018	-3%	-3%	93%	-23%	29%
Average	-4%	-4%	92%	-23%	28%
F.511					
2017	13%	-43%	13%	-9%	51%
2018	-21%	-61%	-21%	-37%	5%
Average	-4%	-52%	-4%	-23%	28%

[23] This crudeness is for the largest part caused by the assumption that the ratio of assets owned is a good approximation of the ratio of spreads paid. In reality, it should mirror the ratio of assets bought and sold in a year.

Although differences in GDP are small for 2019, this is not necessarily the case for the entire time series. Table 10 shows the differences in GDP with the base scenario for the time series 2010-2019. For A1, A2, A3, A7, A8 and A9, differences are small for the entire time series. For A4, A5 and A6, differences in the period 2010-2016 range between almost 100 million euros to more than 250 million euros. In this period banks (S.122) have very large transactions in (governments) debt securities. These three alternatives assume a much different average spread on (government) debt securities[24], resulting in a large difference in output by S.122 and therefore a large difference in GDP.

In both absolute and relative terms, the largest differences occur in 2010 and 2011, when differences in GDP for A4 and A5 are around 250 million euros, or 0.04 percent of GNI.

Table 10. Effects of alternative scenarios on GDP for altenative estimates, difference with base estimate, million

	Base	A1	A2	A3	A4	A5	A6	A7	A8	A9
2010	1084	-12	12	5	-242	253	-190	-15	15	1
2011	1376	-21	21	24	-272	216	-162	-14	14	1
2012	976	-17	17	31	-206	124	-93	-14	14	1
2013	1020	-20	20	30	-205	121	-90	-15	15	1
2014	1146	-25	25	5	-201	140	-105	-15	15	1
2015	1421	-37	37	-1	-180	130	-98	-13	13	-28
2016	1270	-37	37	-43	-147	106	-79	-15	15	-37
2017	943	-29	29	-26	-96	84	-63	-13	13	9
2018	1076	-46	46	-26	7	32	-24	-13	13	1
2019	994	-54	54	2	-18	22	-16	-11	11	0

We could also create extreme scenarios, in which assumptions leading to a lower (or higher) GDP are combined. However, combining alternatives A4 (with a lower relative spread for debt securities) and A6 (with a large discount on producing spreads on government debt securities) is deemed not plausible, as this would lead to extremely low relative spreads on government debt securities. As the other combinations would only combine A4, A5 or A6 with assumptions with a small impact on GDP, the results would not be significantly different from the results from alternatives A4, A5 and A6.

It can be concluded that for 2018 and 2019, different assumptions have a limited impact on the resulting GDP. Furthermore, many of these alternative assumptions result in intermediate use by sectors S.124 and S.129 that are not plausible. The results can therefore be seen as very robust for these years. In the time series, alternative assumptions have a large effect. Alternative assumptions on the average spread on (government) debt securities have the largest impact, up to 0.04 percent of GNI. This can reasonably be seen as the maximum uncertainty in the estimate of the impact of spreads on GNI.

5.2 Differences with current national accounts

Tables 11 and 12 show the differences between the base scenario and the method currently implemented in the Dutch national accounts.

[24] Alternatives A5 and A6 assume a different average spread for government debt securities, alternative A4 assumes a different average spread for all debt securities.

Table 11. Base scenario compared with estimate for current national accounts, million euros.

	Output			Intermediate consumption			GDP		
	Base	NA	Difference	Base	NA	Difference	Base	NA	Difference
2010	2637	2528	109	1553	1352	201	1084	1176	-92
2011	2675	2308	367	1299	1153	146	1376	1155	221
2012	2086	1945	141	1110	961	149	976	984	-8
2013	2093	1916	177	1073	943	130	1020	973	47
2014	2262	1862	400	1116	999	117	1146	863	283
2015	2690	2242	448	1269	1095	174	1421	1147	274
2016	2617	2176	441	1347	1090	257	1270	1086	184
2017	2298	2302	-4	1355	1189	166	943	1113	-170
2018	2407	2439	-32	1331	1111	220	1076	1328	-252
2019	2418	2669	-251	1424	1293	131	994	1376	-382

Table 12. Base scenario compared with estimate for current national accounts, million euros.

	Exports			Imports			HFCE		
	Base	NA	Difference	Base	NA	Difference	Base	NA	Difference
2010	1069	1121	-52	889	812	77	904	867	37
2011	1297	1075	222	700	696	4	779	776	3
2012	945	907	38	658	581	77	689	658	31
2013	982	903	79	619	572	47	657	642	15
2014	1081	791	290	625	613	12	690	685	5
2015	1336	1067	269	682	672	10	767	752	15
2016	1248	1014	234	747	677	70	769	749	20
2017	970	1047	-77	803	719	84	776	785	-9
2018	1066	1274	-208	822	720	102	832	774	58
2019	989	1332	-343	889	845	44	894	889	5

Differences in GDP vary between -381 million euros in 2019 and +284 million euros in 2014. This wide variation is caused by differences in output. Differences in intermediate consumption and household final consumption expenditure are relatively stable. As exports are derived from output, differences in exports show the same variation as differences in output.

The difference in the estimate of spreads for the national accounts is not the same as the difference in the national accounts after implementing it in full in the national accounts. First, the use of spreads by insurance companies and pension funds is already included in the surveyed data from 2017 onwards, both directly on their own transactions and indirectly on transactions of investment funds in which they participate. Information from 2017 was used in the 2015 benchmark revision and the subsequent time series, so that estimates for spreads were included in their intermediate use for the entire time series. These data therefore have to be excluded when adding the estimate of spreads to the national accounts.

Secondly, a double counting has been found in the current national accounts, where the spreads on the transactions of insurance companies and pension funds have been included twice.[25] The reason for this double counting is that it was not known that the survey of insurance companies and pension funds included the use of spreads. Therefore, an estimate of the use of spreads was added to the use from the survey while it was already included in the survey. This double counting should be removed when implementing the new estimate for spreads.

[25] Spreads on transactions by insurance companies in which the insurance companies and investment funds participate are only included once.

Lastly, the first two adjustments lead to balancing differences in the national accounts, which have to be solved. It is estimated that of the resulting balancing differences 25 percent impact household final consumption expenditure and 75 percent impacts intermediate consumption.[26]

Table 13. Breakdown of required adjustments for 2019, million euros

	Output	Int. Cons.	Exports	Imports	HFCE
Direct estimate spreads	-297	121	-343	44	-30
Additional adjustments SUT	46	10	0	0	35
Excluding int. cons. S.128 and S.129	-38	-38	0	0	-38
Removal of double counting	-433	-454	0	0	-433
Balancing adjustments	0	368	0	0	124
Total	-722	7	-343	44	-342

Table 13 shows for 2019 the breakdown of the required adjustments into different components. As can be seen, the removal of the double counting in the current national accounts has a large impact on output, intermediate consumption and household final consumption expenditure. For the latter two categories, these adjustments are partially offset by the subsequent balancing adjustments.

Finally, table 14 shows the time series of all the required adjustments of the Dutch national accounts. In 2019, the required adjustment on GDP is -728 million euros, or 0.09 percent of GNI. In earlier years, the adjustments were smaller, in 2014 even positive, following the adjustments in output.

Table 14. Required adjustments on the national accounts

	Output	Int. Cons.	Exports	Imports	HFCE	GDP	GDP as % of GNI
2010	-272	97	-51	78	-240	-369	-0.06%
2011	19	53	222	5	-251	-34	-0.01%
2012	-226	48	38	76	-236	-274	-0.04%
2013	-159	37	79	47	-228	-196	-0.03%
2014	57	22	291	12	-244	35	0.01%
2015	56	68	270	9	-273	-12	0.00%
2016	41	151	235	70	-275	-110	-0.02%
2017	-373	68	-75	84	-282	-441	-0.06%
2018	-512	94	-208	102	-296	-606	-0.08%
2019	-721	7	-343	44	-341	-728	-0.09%

[26] The impact on imports and exports is assumed small.

6. Summary and conclusions

Measuring spreads is difficult. For the largest Dutch market makers, data on output are available. For output of banks and for intermediate consumption, an estimate of the relative spreads is the starting point. This estimate is based on the ratio of the produced spreads and the total transactions in the relevant assets (debt securities, equity and derivatives) by the Dutch market makers. This average spread is combined with the total transactions in the relevant assets to produce an estimate of output (for banks) and intermediate use (for other sectors). As most spreads are used by sectors in which output is measured as the sum of cost, like investment funds and pension funds, this leads to additional adjustments to output, intermediate consumption and household final consumption expenditure.

Sensitivity analyses shows that different assumptions have little impact on the results for 2018 and 2019. For assumptions concerning the spreads on government debt securities, the impact in the period 2010-2016 is larger. In 2010 and 2011 different assumptions lead to differences of about 250 million euros, large but well below the materiality threshold.

In the process of improving the estimates for spreads, a double counting was found in the intermediate use of insurance companies and pension funds, where intermediate use of spreads is included in the survey data. The removal of this double counting is included in the results of the improved estimated. Together, this leads to adjustments in GDP that range between +35 million euros (in 2014) and -728 million euros (in 2019). This is below the GNI materiality threshold for all years.

A sensitivity analysis shows that the data for 2018 and 2019 are robust. Changing the assumptions underlying the estimates for spreads has for these years at most an impact of 54 million euros. For earlier years, changing the assumptions on the spreads on trade in (government) debt securities has a larger impact, up to 272 million euros (in 2011). For all the other assumptions, the impact is limited for the entire time series.

After verification of the proposed method by the Eurostat team on statistics for administrative purposes (unit C3), the data Dutch transmissions on GNI for own resources will be updated with the results from this new method. This will take the form of a bridge table in the GNI Report on Quality explaining the differences with the current national accounts.

Adjusting the official national accounts (and the balance of payments) is not yet feasible. In order to update the official national account, three additional steps need to be taken. First, quarterly data have to be produced. Second, a time series from 1995 onwards has to be made, as the ESA transmission program requires consistent data from 1995 onwards. Last, for full implementation much more detail is required. Examples are the breakdown of the adjustments in intermediate consumption into industries and the breakdown of adjustments to imports and exports into counterpart countries. A further extended method, including all required details, will be implemented in the national accounts with the 2024 benchmark revision.

7. References

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