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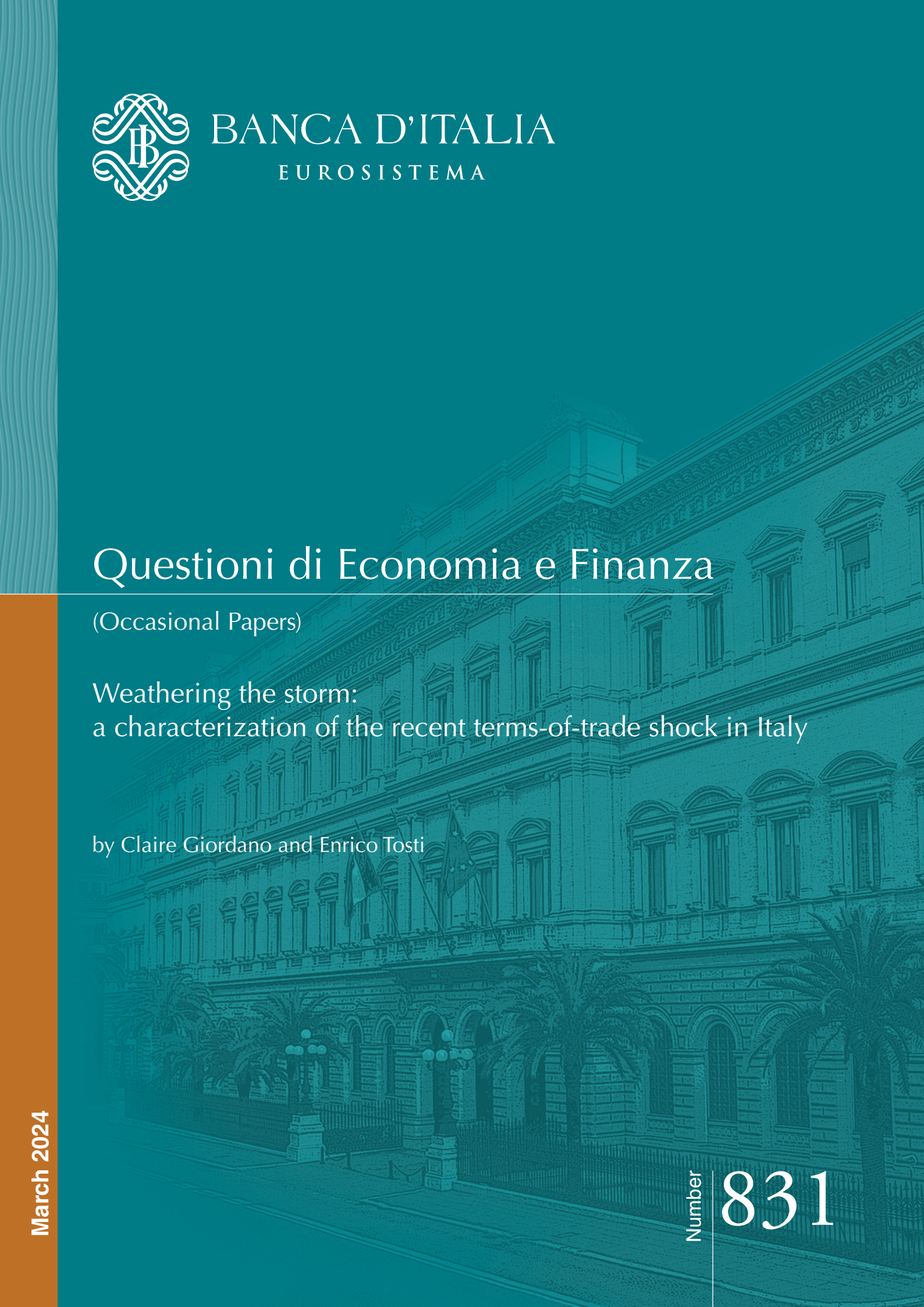

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WEATHERING THE STORM: A CHARACTERIZATION OF THE RECENT TERMS-OF-TRADE SHOCK IN ITALY

by Claire Giordano and Enrico Tosti[1]

Abstract

This study analyses the negative shock to Italy's terms of trade since the second half of 2021: the shock was less pronounced than the 1973-74 oil crisis, yet particularly sharp. The terms-of-trade deterioration was driven by energy goods and was greater than in the other euro-area economies due to a higher rise in energy import prices and to a greater share of energy products in total imports. The energy component was also the main driver both of the strong deterioration in the current account balance and of the large negative income effect. At any rate, Italy has successfully weathered the storm: the gradual recovery in the terms of trade since 2022 has led to the return to a positive current account balance and to a positive income effect.

JEL Classification: F10, F40, Q40.
Keywords: terms of trade, energy prices, energy shock.
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1. Introduction[1]

The COVID-19 pandemic and the subsequent economic rebound were a watershed for the world economy. After the pandemic-induced contraction in economic activity and muted prices in 2020, as of 2021 energy prices in particular began to rise in tandem with aggregate demand regaining momentum. Meanwhile, in the second part of that year the price of key materials and intermediate goods started to increase, owing to global input shortages and international logistics difficulties triggered by further COVID-19 outbreaks and restrictive policies in several regions, amidst strong demand from the global recovery and measures taken by firms involved in supply chains to build up stocks to increase resilience (Celasun *et al.*, 2022). The rebound from the initial phase of the pandemic also led to an increasing mismatch between demand and supply specifically in the oil and natural gas markets (Neri, 2023); the rise in natural gas prices was further boosted by the cuts in gas supplies from Russia, initially on account of the weather conditions, and later as a form of political pressure related to the controversial opening of the Nord Stream 2 pipeline (Visco, 2023).

In February 2022 the Russian invasion of Ukraine led to further, exceptional price hikes as a result both of input shortages of strategic components produced in the war-zone and of the effects of the economic sanctions on Russia introduced by the international community. These developments boosted euro-area countries' import and export prices in a heterogeneous fashion according to their energy (especially natural gas) and strategic input dependence from abroad and led to exceptional negative terms-of-trade (TOT) shocks. The latter in turn affected both current account (CA) balances and, ultimately, economic activity.

In a context of receding energy prices as of the last months of 2022, the gradual substitution away from Russian energy sources and input supplier diversification contributed to interrupt the TOT deterioration. However, the ongoing warfare and high geopolitical tensions – including the Middle-east crisis – suggest that more severe fragmentation of commodity trade is a major risk (IMF, 2023) and that energy and critical input markets remain tight. As a result, volatility in energy and input prices is currently still high and the short and medium-term TOT developments and their real effects uncertain.

This note aims at measuring the recent negative TOT shock for Italy, for goods and for services, setting it both in a historical perspective and in an international comparison within the euro area. The task is not trivial as regards recent developments. Indeed, although our TOT measures are based on official national accounts (NA), in order to obtain a sectoral disaggregation to gauge their main drivers we resort to average unit values (AUV), the source employed specifically for energy products, and compare developments specifically in energy AUV across countries. Via standard accounting procedures, the note finally measures some implications of recent TOT trends for the CA balance and GDP of the four main euro-area economies, up until the third quarter of 2023, for which data are currently available.

The remainder of the note is organized as follows. Section 2 reconstructs Italy's TOT series since 1961 and then zooms into their developments since the energy crisis. Section 3 compares recent TOT dynamics in Italy with those in the three other main euro-area economies. Section 4 compares the

[1] This note is based on data available on 12th December 2023. We are grateful to Silvia Fabiani, Stefano Federico and Alfonso Rosolia for useful suggestions on previous drafts, and to Francesca Di Palma, Maria Moscufo, Carmela Pascucci and Fabio Rapiti, all from Istat, for clarifications on official data sources and methods. The views expressed herein are those of the Authors and not of the institution represented.

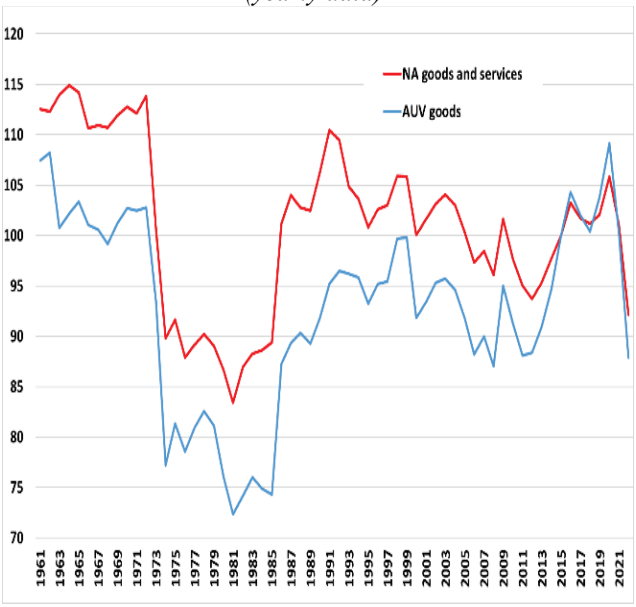
2021-22 trends in goods NA deflators to those in the primary sources, producer price indices (PPI) and AUV, within and across the four countries. It also exploits the Broad Economic Classification breakdown of the AUV to compare developments in particular in the energy import and export AUV. Section 5 illustrates the implications of the TOT shock for the CA balance and quantifies the overall income effect for the four euro-area economies. Section 6 draws some conclusions.

2. Italy's terms of trade: a historical perspective and a focus on recent developments

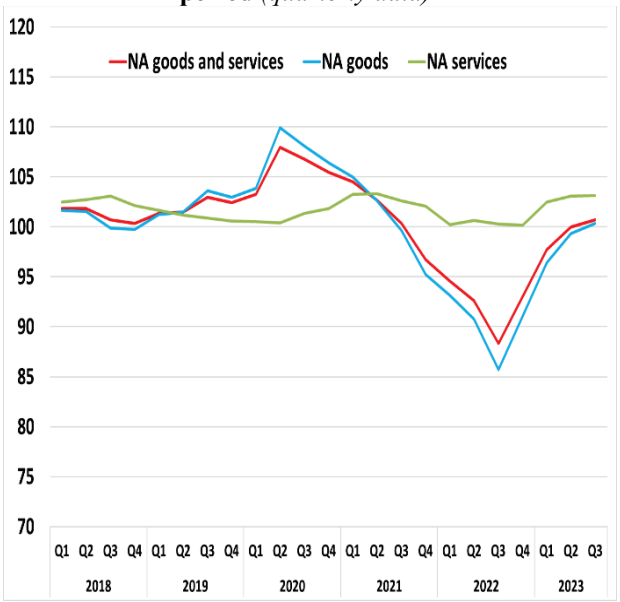
Italy's aggregate and goods TOT have moved hand in hand since 1961 (Fig. 1, left-hand side panel).[2] The 2021-22 fall was more contained than that observed during the oil shock in 1973-74, but still very pronounced (-13.0 per cent versus -21.1, respectively, for the aggregate TOT and -19.5 per cent versus -24.9, respectively, for the goods TOT).

Figure 1. Italy's terms of trade
(index 2015=100)

Aggregate and goods terms of trade from 1961 *(yearly data)*



Goods and services terms of trade in the recent period *(quarterly data)*



Source: Authors' calculations on Istat-Ice foreign trade average unit value data, Istat annual national accounts and Baffigi (2015) for the left hand-side panel and Istat quarterly national accounts for the right hand-side panel.

Zooming into the last 25 years allows switching to the quarterly frequency.[3] After the temporary positive blip during the first wave of the pandemic, Italy's TOT began to rapidly deteriorate in the course of 2021 when energy prices started to rise and global supply bottlenecks began to kick in, reaching its lowest level in the third quarter of 2022, when its year-on-year decline peaked at nearly 12 percentage points (Fig. 1, right-hand side panel).

[2] We splice official annual NA data with Baffigi's (2015) historical NA to construct the aggregate TOT. Baffigi (2015) does not allow computing the goods and services TOT separately, as the goods vs. services breakdown is not available for exports and imports, neither in value nor in volume terms. The long-run goods TOT is hence by us calculated as the ratio of AUV of exports and imports, sourced from various vintages of (annualized) Istat-Ice foreign trade data. The long-run correlation coefficient between the aggregate and the goods series is equal to 0.9. In Annex A we describe the general statistical differences between the various export and import price statistics available.

[3] We consider seasonally unadjusted quarterly NA deflators in order to be consistent with the other price data sources discussed further on. Moreover, there is no clear seasonality pattern in energy goods imports (e.g. imports of natural gas are broadly constant throughout the year even if consumption is not, due to stock-piling activity).

Since then the TOT has improved, albeit still not fully recovering its 2019 values by mid-2023. As already noted for the long run, the dynamics of the aggregate index reflected those in the goods TOT and were muted, albeit only partly, by the broad stability in the services TOT.

TOT developments can be broken down further into changes in NA import and export deflators (Table B1 in Annex B). The goods and hence the aggregate TOT deterioration between the second half of 2021 and the third quarter of 2022 was driven by a more than double increase in import relative to export deflators.

By contrast, for services the export deflator grew nearly as much as the import counterpart. Since the end of 2022 the average year-on-year growth rates of both import and export deflators of goods has dropped drastically, turning negative for the former and remaining positive for the latter. For services, import deflator growth has decreased to a rate that is lower than the roughly stable export deflator growth rate.

To conclude, given their weight in trade and the specific nature of the 2021-22 shocks, a focus on goods is sufficient to capture most of the recent aggregate TOT developments. Moreover, the exceptional rise in import deflator growth and its subsequent decline appears to be the main cause of Italy's TOT deterioration and following improvement.

3. The terms-of-trade shock in the four main euro-area economies

In this section we compare Italy's TOT with that of its main euro-area peers in order to better quantify the relative shock to Italy. The decline in the TOT and in particular in its goods component was significantly stronger in Italy than in the other three main euro-area economies (Fig. 2).[4] Relative to Germany and especially France, the developments in Italy's services TOT were also slightly less favourable.

Spain – whose aggregate TOT declined only to a moderately lesser extent than Italy's in 2021-22 – displayed very different developments to the other economies, since its goods TOT deterioration was the smallest amongst the four countries and its services TOT has recorded a stark downward trend since 2018, broadly stabilising only in 2023.

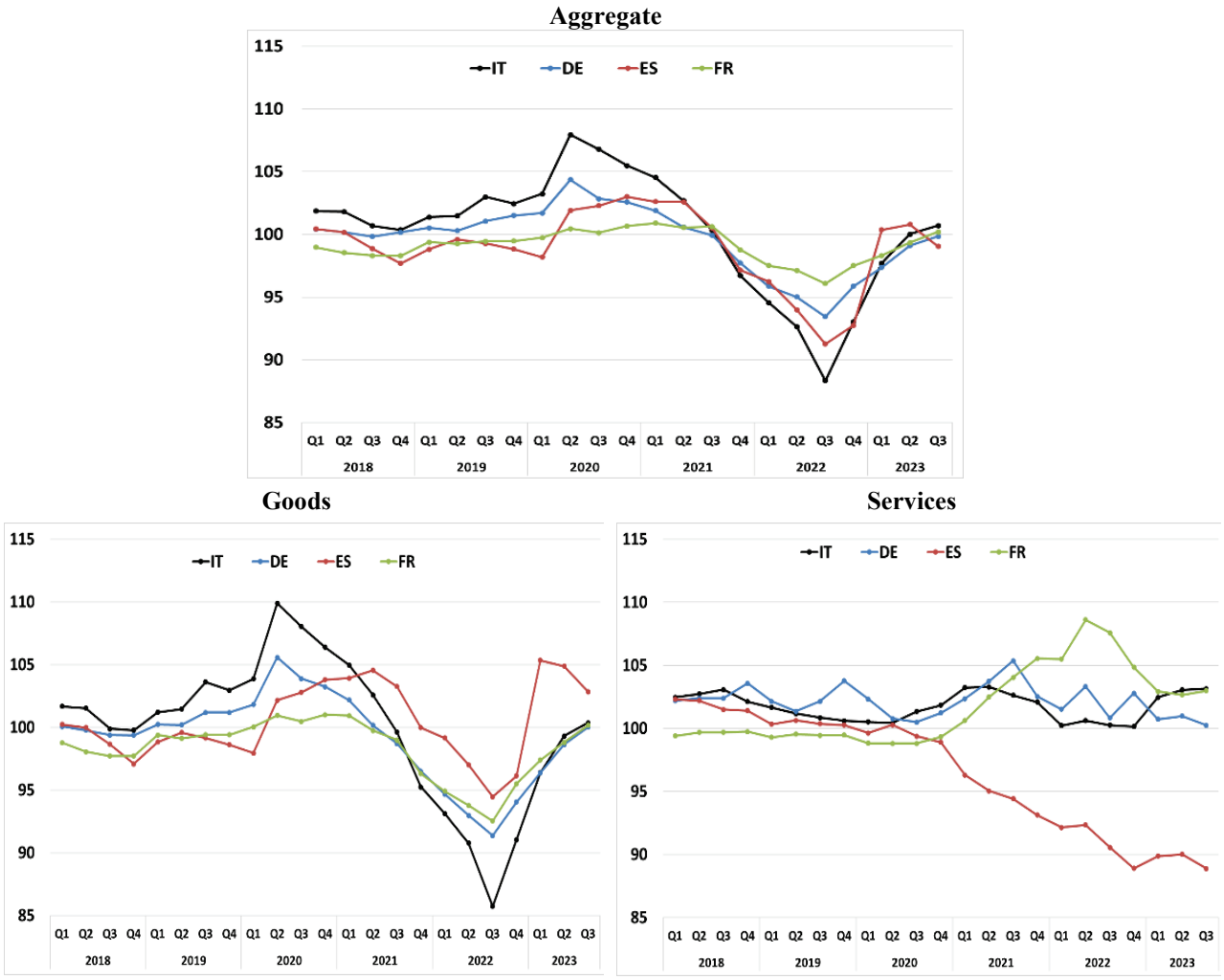
The stronger decline in Italy's goods TOT in the period between the third quarter of 2021 and the third quarter of 2022 was due both to a significantly higher rise in the goods import deflator in comparison with France and Germany and to low export deflator growth, which was broadly in line with Germany and France (Figure 3; Table B1 in Annex B).[5]

[4] The exceptional hike in Italy's goods TOT in the second quarter of 2020 was due to a significantly stronger decline in the country's import relative to the export deflator. The fall in the import deflator was common to the other economies, but was less pronounced.

[5] In general for all four economies under study, volatility – measured by the standard deviation in the quarterly time series since 1999 – is higher for goods import deflators than corresponding export deflators (Table B2 in Annex B). This is consistent with the finding in Di Pace et al. (2020) for countries with high commodity import shares. Goods export and import deflators are highly correlated (Fig. 3), plausibly because they are generally driven by common macroeconomic shocks, such as recently the global economic activity shock in 2020 and the 2021-22 energy shock, which could simultaneously move export and import prices in the same direction. Therefore, the volatility of the TOT is smaller than the volatility of the two deflators. Finally, goods export and import deflators are more persistent (in terms of the first-order correlation) than the goods TOT (again see Table B2).

Figure 2. Terms of trade in the four main euro-area economies

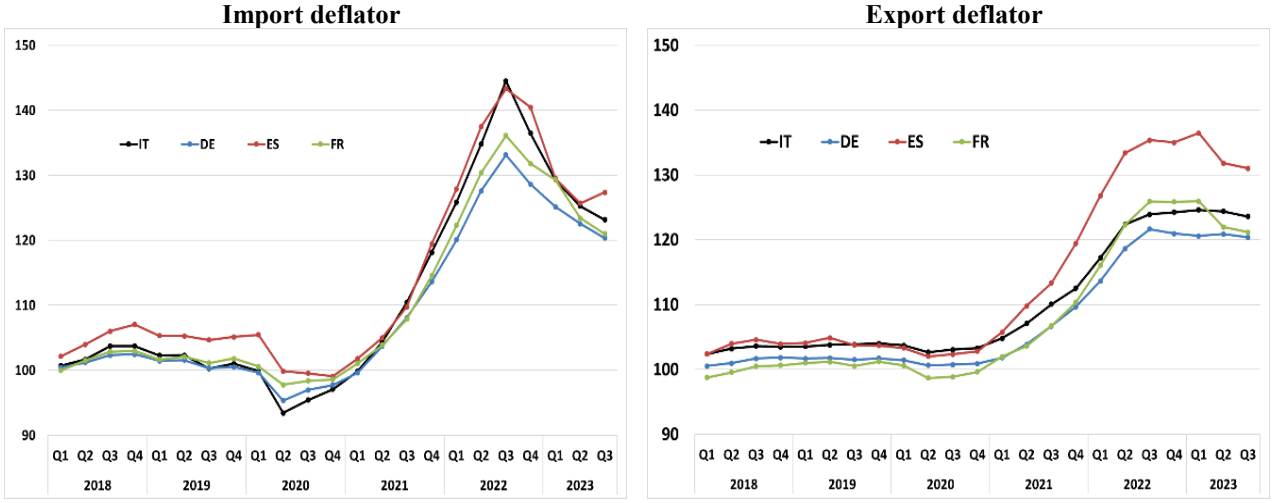
(quarterly data; index 2015=100)



Source: Authors' calculations on Istat and Eurostat quarterly national accounts.

Figure 3. Goods import and export deflators in the four main euro-area countries

(quarterly data; index 2015=100)



Source: Authors' calculations on Istat and Eurostat quarterly national accounts.

In Spain the goods import deflator increased only to a moderately lower extent than in Italy, but this development was offset by a comparatively large pass-through to export prices,[6] in turn leading to the limited fall in this country's goods TOT.

To conclude, the 2021-22 rise in Italy's import deflator was particularly strong in an international comparison, comparable only to that in Spain, where however export deflator growth was also very high, differently to Italy and to the other economies. This strong import deflator growth largely explains the more pronounced decline in Italy's goods and aggregate TOT relative to its euro-area peers.

In order to dig deeper into the causes of the sharper TOT deterioration in Italy, we need to employ sectoral data, which are available at the Broad Economic Category (BEC) level, for both PPI and AUV. Before delving into these breakdowns, it is useful to investigate and compare the underlying price data sources of NA deflators, as done in the following section.

4. A comparison across prices of imported and exported goods within and across the four euro-area economies

4.1 Total goods prices

As discussed in detail in Annex A, Italy's NA goods export deflators are based on export PPI, with the exception of energy goods different from refined petroleum, for which export AUV are employed. The corresponding import deflators are based on import PPI with the exceptions of agricultural goods not tracked by the producer price survey and, more importantly, energy goods, for which import AUV are used.

Whereas the export deflator and the export PPI have gone hand in hand even in recent quarters, in 2021-22 the goods import deflator rose significantly more than the import PPI, albeit less than the import AUV (Fig. 4 and Table A1). As we will document later on, the more pronounced deflator relative to PPI dynamics are due to the increasing weight of the faster-growing energy AUV data underlying the construction of the NA deflator. In turn, the slower growth of energy and hence aggregate PPI was due to data quality issues of the producer price survey for several energy items, which were corrected by Istat as of 2022 (again see Annex A). The rate of change of the import PPI and the NA import deflator became on average comparable again only in 2023, when the energy shock subsided.

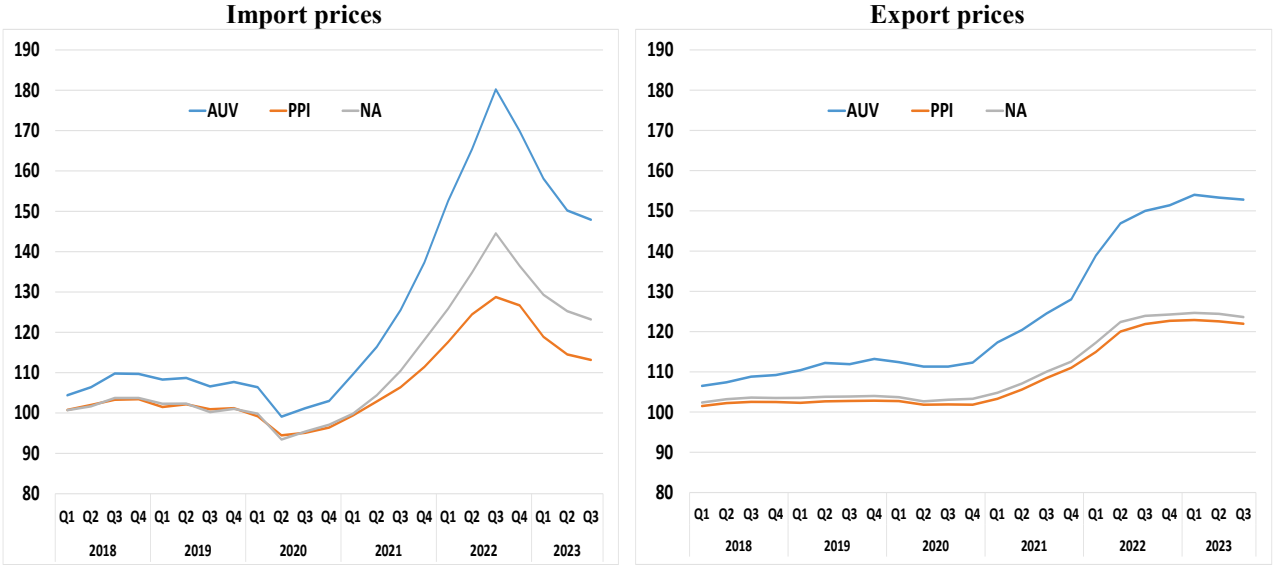
These dynamics imply that if one were to compute Italy's TOT developments according to PPI, the 2021-22 shock would turn out to be significantly more muted (Fig. B1 in Annex B). By contrast, the

[6] As in Figure B2 in Annex B, Spain's import deflator tracks PPI developments very well. According to national experts reported in Giglioli and Giordano (2023), Spain recorded strong manufacturing PPI growth in 2021-22 (which in turn contributed to the large rise in the industry excluding construction PPI documented in Figure B2). This was in turn a result of the swift pass-through of wholesale gas prices to electricity prices, due to the pricing mechanism in the Spanish electricity market. In particular, PPI surged in the oil refining industry; moreover, the sharp increase in electricity prices was especially reflected in prices of energy-intensive sectors. Plausibly Spain managed to pass-through especially its higher energy import to export prices. As documented in García Esteban *et al.* (2023), Spain has a comparative advantage as an alternative source of supply for the European countries most dependent on Russian gas. Indeed, its geographical location allows Spain to be the leading EU country in terms of availability of liquefied natural gas transport, storage and treatment infrastructures. Both these factors contributed to the boost in Spain's energy goods exports in 2022, with a particularly strong increase in re-exports of natural gas to other European countries, which could be traded at high prices.

trends in the AUV-based TOT series would have been quite similar to those of the NA TOT over the past five years.

Figure 4. Italy's goods import and export prices according to various sources

(index 2015=100)



Source: Authors' calculations on Istat quarterly national accounts, foreign trade and producer price index data.

As regards the other main euro-area economies, we are not aware of the exact methodology underlying the construction of NA deflators, but PPI and AUV are still anyhow the primary sources.[7] As seen in Figure B2 in Annex B, AUV import dynamics have generally been more pronounced than those of import PPI during the energy crisis, with the exception of Germany.[8]

However, whereas Italy recorded a large positive gap between the trends of the import deflator and that of the corresponding PPI in 2021-22, France and, above all, Germany showed a significant negative differential (see also Figure B3), in that in the latter two countries goods import deflator growth was much more muted than import PPI growth.[9]

Turning to the cross-country comparison, unsurprisingly given the documented statistical issues, according to the PPI source Italy turns out to be the country with the most muted export, but much more importantly, import price growth in 2021-22 (Fig. 5, upper panel; Table B3 in Annex B).

Hence, if one were to use PPI to compute the TOT shock, Germany would result as the hardest hit country and Italy the least affected (Figure B3 in Annex B), largely overturning the country ranking observed in Figure 2. The more reliable AUV data instead confirms the much steeper increase in Italy's import prices in 2021-22 (Fig. 5, lower panel) and the sharper decline in the resulting TOT relative to the other three countries (again see Figure B3), as already gauged from NA.

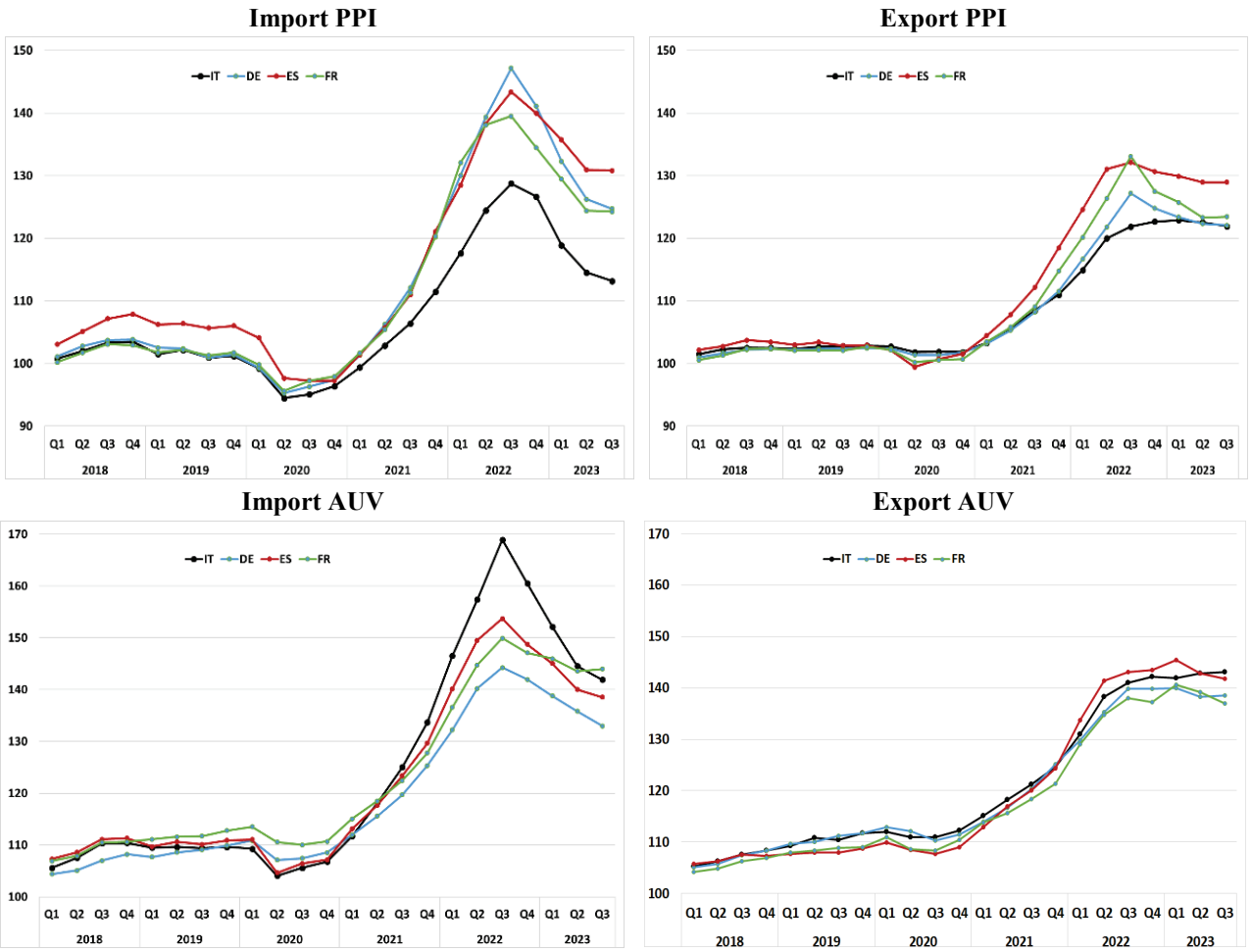
[7] EU regulation indeed refers only to current-price NA series and we are not aware of any public documentation concerning export and import deflators. The information for Italy was obtained directly from exchanges with Istat.

[8] For this international comparison, due to data availability, we refer to the PPI of industry (sectors B to D of the Ateco classification) excluding water supply and wastes (E) and construction (F). Figure 4 and Figure B1 for Italy are based on total industry PPI, but differences are marginal given the negligible weight of sectors E and F in external trade.

[9] For Spain there are no significant differences between PPI and NA deflators, at least until the end of 2022. As for exports, NA deflator and PPI differentials were much smaller for all four countries, although, with the exception of Italy, higher in 2022-23, depending on the country, relative to previous years.

Figure 5. Goods import and export prices in the four main euro-area countries

(index 2015=100)



Source: Authors' calculations on Istat and Eurostat producer price index and foreign trade data.

To sum up, the 2021-22 rise in the goods import deflator in Italy was stronger than that in the corresponding PPI, albeit not as marked than that suggested by the import AUV. By contrast, in 2021-22 in France and Germany NA import deflator growth was more muted than that of the corresponding PPI, which, in turn, recorded much stronger rises than in Italy.

Given the statistical issues underlying Italy's PPI, international comparisons of PPI and of TOT based on PPI are biased, whereas those based on AUV convey similar results to NA deflators. In the next subsection we therefore focus on AUV.

4.2 AUV by Broad Economic Classification

In this sub-section we investigate the sectoral drivers of the stronger deterioration in Italy's TOT in an international comparison, by employing AUV data broken down by BEC.

The increase in Italy's energy import AUV was significantly larger than that of the other countries, suggesting this item to be the main driver of Italy's strong import deflator growth, also given its relevant weight in Italy's goods imports (Table 1). Since the end of 2022 energy import AUV have declined in all economies, in Spain and in Italy in particular.

Table 1. Changes in energy average unit values

(average percentage changes on the corresponding quarter of the previous year within each subperiod)

	Import				Export			
	IT	DE	ES	FR	IT	DE	ES	FR
2019	-6,6	-5,1	-4,9	-3,6	-3,0	3,5	-4,0	-5,3
2021-22	108,9	57,5	73,0	69,1	66,5	80,0	67,4	73,8
2021Q3-2022Q3	143,9	69,7	93,5	86,2	81,0	114,7	84,7	98,3
2022Q4-2023Q3	-10,0	-3,8	-12,1	-7,3	-5,5	-16,1	-13,8	-10,9
Memo: weight of energy in goods trade in 2019	*13*	*9*	*14*	*10*	*3*	*3*	*6*	*3*

Source: Authors' calculations on Istat and Eurostat foreign trade data.

On the other hand, Italy's energy export AUV grew substantially less than in the other three countries. The latter outcome depends on the fact that Italy's energy exports are composed almost exclusively of coke and refined petroleum products (namely, 85 per cent of total energy foreign sales in 2022) and these are the items that recorded the most muted price dynamics across all economies (according to the more finely disaggregated PPI data shown in Table B4).[10] The other three countries present a different energy export composition, with a higher incidence of products, such as electricity, which instead recorded much stronger price growth.

In addition to energy, 2021-22 TOT developments by BEC were particularly unfavourable for Italy also for intermediate goods, whereas TOT dynamics for both capital and consumption goods were broadly stable, similarly to the other countries (Fig. B5 in Annex B).

To sum up, Italy's strong import deflator growth in 2021-22 is largely explained by the significant increase in the country's energy import AUV and by the significant weight of energy imports in the country's overall goods imports. On the other hand, Italy's energy export mix, tilted towards refined petroleum products whose export prices grew only moderately, explains the country's contained energy export AUV growth relative to the corresponding import rise and its limited contribution to the aggregate NA export deflator dynamics.

5. Some real effects of the terms-of-trade shock

After having pinpointed the main driver of the TOT deterioration in 2021-22 and of the subsequent improvement, in this section we gauge some real effects of the TOT shock.

In two seminal articles Harberger (1950) and Laursen and Metzler (1950) argued that a TOT deterioration decreases real income and in turn saving. If investment is constant and there is no government deficit, the change in saving is equal to the change in the current account (CA) balance and hence the "Harberger-Laursen-Metzler effect" implies that the CA worsens in response to a TOT deterioration. A later study by Svensson and Razin (1983) further refined these models, by setting them in an inter-temporal framework. The changes in the trade balance due to a TOT deterioration are separated into: (i) a direct effect, due to rising import *vis-à-vis* export prices; (ii) a wealth effect on consumption, since a TOT deterioration reduces wealth; and (iii) a pure substitution effect on

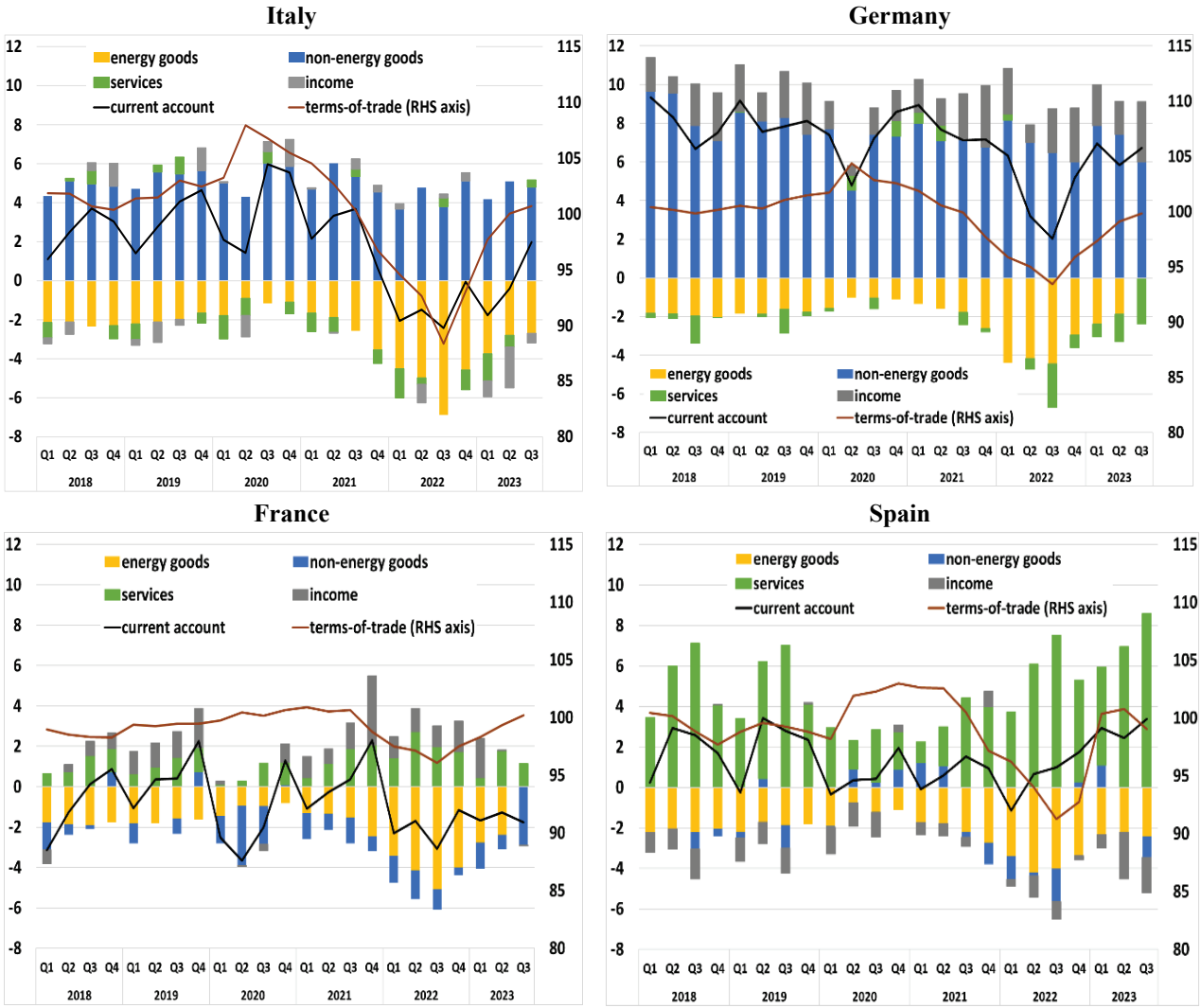
[10] More precisely, Italy's energy export PPI coincides with its coke and refined petroleum export PPI, in that for the other energy items data are not available for confidentiality reasons due to the presence of few exporting firms. The energy import PPI breakdown reported in this table for the sake of completeness is instead not reliable, for the reasons previously stated.

consumption, due to relative price changes within and between periods. The sum of these effects can be of ambiguous sign, but Svensson and Razin (1983) show that the direct and wealth effects are unambiguously negative and dominate in the case of a temporary TOT deterioration.

In 2022, in line with the TOT decline, Italy's CA balance indeed worsened sharply and turned negative for the first time in a decade. The strong fall relative to 2021 was driven for nearly three quarters by the widening of the energy goods trade balance and only partly by the small reduction in the non-energy surplus,[11] against a broad stability of the services deficit (Fig. 6).

Figure 6 - Current account items and the terms of trade in the four main euro-area countries

(seasonally unadjusted data; percentage shares of GDP; index 2015=100 for the terms of trade)



Source: Authors' calculations on Istat and Eurostat quarterly national accounts, on quarterly averages of foreign trade data and on quarterly averages of Bank of Italy and ECB balance of payments data.
Notes: The energy goods share is computed as explained in footnote 14. September foreign trade data are currently unavailable for Germany and France and thus hinder the breakdown of the goods component between energy and non-energy goods for the third quarter of 2023; for this quarter the blue bar hence refers to the overall goods balance.

[11] The energy goods share is here computed as in Giordano and Tosti (2022), by computing the energy import and export shares in total goods from foreign trade data and by applying these shares to total goods imports and exports from balance of payments data. As in Romanini and Tosti (2023), foreign trade energy imports for Germany sourced from Eurostat are corrected by integrating natural gas imports retrieved from Trade Data Monitor, otherwise not included.

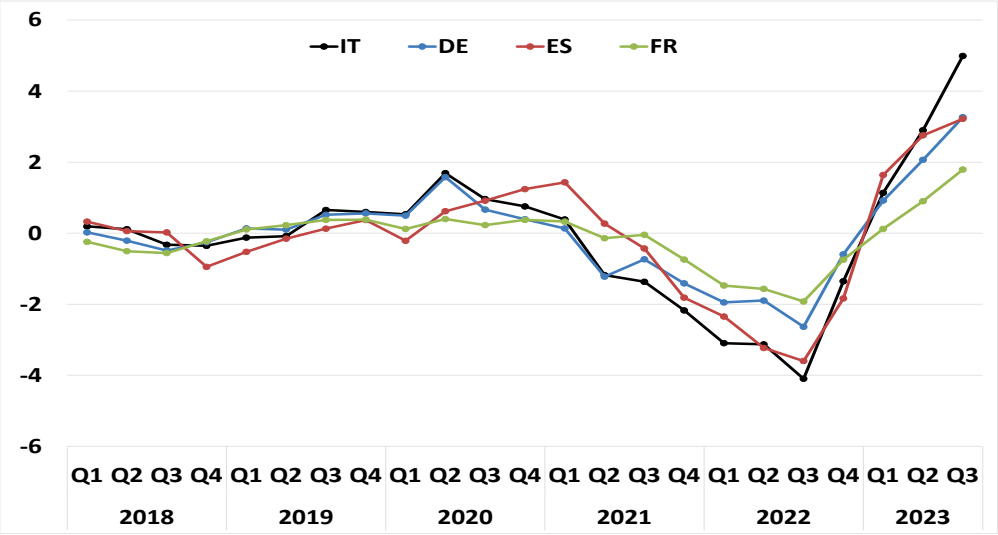
In the other main euro-area economies the negative contribution of the energy deficit was lower. The correlation between the CA balance and the TOT is significant in Italy and, to a lesser extent, in Germany, whereas it is very low in France and Spain, possibly due to their larger services balance.[12]

Since the end of 2022, the improvement in the TOT has hence gone hand in hand with an improvement in the CA balance especially in Italy and Germany, although with some volatility across quarters, also linked to seasonality patterns. In the third quarter of 2023 Italy's CA balance returned to positive values.[13]

Following Gunnella and Schuler (2022), it is possible to measure the income effect of the 2021-22 TOT shock in the four countries (Fig. 7). The nominal (real) income effect of the TOT is calculated by taking the difference between export and import deflator changes relative to the corresponding quarter of the previous year weighted by the previous year export and import values (volumes) respectively, as a percentage share of nominal (real) GDP. Given the availability only in value terms of foreign trade data, necessary for the decomposition by product, we focus on the nominal income effect. However, as shown in Figure B6 in Annex B, the estimated aggregate real income effect is similar (albeit slightly more muted) to the nominal one, with the country ranking remaining unchanged.

Figure 7. The nominal income effect of the aggregate terms of trade shock in the four main euro-area countries

(seasonally unadjusted data; percentage points)



Source: Authors' calculations on Istat and Eurostat quarterly national accounts.
Notes: The nominal income effect of the TOT is calculated by taking the difference between export and import deflator changes relative to the corresponding quarter of the previous year weighted by the previous year export and import values respectively, as a percentage share of nominal GDP.

[12] Since 2021 France has recorded a strong transport surplus, whereas Spain's tourism surplus is historically even larger than Italy's. The correlation between the two series since the first quarter of 2013 is about 0.7 for Italy, 0.5 for Germany, 0.2 for Spain and 0.1 for France.

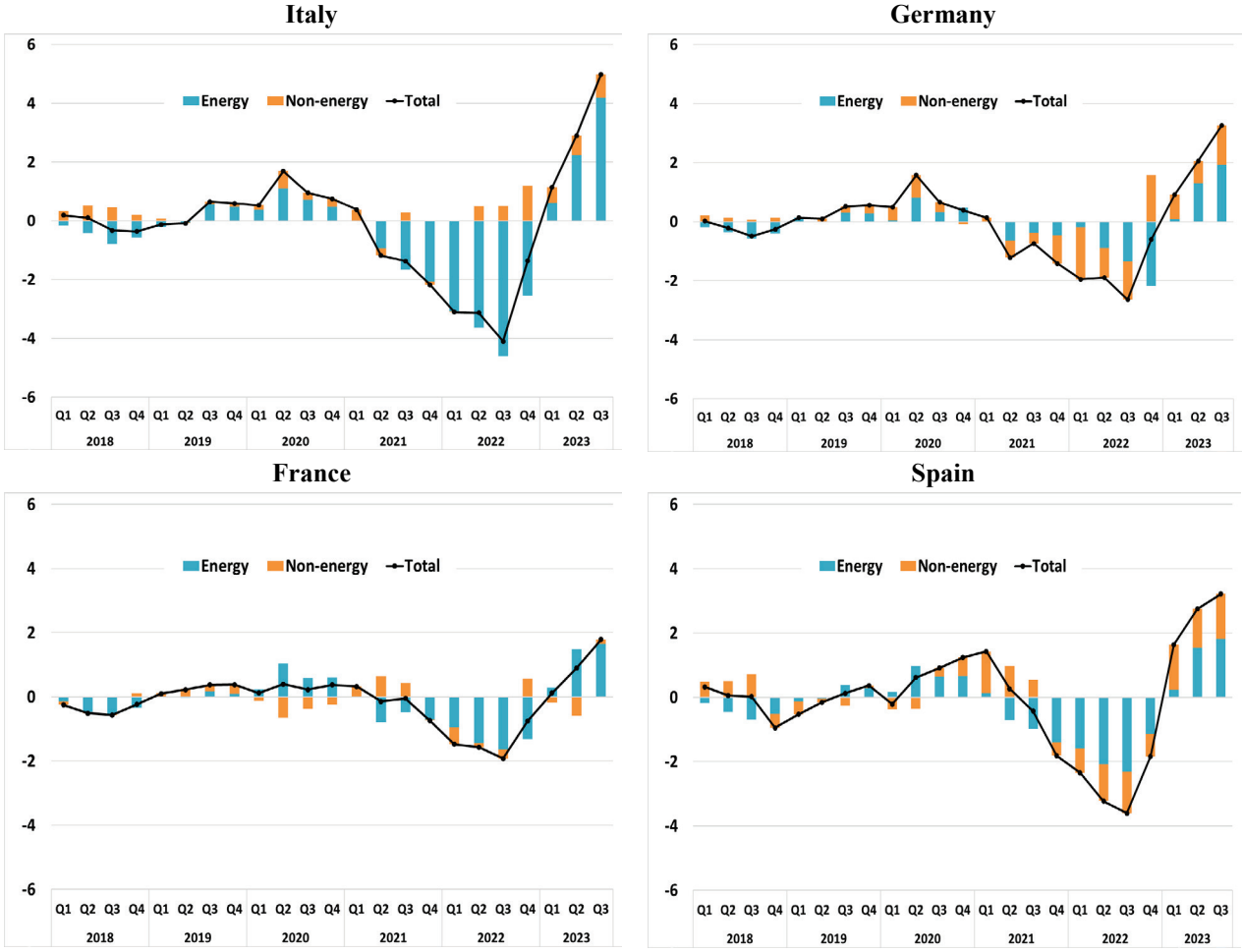
[13] In 2023 a new drag on Italy's CA balance was exerted by the primary income balance, which deteriorated owing to increasing outflows linked to rising monetary policy interest rates. Indeed, Italy has a positive net international position in portfolio investment, but the maturity match between its shorter-term liabilities and medium-long term assets is leading to a temporary deterioration of the portfolio investment income balance. Similarly, the Bank of Italy's outflows to the Eurosystem due to interest payments on its TARGET debtor balance – which is remunerated at the main refinancing operations rate and paid out monthly – have risen, leading to an increase in other investment income debt and thus to a deterioration also of the other investment income balance. The deterioration of the primary income balance should fade and end over the next quarters, also thanks to the shrinking TARGET debtor balance.

In the two years prior to the pandemic, the nominal income effect associated to movements in the aggregate TOT generally fluctuated between -1 and +1 percentage points of GDP in annualized terms. By contrast, in the third quarter of 2022 Italy's windfall loss peaked at an exceptional 4 percentage points, against about 2 and 3 points in France and Germany, respectively.[14]

It is possible to break this effect down further in order to gauge its immediate drivers. The energy component of the nominal income effect of the TOT is calculated by taking the difference between energy export and import unit value changes relative to the corresponding quarter of the previous year weighted by the previous year energy export and import values respectively, as a share of nominal GDP; non-energy is computed as a residual and hence includes both non-energy goods and services. The energy component accounted for most of the losses as of mid-2021 in all four economies, but was particularly large in Italy, where the non-energy goods and services component slightly mitigated the overall loss (Fig. 8).

Figure 8. A decomposition of the nominal income effect of the aggregate terms of trade shock in the four main euro-area countries

(seasonally unadjusted data; percentage points)



Source: Authors' calculations on Istat and Eurostat quarterly national accounts and on quarterly averages of foreign trade data.
Notes: The energy component of the nominal income effect of the TOT is calculated by taking the difference between energy export and import unit value changes relative to the corresponding quarter of the previous year weighted by the previous year energy export and import values respectively, as a share of nominal GDP; non-energy is computed as a residual.

[14] See Neri (2023) for a discussion on how the burden of this "tax" was shared between workers and firms in Italy through wage bargaining and price settings and on the mitigating effects of government measures.

By the first quarter of 2023 income losses had reverted back to gains in all countries, due to the energy component turning positive. The contribution of the non-energy component was also generally positive, with the exception of France. On average in the first three quarters of 2023 the positive income effect was well above 2019 values (between about 1 percentage point for France and 3 points for Italy and Spain), implying that the 2021-22 TOT shock has more than fully been reabsorbed.[15]

6. Conclusions

The deterioration in Italy's aggregate TOT in 2021-22 was less dramatic than that observed during the 1970s oil crisis, but still very strong. In particular, according to NA deflators, the fall in Italy's goods TOT – the main driver of the aggregate TOT – was more pronounced than in the other main euro-area economies, due to the exceptionally large positive wedge between import and export price growth. Whereas export deflators in Italy were broadly in line with those observed in Germany and France, import deflators rose substantially more than in the other two economies.

Italy's NA import deflators are based on PPI with few exceptions, including energy products, for which AUV are employed. Whereas historically import deflators have closely tracked developments in PPI, during the 2021-22 energy shock a strong discrepancy between the two series appeared: the import deflator grew substantially more than the corresponding PPI, whose growth was very subdued also compared with the other main euro-area countries. The sluggishness of Italy's import PPI dynamics was driven by the energy component, due to data quality issues of the underlying sample survey, which were corrected as of 2022 by Istat. Contrary to the Italian case, in the same period French and German NA deflators grew less than the corresponding PPI. These differences suggest using great caution in assessing 2021-22 import PPI, also in an international comparison.

The more reliable AUV data, which can be broken down by BEC, point to Italy's import AUV rising more strongly in 2021-22 than in the other three economies. This development, together with the large weight of Italy's energy imports in overall goods imports, explains the larger increase in Italy's import deflator relative to the other three economies.

The exceptional 2021-22 TOT shock contributed both to a significant deterioration in the CA balance, largely via the expansion of the energy trade deficit, and to an exceptionally strong negative income effect, predominantly driven by the energy component. The gradual recovery in the TOT since the end of 2022 has contributed to an improvement in the CA balance, which returned positive in the third quarter of 2023, and to a substantial income gain, suggesting that Italy has successfully weathered the 2021-22 TOT storm.

Looking forward and given the relevance of the energy component, the levels of energy prices – which are still volatile, due to the tightness of energy markets and to geopolitical tensions, and historically still elevated (at least for natural gas) – will be crucial in determining the evolution of Italy's TOT and CA balance in the short and medium term.

[15] For similar conclusions on the temporary nature of the energy-induced TOT shock for the euro area see Emter et al. (2023).

Annex A – The different goods export and import price statistics and sources for Italy

This Annex discusses the various sources available to compute goods terms of trade (TOT) for Italy, their advantages and shortcomings. It compares them both over the past decade and in the most recent period (Table A1).

Table A1. Annual growth rates in goods import prices according to various sources

(average percentage changes on the previous year or on the corresponding period of the previous year)

	PPI	NA	AUV
2006	4.4	6.1	9.5
2007	0.5	1.4	3.0
2008	4.7	6.6	9.1
2009	-8.6	-9.7	-10.1
2010	5.2	7.0	10.6
2011	8.2	8.4	10.8
2012	3.1	3.2	4.4
2013	-2.4	-2.3	-1.9
2014	-3.1	-3.5	-3.0
2015	-4.7	-4.4	-3.7
2016	-4.0	-4.5	-4.3
2017	3.5	4.0	7.1
2018	3.0	3.2	5.0
2019	-0.9	-1.0	0.2
2020	-5.1	-5.0	-5.0
2021	9.0	12.2	19.3
2022	18.5	25.2	36.6
2023*	-7.1	-7.0	-8.9

Source: Authors' calculations on Istat quarterly national accounts, foreign trade and producer price index data.
Notes: Figures in red flag falls in prices; * Average of the first three quarters.

Average unit values (AUV), which are derived from customs documents and included in Istat foreign trade releases, are indices based on the ratio of the unit value in the current period to a reference period, and measure, for individual commodity groups, the change over time in the total value of shipments divided by the corresponding total quantity. They are known to contain biases stemming from changes over time in the trade product mix or from the poor quality of customs data on quantities (e.g. Kravis and Lipsey, 1971; Silver, 2009).[16]

Export and import producer price indices (PPI), available for Italy since 2000 and 2005 respectively, are based on the price change of representative items derived from firm surveys. As declared by Istat in its monthly foreign trade press release in May 2022 (Istat, 2022), starting from January 2022 Istat has begun to use AUV instead of sample survey information for three types of energy goods (natural gas, crude oil and electricity) in order to construct energy import PPI.[17]

Finally, NA goods export deflators are based on export PPI, with the exception of energy goods different from refined petroleum products, for which AUV are employed, since the underlying producer price survey does not track these items, given their negligible weight in the country's exports (see also Table B4 in Annex B). The corresponding import deflators are based on import PPI with the

[16] As pointed out by Silver (2009), if export and import AUV are biased to the same extent and direction, the AUV will provide a correct indication of changes in the TOT as the bias cancels; in the opposite case, the TOT bias will compound.
[17] At the same time, another methodological change was introduced: Istat moved from an index calculated on a fixed basis to a chained index with reference to the month of December of the previous year. Since the PPI for imports of energy goods was very high in December 2021, import PPI developments in 2022 were muted owing to this base effect.

exceptions of agricultural goods not tracked by the producer price survey and of almost all energy goods,[18] for which the use of import AUV is preferred.

In general, since 2011 import PPI and NA goods import deflator dynamics have been very similar, diverging substantially only in 2021-22 when the energy shock hit and the relative importance of energy AUV data increased in the construction of the NA deflators (again see Table A1).

[18] In more detail, for some energy goods from 2011: (062) Natural Gas, liquefied or in gaseous state, (191) Coke oven products and (192) Refined petroleum products; for other energy goods from 2015: (061) Crude petroleum and (351) Electricity, transmission and distribution services.

Annex B – Additional tables and figures

Table B1. Changes in import and export deflators in selected periods

(average percentage changes on the corresponding quarter of the previous year within each period)

	Import				Export			
	IT	DE	ES	FR	IT	DE	ES	FR
Aggregate								
2019	-0.2	-0.1	0.7	0.3	0.7	0.5	0.6	1.1
2021-2022	15.9	13.1	15.5	12.2	7.9	8.6	10.6	10.3
2021Q3-2022Q3	20.8	16.9	21.0	16.0	9.7	10.9	13.3	13.0
2022Q4-2023Q3	-0.2	0.6	0.8	1.0	4.5	3.1	4.3	2.4
Goods								
2019	-0.9	-0.6	0.3	-0.2	0.6	0.4	0.4	1.1
2021-2022	18.8	14.6	17.2	15.0	8.8	8.5	13.9	11.1
2021Q3-2022Q3	24.7	18.9	23.6	19.7	10.9	10.9	17.6	13.7
2022Q4-2023Q3	-0.9	1.0	-0.2	1.1	4.5	4.3	4.1	4.6
Services								
2019	2.3	1.3	2.3	1.3	0.8	1.0	0.8	1.1
2021-2022	4.4	8.4	7.4	4.8	4.0	8.9	2.7	8.8
2021Q3-2022Q3	5.6	10.6	8.6	6.4	4.3	10.6	3.8	11.8
2022Q4-2023Q3	2.6	-0.4	7.1	0.9	4.0	-1.2	4.0	-2.3
Memo: weight of goods in trade in 2019	*78*	*76*	*81*	*72*	*81*	*80*	*68*	*70*

Source: Istat and Eurostat annual national accounts.
Notes: (1) Percentage share of the value of goods trade in aggregate trade in 2019.

Table B2. Volatility and persistence of the goods import and export deflators in the four main euro-area countries

(quarterly time series since 1999; for volatility, standard deviations; for persistence, first-order autocorrelation)

	IT	DE	ES	FR
Volatility				
Import deflator	13.3	7.8	13.8	8.6
Export deflator	10.3	6.8	13.0	7.8
Terms of trade	2.5	3.0	2.6	2.5
Persistence				
Import deflator	0.94	0.92	0.94	0.93
Export deflator	0.95	0.93	0.94	0.94
Terms of trade	0.90	0.91	0.70	0.89

Source: Authors' calculations on Istat and Eurostat quarterly national accounts.

Table B3. Changes in producer prices indices

(average percentage changes on the corresponding quarter of the previous year within each subperiod)

	Import				Export			
	IT	DE	ES	FR	IT	DE	ES	FR
2019	-0.9	-1.0	0.3	-0.2	0.4	0.6	0.0	0.6
2021-22	13.8	20.2	18.3	18.4	8.4	9.9	13.5	12.2
2021Q3-2022Q3	17.6	26.1	25.0	24.7	10.5	12.5	17.3	16.0
2022Q4-2023Q3	-1.3	-1.4	1.8	-2.8	4.9	3.5	2.6	1.5

Source: Authors' calculations on Istat and Eurostat producer price index data

Table B4. Producer price indices of the main energy products

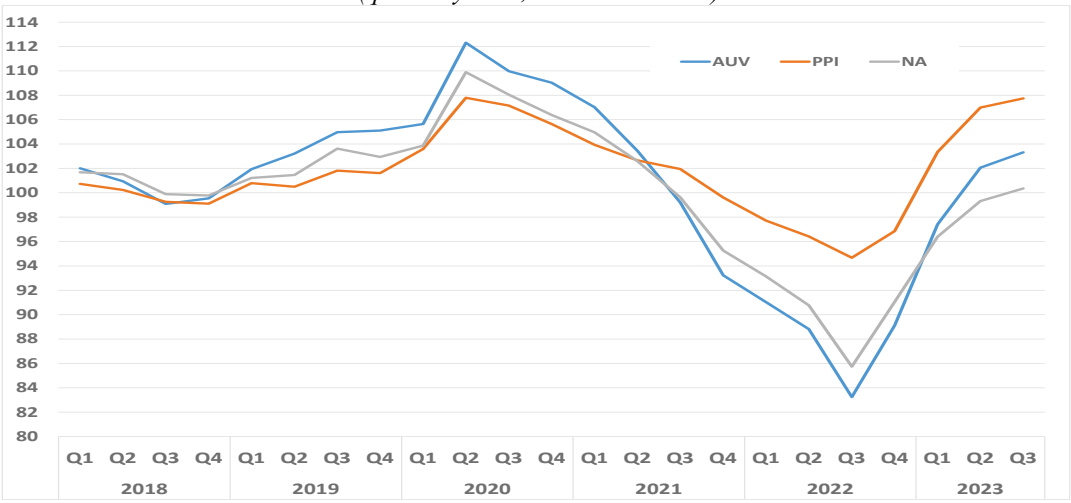
(index 2015=100; yearly averages)

		IMPORT						EXPORT					
		2018	2019	2020	2021	2022	2023	2018	2019	2020	2021	2022	2023
Germany	MIG - energy (except section E)	119.5	109.3	75.1	138.0	291.5	188.6	114.1	103.5	79.0	141.6	303.3	181.4
Germany	Coal and lignite	144.1	125.0	95.9	168.8	442.1	252.2	92.0	94.3	95.4	94.0	97.8	169.4
Germany	Crude petroleum	126.2	123.3	81.2	135.3	213.5	170.7	124.8	n.a	n.a	n.a	n.a	n.a
Germany	Natural gas, liquefied or in gaseous state	107.9	85.7	62.5	149.2	415.6	216.3	100.5	79.2	66.5	141.1	376.8	175.6
Germany	Coke and refined petroleum products	119.5	116.0	78.0	116.2	203.4	163.3	118.7	115.8	83.9	120.1	201.6	167.0
Germany	Electricity, gas, steam and air conditioning	140.0	118.3	96.3	304.7	743.6	312.3	140.0	118.3	96.3	304.7	743.6	312.3
Spain	MIG - energy (except section E)	122.4	120.6	84.0	123.9	232.3	178.3	117.5	107.3	79.0	151.1	272.2	185.2
Spain	Coal and lignite	85.9	78.3	64.1	84.5	144.5	105.3	n.a	n.a	n.a	n.a	n.a	n.a
Spain	Crude petroleum	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Spain	Natural gas, liquefied or in gaseous state	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Spain	Coke and refined petroleum products	117.5	112.5	90.6	119.7	201.8	168.2	117.5	112.6	81.4	124.6	194.6	167.5
Spain	Electricity, gas, steam and air conditioning	119.9	92.4	72.3	203.4	338.5	166.4	123.1	102.8	74.0	170.1	297.9	158.5
France	MIG - energy (except section E)	119.0	112.6	72.7	140.0	294.9	191.1	125.2	113.2	77.5	164.5	352.1	193.5
France	Coal and lignite	116.3	128.5	104.2	117.8	303.4	279.0	n.a	n.a	n.a	n.a	n.a	n.a
France	Crude petroleum	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
France	Natural gas, liquefied or in gaseous state	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
France	Coke and refined petroleum products	121.0	117.0	74.8	111.1	203.2	159.6	118.6	114.8	72.5	116.3	197.4	166.8
France	Electricity, gas, steam and air conditioning	n.a	n.a	n.a	n.a	n.a	n.a	123.7	98.3	81.3	251.6	636.1	238.1
Italy	MIG - energy (except section E)	115.1	108.3	78.5	112.5	194.3	124.5	125.8	120.2	99.1	127.6	161.0	150.6
Italy	Coal and lignite	89.8	87.8	74.5	83.0	104.3	94.4	n.a	n.a	n.a	n.a	n.a	n.a
Italy	Crude petroleum	n.a	n.a	n.a	n.a	175.1	141.4	n.a	n.a	n.a	n.a	n.a	n.a
Italy	Natural gas, liquefied or in gaseous state	n.a	n.a	n.a	n.a	256.5	109.1	n.a	n.a	n.a	n.a	n.a	n.a
Italy	Coke and refined petroleum products	124.0	114.6	103.6	133.9	188.3	175.3	125.8	120.2	99.1	127.6	161.0	150.6
Italy	Electricity, gas, steam and air conditioning	n.a	n.a	n.a	n.a	106.5	45.0	n.a	n.a	n.a	n.a	n.a	n.a

Source: Istat and Eurostat producer prices indices.
Notes: 2023 refers to the first nine months of 2023.

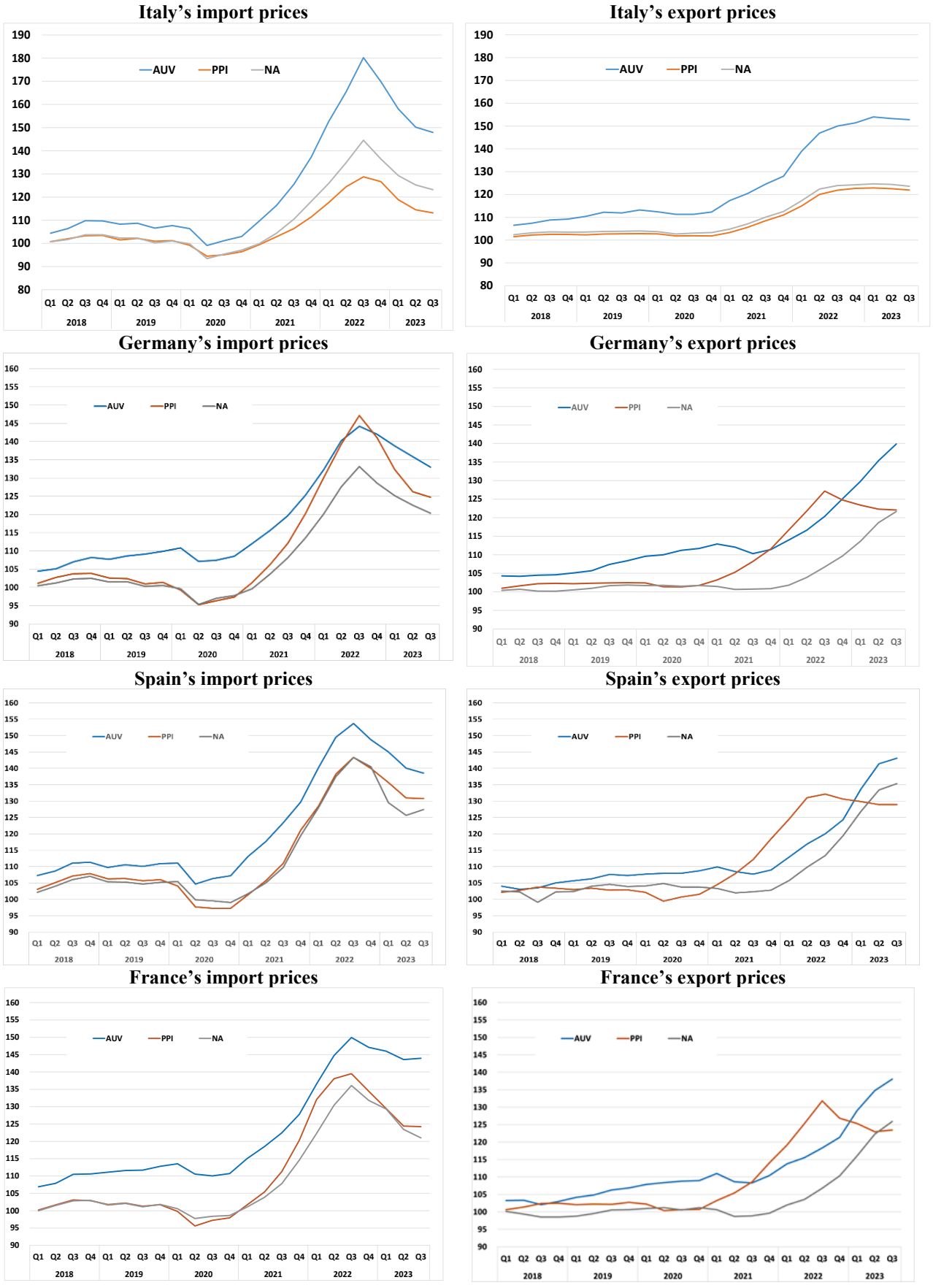
Figure B1. Italy's goods terms of trade according to various sources

(quarterly data; index 2015=100)



Source: Authors' calculations on Istat national account, foreign trade and producer price index data.

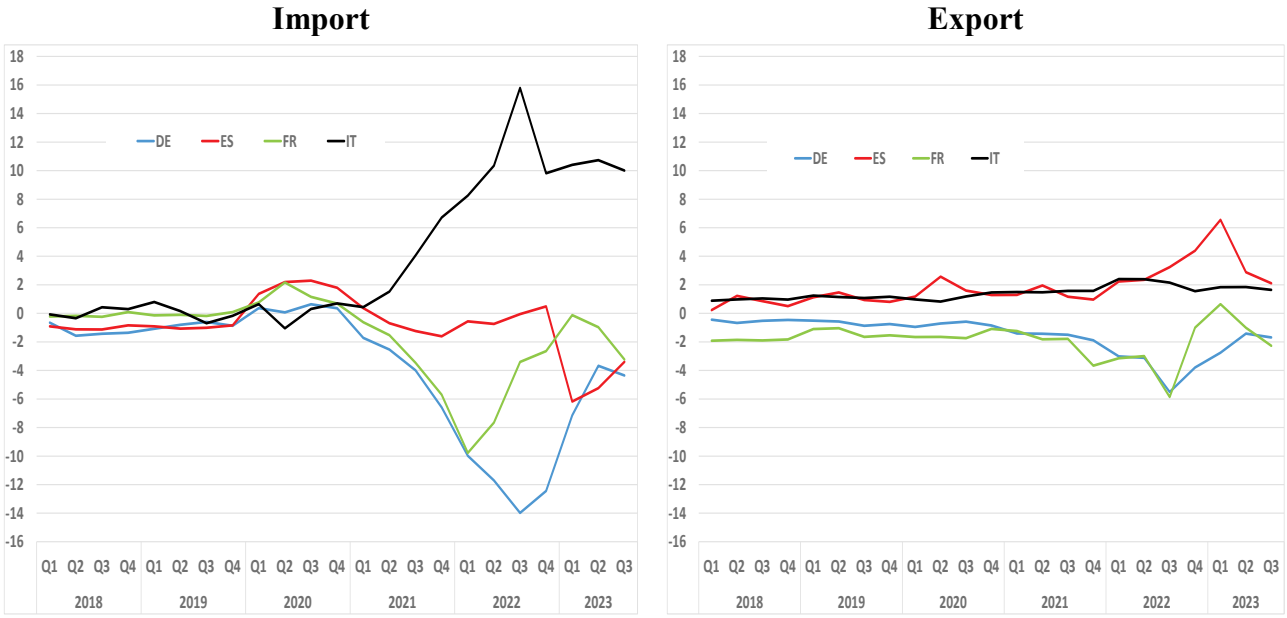
Figure B2. Goods import and export prices according to various sources in the four main euro-area economies *(index 2015=100)*



Source: Authors' calculations on Istat and Eurostat quarterly national accounts, foreign trade and producer price index data.

Figure B3. Differences in goods prices (NA-PPI) within the four main euro-area countries

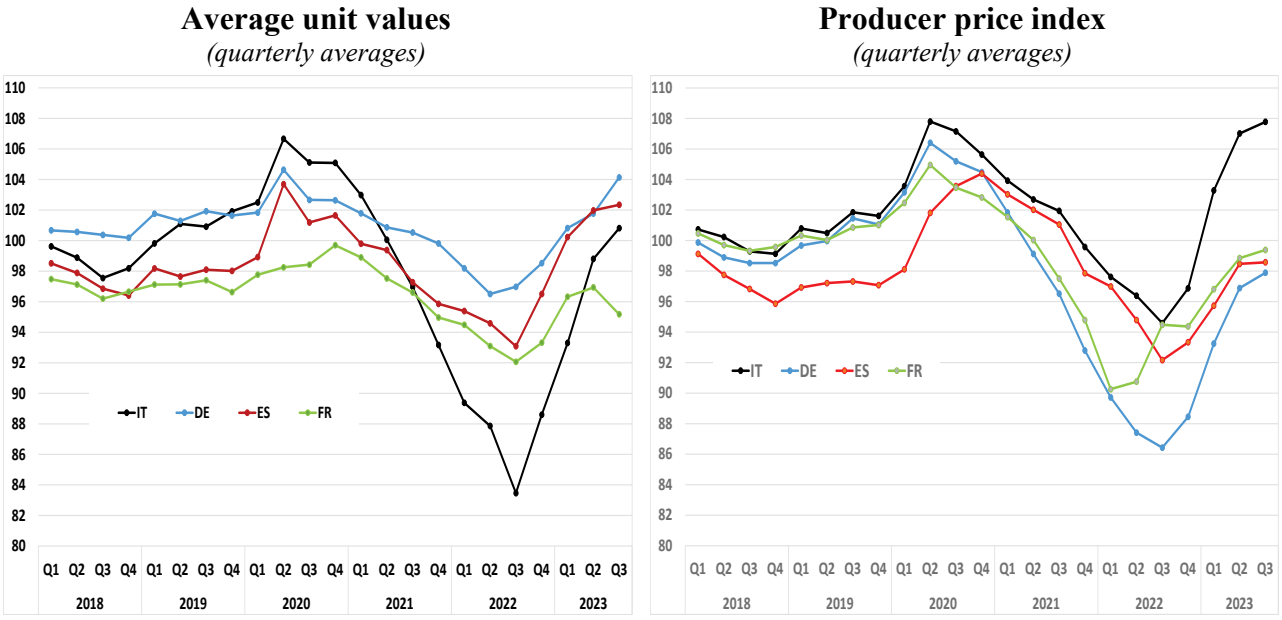
(absolute differences among indexes; 2015=100)



Source: Authors' calculations on Eurostat foreign trade and producer price index data.

Figure B4. Goods terms of trade in the four main euro-area countries according to alternative data sources

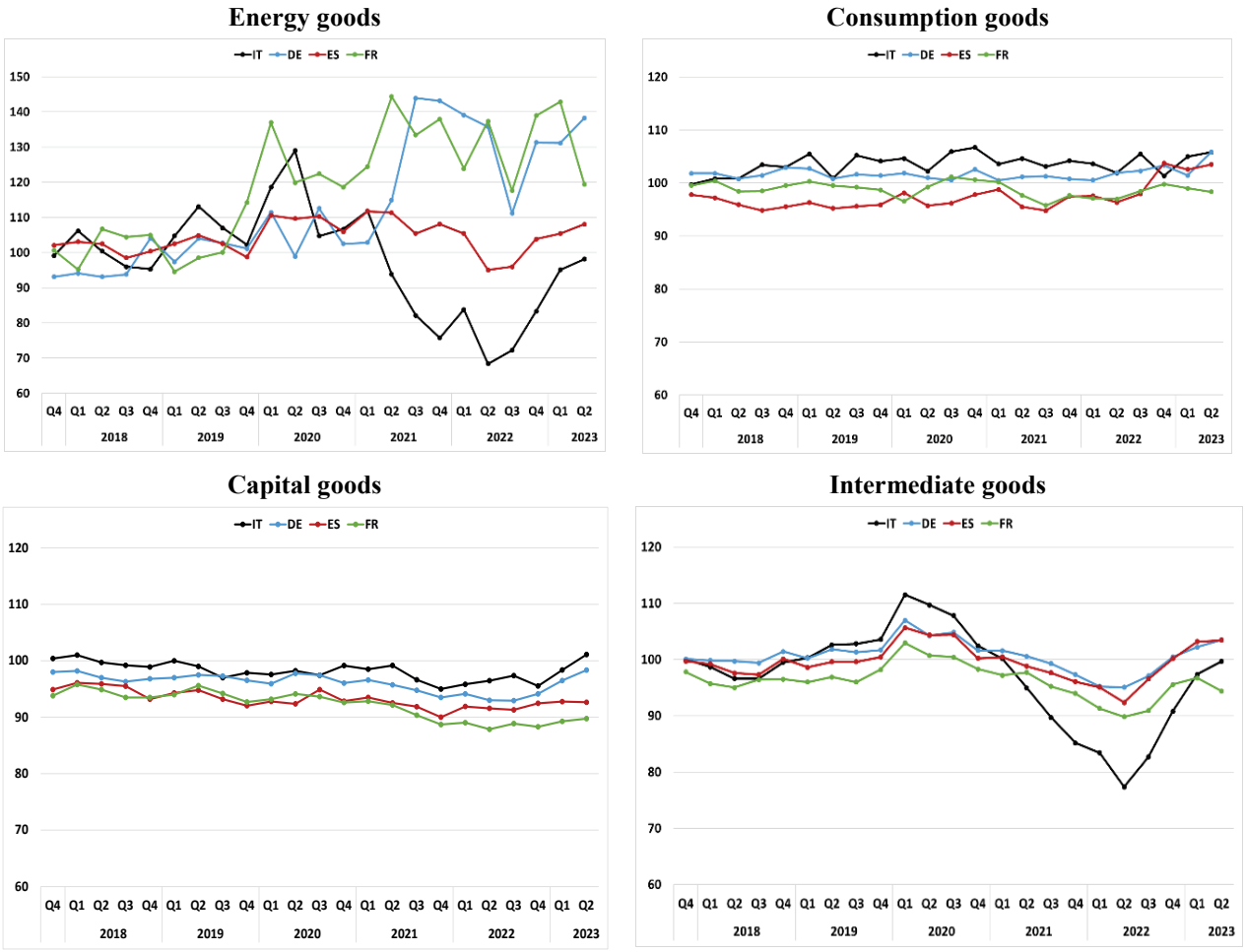
(index 2015=100)



Source: Authors' calculations on Eurostat foreign trade and producer price index data.
Notes: The PPI refers to industry excluding construction.

Figure B5 - Terms of trade broken down by Broad Economic Classification in the four main euro-area countries

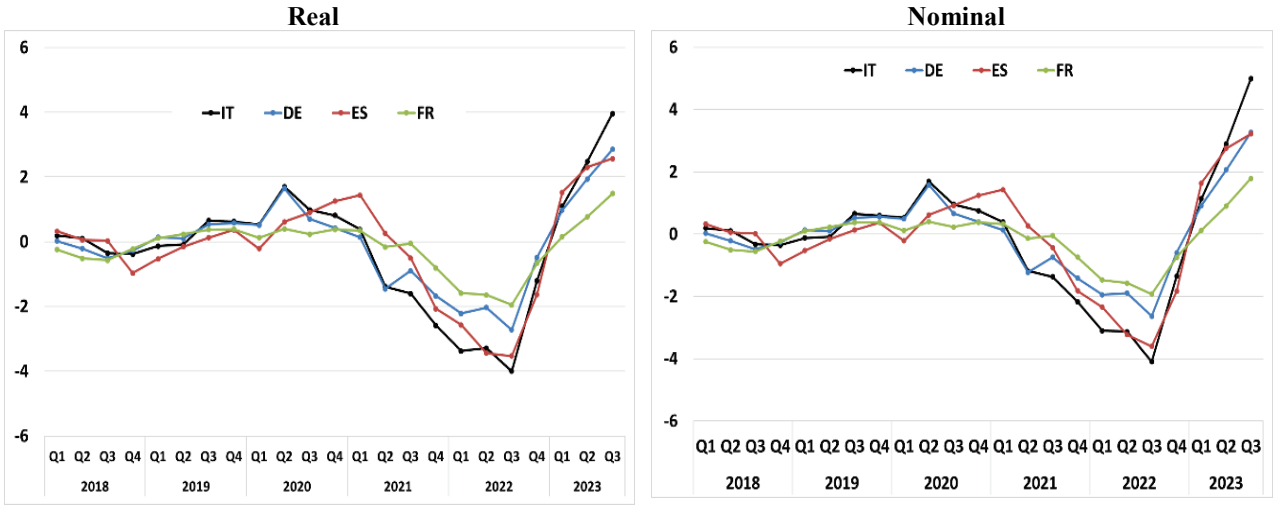
(index 2015=100)



Source: Authors' calculations on Istat and Eurostat quarterly averages of foreign trade data.

Figure B6. The real vs nominal income effects of the terms of trade shock in the four main euro-area countries

(percentage points)



Source: Authors' calculations on Istat and Eurostat quarterly national accounts.

Notes: The real (nominal) income effect of the TOT is calculated by taking the difference between export and import deflator changes relative to the corresponding quarter of the previous year weighted by the previous year export and import volumes (values) respectively, as a percentage share of real (nominal) GDP.

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