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RETHINKING PRICES AND MARKETS UNDERLYING PRICE-COMPETITIVENESS INDICATORS

by Alberto Felettigh* and Claire Giordano*

Abstract

A comprehensive analysis of price and cost competitiveness warrants an assessment of a range of alternately deflated nominal effective exchange rates. Here, we focus solely on the price-competitiveness indicator currently published by the Bank of Italy (Felettigh et al., 2015), which is based on the producer prices of domestically-sold manufactures, and we refine its measurement. First, we update the data sources for the producer price index. Revisions mainly refer to non-euro area countries, yet also affect relative prices and therefore the price-competitiveness trends of the four main euro-area economies. These countries have performed better according to the revised indicators, in particular since 2010. Second, we present a novel three-market view of price-competitiveness indicators by splitting destination markets. The overall indicator encompassing competitive pressures on both the import and the export side can indeed be broken down into three components: the domestic market, where local producers are rivalled by foreign competitors with their import penetration; euro-area markets, where all countries compete; and non-euro-area markets, where, similarly, all countries compete. Whereas France and Germany have displayed similar price-competitiveness developments in both the euro and non-euro area markets over the entire period since 1999, Italy and Spain have performed better in the non-euro area than in the euro-area markets. Competitiveness in the domestic market and that in non-euro area markets are the main, equally important, drivers of overall developments since 1999 in Italy and in Germany.

JEL Classification: F10, F30, F31.

Keywords: price-competitiveness indicators, real effective exchange rates, producer prices, destination markets, import competition.

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1. Introduction¹

This study focuses on the measurement of price-competitiveness developments. It first describes a significant revision to the sourcing of data underlying the construction of Bank of Italy's price-competitiveness indicators (PCIs).² It next extends the existing set of measures, thereby providing an extra tool to refine the economic analysis of price competitiveness, which is here conducted for the four main euro-area economies.

The first release of PCIs by the Bank of Italy dates back to the early 1980s (Valcamonici and Vona, 1982). Since then, the framework has progressively evolved, benefitting from improvements in data availability and from several significant methodological innovations (Tristani and Zollino, 1998; Finicelli, Liccardi and Sbracia, 2005; Felettigh et al., 2015 and 2016), thereby keeping the pace of, if not improving upon, similar statistical products released by the main international institutions, such as the IMF, the BIS and the ECB (Bayoumi, Lee and Jayanthi, 2005; Klau and Fung, 2006; Schmitz et al., 2013) and by other central banks (Lynch and Whitaker, 2004; Loretan, 2005). In parallel, the set of countries for which PCIs are regularly computed has increased since the 1980s, going from 25 to 62. In May 2018, however, Venezuela had to be dropped from the sample, as the publication of its official price series was interrupted, bringing the set of countries for which PCIs are currently available down to 61 (Bank of Italy, 2018), a large number still if compared to other institutions' releases.

The Bank of Italy constructs PCIs deflated by the producer price index (PPI) of domestically sold manufactures. Using a similar methodology, the ECB provides PCIs deflated by the consumer price index, the GDP deflator and the unit labour cost of the total economy (Schmitz et al., 2013). There is indeed consensus both in the literature and in the policy debate that no optimal deflator exists (e.g. Chinn, 2006; Kangur, 2018), and developments of alternately deflated PCIs can differ – and have differed – substantially for a number of countries (e.g. ECB, 2003; Deutsche Bundesbank, 2004; Giordano and Zollino, 2016). This implies that a comprehensive analysis of price and cost competitiveness should be based on a range of alternately deflated indicators (on this, see also Fidora, Giordano and Schmitz, 2018; Giordano, 2018), yet this aim goes beyond the scope of this paper.

Owing to further progress made in data availability and dissemination for (mainly) non-euro area countries, the refinement described in this study starts with a reassessment of the existing data sources for various types of PPIs, leading to a reconstruction of the manufacturing domestic-sales PPI index for most of the 43 non-euro area countries in the sample. The impact of this overall refinement is non-negligible not only for the price competitiveness of those (reporting) countries for which the sourced prices have changed, but also for that of their main trading partners and therefore of the four largest euro-area countries, as documented herein. Current PCI series begin in 1993, preventing an appraisal of price-competitiveness developments during the most dramatic phase of the European Monetary System in the second half of 1992. This study also overcomes this

¹ We thank Aušra Buivienė, Mariarosaria Comunale, Mihnea Constantinescu, Andrea Finicelli, Rosanna Gattodoro, Rosario Luppino, Attilio Mattiocco, Anna Maria Stellati and Andrea Zucchini for sharing data and discussing data issues with us; we are also grateful to Andrea Brandolini, Silvia Fabiani, Roberto Tedeschi and Francesco Zollino for comments to previous versions of this paper. This version is based on 5th June 2018 data vintage.

² The revised PCIs are planned to be released by the Bank of Italy in the Autumn 2018; they are here referred to as the “new” indicators, replacing the “current” PCIs.

shortcoming by presenting an extension of PCIs back to January 1992, based on a historical reconstruction of PPIs and exchange rates for a limited set of countries and currencies for which this information was missing, in a dedicated box.

After having depicted the new PPI dynamics in selected non-euro area countries for which the revisions were most pronounced in comparison to the current series, the effect of this revision on price-competitiveness (hereafter simply “competitiveness” for the sake of brevity) developments in the four largest euro-area countries is then analysed, focusing on the post-1999 period. The new PCIs show that in the overall 1999-2017 period trends have generally been moderately more favourable than those gauged by the current PCIs, yet to a slightly different extent across the four countries, with Spain “gaining” the most. In particular, in the most recent sub-period since 2010, the new PCIs confirm that competitiveness in France, Italy and Germany has improved, and moderately more than predicted by the measures currently in use; Spain’s loss has been revised downwards according to the new measures. In 2017 the competitiveness gap *vis-à-vis* Germany of France and Italy hardly changed when employing the new PCIs, whereas Spain’s differential moderately shrank.

In addition to world-wide PCIs, the current set of Bank of Italy indicators, similarly to the ECB, includes measures centred on subgroups of competitors, in particular to euro-area or non-euro area trading partners. The set of indicators is now extended to also include export-based³ measures of competitiveness in specific markets and, in particular, in euro-area and non-euro area markets; to our knowledge this is the first attempt to achieve this type of breakdown. This addition enables assessing competitiveness trends of a given economy in specific geographical areas, taking into account pressures from all countries that export to that region, instead of competitiveness developments in world markets against selected trading partners.⁴ Moreover, by considering also competition in the domestic market between local producers and foreign exporters, overall PCIs can be conveniently broken down according to a three-market perspective (domestic; euro-area; non-euro area). This allows gauging the role of each component in driving aggregate price-competitiveness trends of the four main euro-area countries.

The split between euro vs. non-euro area export outlets shows that in the overall 1999-2017 period Germany and France’s competitiveness gains were roughly comparable in the two export markets, where they both recorded significant gains. Conversely, Italy’s and Spain’s performances stand out as being unbalanced, with a notably poorer performance on euro-area markets, where Italy recorded a much smaller gain and Spain a larger loss, relative to non-euro area destinations. Competitiveness in the domestic market and that in non-euro area markets contributed broadly equally to aggregate price-competitiveness dynamics in Italy and in Germany.

³ PCIs typically distinguish between import-based competitive pressures in the domestic market and export-based competition in foreign markets; the two components are then averaged into an overall PCI.

⁴ A country’s price competitiveness performance may differ across markets for an array of heterogeneous factors, which go beyond the scope of this study. On the one hand, enterprises choose *ex ante* which outlays to penetrate, how much to sell to each market and at what price, according to their pricing strategies and to the strength of demand in the various destination markets (see, for example, Bernard et al., 2018 which encompasses all the decisions an exporting firm has to make in a tractable model). On the other hand, not all firms export to all markets, and especially small and less innovative firms typically export only to the closest markets, so as to contain trading costs. For some stylised facts concerning external trade and productivity across EU countries based on micro-aggregated data, see Giordano and Lopez-Garcia (2018). By using manufacturing domestic-sales PPIs to deflate PCIs, which, as afore-mentioned, proxy for overall production costs rather than actual prices charged, we abstract from all these considerations.

The structure of the paper is the following. Section 2 illustrates the new data sources employed for the PPIs of non-euro area countries and the most relevant revisions since 1992. Section 3 analyses the impact of these revisions on competitiveness developments of the four largest euro-area countries since 1999, the benchmark initial year of competitiveness analyses at the Bank of Italy. Section 4 discusses developments in price competitiveness of the four main euro-area countries in euro and non-euro markets, according to the novel set of indicators put forward herein. Section 5 describes a three-market decomposition of aggregate price-competitiveness developments, in order to gauge the main drivers of the latter in the four countries of interest. Section 6 concludes.

2. The revisions to price sources and series

We define a country's price-competitiveness indicator (PCI) – or real effective exchange rate (REER) for non-euro area countries according to the Eurosystem's taxonomy – as a weighted geometric average of nominal exchange rates *vis-à-vis* its main trading partners (the nominal PCI or the nominal effective exchange rate, NEER, respectively), deflated by relative prices or costs. The methodology underlying the Bank of Italy's current PCIs (Felettigh et al., 2015; 2016) is described in brief in Annex A. In the refinement discussed herein the NEER continues to be constructed as in the current framework; conversely, relative prices were the component subject to revisions.

Discussions on the various alternative cost and price indices employed to deflate the NEER are found, for example, in Turner and Van't dack (1993) and in Chinn (2006), yet both theoretically and empirically, no index proves to be optimal. Ahn, Mano and Zhou (2017) show that relative prices can account for up to 40 per cent of variation in quarterly growth in REERs; the choice of the price or cost index thereby matters significantly in the assessment of competitiveness developments (Giordano and Zollino, 2016; Christodouloupoulou and Tkačevs, 2016).

The Bank of Italy's PCIs are based on the producer price indices (PPI) of manufactures sold domestically, when available. These prices may be considered as a proxy for cost developments that encompasses all production cost pressures, including (but not restricting to) labour costs, in the sector of tradable goods, which is a broader concept than traded goods, since some tradables may turn out not to be actively traded specifically because of competitiveness issues (foreign sales typically involve higher transportation and sunk costs relative to domestic sales). In other terms, the basket of products represented in producer prices of manufactures sold on the internal market is more likely to capture the whole spectrum of potential supply to domestic and foreign markets.⁵ PPIs also have the practical advantage of being available on a monthly basis.

Since the last revision of PPIs undertaken in Finicelli, Liccardi and Sbracia (2005), which still underpins Bank of Italy's current indicators,⁶ price data availability and dissemination for

⁵ See Felettigh et al. (2015) for a more thorough discussion of alternative price and cost indices in constructing PCIs, also encompassing export and import prices. As for the ability of alternative PCIs to explain export dynamics in the four main euro-area countries, see Giordano and Zollino (2016): this study finds that in the case of Italy, the PPI-based PCI has a higher explanatory power than especially PCIs deflated using unit labour costs in manufacturing, which indeed only capture the labour component of production costs. More recent research undertaken at the Bank of Italy has further pointed to the fact that the export performance of euro-area countries is better understood when considering relative PPIs (or relative unit labour costs) in conjunction with profit margins (Amici, Bobbio and Torrini, 2017), and that PCIs alone, however deflated, are therefore insufficient to explain export developments.

⁶ As mentioned in the introduction, the most recent methodological refinement to the Bank of Italy's PCIs is described in Felettigh et al. (2015; 2016), which updated and improved the weighting procedure, amongst various innovations;

mainly non-euro area countries have significantly improved. This allows actual PPIs of manufactured goods sold in domestic markets to be used more extensively in new than in current PCIs; when unavailable the closest proxy is implemented.

In general, the following hierarchy of sources is employed: Eurostat/ECB, OECD, IMF (International Financial Statistics) and Datastream. For all OECD countries, and for the most recent years at least, PPIs of manufactured goods sold in domestic markets are used; for all remaining countries and/or previous periods manufacturing, industrial or total PPIs or wholesale price indices (WPIs) are employed, whereas consumer price indices (CPIs) are adopted only as a last resort for Algeria, Nigeria and Saudi Arabia (see all details in Table B1 in Annex B). Since price data for all countries were found to be available also for 1992, and since we were able to construct estimates of nominal exchange rates in that year for selected countries,⁷ the new PCIs cover the whole period since January 1992 (as opposed to January 1993).

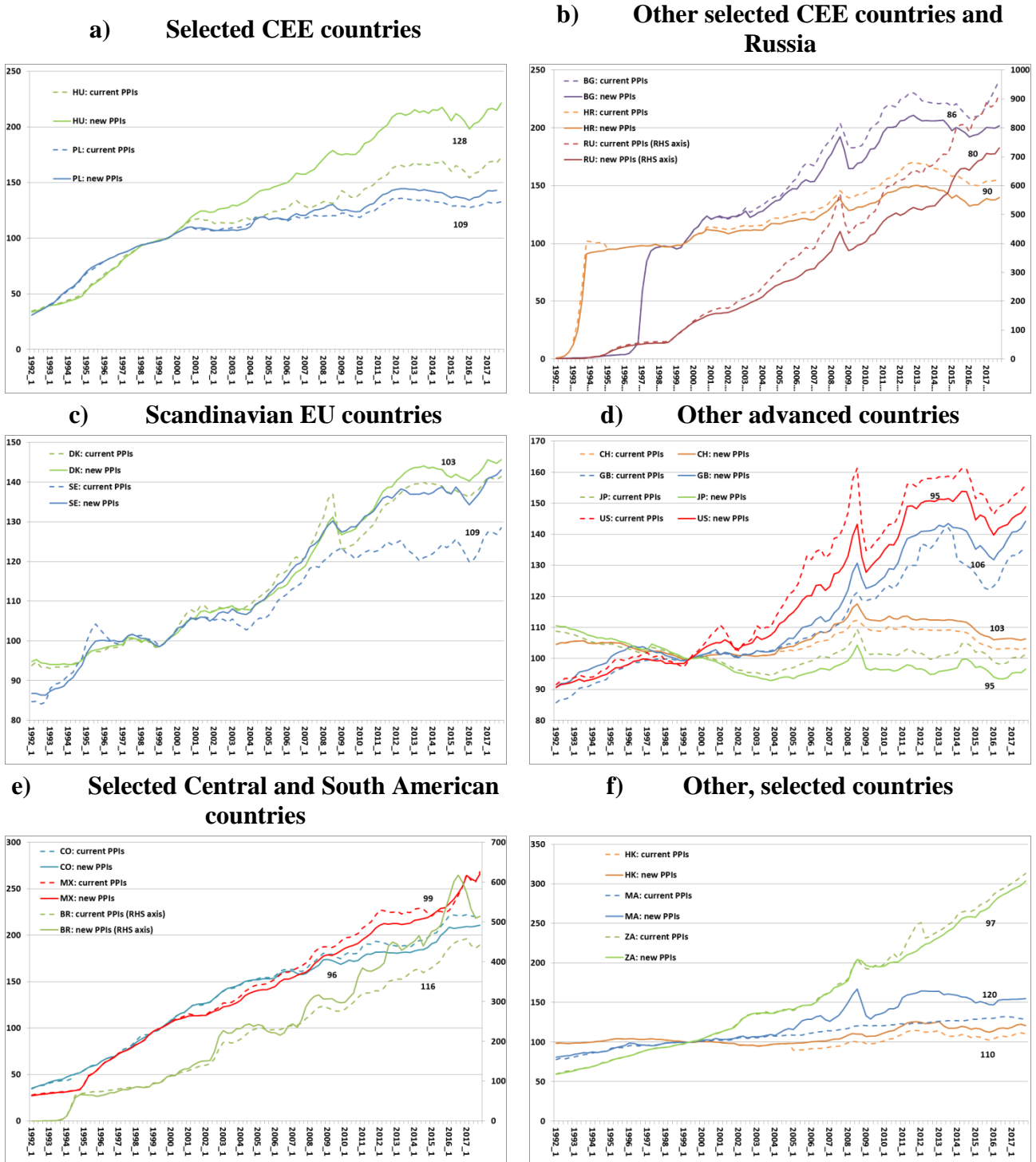
The most pronounced revisions relative to the PPI series underlying the current PCIs concern six geographical aggregates: four countries of the Central and Eastern European (CEE) region (Bulgaria, Croatia, Hungary and Poland) and Russia, the Scandinavian EU countries (Denmark and Sweden), other advanced economies (Switzerland, Japan, the United Kingdom and the United States), several Central and South American countries (Brazil, Colombia and Mexico) and some other emerging economies (Hong Kong, Morocco and South Africa). In more detail, these data adjustments are mainly due to the transition towards a price concept that is as close as possible to our elective indicator (PPIs of domestically sold manufactures), such as moving from industrial to manufacturing PPIs (Mexico), from manufacturing total sales to manufacturing domestic sales (Poland, Russia and Sweden), from industrial total sales PPIs to manufacturing domestic sales PPI (Bulgaria, Colombia, Croatia, Denmark, Hungary, Japan, South Africa, Switzerland, the United Kingdom, the United States) or from CPIs to total sales PPIs (Morocco). As regards the two residual cases, the IMF's Brazilian WPI series, which we continue to employ, was revised, while for Hong Kong's PPIs we switched from Datastream to IMF sources.

Revisions to PPIs go in both directions, pointing to either higher or lower growth according to the country under analysis (Fig. 1). Adjustments mainly refer to the post-1999 years and therefore affect recent competitiveness developments in particular.

conversely, the price indices employed to deflate the NEERs were not touched, at that time, relative to the previous revision, documented in Finicelli, Liccardi and Sbracia (2005).

⁷ These refer, in particular, to Russia, the three Baltic States, the Czech Republic and Slovakia.

Figure 1. PPI developments in selected countries according to the new and current series (indices 1999=100, unless otherwise indicated; quarterly averages)



Sources: Authors' calculations on data described in Table B1 for the new PPI series and Feletigh et al. (2015) for the current series.

Notes: The scales are different across charts. The figures reported in the charts refer to the ratio (multiplied by 100) between the 2017Q4 average PPI value according to the new series and the average according to the old series. The acronyms refer to the following countries: Brazil (BR), Bulgaria (BG), Colombia (CO), Croatia (HR), Denmark (DK), Hong Kong (HK), Hungary (HU), Japan (JP), Mexico (MX), Morocco (MA), Poland (PL), Russia (RU), South Africa (ZA), Sweden (SE), Switzerland (CH), the United Kingdom (GB) and the United States (US).

In Table B2 in Annex B we report the weight of each of the countries depicted in this section in the trade baskets of France, Germany, Italy and Spain, respectively, both in 1999-2001 and in 2009-2011 (the two reference periods for which Bank of Italy's PCIs were constructed; again see Annex A). In the first period, the aggregate of these countries accounted from 25 (Spain) to 39 (Germany) per cent of the four main euro-area countries' trade baskets. Amongst the countries' considered, the non-Scandinavian advanced economies are those that generally weigh most in the four main euro-area countries' trade baskets, yet by 2009-2011 the weight of the CEE economies had also increased significantly. This gives us an idea of which PPI revisions matter most in explaining the revisions to the PCIs of the four main euro-area countries, to which we turn in the next section.

3. The impact of the new price series on PCIs for the four largest euro-area countries

In this section we appraise the impact of the PPI revisions on competitiveness developments of the four main euro-area countries between 1999 and 2017 (Table 1; Fig. 2, panel a). Overall, differences between the current and the new PCIs are small, yet slightly more pronounced in the post-2010 sub-period.

In more detail, according to the new PCIs, competitiveness dynamics are slightly more favourable over the entire period in all economies, with Germany gaining 9.7 percentage points, France 8.2 and Italy 1.8. The difference between the current and the new PCIs is the largest for Spain, whose competitiveness loss between 1999 and 2017 is scaled down from 10.0 to 8.9 percentage points. In the most recent period since 2010, the new PCIs indicate a larger improvement in France, Germany and Italy, relative to the current measures, and Spain's indicator marked a smaller loss.

Table 1. Price-competitiveness developments in the four largest euro-area countries by sub-period according to Bank of Italy's new and current indicators
(percentage changes on annual averages; differences in percentage points)

	France			Germany			Italy			Spain		
	Current PCIs	New PCIs	Difference	Current PCIs	New PCIs	Difference	Current PCIs	New PCIs	Difference	Current PCIs	New PCIs	Difference
1999-2007	1.5	1.6	0.1	-3.3	-3.2	0.1	4.2	4.5	0.2	9.9	9.7	-0.2
2007-2010	-5.3	-5.4	-0.1	-4.8	-5.0	-0.2	-3.9	-3.9	-0.1	-1.2	-1.3	0.0
2010-2017	-3.9	-4.5	-0.6	-1.2	-1.8	-0.7	-1.4	-2.1	-0.7	1.3	0.5	-0.7
1999-2017	-7.7	-8.2	-0.5	-9.0	-9.7	-0.7	-1.2	-1.8	-0.6	10.0	8.9	-1.1

Source: Authors' calculations.

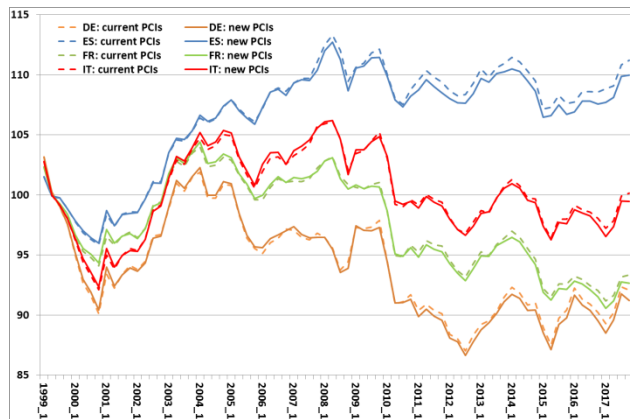
Notes: A positive (negative) change indicates a loss (gain) in price competitiveness.

Given these dynamics, unsurprisingly the relative performance of France, Italy and Spain *vis-à-vis* Germany does not change when assessed according to the new PCIs (Fig. 2, panel b). Indeed, according to both sets of indicators, all three countries progressively lost ground until 2008; the gaps temporarily closed during the Great Recession, but then widened again until 2012-2013. Since then, the differentials relative to Germany have decreased. The new indicators thus confirm that after the sovereign debt crisis across Europe a recovery in competitiveness *vis-à-vis* Germany was determined by relative-price adjustments. Focusing on Italy and Spain, by the third quarter of 2012 their PCIs had cumulated a competitive loss of 10.0 and 21.0 percentage points, respectively,

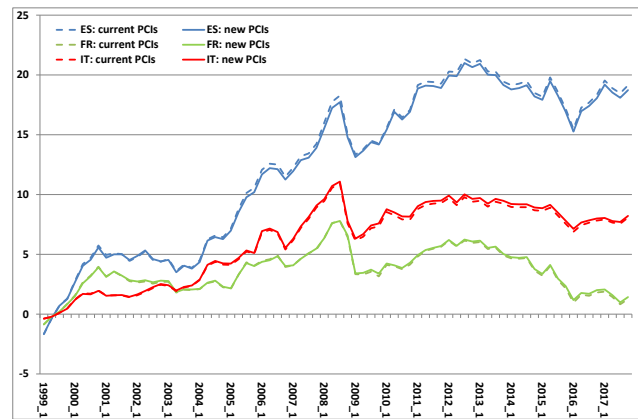
relative to Germany.⁸ The shortfall reached a minimum in the first quarter of 2016 to end up at 8.2 and 18.7 percentage points, respectively, in the fourth quarter of 2017.⁹

Figure 2. Price competitiveness in the four largest euro-area countries according to Bank of Italy’s new and current indicators

a. Developments
(indices 1999=100; quarterly averages)



b. Differentials with respect to Germany
(differences between indices 1999=100; quarterly averages)



Source: Authors’ calculations.

Notes: An increase (a decrease) in the PCI indicates a loss (gain) in price competitiveness in the left hand-side panel. A positive (negative) differential indicates that since 1999 the country has incurred a cumulative loss (gain) in price competitiveness relative to Germany in the right hand-side panel.

Overall, the revisions to the PCIs of the four main euro-area countries are small, owing to the fact that, as documented in Section 2: a) euro-area partners, which attract the bulk of their trade, were hardly affected by PPI revisions, and b) revisions to PPIs of their non-euro area competitors were of opposite sign, and thus partially cancelled out.

In Annex B we also report current and new PCI dynamics of other selected countries, again grouped by geographical area, for which the impact of the undertaken PPI revisions was substantial (Fig. B1). To provide some examples, the overall loss in price competitiveness in the United States since 1999 was significantly revised downwards according to the new PCIs; this was mirrored by an important upward adjustment in Canada’s competitiveness loss, in spite of the fact that Canada’s PPIs were not revised in any way. A similar outcome concerns the United Kingdom and Ireland: until the mid-2000s a smaller overall gain in the former country’s competitiveness, according to the new PCIs, translated into a (much) smaller loss in that of the latter country, where PPIs however were not adjusted. Moreover, PPI revisions to Denmark and Sweden not only had a strong impact on these two countries’ PCIs, but also on those, for example, of Norway.

Finally, in the box below we show the changes in price competitiveness in selected European countries before, during and after the 1992 currency crisis, an analysis which is now possible owing to the earlier starting date (January 1992) of the new PCIs.

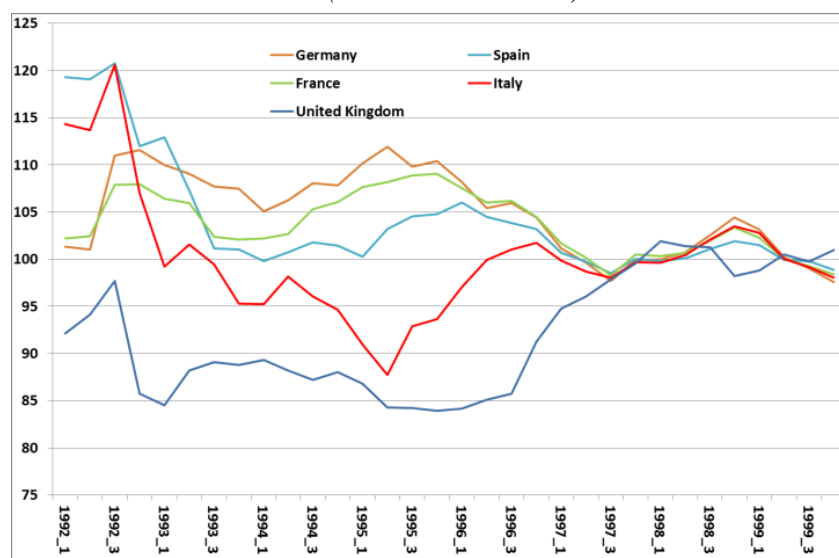
⁸ 2012Q3 is the local maximum for Italy and the absolute maximum for Spain.

⁹ On average in 2017 the competitiveness gap *vis-à-vis* Germany according to the new PCIs stood at 18.6 points in Spain, 7.9 in Italy and 1.5 in France.

Price-competitiveness developments in selected European countries during the 1992 currency crisis

In Figure A the 1990s' price-competitiveness dynamics of the European countries that were most affected by the 1992 currency crisis are shown, according to the new PCIs. Italy stands out as being the country that recorded the sharpest, immediate depreciation after the Summer of 1992 (the PCI dropped from 120.7 in the third quarter to 99.3 in the first quarter of 1993), followed by the United Kingdom. Moreover, Italy recorded a further depreciation at the turn of 1995, due to the turbulence triggered by the Mexican financial crisis, coupled with domestic political and fiscal uncertainty (Bank of Italy, 1996, p. 135), thereby recording an overall gain in competitiveness from peak to trough of an exceptional 27 percentage points (against an improvement of 17 and 14 points in Spain and in the United Kingdom, for instance).¹ Interestingly, the PCI for Italy nowadays stands at 98.9, a comparable level to that observed at the beginning of 1993 after the 1992 devaluation of the lira (99.3) and during the first year of the monetary union (100).

Figure A. Price-competitiveness developments in selected countries during the 1990s according to the new PCIs
(indices 1999=100)



Source: Authors' calculations.

Notes: An increase (decrease) in the PCI indicates a loss (gain) in price competitiveness.

¹ These results are qualitatively similar to those reported in Finicelli, Liccardi and Sbracia (2005), based on a simpler methodology than the current one.

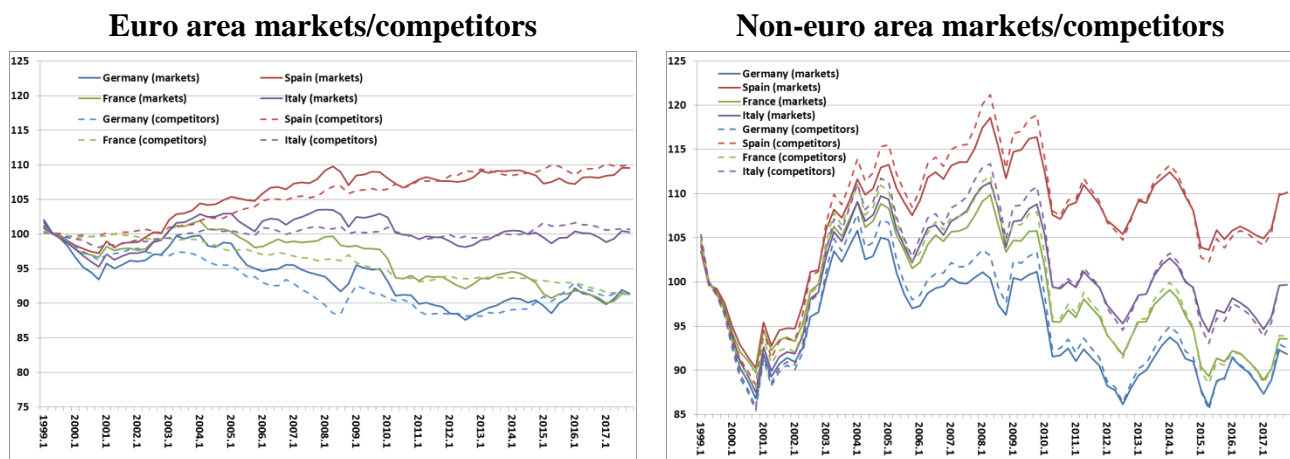
4. Moving from a competitor-based view to a market-based view of export-based price competitiveness

In addition to world-wide indicators computed *vis-à-vis* all 60 trading partners, the Bank of Italy, similarly to the ECB, provides indicators *vis-à-vis* subsets of competitors, for instance the euro-area members. Only the set of trading partners is restricted; they are still assumed to compete, as is the case for the world-wide measure, on all markets.

Together with the revision of the PCIs, a novel set of indicators has been developed: instead of being competitor-based, these measures are market-based. In other terms, they capture competitiveness dynamics of a given reporting country *vis-à-vis* all competitors in selected countries/areas (“markets”). These indicators refer only to export competitiveness (that is, to PCIs that are constructed using solely export weights and not also import weights, as is the case of the overall PCIs described in the previous section) since a market-based disaggregation is not meaningful for import competition, which by definition only takes place in the domestic market. While the methodological details are spelled out in Annex A, the following example helps clarifying the differences between the competitor-based and the market-based disaggregation. The competitor-based measure for Italy *vis-à-vis* euro-area partners simply relates Italy’s PPIs to those of euro-area competitors, as the corresponding nominal exchange rates are fixed to unity, and weighs the resulting relative prices across all markets. Conversely, the market-based measure for Italy in euro-area markets compares Italy’s PPIs to those of all 60 competitors, taking into account the corresponding exchange rates, yet the weighting only refers to euro-area markets. As is the case for world-wide indicators, both the competitor-based and the market-based measures are deflated by the PPIs of domestically sold manufactures, described in Section 2, and two matrices of fixed weights are employed (1999-2001; 2009-2011). Naturally, this market-based decomposition could be applied to any PCI, whatever the price or cost index employed.

To our knowledge, no other institution produces market-based indicators, yet they are essential to shed light on the drivers of export growth in selected markets. Indeed, they have evolved differently at business-cycle frequencies compared to competitor-based measures (Fig. 3).

Figure 3. Market-based vs. competitor-based price-competitiveness developments
(indices 1999=100)



Source: Authors’ calculations.

Notes: An increase (decrease) in the PCI signals a loss (gain) in price competitiveness.

On the basis of this newly developed set of indicators, it is possible to compare export competitiveness dynamics of Italy, France, Germany and Spain in euro-area markets, as opposed to those in non-euro area markets (Table 2; Fig. 4).

**Table 2. Export price-competitiveness developments
in euro-area and non-euro area markets by sub-period**
(percentage changes on annual averages)

	Euro-area markets				Non-euro area markets			
	France	Germany	Italy	Spain	France	Germany	Italy	Spain
1999-2007	-1.1	-5.3	2.7	7.5	6.3	0.2	8.0	13.8
2007-2010	-4.6	-3.3	-2.1	-0.2	-8.4	-7.0	-6.5	-4.3
2010-2017	-3.9	-0.8	-0.8	1.6	-6.0	-3.3	-3.5	-1.1
1999-2017	-9.3	-9.1	-0.3	9.0	-8.5	-9.9	-2.5	7.7

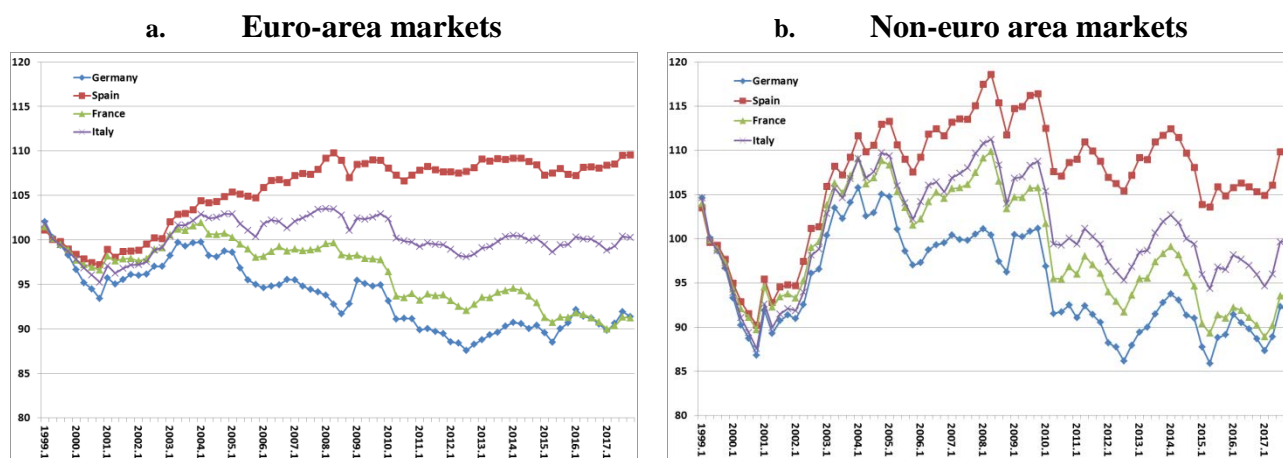
Source: Authors' calculations.

Notes: A positive (negative) change indicates a loss (gain) in price competitiveness.

First, the export-based price-competitiveness performance in the two sets of markets is found to be very heterogeneous across the four countries. Italy's overall gain since 1999 was driven by an improvement in non-euro area markets (2.5 points), against a broad stability in euro-area markets. Similarly, Spain's performance was slightly more favourable in non-euro area markets (where it lost nearly 8 percentage points) than in euro-area markets (where it lost 9 points). In the other two economies, developments were more balanced between the two sets of markets: France's gain was only mildly higher in euro-area markets (9.3, against 8.5 in non-euro area markets) and Germany's was only mildly larger in non-euro area markets (9.9, against 9.1 in euro-area markets). Seen from a different angle, in the overall 1999-2017 period France and Germany achieved a price-competitiveness gain in euro-area markets against a broad stability for Italy and a sharp loss in Spain; in non-euro area markets instead, all countries but Spain marked a gain (although Italy to a lower extent), and Spain recorded a significant loss.

Second, developments also differ by sub-period. In the years prior to the eruption of the global financial crisis, France, Italy and Spain lost export competitiveness in non-euro area markets, in connection with the appreciation of the nominal effective exchange rate of the euro (as sourced by the ECB), whereas Germany recorded a broad stability. In euro-area markets competitiveness developments mirrored those of relative prices among the four economies; France and, more starkly, Germany ended up improving their competitiveness, whereas Italy and, more significantly, Spain reported a deterioration. During the Great Recession all four countries recorded competitiveness gains in both sets of export markets. After 2010 the substantial improvement continued in non-euro area markets, where the weight of non-euro area competitors is larger and where therefore the benefit of the nominal depreciation of the euro was greater. Spain was the only country not to achieve competitiveness gains in euro-area markets in these years. France stood out as marking the largest improvements in both sets of markets; Germany and Italy's gains were comparable in this sub-period.

**Figure 4. Export price-competitiveness developments
in euro-area and non-euro area markets**
(indices 1999=100; quarterly averages)



Source: Authors' calculations.

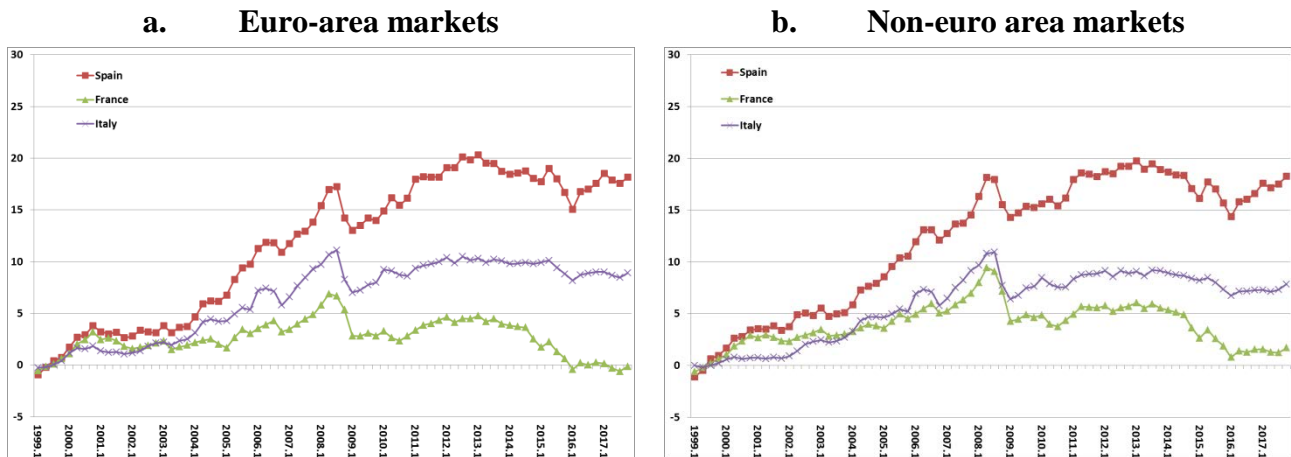
Notes: An increase (decrease) in the PCI indicates a loss (gain) in price competitiveness.

Finally, in euro-area markets in the 1999-2007 sub-period the export-competitiveness gaps of France, Italy and Spain relative to Germany rose, to a varying and increasing extent across the three countries (Fig. 5, panel a). The differential continued to widen in Spain until 2013, broadly stabilising thereafter. Conversely, after peaking at the beginning of 2009, the gap levelled out in Italy and decreased in France. On average in 2017 Spain's gap *vis-à-vis* Germany was of nearly 18 percentage points, Italy's stood at 9 points, whereas France even recorded a tiny advantage over Germany.

Concerning non-euro area markets, developments *vis-à-vis* Germany were similar, for each country, to the corresponding dynamics observed in euro-area markets, although the size of the gap was different in Italy and in France (Fig. 5, panel b). In particular, on average in 2017 Italy's export-competitiveness differential was smaller than that reported for euro-area markets, standing at 7 percentage points, whereas France's gap was negative, albeit contained (over 1 point).¹⁰

¹⁰ Moreover and in particular, since its peak in either 2012 (euro-area markets) or 2013 (non-euro area markets), Italy's price-competitiveness gain relative to Germany was larger in non-euro area markets (2.4 percentage points) than in euro-area markets (1.4 points).

Figure 5. Export price-competitiveness differentials with respect to Germany
(differences in indices 1999=100; quarterly averages)



Source: Authors' calculations.

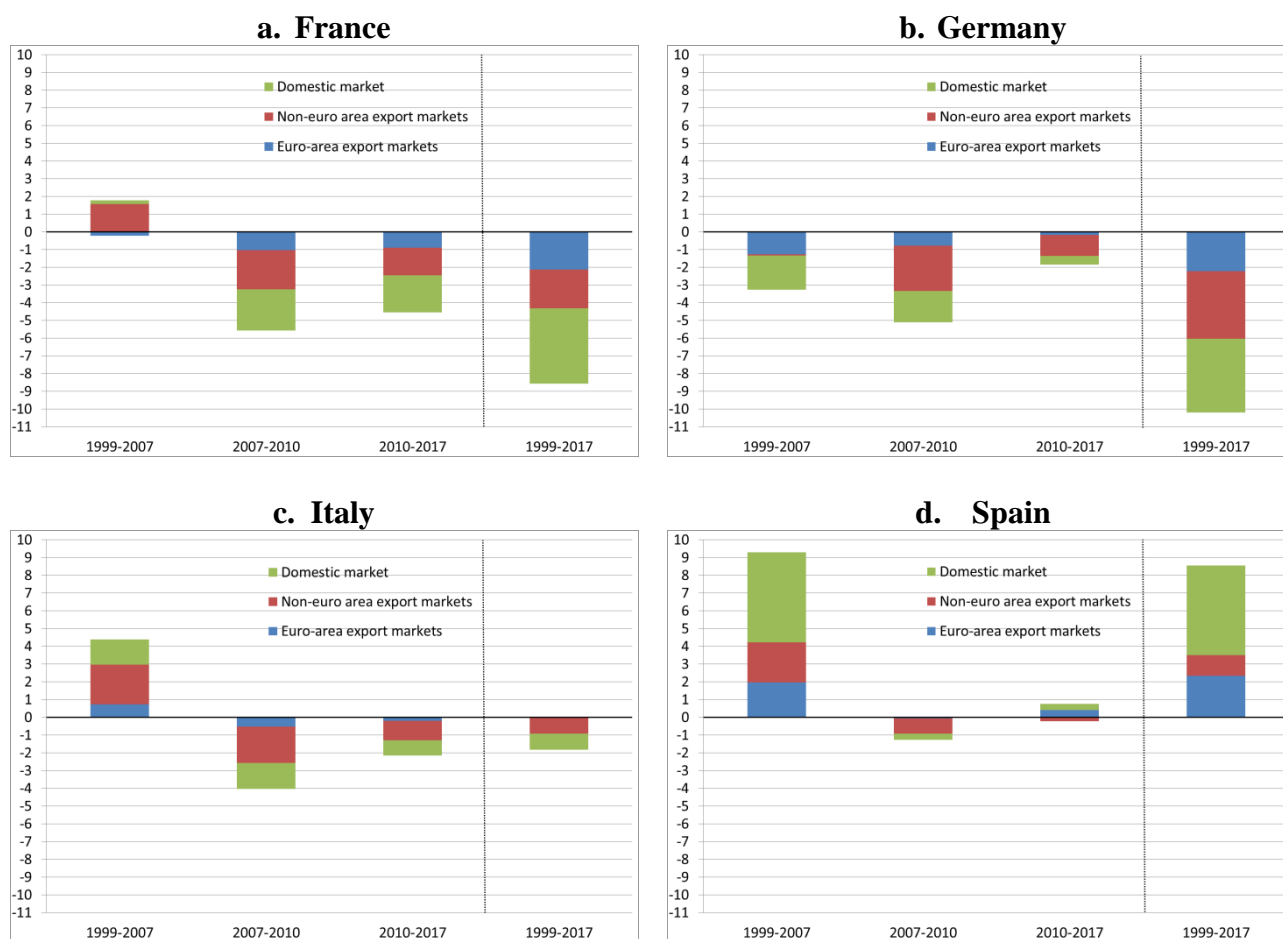
Notes: A positive (negative) differential indicates that since 1999 the country has incurred a cumulative loss (gain) in price competitiveness relative to Germany.

5. A three-market view of overall PCIs

The overall PCI of a given reporting country can be decomposed into three components (the three square brackets in equation A12 in Annex A), each referring to a different market: a) the domestic market, in which domestic producers compete with foreign exporters; b) euro-area export markets, in which all countries compete against each other; c) non-euro area markets, in which again all countries compete against each other. Figure 6 depicts the contribution of each component by sub-period in the four main euro-area countries.

Several facts stand out. First, all three components generally display the same sign (within country and sub-period), so that export competitiveness developments (i.e. the sum of blue and red bars in the figure) is magnified by competitiveness in the domestic market. Viewed from a different angle, this also means that differences across countries in overall competitiveness developments are larger than differences in export competitiveness alone. Second, the contribution of export competitiveness in euro-area markets tends to be the smallest in absolute value across the four countries. This is plausibly due to the fact that in euro-area markets the weight of euro-area competitors (including local producers), against which the nominal exchange rate is fixed, is very high, and therefore the resulting indicators are more stable over time than the non-euro area export-based measure, as seen in Figure 4. Third, in each sub-period non-euro area export markets typically turn out to be the main driver of overall price-competitiveness developments in Italy, France and Germany. Turning to the overall 1999-2017 period, instead, competitiveness in the domestic market and export competitiveness in extra-euro area markets are the main drivers of, and contribute roughly equally to, aggregate price-competitiveness developments in Italy and in Germany.

Figure 6. A decomposition of overall price competitiveness by market
(percentage-point contributions; averages by period)



Source: Authors' calculations.

Notes: Positive (negative) bars indicate a loss (gain) in price competitiveness. Each bar is obtained by adding up the annual log changes of the corresponding sub-indicator, thereby disregarding compounding. See Annex A for the formal decomposition.

6. Conclusions

The refinement in the construction of Bank of Italy's price-competitiveness indicators (PCIs) presented herein is motivated first of all by the use of revised data – mainly for non-euro area countries – for the manufacturing domestic-sale PPI employed for deflating NEERs or nominal PCIs. Revisions are large in some cases, thereby affecting not only the PCIs of the countries for which PPIs were adjusted, but also those of their main trading partners. Moreover, data are now available since 1992, gaining an extra year relative to the current series and encompassing the most dramatic phase of the European Monetary System crisis.

Price-competitiveness developments of the four main euro-area countries turn out to be slightly more favourable in the overall 1999-2017 period according to the new PCIs, especially for Spain. Competitiveness gaps *vis-à-vis* Germany in 2017, the last year for which data are available, are broadly unchanged for France and Italy relative to the current PCIs, and more contained, albeit still very large, in the case of Spain. In conclusion, recent price-competitiveness analyses conducted at the Bank of Italy (Bugamelli et al., 2018) still hold according to the new PCIs.

Furthermore, a novel decomposition of PCIs is developed, which enable to correctly disentangle export competitiveness developments in euro-area vs. non-euro area markets, as well as those in the domestic market. According to these new indicators, whereas France's and Germany's substantial gain in competitiveness in the 1999-2017 period is found to be quite balanced between euro and non-euro markets, Italy's improvement was much smaller and Spain's deterioration larger in euro-area markets than elsewhere. After 2010 France, Germany and Italy all marked gains in both sets of markets, whereas Spain lost competitiveness in euro-area markets. In the entire 1999-2017 period competitiveness in the domestic market and export competitiveness in non-euro area markets equally shape the aggregate competitiveness developments observed in Italy and in Germany.

A note of caution to the analysis here presented is warranted. Bank of Italy's PCIs are based on one particular price index, yet it is now common knowledge that competitiveness developments vary significantly according to the price or cost index employed to deflate NEERs or nominal PCIs (ECB, 2003; Deutsche Bundesbank, 2004; Giordano and Zollino, 2016). In general, therefore, a complete assessment of competitiveness trends should be based on the examination of a set of differently deflated PCIs, of which the indicators that Bank of Italy constructs and publishes are only one of several, complementing the set published by the ECB.

Annex A. The methodology underlying the construction of the Bank of Italy's price-competitiveness indicators

This Annex first recaps the methodology underlying Bank of Italy's current price-competitiveness indicators (PCIs), described more in detail in Felettigh et al. (2015; 2016); next, it describes the novel breakdown of export-based indicators in euro and non-euro markets and therefore the three-market decomposition of overall PCIs.

A1. A recap of the current methodology

The starting point is the nominal effective exchange rate (NEER), or nominal PCI for euro-area countries, which is calculated as the weighted geometric average of bilateral nominal exchange rates. Omitting time subscripts for simplicity, the NEER of reporting country i in time t is defined as:

$$NEER_i = \prod_{j=1}^N e_{ij}^{w_j^i} \quad [A1]$$

where N denotes the number of trading partners ($N = 61$ in Bank of Italy's case, including the reporting country), e_{ij} stands for the index of the nominal bilateral exchange rate between country i and country j (expressed in terms of j 's currency per unit of i 's currency, so that an increase indicates a loss of price competitiveness for i), and w_j^i indicates the overall weight of competitor j for the reference country i .

In computing the NEER for country i , the overall weight w_j^i of each competitor j in the group of N trading partners is equal to the weighted average of export ($^xw_j^i$) and import weights ($^mw_j^i$):

$$w_j^i = \alpha_i \ ^xw_j^i + (1 - \alpha_i) \ ^mw_j^i \quad [A2]$$

where $\alpha_i = \frac{X_i}{X_i + M_i}$ is the share of exports of reporting country i on its total trade flows, computed in the reference period we detail below and reported in Table A1 for each of the four euro-area countries. Countries that are structurally net exporters (importers) are thus assigned a higher export (import) weight.

The import weight of competitor country j is defined as its share in the reporting country i 's total imports:

$$^mw_j^i = m_j^i / \sum_{a=1}^N m_a^i \quad [A3]$$

where m_j^i denotes imports of reporting country i from country j and the denominator indicates total imports of reporting country i , with $m_i^i = 0$ and $\sum_{j=1}^N \ ^mw_j^i = 1$. The higher the share of competitor j in the reporting country's total imports, the larger the weight of its exchange rate in the basket of currencies included in the NEER.

The export weight of competitor j in the computation of the NEER for country i is more articulate, as it is double-weighted in order to account for third-market effects:

$${}^xw_j^i = \sum_{k=1, k \neq i}^{N+1} S_k^j x_k^i, \quad j = 1, \dots, N \quad [A4]$$

where S_k^j denotes the share of competitor j in market k , $S_k^i = 0$ by normalization, x_k^i denotes the share of market k in i 's exports and $N+1$ denotes the overall number of outlet markets considered, which is equal to N plus the residual aggregate “rest of the world”. Each foreign market k is defined, from the viewpoint of reporting country i , as the sum of “locally-sold local production”, i.e. manufacturing gross output of country k sold in its domestic market, and of manufacturing exports to country k from all competitors j ($j \neq i$). Note that, due to data limitations, the residual aggregate “rest of the world” is treated as an additional outlet market while it is not included in the set of competitors for reporting country i .¹¹

The double-weighted export weight measures both the direct competition faced by reporting country i in market j from its local manufacturers ($k=j$) and the indirect competition faced by reporting country i from j 's exports in third markets k ($k \neq j$).

As is common practice in the literature, bilateral trade flows in some fixed reference period are employed to compute the weights (w_j^i , ${}^m w_j^i$ and ${}^x w_j^i$)¹² for the 61 countries listed in Table B1 in Annex B. In particular, Bank of Italy's trade weights are based on flows of manufactured goods only, which are less subject to non-market practices, typical of agricultural goods, and to large price volatility, as is the case for raw commodities. Two matrices of fixed weights are used: the first, based on 1999-2001 bilateral trade data for 62 countries and their exports to the residual aggregate “rest of the world”, is employed to calculate PCIs for the January 1993 - December 2004 period; the second matrix, based on 2009-2011 data, is employed for indicators as of January 2005. The two series are then chain-linked in January 2005.¹³

¹¹ That is, exports from the “rest of the world” to the other markets are disregarded. Moreover, local production is not considered in the definition of the “rest of the world” market. This is of course a simplification of reality, as in this way “rest of the world” is supposed to be only consuming and not producing anything. As discussed in Buldorini, Makrydakakis and Thimann (2002), the exclusion of the own-production effect for the “rest of the world” could, under certain circumstances, introduce some bias in the computation of the double-export weights. One case is when a competitor country has its main trading partners in the “rest of the world”: the double-export weight of this country could be expanded relative to that of another competitor country whose trading partners are mainly among the 62 countries considered in the Bank of Italy's indicators. This procedure is anyhow standard in the construction of price-competitiveness measures (see, for example, Schmitz et al., 2013).

¹² These weights are constructed according to two key assumptions: i) countries trade only in final goods (Armington, 1969) and ii) the elasticity of substitution is constant not only for products coming from different countries, but also across different products (Spilimbergo and Vamvakidis, 2003). An emerging literature has however attempted to take on board at least three dimensions of rising globalization, which question these two key assumptions, in the construction of PCIs: a) owing to (increasing) vertical integration, countries add value to different stages of the production process and therefore compete in supplying domestic value added to international markets (Bems and Johnson, 2012); b) an appreciation of a country's currency raises the international price of its final goods, but this effect may be (partially or entirely) offset by the fact that the appreciation also reduces the cost of importing intermediate inputs, thereby dampening overall production costs within the country, especially for economies at the end of the production chain (Bems and Johnson, 2015), c) sectors are not identical in their interactions across borders and elasticities of substitution are not homogeneous across products, and at least sector-specific (Patel, Wang and Wei, 2017). These more sophisticated PCIs, based on value-added information extracted from world input-output tables, suffer, however, from a more limited geographical coverage and a shorter time-span (see Bugamelli et al., 2017 for a more thorough discussion) and are not currently constructed by the Bank of Italy.

¹³ As a result, whenever the period of interest includes January 2005, PCIs change also due to the switch between the two sets of weights. More elaborate weighting schemes, such as the rolling trade weights underlying the ECB's

The trade weights and coefficients α_i of equation [A2] are based on the following sources: Eurostat bilateral export data for EU countries; United Nations Comtrade (UN) export data for non-EU countries; CEPII-BACI data for Taiwan and for other missing observations. In all cases the 61-by-61 matrix of bilateral exports together with overall exports by each country was retrieved so that exports to the 62nd partner “rest of the world” were computed residually. As in Tristani and Zollino (1998) and Schmitz et al. (2013), local producers’ sales in their domestic market are approximated by the difference of the country’s manufacturing value added (VA) and its net manufacturing imports. This method is based on the assumption that manufacturing goods imports are a reasonable approximation of the total value of intermediate inputs of foreign origin, in turn reflecting the high and growing degree of internationalization of manufacturing production. Current-price manufacturing VA data for all 61 countries, except Taiwan and China, are retrieved from United Nations Statistics. Data for Taiwan are sourced from WIOD for 1999-2001 and from the Taiwan Statistical Bureau for 2009-2011; data for China for 1999-2001 are taken from World Bank data. As for manufacturing imports, the hierarchy of sources used for (bilateral) exports is confirmed.

As mentioned earlier, the PCI of a country i in time t is defined as the weighted geometric average of its relative prices or costs, where all prices/costs are measured in a common currency. Alternatively but equivalently, again omitting time subscripts, the indicator can be computed as the product of the NEER and a weighted geometric average of relative prices or costs:

$$PCI_i = \prod_{j=1}^N (P_{ij} e_{ij})^{w_j^i} = NEER_i \prod_{j=1}^N (P_{ij})^{w_j^i} \quad [A5]$$

where the last equal sign follows from equation [A1] and $P_{ij} \equiv P_i/P_j$, where P_i and P_j are the price indices for countries i and j , respectively. Given the way it is constructed, an increase in the indicator implies a loss in price competitiveness for the reporting country i . Equations [A2] and [A5] can be combined to obtain an alternative interpretation of the “overall” PCI, expressed as a geometric weighted average of an export-based competitiveness indicator (PCI_i^X) and an import-based indicator (PCI_i^M), the weights being α_i and $(1 - \alpha_i)$:

$$PCI_i = \left[\prod_{j=1}^N (P_{ij} e_{ij})^{x_{wj}^i} \right]^{\alpha_i} \cdot \left[\prod_{j=1}^N (P_{ij} e_{ij})^{m_{wj}^i} \right]^{1-\alpha_i} \\ = (PCI_i^X)^{\alpha_i} \cdot (PCI_i^M)^{1-\alpha_i} \quad [A6]$$

A2. The new, market-based view of export-based price competitiveness

In order to construct market-restricted indicators, the starting point is the export-based PCI for country i (PCI_i^X), referred to in equation [A6]. By taking logs of this equation and by replacing the export weights with equation [A4], one obtains:

indicators (Schmitz et al., 2013), entail a signal extraction problem for all PCIs’ annual changes, which are affected not only by the evolution of prices (or costs) and nominal exchange rates, but also by that of the weights. We regard keeping weights fixed for a decade as a good compromise between preserving the role of market signals and taking into account the (slowly) changing structural composition of trade flows.

$$\ln(PCI_i^X) = \sum_{j=1}^N \left[\left(\sum_{k=1, k \neq i}^{N+1} S_k^j x_k^i \right) \ln(e_{ij} P_{ij}) \right], \quad [A7]$$

where again S_k^j denotes the share of competitor j in market k ,¹⁴ $S_k^i = 0$ by normalization, x_k^i denotes the share of market k in i 's exports and $N+1$ denotes the overall number of outlet markets considered, which is equal to N plus the residual aggregate “rest of the world”. P_{ij} is, as before, the relative PPI (of domestically sold manufactures) between reporter i and competitor j .

By inverting the two summations and using the definition $P_{ij} \equiv P_i/P_j$, equation [A7] becomes:

$$\ln(PCI_i^X) = \sum_{k=1, k \neq i}^{N+1} x_k^i \left[\sum_{j=1}^N S_k^j \ln \left(e_{ij} \frac{P_i}{P_j} \right) \right], \quad [A8]$$

where $\sum_{j=1}^N S_k^j = 1$ for any $k \neq i$ and $S_k^i = 0$ by normalization. By applying the non-arbitrage condition such that $e_{ij} = e_{ik}/e_{jk}$, where e_{ik} is the bilateral nominal exchange rate between country i and outlet market k (k 's currency for one unit of i 's currency) and e_{jk} is the bilateral nominal exchange rate between competitor j and outlet market k (k 's currency for one unit of j 's currency), equation [A8] can be recognized as the market-based version of the export-based PCI. Indeed, the second summation is, for a given outlet market k , a weighted average of the (log) relative prices, all measured in market k 's currency, which reporting country i faces in market k ; the weights are given by the share of each competitor j in market k .¹⁵ For a given market k , this term thus captures the competitiveness pressures which reporting country i faces in a given market k (including local producers). The first summation then sums up the competitiveness pressures stemming from all markets $k \neq i$, weighting them with the share of each outlet market k in country i 's exports.

So, for example, the export-based PCI of country i in euro-area markets can be computed, by appropriately restricting the k sum, as:

$$\ln(PCI_i^{XEA}) = \sum_{\substack{k \in EA \\ k \neq i}} x_k^i \left[\sum_{j=1}^N S_k^j \ln \left(\frac{e_{ij} P_i}{P_j} \right) \right] \quad [A9]$$

Notice that x_k^i is the weight of market k in i 's overall exports; equation [A9] can be equivalently re-written in terms of the weight of market k in i 's exports to the euro area ($x_k^{i,EA}$) as follows:

$$\ln(PCI_i^{XEA}) = \beta_i \sum_{\substack{k \in EA \\ k \neq i}} x_k^{i,EA} \left[\sum_{j=1}^N S_k^j \ln \left(\frac{e_{ij} P_i}{P_j} \right) \right], \quad [A10]$$

¹⁴ The competitive pressures of local producers by competitor k in the competitor's own market k (namely the case $j=k$) is also considered.

¹⁵ It is noteworthy that, as in Schmitz et al. (2013), country i 's weight in market k is not considered, in that the weights S_k^j are defined as the share of competitor j in market k net of country i . In other terms, when $j=i$ in the second summation, the addendum is zero. If this was not the case, then the resulting PCIs would plausibly be smoother in that they would assign a positive weight to one “competitor” (the reporting country itself) with relative prices fixed at unity.

where β_i is the weight of euro-area exports of country i on its total exports.

The world-wide (i.e. on all markets) export-based PCI of country i can be expressed as a weighted average of the two restricted (euro-area and non-euro area) measures, where the weights are β_i and $(1 - \beta_i)$, respectively:¹⁶

$$\ln(PCI_i^X) = \beta_i \ln(PCI_i^{XEA}) + (1 - \beta_i) \ln(PCI_i^{XNEA}), \quad [A11]$$

where PCI_i^{XNEA} is defined along the lines of equation [A10] by letting k index non-euro area markets.

Lastly, the log-version of equations [A6] and [A11] underpins the three-market view of PCIs discussed in Section 5, based on the following decomposition:

$$\ln(PCI_i) = [\alpha_i \beta_i \ln(PCI_i^{XEA})] + [\alpha_i (1 - \beta_i) \ln(PCI_i^{XNEA})] + [(1 - \alpha_i) \ln(PCI_i^M)] \quad [A12]$$

¹⁶ Symmetrically to world-wide indicators, described in the previous section, the weight β_i is computed in two reference periods, 1999-2001 and 2009-2011. The 1999-2001 weight matrix is employed to calculate PCIs for the January 1993 - December 2004 period, while the 2009-2011 matrix is employed for indicators as of January 2005. The two series are then chain-linked in January 2005. The weights β_i for the four main euro-area countries range between 0.430 (Germany) and 0.615 (Spain) in 1999-2001 and between 0.395 (Germany) and 0.581 (Spain) in 2009-2011.

Annex B. Additional tables and figures

Table B1. The price indices and sources underlying the 61 new Bank of Italy PCIs

	Country	Deflator	Source
euro-area countries	Austria	PPI, domestic sales of manufactures	ECB
	Belgium	PPI, domestic sales of manufactures	Eurostat
	Cyprus	PPI/PPI, domestic sales of manufactures	IMF/ Eurostat
	Estonia	CPI/PPI/PPI, domestic sales of manufactures	IMF/IMF/ Eurostat
	Finland	PPI, domestic sales of manufactures	ECB
	France	PPI, domestic sales of manufactures	ECB
	Germany	PPI, domestic sales of manufactures	ECB
	Greece	PPI, domestic sales of manufactures	ECB
	Ireland	PPI, domestic sales of manufactures	ECB
	Italy	PPI, domestic sales of manufactures	Istat
	Latvia	CPI/PPI/PPI, domestic sales of manufactures	IMF/IMF/ Eurostat
	Lithuania	CPI/PPI/PPI, domestic sales of manufactures	IMF/IMF/ Eurostat
	Malta	CPI/PPI, domestic sales of manufactures	IMF/ Eurostat
	Netherlands	PPI, domestic sales of manufactures	ECB
	Portugal	PPI, domestic sales of manufactures	Eurostat
	Slovakia	PPI, dom. sales of ind. goods /PPI/PPI, dom. sales of manuf.	ECB/Eurostat
Slovenia	PPI, domestic sales of manufactures	ECB	
Spain	PPI, domestic sales of manufactures	ECB	
non euro-area EU countries	Bulgaria	CPI/PPI/PPI, domestic sales of manufactures	IMF/IMF/ECB
	Croatia	CPI/PPI/PPI, domestic sales of manufactures	IMF/IMF/ECB
	Czech Republic	PPI, domestic sales of manufactures/	ECB
	Denmark	PPI, domestic sales of manufactures	OECD/ECB
	Hungary	PPI/PPI, domestic sales of manufactures	IMF/ECB
	Poland	PPI/PPI, tot. sales of manuf./PPI, dom. sales of manuf.	IMF/OECD/ECB
	Romania	PPI/PPI, domestic sales of manufactures	IMF/ECB
	Sweden	PPI/PPI, tot. sales of manuf./PPI, dom. sales of manuf.	IMF/OECD/ECB
	United Kingdom	PPI/PPI, domestic sales of manufactures	IMF/OECD
	non EU countries	Algeria	CPI
Argentina (*)		CPI/PPI/PPI	IMF/IMF/Datastream
Australia (*)		PPI/PPI, total sales of manufactures	IMF/OECD
Brazil		WPI	IMF
Canada		PPI, total sales of manufactures	OECD
Chile		WPI/PPI, total sales of manufactures	IMF/OECD
China		CPI/PPI/PPI	IMF/Datastream/IMF
Colombia		PPI/PPI, domestic sales of manufactures	IMF/OECD
Ecuador		WPI/CPI/PPI	IMF/IMF/IMF
Hong Kong SAR (*)		CPI/PPI	IMF/IMF
India		WPI	IMF
Indonesia		WPI/ WPI of total manufactures	IMF/OECD
Israel		WPI/PPI, domestic sales of manufactures	IMF/OECD
Japan		PPI/PPI, domestic sales of manufactures	IMF/OECD
Kuwait		WPI	IMF
Malaysia		CPI/PPI	IMF/IMF
Mexico		PPI/PPI, domestic sales of manufactures	IMF/OECD
Morocco		WPI/CPI/PPI	IMF/IMF/IMF
New Zealand (*)		PPI, domestic sales of manufactures	OECD
Nigeria		CPI	IMF
Norway		PPI, domestic sales of manufactures	OECD
Pakistan		WPI	IMF
Peru		WPI	IMF
Philippines		CPI/PPI	IMF/IMF
Russia		PPI/PPI, domestic sales of manufactures	IMF/OECD
Saudi Arabia		CPI	IMF
Singapore		WPI	IMF
South Africa		PPI, domestic sales of manufactures	OECD
South Korea		PPI, domestic sales of manufactures	OECD
Switzerland		PPI/PPI, domestic sales of manufactures	IMF/OECD
Taiwan		WPI	Datastream
Thailand		PPI	IMF
Turkey		PPI, dom. sales of ind. goods /PPI, dom. sales of manuf.	OECD/OECD
United States		PPI, total sales of manufactures	OECD

Notes: PPI= producer price index; CPI= consumer price index; WPI=wholesale price index. The indices and relative sources are listed in chronological order, such that the last index and source refers to the data employed for the most recent (country-varying) period. The new data are highlighted in green. (*) Quarterly data are converted into monthly series for certain periods.

**Table B2. The weight of selected countries
in the four largest euro-area economies' trade baskets
(percentages)**

A. 1999-2001

Country	Italy			France			Germany			Spain		
	Import weights	Double export weights	Overall weights	Import weights	Double export weights	Overall weights	Import weights	Double export weights	Overall weights	Import weights	Double export weights	Overall weights
Bulgaria	0.4	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Brazil	0.7	1.1	0.9	0.3	1.0	0.6	0.3	1.0	0.7	0.3	1.2	0.7
Canada	0.3	1.2	0.8	0.3	1.2	0.8	0.3	1.2	0.8	0.2	0.7	0.4
Switzerland	3.7	2.6	3.1	2.7	2.7	2.7	4.4	3.1	3.7	1.9	1.7	1.8
Colombia	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.1
Denmark	0.5	0.9	0.7	0.6	1.0	0.8	1.7	1.3	1.5	0.6	0.8	0.7
United Kingdom	7.2	7.3	7.3	9.0	9.0	9.0	7.6	8.4	8.1	8.3	8.4	8.3
Hong Kong SAR	1.3	1.3	1.3	1.3	1.4	1.4	1.8	1.4	1.6	1.2	1.1	1.2
Croatia	0.5	0.4	0.4	0.0	0.1	0.1	0.2	0.2	0.2	0.0	0.1	0.1
Hungary	0.9	0.9	0.9	0.6	0.7	0.6	2.5	1.2	1.8	0.4	0.6	0.5
Japan	3.3	4.7	4.1	2.7	4.8	3.7	4.5	5.2	4.9	2.6	3.4	3.0
Morocco	0.2	0.3	0.2	0.8	0.7	0.7	0.1	0.2	0.1	0.4	0.8	0.6
Mexico	0.1	1.0	0.6	0.1	0.9	0.5	0.4	1.2	0.8	0.2	1.2	0.6
Poland	1.1	1.4	1.3	0.6	1.1	0.9	2.5	2.0	2.2	0.4	1.0	0.6
Russia	0.4	1.1	0.8	0.1	0.8	0.5	0.4	1.3	0.9	0.1	0.6	0.3
United States	5.5	12.3	9.3	7.5	12.1	9.8	6.8	13.5	10.6	3.9	8.6	6.0
South Africa	0.3	0.5	0.4	0.1	0.5	0.3	0.5	0.6	0.6	0.2	0.4	0.3
<i>Sum of these countries</i>	<i>26.3</i>	<i>37.3</i>	<i>32.5</i>	<i>27.0</i>	<i>38.1</i>	<i>32.6</i>	<i>34.0</i>	<i>42.2</i>	<i>38.7</i>	<i>20.9</i>	<i>30.8</i>	<i>25.3</i>
<i>Remaining extra-euro area countries</i>	<i>12.6</i>	<i>17.0</i>	<i>15.1</i>	<i>8.9</i>	<i>16.8</i>	<i>12.9</i>	<i>15.3</i>	<i>17.9</i>	<i>16.8</i>	<i>9.5</i>	<i>14.1</i>	<i>11.5</i>
<i>Euro-area countries ⁽¹⁾</i>	<i>61.1</i>	<i>45.7</i>	<i>52.5</i>	<i>64.2</i>	<i>45.1</i>	<i>54.5</i>	<i>50.8</i>	<i>39.9</i>	<i>44.5</i>	<i>69.6</i>	<i>55.1</i>	<i>63.2</i>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Weight of the export-based PCI in the overall PCI (α)	56.3			57.2			50.7			44.1		

B. 2009-2011

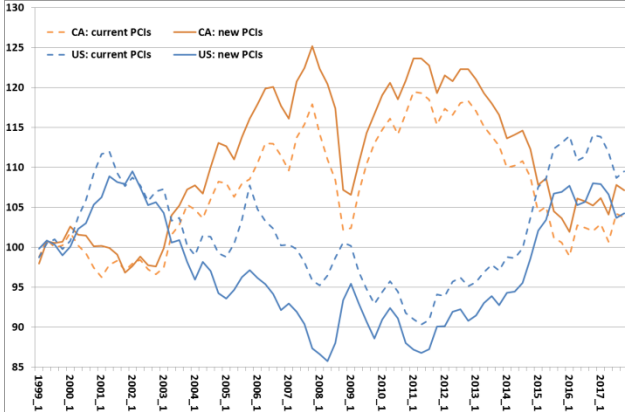
Country	Italy			France			Germany			Spain		
	Import weights	Double export weights	Overall weights	Import weights	Double export weights	Overall weights	Import weights	Double export weights	Overall weights	Import weights	Double export weights	Overall weights
Bulgaria	0.6	0.3	0.4	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.2	0.2
Brazil	0.5	1.3	0.9	0.2	1.1	0.7	0.4	1.2	0.8	0.5	1.3	0.9
Canada	0.2	0.8	0.6	0.4	0.9	0.6	0.3	1.0	0.7	0.2	0.6	0.4
Switzerland	4.1	2.9	3.5	2.9	2.5	2.7	4.3	3.0	3.6	2.7	2.1	2.4
Colombia	0.1	0.2	0.1	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.2	0.1
Denmark	0.6	0.7	0.6	0.6	0.8	0.7	1.3	1.1	1.2	0.8	0.7	0.7
United Kingdom	3.9	4.8	4.4	4.4	5.7	5.0	4.4	5.8	5.2	5.0	5.3	5.2
Hong Kong SAR	1.2	1.2	1.2	0.9	1.3	1.1	1.4	1.5	1.4	0.9	0.9	0.9
Croatia	0.5	0.4	0.5	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.1	0.1
Hungary	1.3	1.1	1.2	1.0	1.0	1.0	2.9	1.2	1.9	1.3	0.9	1.1
Japan	1.6	3.3	2.5	1.4	3.7	2.5	2.4	3.8	3.2	1.3	2.3	1.8
Morocco	0.2	0.4	0.3	0.7	0.7	0.7	0.0	0.2	0.1	1.1	1.3	1.2
Mexico	0.2	0.9	0.6	0.1	0.8	0.4	0.4	0.9	0.7	0.2	1.1	0.6
Poland	2.8	2.4	2.5	2.0	2.0	2.0	4.6	3.0	3.7	1.7	1.9	1.8
Russia	1.2	2.3	1.8	0.1	1.8	0.9	0.5	2.7	1.8	0.1	1.1	0.6
United States	3.2	7.8	5.7	3.4	8.2	5.7	4.6	9.0	7.2	3.0	5.8	4.3
South Africa	0.2	0.6	0.4	0.1	0.6	0.4	0.5	0.7	0.6	0.3	0.5	0.4
<i>Sum of these countries</i>	<i>22.2</i>	<i>31.3</i>	<i>27.2</i>	<i>18.4</i>	<i>31.7</i>	<i>24.7</i>	<i>28.3</i>	<i>35.7</i>	<i>32.6</i>	<i>19.2</i>	<i>26.4</i>	<i>22.6</i>
<i>Remaining extra-euro area countries</i>	<i>22.0</i>	<i>27.0</i>	<i>24.7</i>	<i>15.2</i>	<i>27.8</i>	<i>21.2</i>	<i>23.2</i>	<i>29.0</i>	<i>26.6</i>	<i>17.6</i>	<i>22.4</i>	<i>19.8</i>
<i>Euro-area countries ⁽¹⁾</i>	<i>55.8</i>	<i>41.7</i>	<i>48.1</i>	<i>66.4</i>	<i>40.5</i>	<i>54.1</i>	<i>48.5</i>	<i>35.3</i>	<i>40.8</i>	<i>63.2</i>	<i>51.2</i>	<i>57.6</i>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Weight of the export-based PCI in the overall PCI (α)	54.4			58.6			47.4			46.6		

Source: Feletigh et al. (2015; 2016) and Banca d'Italia (2018).

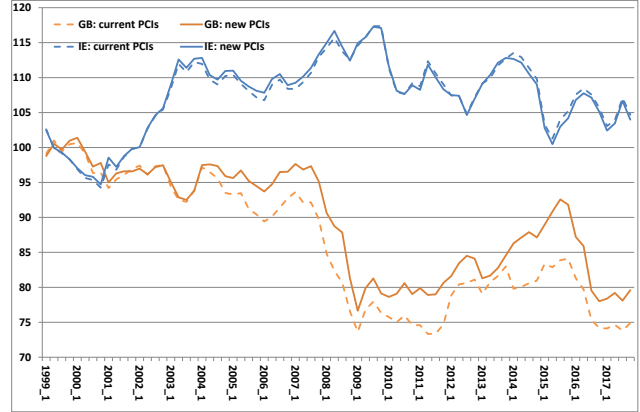
Notes: (1) Luxembourg is not included.

Figure B1. Price-competitiveness developments in selected countries according to the new and current indicators (indices 1999=100)

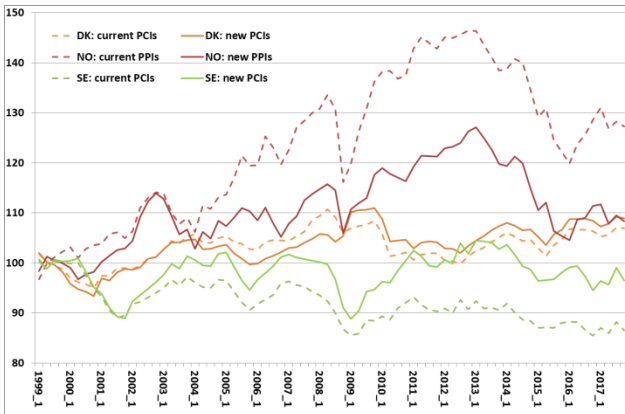
a) Canada and the United States



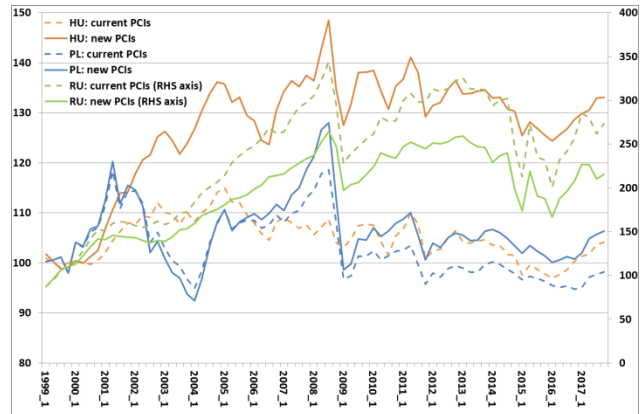
b) Ireland and the United Kingdom



c) Scandinavian countries



d) Selected CEE countries and Russia



Sources: Authors' calculations.

Notes: An increase of the PCI indicates a loss in price competitiveness. Note that the scales are different across charts. The acronyms refer to the following countries: Canada (CA), Denmark (DK), Hungary (HU), Ireland (IE), Norway (NO), Poland (PL), Russia (RU), Sweden (SE), the United Kingdom (GB) and the United States (US).

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