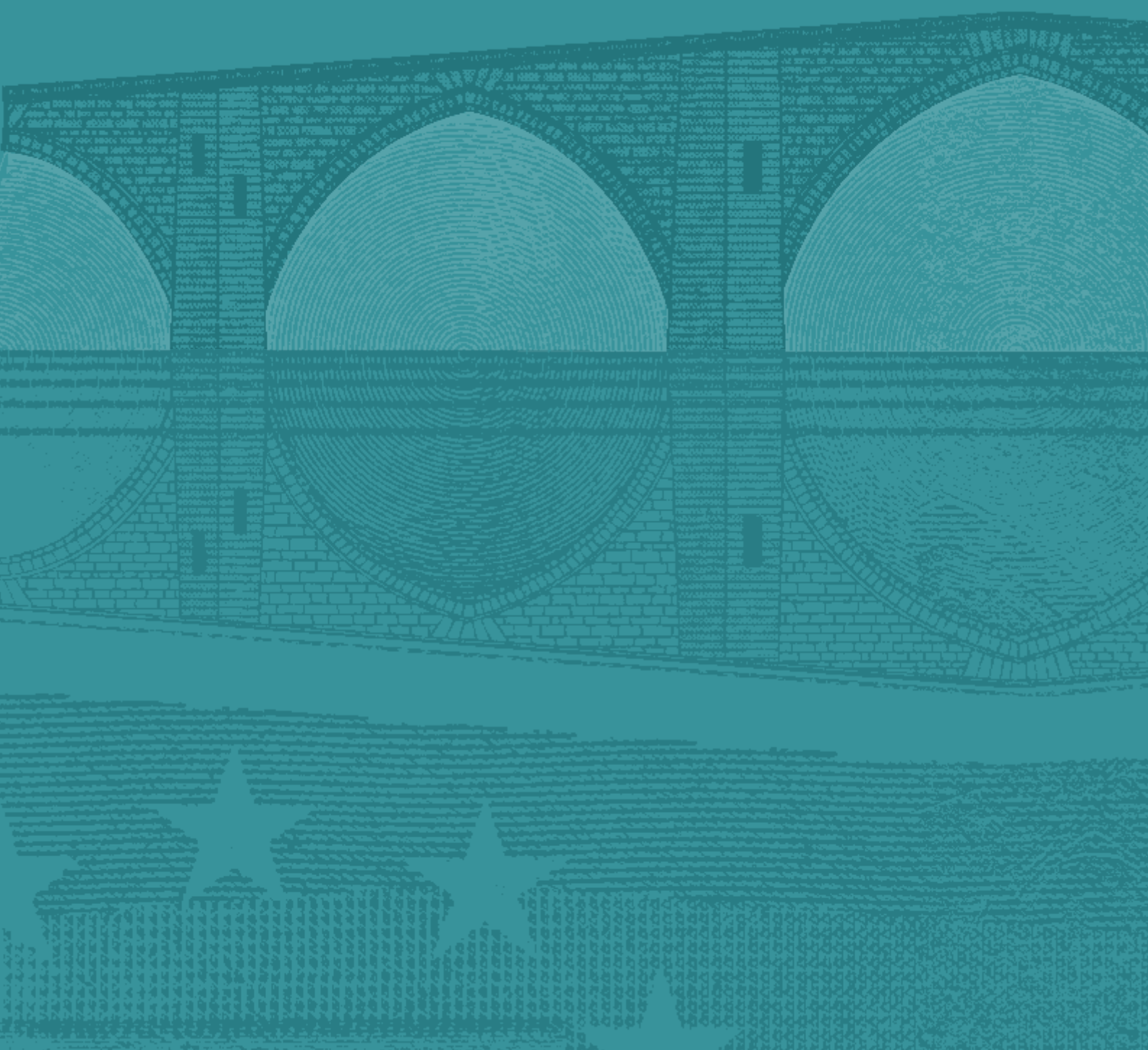# COMPETITIVENESS RESEARCH NETWORK INTERIM REPORT II: RESULTS IN 2013 AND PLANS FOR 2014

APRIL 2014

EUROPEAN CENTRAL BANK

EUROSYSTEM

CompNet The Competitiveness Research Network

In 2014 all ECB publications feature a motif taken from the €20 banknote.

COMPETITIVENESS RESEARCH NETWORK INTERIM REPORT II: RESULTS IN 2013 AND PLANS FOR 2014

APRIL 2014

The network is composed of economists from the European System of Central Banks (ESCB) – i.e. the 28 national central banks of the European Union (EU) and the European Central Bank – the EU national statistical institutes ISTAT and Statistics Finland, and several international organisations (the World Bank, OECD, EU Commission), universities and think-tanks, as well as a number of non-European central banks (Turkey, Argentina and Peru) and organisations (US International Trade Commission).

The objective of CompNet is to develop a more consistent analytical framework for assessing competitiveness, which allows for greater correspondence between determinants and outcomes.

Research is carried out in three workstreams: 1) Aggregate Measures of Competitiveness; 2) Firm Level; 3) Global Value Chains. CompNet is chaired by Filippo di Mauro (ECB). Workstream 1 is currently headed by Ettore Dorucci, Pavlos Karadeloglou (all ECB) and Konstantins Benkovskis (Latvijas Banka); workstream 2 is headed by Antoine Berthou (Banque de France) and Paloma Lopez-Garcia (ECB); and workstream 3 by João Amador (Banco de Portugal) and Frauke Skudelny (ECB). Julia Fritz (ECB) is responsible for the CompNet Secretariat.

Filippo di Mauro

European Central Bank; e-mail: filippo.di_mauro@ecb.europa.eu

CONTENTS

EXECUTIVE SUMMARY – COMPNET INTERIM REPORT II – RESULTS IN 2013 AND PLANS FOR 2014

This second Interim Report[1] summarises the main findings and results of the Competitiveness Research Network (CompNet) achieved over 2013 and its plans up to the end of its activities (mid 2015). In doing so, it will refer to its organisation and mandate only briefly (see Introduction)[2], and concentrate only on the most recent results and plans over and above the ones included in the previous Interim Report, published in June 2013[3].

The most important result in 2013 was the finalisation of a novel set of indicators based on firm-level data for 11 EU countries. The data set is superior to others available in several respects: (i) *coverage*, as it includes 58 sectors and 11 EU countries; (ii) *time horizon*, since it comprises – spanning from 1995 to 2011 – the recent boom-bust cycle; (iii) *cross country comparability* and (iv) *comprehensiveness* of the indicators included. This database has been constructed through a project centralised at the ECB in which NCBs and NCIs have independently completed the computations of a common program without disclosing raw data in order to address the issue of the confidentiality of firm-level data. The resulting indicators have then been collected and elaborated at the ECB.

So far micro-based indicators include firm size, labour productivity and TFP dynamics, with a particular emphasis on the impact on productivity of the process of resource reallocation across firms operating within the same sector. There are three main stylised facts which are already emerging, with critical policy implications:

• *there is a significant heterogeneity in the productivity of firms across sectors and within sectors;*

• *firms in both tails of the productivity distribution (that is the most and least productive firms within the sector) display different dynamics, for instance, with respect to interaction between respective sizes and labour costs;*

• *there is a positive relationship between labour productivity and size, which is highly diversified across countries and sectors.*

This data set will be used in two ways. On the one hand, it will be used to write academic papers and studies on specific research questions of high *policy relevance* (e.g. role of firm size in specific industries, identification of factors hampering effective resource allocations, evolution of labour costs for different productivity quintiles, and so on). A related challenge will be to incorporate the most robust CompNet findings into policy outlets such as the ECB surveillance reports on euro area and non-euro area Member States, which are produced once per year and discussed by the Governing and General Councils of the ECB, respectively. On the other hand, the firm-based indicators will also be added - along with GVC measures - to the set of macro indicators previously developed (standard and not, such as proxies for non-price factors[4]) within a comprehensive "*Competitiveness Diagnostic Toolkit*". The toolkit – containing a large set of traditional and newly

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1   This report was prepared by Filippo di Mauro with the assistance of Maddalena Ronchi (Bocconi University). It includes inputs and comments from P. López-García (ECB), C. Altomonte (Bocconi University), J. Amador (Banco de Portugal), F. Skudelny (ECB), K. Benkovskis (Latvijas Banka), A. Berthou (Banque de France), E. Bobeica (ECB), J. Vanhala (Bank of Finland), M. Bugamelli (Banca d'Italia), K. Galuczak (Czech National Bank), C. Sanchez Muñoz (ECB), J. Wörz (Oesterreichische Nationalbank), E. Prades Illanes (Banco de España), K. Lommatzsch and S. Blank (Bundesbank).
2   For details on the organisation and membership of CompNet please consult our website: http://www.ecb.europa.eu/home/html/researcher_compnet.en.html
3   See http://www.ecb.europa.eu/home/pdf/research/compnet/CompNet_First_Year_Results.pdf?4eab54308d2155b0ffe48335a795bb6a
4   See previous Interim Report: http://www.ecb.europa.eu/home/pdf/research/compnet/CompNet_First_Year_Results.pdf?4eab54308d2155b0ffe48335a795bb6a

developed indicators – is designed to be used on a regular basis for competitiveness assessment[5]. Work is ongoing with NCBs (as well as with EC-EcFin) to share indicators and related analysis, in part in order to support the EU surveillance framework.

Looking forward and up to the end of its mandate (mid-2015), CompNet will focus on two broad fronts:

1) expanding the firm-level data analysis not only to a broader geographical range (21 countries are included in the next version of the database) and temporal dimension (the period covered is now until 2012) but, also, to additional firm-level information. In particular, beside productivity and cost-related indicators, CompNet is currently collecting information concerning four new dimensions, namely: trade, financial constraints, mark-ups, and labour markets.

2) fully exploiting synergies across the three workstreams. Besides the full integration of the indicator database, further efforts will be made to connect determinants of competitiveness with the most relevant outcomes (trade, growth and welfare). In doing so the complementarities across the three dimensions – i.e. macro, firm level and GVC – will be fully exploited via conceptual and empirical analysis[6].

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5   The detailed list of indicators, including relevant data collection and their use, will be contained in a "Compendium of indicators" which is being prepared.
6   See for instance Formai, S. and Osbat, C. (2013), "The determinants of trade competitiveness: a Bayesian Model Selection approach", presented at the Dublin CompNet workshop.

I INTRODUCTION: COMPNET'S APPROACH

Restoring competitiveness is broadly acknowledged as one of the critical building blocks in getting the EU economy back to full speed. How to assess the drivers behind the competitive position of European countries accurately, however, remains highly debatable; particularly so at a time when the extensive internationalisation of production processes has blurred country borders thus evidently limiting the influence of some factors, such as price/cost. Against this background, the Governing Council of the ECB approved the creation of the Competitiveness Research Network (CompNet)[7] in March 2012.

The innovation that CompNet brings to research on competitiveness lies in its holistic approach, in which the three levels referred to above – macro, firm level and GVC – are linked together, as is also suggested by most recent economic theory. Chart 1 gives an intuitive idea of the types of linkages running across the three dimensions considered by the comprehensive approach of CompNet:

(i)   the macro level markedly affects the micro one, as it determines the institutional and overall macroeconomic environment in which firms operate;

(ii)   the micro level is crucial to understanding the drivers and implications of cross-border activity;

(iii)   the increased integration in GVCs impacts the macro level, as it causes spillovers across countries and gives rise to vulnerabilities to shocks and possible co-movements of macro variables.

Chart I The CompNet approach to competitiveness assessment

Source: ECB.

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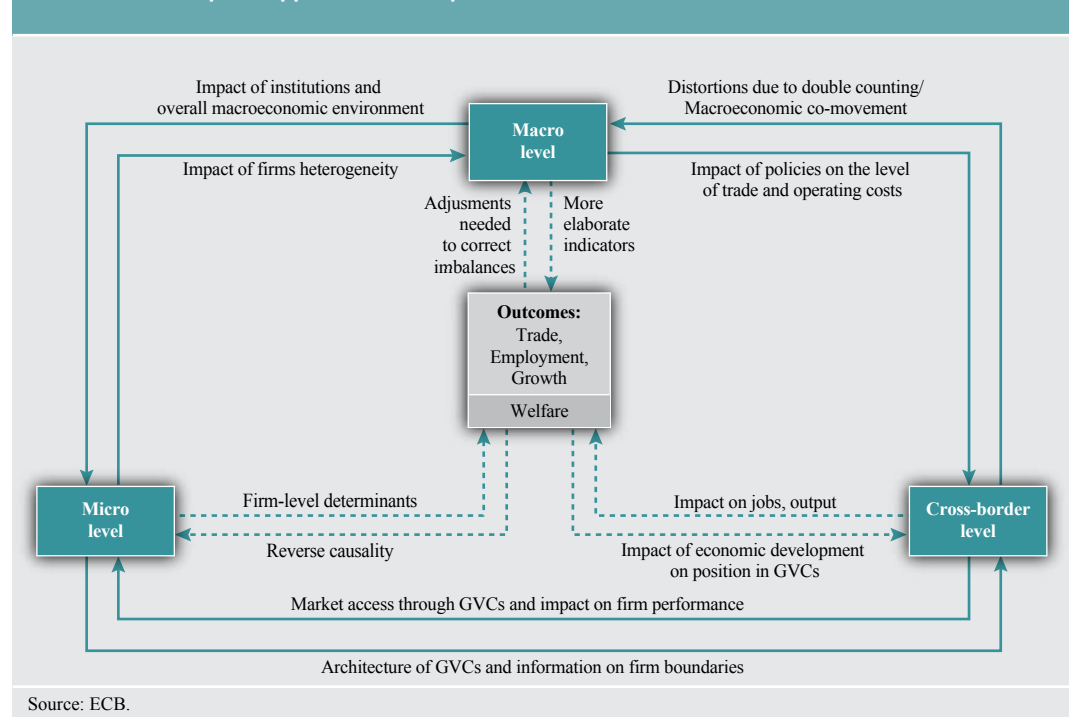
7   The objectives of CompNet, as well as information on relevant events, presentations and speeches, are available at: http://www.ecb.int/home/html/researcher_compnet.en.html.

All three levels of analysis are intertwined and related to the final goal of welfare.

The rest of this report is structured as follows: Sections 2-4 summarise the results achieved by each workstream during 2013, Section 5 focuses on CompNet's future research challenges, sketching out the road ahead, and Section 6 concludes. This report is just a brief summary of the main findings; all the technical details, including robustness checks and complete references, will of course be included in the final report.

2 A MACRO VIEW OF COMPETITIVENESS

On the aggregate, macro side, CompNet-Workstream 1 has worked in two parallel dimensions: i) developing proxies for non-price factors in order to complement more traditional indicators, mostly price/cost based; and ii) establishing robust connections between competitiveness determinants and relevant policy outcomes.

2.1 DEVELOPING PROXIES FOR NON-PRICE FACTORS

WS1 went beyond the traditional focus on costs and prices, and developed additional indicators aimed at measuring various "non-price" factors of competitiveness. This analysis has resulted in a number of working papers [8] aimed at providing a comprehensive view of the competitive position of EU countries and their peers focusing on four dimensions:

(1)   price and non-price competitiveness;

(2)   product and geographical differentiation;

(3)   measures of competitiveness pressures;

(4)   extensive and intensive margins.

We provide just a brief overview of the main findings below.

(1) Price and non-price competitiveness: using a very detailed product-level disaggregation (over 5,000 products on average), Osbat et al. (2012) disentangled the role of **price and non-price factors** in driving the trade balance. The idea is simple: for example, if German car engines increase their world market share despite being more expensive than those of competitors, the car engine product category is classified as having a non-price "competitiveness premium". By aggregating the export values corresponding to all 5,000 products, the trade balance can be divided into price and non-price contributions, which can be positive or negative in net terms. Chart 2 illustrates the significant negative contribution that price factors played in determining the trade balance in Greece, Cyprus and Malta.

This indicator can be used as a tool for assessing whether countries mostly need: i) structural policies aimed at boosting non-price competitiveness (more flexibility in product and labour markets, moving up the quality ladder by investing in R&D, integration of global value chains, etc.) or, instead, ii) adjustments to relative prices.

An alternative way of gauging non-price aspects embedded in one country's exports is to assess the **degree of sophistication** as promoted by Hausmann et al. (2007). This metric is based on the idea that the higher the average income of an exporter, the more sophisticated the exported basket. The rationale for this lies in the factor endowment theory, according to which more developed countries export more skill and capital-intensive goods, whereas poorer countries are mostly specialised in

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8   See for example Osbat et al. (2012), Benkovskis and Wörz (2013 and 2014), Di Comite et al. (2012), Altomonte et al. (2012) for price and non-price competitiveness, Dyadkova and Momchilov (2014) and Gaulier et al. (2014) for product and geographical differentiation, Benkovskis et al. (2013) for measures of competitiveness pressures. For a more detailed review of the literature on the importance of non-price factors in explaining recent trade developments, please see previous Interim Report, published in June 2013 (http://www.ecb.europa.eu/home/pdf/research/compnet/CompNet_First_Year_Results.pdf?4eab54308d2155b0ffe48335a795bb6a)

Chart 2 Decomposition of the trade balance into price and non-price competitiveness (avg. 2008 – 2010)

(percentage of GDP)
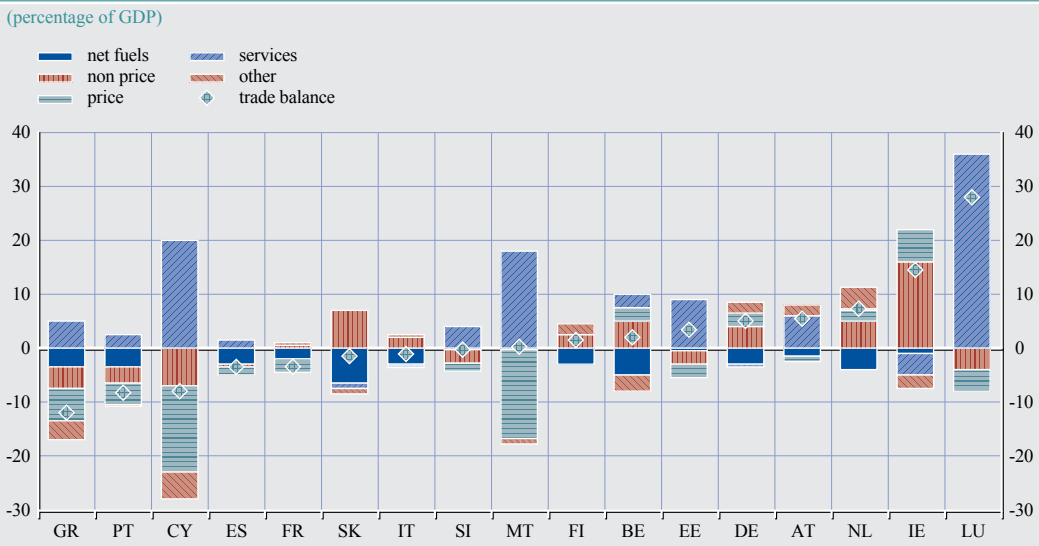
Source: Osbat et al. (2012).

natural resources or labour-intensive products. Richer countries also pay higher wages, so their ability to compete in international markets is not based on relative low prices and costs, but rather on higher productivity.

Chart 3 presents the ranking of export sophistication in the EU, based on a metric improved in the following respects: (i) when assessing the productivity embedded in a country's exports, only the rest of the world is considered; and (ii) mineral products and some other natural resources are not considered.

Chart 3 Export sophistication of goods

(perc. dev. from EU average in 2012)
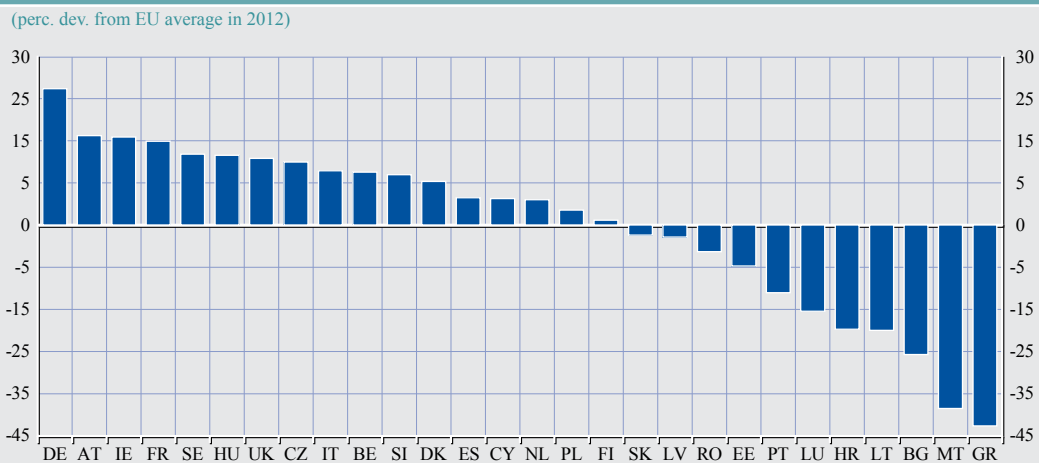
Sources: UN Comtrade, ECB calculations.

Chart 4 Decomposition of export market share growth (Q2 2005 – Q3 2011)

(average growth; percentage)

- ■ sectoral
- ▥ geographic
- ▤ push effect
- ◆ export share growth
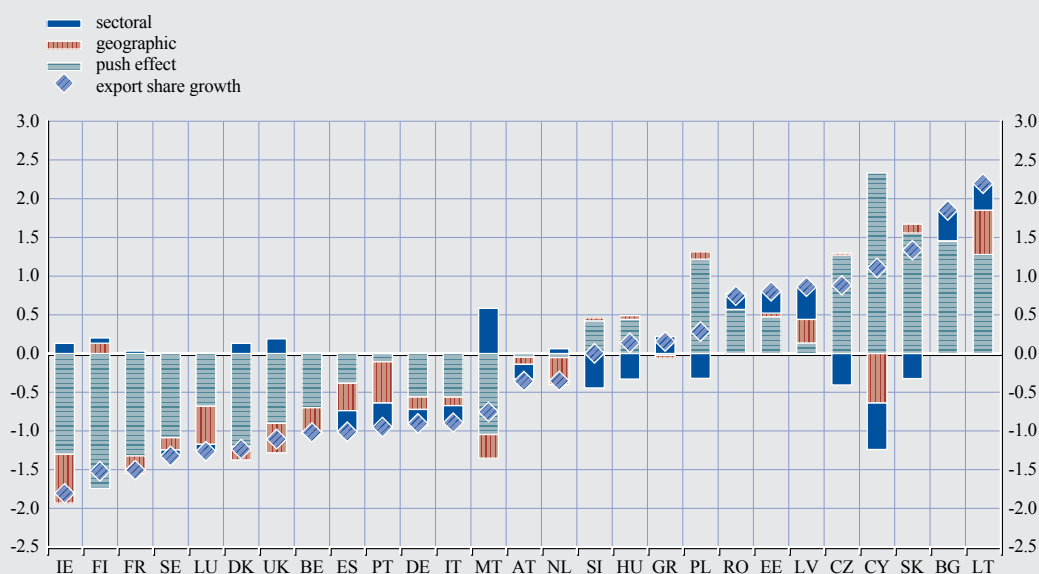
Sources: World Bank/Banque de France.

(2) Product and geographical differentiation: from an alternative perspective, non-price factors can be inherent to **specialisation in high-growth sectors** or to exporting towards the **most dynamic destinations.** In a joint project (see Gaulier et al., (2013)), the Banque de France and the World Bank are working on decomposed export market shares along various dimensions: (i) the degree of product specialisation; (ii) the degree to which export destinations are fast-growing; and (iii) a pure competitiveness effect, free of compositional effects (or the so-called "push effect"). Their approach has several advantages over the standard constant market share (CMS) decomposition, the most notable one being the independence of the results from the ordering of the geographical and sectoral effects.
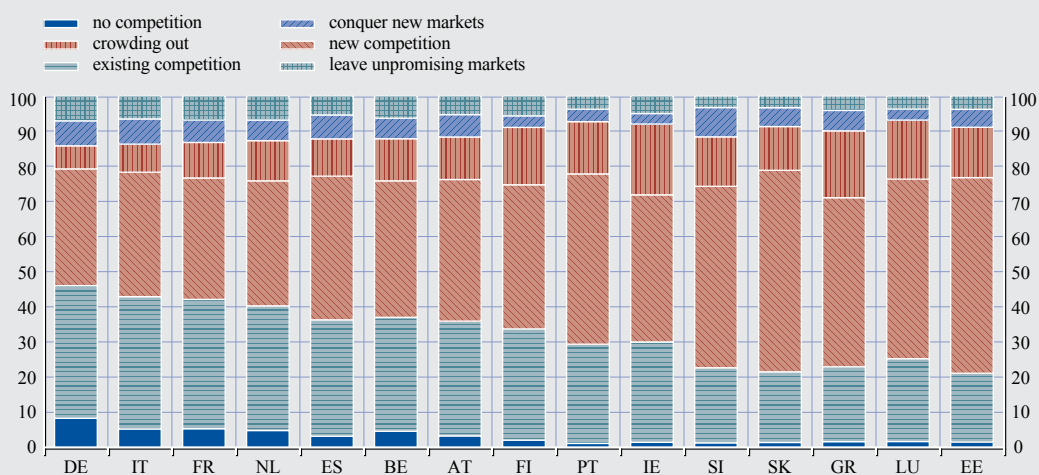
This tool provides a better understanding of export patterns, as well as insight into whether a reallocation of resources towards other sectors is necessary or a refocusing of trade relations on more dynamic markets is needed. The results obtained for EU countries are illustrated in Chart 4. **Most of the decline in export market shares is attributable to the squeeze on export performance free of other compositional effects ("push effect").** However, the geographical orientation of exports towards shrinking markets also acted as a handicap.

(3) Measures of competitiveness pressure: another powerful tool developed within CompNet by Benkovskis et al. (2013) is a **"barometer" of the competitive pressures stemming from competitors on the same market.** One of the possible explanations for the decreasing market shares of advanced European economies is the crowding-out from the proliferation of low-cost exporters from developing countries. An exemplification of this tool is the analysis of the magnitude and types of competitive pressure for individual euro area countries stemming from the BRIC (Brazil, Russia, India and China) countries and from other euro area Member States. Taking into consideration the dynamics of trade links with third countries between 2000 and 2010,

Chart 5 Barometer of competitive pressures: types of competition, euro area countries vs. BRICs

(in percentage of reporter's existing trade links)

- no competition
- crowding out
- existing competition
- conquer new markets
- new competition
- leave unpromising markets

Sources: UN Comtrade, Latvijas Banka/Oesterreichische Nationalbank calculations.

the new indicator allows us to distinguish between the following situations (Charts 5 and 6 depict the results for euro area countries):

- *No competition*: euro area country exports to a market not supplied by competitor.

- *Existing competition*: euro area country and competitor export to the same market.

- *New competition*: euro area country or competitor enters a destination market where the other exporter is already active, or both enter a new market.

Chart 6 Barometer of the competitive pressures: types of competition, intra-euro area

(in percentage of reporter's existing trade links)

- no competition
- crowding out
- existing competition
- conquer new markets
- new competition
- leave unpromising markets

Sources: UN Comtrade, Latvijas Banka/Oesterreichische Nationalbank calculations.
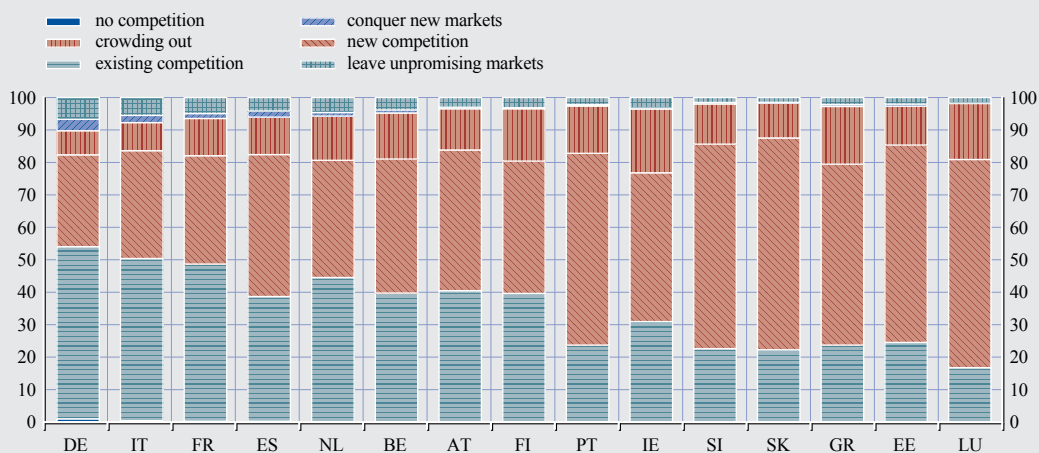
- *Crowding-out*: euro area country or competitor leaves a market where the other exporter is active or has entered.

- *Conquering new markets*: euro area country starts exporting to a new destination market not supplied by competitor.

- *Leaving unpromising markets*: euro area country leaves market where competitor is not active, or both exporters leave simultaneously.

The results presented in Charts 5 and 6 reveal that even after controlling for country size, large euro area countries were continuously exposed to more competition from both the BRICs and other euro area countries over the past decade that the smaller peripheral countries. Countries like Portugal, Ireland, Slovenia, Slovakia, Greece, Estonia and Luxembourg have, therefore, experienced an increase in competition from the BRICS and other euro area countries over this period. Finland is in a special position: while it has been exposed to relatively strong competition from other euro area countries since 2000, its profile is more like that of a small peripheral country in competition with the BRICs. It should be noted that by 2010 all euro area countries were roughly equally exposed to competition from both other euro area countries and the BRICs regardless of their starting points. Thus, they stand in direct competition with a competitor from the euro area or the BRICs in about 70% of all possible product markets. In general, existing competition at the outset was higher within the euro area than between individual euro area countries and the BRICs.

(4) Extensive and intensive margin: the ability to stand up to international competition also depends on the flexibility of the economy with respect to moving into new, yet promising markets and maintaining a presence there. For a calculation of the intensive (i.e. deepening of existing trade links) and extensive (i.e. opening up towards new regional or sectoral export markets) margin of trade, Benkovskis et al. (2013) split export growth (in nominal US dollars) into the growth in existing varieties (intensive margin) and the ratio of new to old varieties (extensive margin) in a year-to-year comparison.[9]

Chart 7 shows that the average contribution of the extensive margin to total trade growth was fairly small over the last decade. Thus, EU countries' **export growth was mainly the result of a deepening of existing trade relationships rather than the exploration of new sectoral or geographical markets.** However, the establishment of new trade relationships is somewhat more important for export growth for the CESEE (central, eastern and south-eastern European) countries than for the core EU countries and the periphery. The analysis of annual data further suggests that the introduction of the single currency supported the establishment of new trade relationships for the core and periphery EU countries. The CESEE countries also seem to have benefited from spillover effects with a short time lag. Furthermore, EU accession in 2004 and 2007 boosted the establishment of new trade relationships for the CESEE countries. During the economic and financial crisis, exports declined remarkably for all countries. However, the decline was mainly caused by a reduction in the value of exports within established trade relationships rather than the termination of active trade links.

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9   Thus, as in Amiti and Freund (2010), the authors implicitly use the variety index of Feenstra (1994) as the basis of the definition of the extensive margin whereby variety refers to each product-destination combination. A new variety is only counted in the extensive margin in the year when it is first exported. In subsequent years, it will be counted in the intensive margin. New varieties which do not survive a second year are excluded from the analysis.

Chart 7 Average contribution of the extensive margin to total export growth (2000 – 2010)

(percentages)
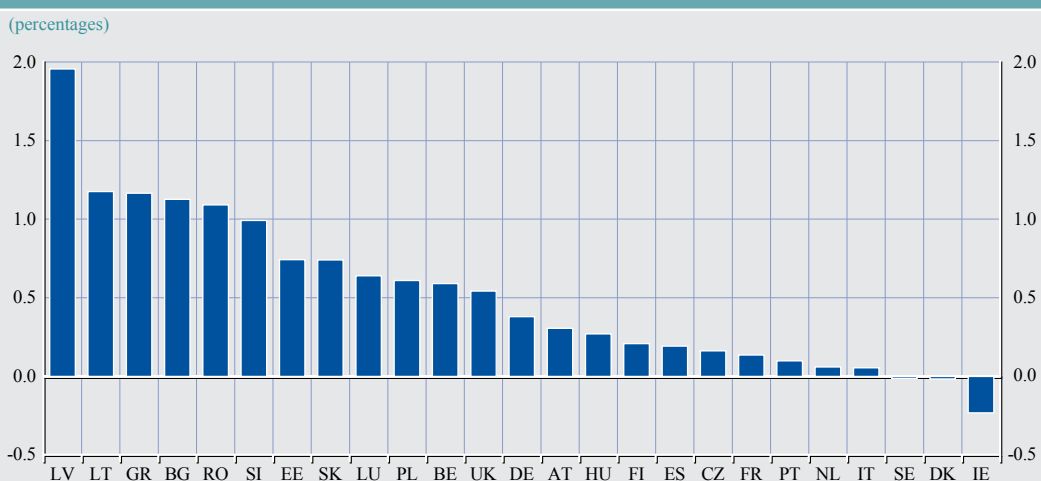
Sources: UN Comtrade, Latvijas Banka/Oesterreichische Nationalbank calculations.

Using a similar approach, Gordo and Tello (2011) estimate the importance of the extensive, intensive and quality margins in trade performance for Germany, France, Italy and Spain. The results show the importance of the extensive margin in explaining the relatively good performance of exports of Spanish goods between 2000 and 2009 compared to other euro area countries. However, the intensive margin remained relatively stable at low levels in Spain, while it declined in France and Italy, and the quality margin indicates that Spanish products were of low quality, mainly compared to the German ones.

2.2 CONNECTING DETERMINANTS AND OUTCOMES

While the design of new competitiveness indicators is an important issue, connecting determinants (newly developed and traditional indicators) and outcomes (competitiveness) remains the main focus of WS1. The identification of strong and robust causality is of primary importance, as such findings may lead to significant policy conclusions.

The very recent investigation by Gabrisch and Staehr (2014) checks the causality between cost or price competitiveness and external capital flows in EU countries. The direction of linkages is widely debated and this analysis is particularly pertinent given the adoption of the *Euro Plus Pact* that encourages participating countries to improve their cost or price competitiveness in order to reduce the likelihood of financial imbalances. Empirical analysis, however, suggests that lagged changes in the current account balance help explain changes in unit labour costs, while there is no effect in the opposite direction. In other words, changes in capital flows appear to affect cost competitiveness in the short term, while changes in cost competitiveness appear to have no effect on capital flows in the short term.

These results suggest that increasing capital flows towards distressed EU economies may partly explain deteriorating cost competitiveness in Southern, Central and Eastern Europe as well as improving cost competitiveness in Northern Europe. Therefore, it is important to monitor external capital flows as a means for understanding developments in cost competitiveness.

Despite the importance of non-price factors, analysts and policy makers should still devote a lot of attention to traditional cost or price competitiveness indicators. Christodoulopoulou and Tkacevs (2014) analyse how efficient different measures of Harmonised Competitiveness Indicators (HCIs) are in driving exports and imports, by estimating standard export and import equations for each euro area country. Results show that HCIs based on broader cost and price measures have a larger marginal effect on exports of goods. A similar finding is valid for exports of services in large euro area countries. At the same time, imports of goods and imports of services are quite insensitive to changes in relative prices, regardless of the choice of HCI.

In addition to cost and price competitiveness, the export performance of a country can be explained by domestic demand pressures – a variable that is usually ignored in traditional export equations. Soares, Esteves and Rua (2013) argue that domestic conditions can influence firms' willingness or ability to supply exports. For example, firms may try to compensate for the decline in domestic sales by increased efforts with exports, thus one could expect a negative relationship between domestic demand and exports. The empirical check of the Portuguese case indeed suggests that domestic demand behaviour is relevant for modelling the short-run dynamics of exports. This issue is further investigated by Belke et al. (2014), who analyse the relationship between domestic demand and export performance for six euro area countries. They find a substitutive relationship if deviations from average capacity utilisation are large in Spain, Portugal and Italy. In the cases of Ireland and Greece, domestic demand and exports are slightly substitutive during a business cycle trough and act as complements during normal times and in a boom. For France, mostly complementary relationships are found.

Belke et al. (2014) suggest that the negative link between domestic demand and export performance is a short-run phenomenon, while export growth is related to price developments in the long run. This implies that a lot of the gains in export market shares of vulnerable euro area countries could be lost in the long run. However, there are several factors that can improve export performance in the long run: a) domestic producers have already paid sunk costs for shifting sales abroad and may retain exporting activities; b) the current economic crisis leads to a change in investment activities; and c) expected general efficiency improvements induced by learning-by-doing effects.

The connection between determinants and outcomes can also be performed by sophisticated macroeconomic models. Following the global financial crisis there has been widespread recognition that sizeable net lending among countries may constitute a significant risk to the currency union. Angelini et al. (2014) assess the rebalancing process within the euro area through the prism of the new multi-country model (NMCM). According to simulation results, large external, fiscal and monetary shocks explain to a significant extent the adjustment of current accounts. Use of the NMCM also helps to explore alternative scenarios, i.e. an improvement in the economic outlook driven by a German-led demand recovery, while current accounts deteriorate and real economic divergence persists. By contrast, an improvement in wage competitiveness helps both the current account and domestic rebalancing process at the cost of stronger pressure on households' balance sheets.

Going forward, the Network's main goal within WS1 is to provide its members with a comprehensive, internally consistent diagnostic toolkit, which would also be useful in providing guidance for country missions or could be used internally by the ECB and other authorities (see section 5.3)

3 COMPETITIVENESS DIAGNOSTICS BASED ON FIRM-LEVEL DATA

3.1 CONCEPTUAL FRAMEWORK

There is a solid theoretical underpinning for using firm-level data for competitiveness analysis. The classical reference [10] is Melitz (2003), assuming a distribution of firms' productivity that is not symmetric around the mean. In turn, this supports (i) an emphasis on removing market distortions in order to favour resource reallocation towards the most productive firms as a means of increasing aggregate productivity, as well as (ii) the need to move away from merely considering average performance – which can be misleading- and analyse the full underlying productivity distribution instead.

Empirical literature for both the United States (Bernard et al, 2011) and a number of EU countries (Mayer and Ottaviano, 2007) has confirmed that, in general, firm-level productivity is typically distributed following a non-symmetric probability distribution. As already suggested by Altomonte et al (2011), policies aimed at enhancing competitiveness may greatly benefit from firm-level evidence; unfortunately, the availability of micro-founded data has until now remained inadequate for meaningful analysis, particularly of a cross-country nature.

3.2 THE DATABASE

Towards the end of 2012, CompNet's Workstream 2 started a complex process of collecting firm-level based indicators.[11] Since individual firm-level data are confidential and cannot be shared outside the respective countries, the working method was to establish a small team of researchers at the ECB, coordinating 13 national teams, which have run – on their computers and with their national firm-level data – programs developed by experts both at the ECB and at the NCBs to compute pre-agreed indicators of competitiveness/productivity aggregated at the sector level (two-digit NACE industries), while keeping most of the richness of firm-level data (see also Bartelsman et al. (2004)).

As it stands, the firm-level indicator database [12] makes it possible to investigate how firms' size and labour costs interact and evolve at different parts of the productivity distribution.

Two features are specific to the CompNet database and significantly differentiate it from others (i.e. Amadeus):

1) The capability of making firm-level indicators truly comparable across EU countries

2) The potential for expansion to additional countries and domains. This enlargement is, indeed, already taking place with respect to the creation of new indicators related to firms' financial positions, credit constraints and export status, which are of obvious importance for the central bank.

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10 For a more detailed view on the conceptual underpinnings, please see Section 3.1 of the previous Interim report, published in June 2013 (http://www.ecb.europa.eu/home/pdf/research/compnet/CompNet_First_Year_Results.pdf?4eab54308d2155b0ffe48335a795bb6a)

11 Heads of Research will note that the collection of data for the database was initiated (albeit at a later stage) as a way of testing whether comparable firm-level data were already available across EU countries before embarking on dedicated, but costly, firm-level surveys, such as EFIGE. As it turned out, the results were better than expected and led to a methodological paper (ECB WP1634) providing a robust base for further development, although inevitably the project took more time than expected to complete.

12 Please see CompNet Task Force 2014, accessible at http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1634.pdf?f72d88ba01836d9c8a207 c522202d4df

More precisely the constructed database comprises firm-level indicators on productivity, labour costs and employment computed and collected using the highest standards of comparability across a huge sample of about 700,000 firms per year, operating across 58 sectors, 11 EU countries and for 15 years. The following table contains some of the indicators that have been computed so far:

Table 1 Main indicators collected in the first CompNet database (2013)

Number of employees	Real turnover
Value-added	Capital/labour
Capital	Turnover/labour
Material costs	Real turnover/labour
Labour costs	Cost per employee
Turnover	Wage share
Real VA	Labour productivity
Real capital	Revenue-based labour productivity
Capital productivity	Unit labour cost (ULC)
Total factor productivity (TFP)	Olley-Pakes decomposition components [1]
Foster decomposition components	Additional average variables

1) See box 1 below.

Box 1

OLLEY AND PAKES DECOMPOSITION

Olley and Pakes decomposed industry-specific aggregate productivity into unweighted average labour productivity and a measure of allocative efficiency, as shown in equation 1

$$y_{st} = \sum_{iEs} \theta_{it}\omega_{it} = \overline{\omega_{st}} + \sum_{iEs} (\theta_{it} - \overline{\theta_{st}})(\omega_{it} - \overline{\omega_{st}}) \qquad (1)$$

where y_{st} is the weighted average productivity of sector s at time t, S is the set of firms belonging to sector s, θ_{it} and $\omega_{i,t}$ represent size and productivity of firm i at time t, respectively, and $\overline{\theta_{st}}$ and $\overline{\omega_{st}}$ represent the unweighted mean size and productivity of industry s at time t, respectively. Hence allocative efficiency is proxied by the covariance between the relative size of a firm and its relative productivity. That is, if resources were allocated randomly across firms in the industry the covariance measure in the right-hand side of equation (1) would be zero, and aggregate and average productivity would coincide. The larger the covariance, the more efficiently resources are allocated within the sector and the higher the contribution of the (efficient) allocation of resources to the

Covariance between size and productivity, average 2003-2007

y-axis: OP gap
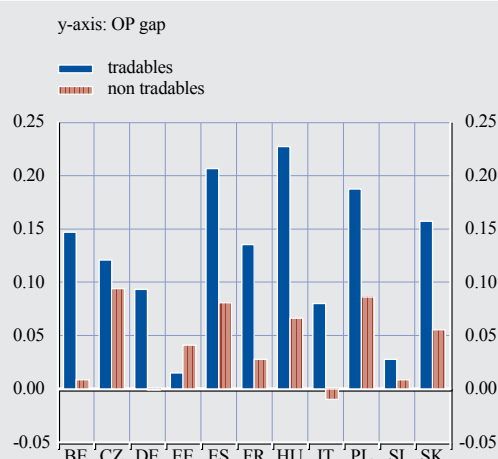
Source: CompNet Dataset.

sector productivity, vis-à-vis the unweighted average productivity of the firms operating in the sector.

The chart above presents this indicator of allocative efficiency in each of the CompNet countries, aggregated over the period 2003-2007, distinguishing between tradable and non-tradable sectors. The figure is calculated with the restricted samples, that is, using only firms with more than 20 employees, in order to ensure as much cross-country comparability as possible.

3.3 INITIAL RESULTS

Although the database does not make it possible as yet to connect competitiveness drivers and outcomes directly, it already provides critical information on the structure of the underlying economies, as illustrated in the three charts below.

Chart 8 presents the distribution of labour productivity across countries. Apart from the differences in levels – not fully comparable since there is no PPP adjustment – it is the marked heterogeneity of firm labour productivity (i.e. the width of the range of values) within and across countries which is remarkable.

In particular, of major policy relevance is the high skewness of the distribution within each country, as represented by the difference (shown to be statistically significant in the paper) between the median and average of the productivity distribution. Far from being "normal" – with many firms centred around the "average" performance level – the respective country distributions indicate that

there are just a few highly productive firms and a lot with low or very low productivity. For policy this implies, firstly, that when talking about the competitiveness/productivity of a country, we can and must go much deeper than simple averages (ULC, market shares), since the true relevant distribution is far from symmetric, and, secondly, that by looking at averages alone we are obviously missing important empirical evidence that it is now increasingly available.

This calls, inter alia, for targeted policies along the productivity distribution derived by empirical findings on how productivity in different quintiles of the productivity distribution interacts with specific determinants such as firm size (already available) and others (soon to be available) such as trade and financial constraints.

Among the applications currently possible, we can look at the way the size of the firms and their respective labour costs differ for the least and most productive firms within the

Chart 8 Labour productivity distributions

x-axis: labour productivity levels

- inter quartile range
- mean
- median
- p10 - p90
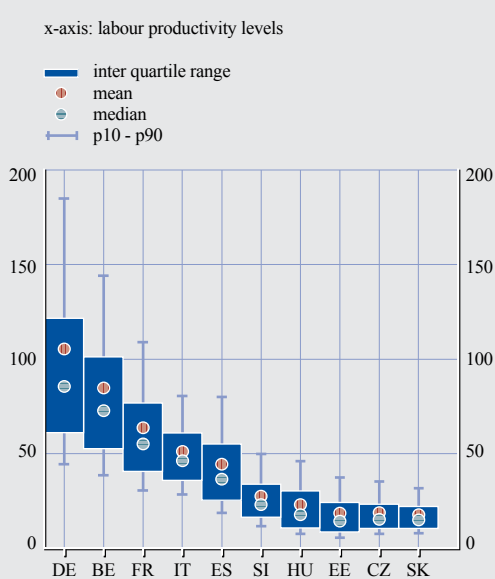
Source:

same sector; and compare this across countries. Chart 9 below shows that the most productive firms (P90) are up to 10 times larger than the median productive firm in the same two-digit sector.

Moreover, Chart 10 clearly shows that, taking for example Spain, the average cost per employee differed, in this case, greatly between low and high productivity firms (located at the percentile 10 and 90 of the productivity distribution respectively). Before the crisis, low productivity Spanish firms experienced a large and continuous increase in average cost per employee, coupled with a flat productivity performance. Top productivity Spanish firms, on the other hand – i.e. those active in international markets and which account for the bulk of Spanish exports – were able to contain cost increases as well as their German counterparts, at least until 2008. Hence, as Antras et al. (2010)

Chart 9 Relative size of most and least productive firms within the same sector

(average size per lab prod percentile; period: 2003-2007)

■ P10
▥ P90
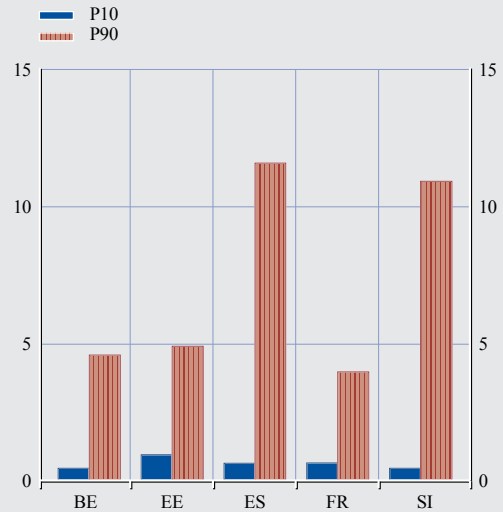
Source:

Chart 10 Average labour cost and productivity in Germany and Spain in different tails of the productivity distribution, 2002-2010. Sample of firms with more than 20 employees. Tradables

Evolution of Labor Prod and Labor cost
Tradables

y-axis: Relative to 2002

—— Germany LPROD
······ Spain LPROD
– – – Germany LC
—— Spain LC

a) P10

b) P90
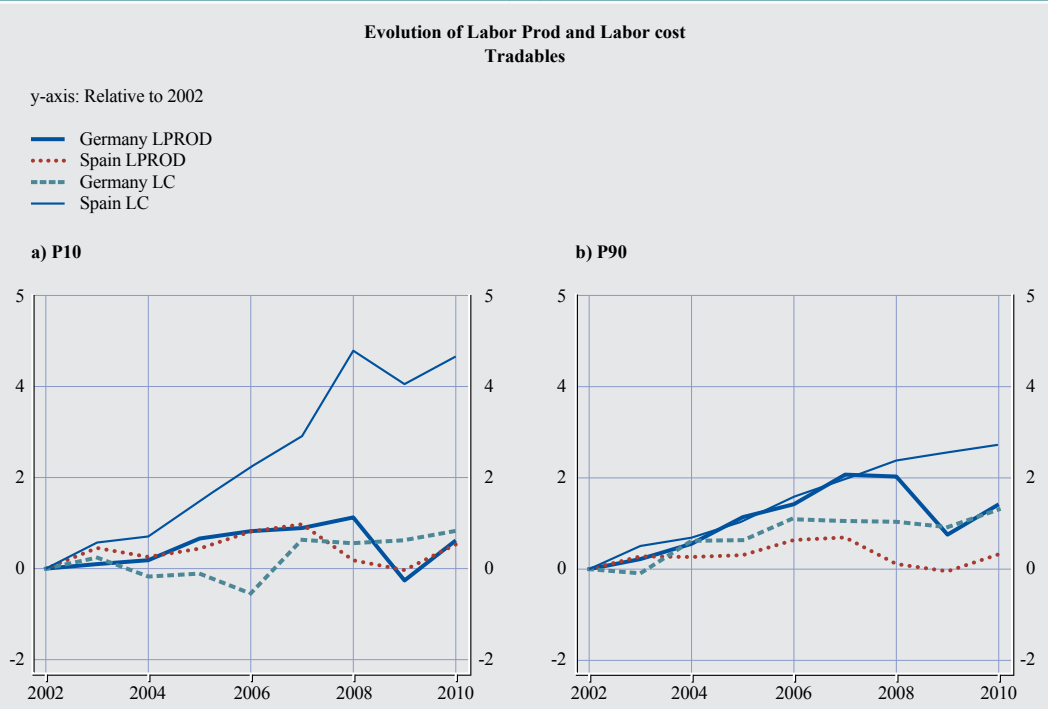
Source: Value added based productivity

show, the so called "Spanish paradox" – i.e. rising average unit labour costs (ULC) associated with improved export market share – is attributable to the composition bias of the aggregate figures. When one focuses the analysis on those firms that actually export and compete abroad, there is much less of a paradox.

3.4 POTENTIAL FOR FURTHER DEVELOPMENT OF THE DATABASE

Completion of the database meant, at first, high set-up costs, in order to agree on a number of technical features (e.g. how and which indicators to construct, how to treat outliers, time horizon, common deflators, variable definitions and so on). Over time, however, a very solid structure of expert correspondents has been created, which may be activated for answering additional issues based on very detailed data.

As a matter of fact, CompNet is now extending some of the computations previously mentioned in a number of directions. For instance, the team is now analysing interactions between productivity and financial conditions, as well as labour markets, mark-ups and trade (see Section 5.1 for more details). The potential policy value of such extensions can hardly be overestimated.

4 THE RELEVANCE OF GLOBAL VALUE CHAINS IN ASSESSING COMPETITIVENESS

The third dimension taken into account within CompNet's assessment of competitiveness is the cross-border dimension. The emergence of global value chains has resulted in a reconfiguration of world trade in terms of participants and comparative advantages, which have direct implications for international competitiveness and labour market developments.

Yet, standard trade indicators do not take any consideration of the fact that economies are increasingly interconnected at all stages of the production chain. For that reason, CompNet has made efforts to devise and update existing indicators based on a decomposition of value added into its domestic and foreign components, in order to map the impact of GVC for Europe. Below, we highlight a few major findings.

First, following Amador et al. (2013), the financial crisis appears to have stopped the global integration of euro area economies only temporarily. In particular, the foreign value added in exports contracted sharply in 2009 only, then rebounded in 2011 (Chart 11).

Notwithstanding this increase in global integration, the average share of foreign value added in euro area exports (e.g. broadly, the import content of exports) still equalled just over 30% in 2011. Despite the need for further research into the link between value added generation and GVC integration, this means that there is substantial VA generated independently in Europe, which is shown to be a resilient and potentially competitive economy.

We can therefore contend that Europe as a whole tends to emerge as a much more resilient and potentially competitive economy than it is traditionally portrayed, once standard economic activity and trade measures have been purged of distortion.

One reason for that is the growing importance of services associated with increasing integration into GVCs. In particular, it is increasingly acknowledged that output of final manufacturing goods "embodies" a larger share of service activities (Chart 12; Timmer et al., 2013).

Chart 11 Foreign value added in exports, 2000-2011

(percentages)

◆ 2000   ▲ 2009
▥ 2007   ✕ 2011
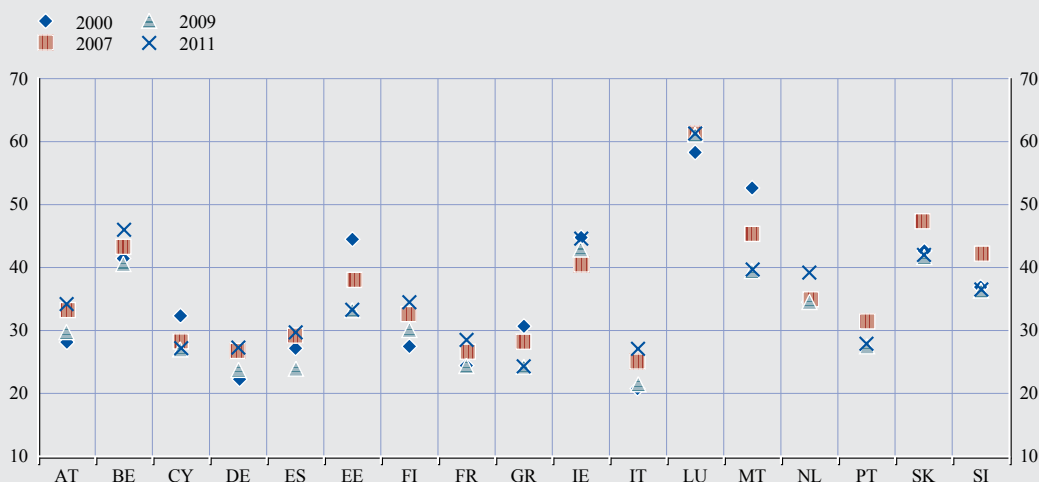
Source: Amador et al. (2013) using WIOD.

Chart 12 Services VA embodied in gross exports, 1995-2009

(percentages)

- US
- EU27
- China
- Japan
- India
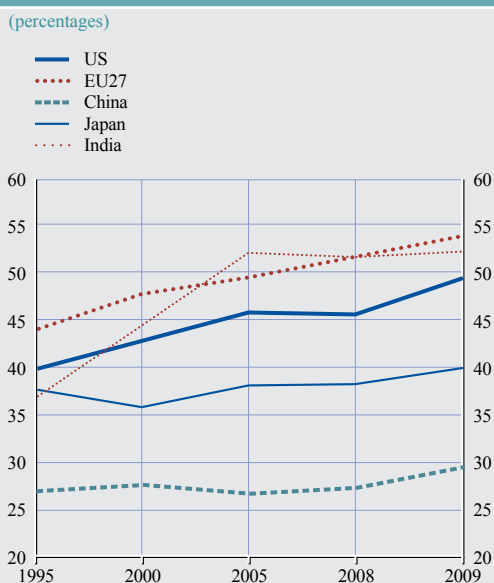
Source: WTO-OECD TiVA (2013).

Chart 13 GVC jobs creation (in '000s), 1995 vs. 2008

- services
- manufacturing
- agriculture
- total
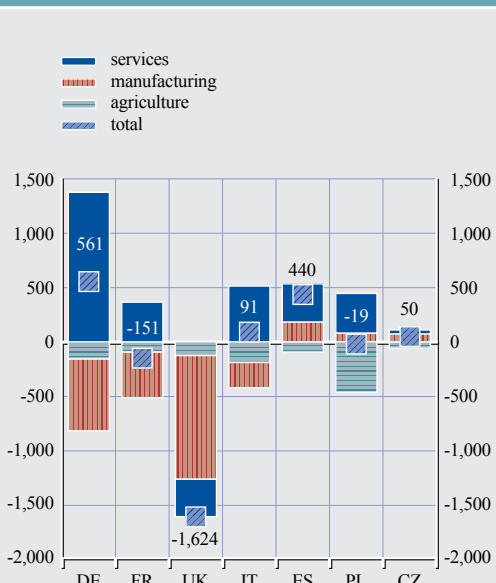
Source: Timmer et al. (2013) using WIOD.

In turn, services are an increasingly important contributor to job creation. Similar to their "manufacturers GVC income" indicator, Timmer et al. (2013) built another indicator, "manufacturers GVC jobs", which computes the number of jobs associated with all activities that are directly and indirectly involved in the production of final manufacturing goods. Results are in this case fairly positive for Europe (the UK is a notable exception) (Chart 13).

In the last few years CompNet has gone to considerable effort to construct new databases, as well as to update and interpret existing ones, which allow us to proxy – still only partially – the complex interactions taking place in global production and supply chains. Such statistics, aimed at measuring trade in value-added terms, show in many cases a different picture than the traditional trade indicators based on gross terms. In particular if we apply such new indicators to Europe, the picture that emerges in terms of trade performance and competitiveness is more nuanced than standard statistics would suggest.

To conclude, it is worth mentioning that throughout 2013 CompNet has built on the analysis of GVCs in the euro area in order to produce country-specific studies. Cappariello and Felettigh (2013) analyse how far foreign demand activates domestic value added in Italy and Amador and Stehrer (2013) focus on Portuguese exports in GVCs, exploring the geographical and sectoral dimensions. Such research can be replicated for other countries.

5 FUTURE PERSPECTIVES

5.1 RESEARCH AGENDA UP TO END-2014

As implied by the previous discussion, CompNet's work is still very much ongoing, albeit with clear signs that important research results will soon be achieved with potentially powerful policy messages. Below we indicate the four broad areas on which research efforts will be focused, with an emphasis on ultimately going beyond the distinction across workstreams. At the end, it is the full integration of results across them that encapsulates the core of our holistic approach.

➜ MACRO LEVEL

WS1 is currently working on a paper presenting the potentialities of the Diagnostic Toolkit for Competitiveness Assessment for identifying correctly the drivers behind the competitive position of individual countries.

Thanks to the work done so far, a comprehensive list of indicators characterising the broadly defined competitive position of a country/sector has been put together; it includes indicators related to the macroeconomic environment, labour market conditions, financing conditions, total factor productivity, infrastructure, quality of institutions and much more.[13] An important innovation of the Toolkit is the inclusion of indicators based on firm-level data (WS2) and world input-output data (WS3).

The next step consists of writing a Compendium: a comprehensive user guide to the Diagnostic Toolkit. The Compendium entails a short description and assessment of traditional and newly developed indicators. To provide more help to the user, various measures of external performance will be regressed on this large set of indicators making use of Bayesian Model Averaging[14] (BMA). This exercise makes it possible to identify the main drivers among the large set of indicators (see box 3 in section 5.2).

Ultimately, the overall analysis aims at comparing the outcome for a country with the projected outcome for its peer group, selected on the basis of a common fundamental economic structure. This benchmark will obviously provide a guide on how to respond to future competitiveness developments (see section 5.2 below).

➜ MICRO LEVEL

The ongoing challenge of WS2 is to expand the firm-level based indicators not only to a broader geographical range (21 countries are included in the next version of the database) and temporal dimension (the period covered is now until 2012) but, also, to a much broader set of indicators.

More specifically, beside productivity and cost-related indicators, CompNet is expanding its analysis to four new dimension or "modules" related to:

1)   trade,

2)   financial constraints,

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13 See table 2 in section 5.2 for the full list.
14 See box 1 in section 5.2 for more detailed information on the BMA methodology.

3)   mark-up, and

4)   labour markets.

Overall, the additional information – in reference to the same set of firms – will enable researchers to interpret variations in productivity performance across countries, industries, and time periods correctly, as well as to forecast the impact of policies more accurately, given the underlying distribution of firms.

Out of these modules, a selection of research/policy questions could be tackled, including:

- *What is the productivity premium of exporting firms? Has it changed with the crisis?*

- *Are productive firms credit constrained in some countries?*

- *Are credit constraints hampering exports?*

- *Are sector mark-ups and bargaining power related to sector regulation?*

- *Do sectors with higher mark-ups distribute resources less efficiently?*

- *Are firms growing on different paths within the same sector? Is this related to credit constraints? Is it related to regulation?*

In order to maximise the policy impact of the firm-level indicators database, CompNet members are also interacting with international organisations and other relevant networks. For instance, with the EU Commission a project is being discussed to set-up a common database and to use it for country surveillance. Moreover, with the OECD plans are ongoing regarding the matching of productivity indicators with product market regulation indexes produced by the OECD. Finally, CompNet members are participating in the third round of the Wage Dynamic Network (WDN) to explore how productivity developments at firms relate to their wage and price setting behaviour as well as to the labour market structure.

Another way to maximise the policy impact of firm-level based indicators is to feed them into the regular analysis of national central banks, namely through boxes, graphs or tables to be published in regular publications. The progressive use of firm-level indicators in current economic analysis by central banks is gaining ground and CompNet aims to reinforce this trend (see section 5.3 below for some details on the so called "drill-down approach").

→ **GLOBAL VALUE CHAINS**

WS3 research will be aimed at understanding how GVCs influence assessment of competitiveness across two dimensions: (1) cross-country spillovers, and (2) domestic impact on productivity.

With respect to the first aspect, two projects are ongoing which analyse the cross-country spillover effects of shocks using value added trade data, one in the context of a GVAR model and the other via network analysis. Moreover, three projects are looking into external imbalances using a gravity approach: the aim is to compare how the assessment of imbalances changes when using value added instead of gross trade data. Finally, two projects have just been started to assess how the existence

of GVCs has changed the exchange rate pass-through to prices and the price and demand elasticity of traditional trade equations.

With respect to the second aspect, further work is ongoing on the implications of GVCs on the domestic economy (productivity, employment, distributional aspects) and on sectoral developments.

Third, a line of research currently being investigated, relates to the possibility of improving GVC analysis via firm-level data. The main idea for future work is to explore the information on imports of intermediate products at the firm level to compute a proxy of foreign value added in exports. Nevertheless, this information is available for some countries only.

→ **LINKING THE MICRO AND MACRO DIMENSIONS**

Exploiting interaction across workstreams will represent the most novel focus of CompNet's final stage of activity. This will be done, firstly, by analysing how macro and firm-level indicators can provide a consistent and complementary picture of competitiveness. Moreover, a number of projects, to be defined further, will enable us to extract, in the next few months, policy relevant results from the already existing data, without the need for further costly data collection. Possible projects may be articulated within the three main areas described below in order of priority: 1) competitiveness and adjustment; 2) analysis of allocative efficiency and 3) implications for potential output (for further details, please see box 2 below).

Box 2

SOME EXAMPLES OF POSSIBLE RESEARCH PROPOSALS LINKING THE MICRO AND MACRO DIMENSION

1) Competitiveness and adjustment

A) *Exchange rate adjustment when firm-level productivity is heterogeneous.* In the framework of the standard "transfer problem", assessment will be made of the extent to which exchange rates need to move to correct for an external imbalance, when firm productivity heterogeneity is taken into account. In a three-country framework (di Mauro, Pappada', 2014 forthcoming), the exchange rate adjustment for euro area countries will also depend on the relative openness within and outside the euro area. The model is calibrated using CompNet firm-level indicators.

2) Analysis of allocative efficiency

A) *Efficiency and output gap:* measures of static allocative efficiency which have been computed within CompNet (using firm costs' data at the percentile-level for a sector and/or region) can be used in cases where firm-level data are not available. These measures can be related to the concepts of output gaps routinely used in the assessment of the need for monetary policy intervention.

B) *Inefficiency gaps and financial constraints:* starting from the inefficiency gap measures, it would be possible to build a panel dataset to assess the time-variation of each inefficiency gap over the latest euro-area recession (using 2006 and 2010 annual data). Moreover, thanks to data

on financing cost and assets/liabilities, we could estimate the impact of financial constraints in aggravating misallocation during a recession

C) *Disaggregated gaps:* by using markup data and cost of individual factors data, the inefficiency gap can be further disaggregated among price markups, cost of external funding, and labour cost inefficiency gaps.

3) Improve measurement of potential output

A) *Role of TFP at firm level for forecasts of potential output:* obviously structural reforms affect TFP composition, entry and exit components. These changes in aggregate TFP, in turn, will have an impact on potential output. Therefore being able to predict the variation in TFP distribution would also mean being able to predict variations in potential output.

5.2 DESIGNING THE COMPETITIVENESS DIAGNOSTIC TOOLKIT

WS1 is currently developing a "Diagnostic Toolkit for Competitiveness Assessment" and investigating which indicators among the ones available – both standard and newly developed – would match more effectively relevant policy outcomes, such as exports or trade balance.

This is being done in two steps: firstly, by extending further the list of competitiveness indicators (see list below); this list – and this is the novel part of the approach – includes some of the indicators developed in Workstream 2 from firm-level data, as well as GVC indicators to reflect the internationalisation of production. Thus, the Toolkit assesses various aspects of competitiveness. The second step consists of providing comprehensive guidance on the virtues and drawbacks of each indicator, as well as selecting a smaller set of the most relevant determinants of external performance, proxied by policy outcomes such as net trade or export, via a Bayesian modelling approach (see box at the end of this section).

A comprehensive Compendium of the above indicators is being prepared with the ultimate goal of providing a detailed description of the Toolkit, focusing in particular on how the indicators were created, how the data were collected and, last but not least, their relevance for the analysis of competitiveness. In this respect, section 5.3 below will detail specific ways the toolkit could be used for country surveillance analysis, in what we call a "drilling down approach".

Table 2 Competitiveness Toolkit, synthetic list of variable

Field	Sub-field	Examples
Macro environment	Size	*GDP per capita, private and government consumption, investment, etc.*
	Employment	*Unemployment rate, youth unemployment, etc.*
	Government efficiency	*Cash surplus/deficit, public debt, tax revenues, WGI government effectiveness index, etc.*
	Tax rates	*Implicit tax rate, pay-roll taxes*
	Trade specialisation	*Export diversification, RCA exports/imports, trade openness, indicators from shift-share analysis, competitive pressure, etc.*
	Internationalisation of product	*Balassa index in intermediates, domestic value added embodied in foreign final demand, GVC participation, etc.*
	Relative prices	*REER-CPI/PPI/GDP/ULMC/ULCT, relative export prices, etc.*
	CompNet firm-level indicators	*TFP growth/skewness/inter-quantile range, labour productivity growth/skewness/inter-quantile range, ULC growth/skewness/inter-quantile range, OP gap, etc.*
Indicators based on CompNet firm-level data	Labour market participation	*Labour force participation rate, female labour market participation, part-time employment rate, trade union density, etc.*
Labour market	Skilled labour force	*Labour force with primary/secondary/tertiary education, etc.*
	Productivity	*TFP annual growth, labour share in TFP, capital share in TFP, etc.*
	Employment and social protection	*EPL index*
	SMEs	*Industry by employment size class*
	R&D and innovation	*Total intramural R&D expenditure, patent applications to the EPO, patents granted by the USPTO, etc.*
Human capital and innovation	Human capital	*Researchers in R&D, general government expenditure, index of human capital per person, etc.*
	Energy	*Energy imports*
Energy, infrastructures and institutions	Basic infrastructures	*Air transport, road density, etc.*
	Technological infrastructures	*Internet users, broadband subscribers, etc.*
	Institutions	*Size of government, control of corruption, rule of law, etc.*
	Ease of doing business	*Legal system of property rights, freedom to trade, regulations…*
Business environment	Access to finance	*Domestic credit to private sector, ease of obtaining credit, short-term loans to non-financial corporations, etc.*
Financial development and openness	Cost of finance	*Real interest rate, price level of capital formation, share price index, etc.*
	Financial integration	*IFIGDP, GEQY, EQSH, portfolio equity liabilities, etc.*
	Liquidity	*Money stock, liquid liabilities, central bank assets, etc.*
Control variables	Demographics and geography	*Land area, population growth, urban population, etc.*

Box 3

THE BAYESIAN MODEL AVERAGING (BMA) APPROACH

For a rigorously founded policy analysis aimed at enhancing external performance, it is essential to identify the drivers behind the competitive position of individual countries. The Toolkit takes on the ambitious goal of establishing what are the economic indicators more closely linked to trade outcomes by making use of Bayesian model averaging (BMA).

The BMA approach is a formal treatment of variables/models' uncertainty by considering all possible combinations of indicators. The Bayesian inference about an indicator of interest is based on its posterior distribution. The full posterior distribution of the variable is a weighted average of its posterior distributions under each of the models, where the weights are the posterior model probabilities.

This methodology was popularised in the growth related literature. As in the case of growth economics, competitiveness analysis faces the problem of the '*openness of theories*', translating into the fact that the numerous variables proposed as competitiveness drivers in previous studies have some ex-ante plausibility. BMA makes it possible, after having run millions of regressions, to identify just a few variables which can be considered robust determinants of the dependent variable (in this case measures of export performance). More details are provided in Benkovskis et al. (2014), "A diagnostic toolkit for competitiveness assessment".

5.3 POLICY USE: DRILL-DOWN APPROACH

CompNet is currently addressing important research questions, such as determining the productivity premium of exporting firms and whether it has changed with the crisis, quantifying the number of credit-constrained firms within a country and understanding how this is related to export performances. But attention has also been devoted to determining the correlation between mark-ups and allocative efficiency, understanding if sectors with higher mark-ups distribute resources less efficiently and, eventually, to discovering if firms within the same sector are growing following different paths and if so, why.

All this information can be of critical value when conducting, for instance, country analysis related to structural reform.

In the following we will sketch out the so called "drill-down approach", whereby country desks could use macro as well as firm-level indicators developed by CompNet researchers to complement analysis conducted at the macro and sectoral levels.

The idea is to start with a policy question, such as the need to understand (and devise appropriate policy recommendations to correct) export market share losses for a country. The indicator used first, e.g. a standard constant market share analysis, may signal for instance a weakness due to the sectoral specialisation of exports. The graph below, which suggests that country teams could directly consult the set of standard charts already existing in the CompNet database, illustrates how CompNet can help. A

Chart 14 Competitiveness Assessment Toolkit: Drill-down approach

| What issue do I want to look at? (e.g. market share, productivity growth...) | ⇒ | What will be my LHS measure? (market share, long-term growth,...) | ⇒ | What are the potential determinants? | ⇒ | Diagnosis Weakness related to e.g. ● Excessive concentration in slow growing markets ● ... |

Via user friendly interface country desks could independently exploit for country analysis standard charts or indicarors identified by CompNet researches, for instance:

– *Firms' size distribution by sector in comparison with EU average*
– *Correlation firm size/productivity*
– *Measures of allocative efficiency*
– *...*

Source:

Among the firm-level charts, analysts could look at correlations, based on firm-level data, between productivity, size and labour costs, using average values of specific quintiles of the productivity distribution. In order to make the process of selection easier (countries, timing, variables, and so on), a CompNet team is currently investigating the most efficient interfaces to be offered to the final users.

6 CONCLUSIONS

This Interim Report has shown that CompNet has made substantial progress in 2013 towards the achievement of its **two main objectives**, i.e. improving the indicators database and creating a solid conceptual framework connecting determinants with policy outcomes. Still, further work and efforts are needed to fully exploit the potential of the network, particularly as regards the firm-level database. At the moment, it is expected that by early 2015 the bulk of the work should be completed. This includes indicators databases - both at the macro and firm levels – as well as most of the ongoing research. By mid-2015, CompNet's activities will be wrapped up with a final report, to be discussed in a concluding high profile conference.

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ANNEXES

I LIST OF COMPNET MEMBERS

Institution	Name	Surname	E-mail
Banca d'Italia	Matteo	Bugamelli	matteo.bugamelli@bancaditalia.it
Banca d'Italia	Rita	Cappar
iello	rita.cappariello@bancaditalia.it
Banca d'Italia	Silvia	Fabiani	silvia.fabiani@bancaditalia.it
Banca d'Italia	Sara	Formai	sara.formai@bancaditalia.it
Banca d'Italia	Francesco	Zollino	francesco.zollino@bancaditalia.it
Banca Naţională a României	Alexandru	Leonte	Alexandru.Leonte@bnro.ro
Banca Naţională a României	Bogdan	Chiriacescu	Bogdan.Chiriacescu@bnro.ro
Banco Central de la Rep. Argentina	Laura	D´Amato	ldamato@bcra.gov.ar
Banco Central de la Rep. Argentina	Maximo	Sangiacomo	Maximo.Sangiacomo@bcra.gov.ar
Banco Central de Reserva del Perú	Rafael	Vera Tudela	rafael.veratudela@bcrp.gob.pe
Banco de España	Cristina	Fernández	cfvidaurreta@bde.es
Banco de España	Esther	Gordo	egordo@bde.es
Banco de España	Juan Francisco	Jimeno	juan.jimeno@bde.es
Banco de España	Cesar	Martín	cmartin@bde.es
Banco de España	Carmen	Martínez	carmen.martinez@bde.es
Banco de España	Jose Manuel	Montero	jmontero@bde.es
Banco de España	Enrique	Moral	enrique.moral@bde.es
Banco de España	Elvira	Prades	elvira.prades@bde.es
Banco de España	Daniel	Santabarbara	Daniel.santabarbara@bde.es
Banco de España	Patrocinio	Tello	patry.tello@bde.es
Banco de Portugal	João	Amador (Head WS3)	Joao.Amador@bportugal.pt
Banco de Portugal	Paulo	Esteves	pmesteves@bportugal.pt
Banco de Portugal	Luca David	Opromolla	luca.opromolla@nyu.edu
Banco de Portugal	Pedro	Portugal	Jose.Pedro.Portugal.Dias@bportugal.pt
Banco de Portugal	Paulo	Soares Esteves	pmesteves@bportugal.pt
Bank of England	Nicola	Shadbolt	nicola.shadbolt@bankofengland.co.uk
Banka Slovenije	Urska	Cede	urska.cede@bsi.si
Banka Slovenije	Andreja	Lenarcic	andreja.lenarcic@bsi.si
Banka Slovenije	Matija	Lozej	matija.lozej@bsi.si
Banka Slovenije	Vesna	Lukovic	vesna.lukovic@bsi.si
Banque centrale du Luxembourg	Muriel	Bouchet	muriel.bouchet@bcl.lu
Banque centrale du Luxembourg	David	Dubois	david.dubois@bcl.lu
Banque centrale du Luxembourg	Ladislaf	Wintr	Ladislav.Wintr@bcl.lu
Banque de France	Antoine	Berthou (Head WS2)	Antoine.berthou@banque-france.fr
Banque de France	Pauline	Bourgeon	Pauline.BOURGEON@banque-france.fr
Banque de France	Jean-Charles	Bricongne	jean-charles.bricongne@banque-france.fr
Banque de France	Valérie	Chauvin	valerie.chauvin@banque-france.fr
Banque de France	Lionel	Fontagné	lionel.fontagne@univ-paris1.fr
Banque de France	Guillaume	Gaulier	Guillaume.GAULIER@banque-france.fr
Banque de France	Claude	Lopez	claude.lopez@banque-france.fr
Banque de France	Claude	Lopez	claude.lopez@banque-france.fr
Banque de France	Daniel	Mirza	Daniel.mirza@univ-tours.fr
Banque de France	Patrick	Sevestre	patrick.sevestre@banque-france.fr
Banque de France	Vincent	Vicard	Vincent.VICARD@banque-france.fr
Banque de France	Soledad	Zignago	Soledad.ZIGNAGO@banque-france.fr
Bocconi University	Carlo	Altomonte (consultant)	carlo.altomonte@unibocconi.it
Bruegel	Zolt	Darvas	sarah.roblain@bruegel.org
Bulgarian National Bank	Georgi	Momchilov	Momchilov.G@bnbank.org
Central Bank of Croatia	Gorana	Lukinic	gorana.lukinic@hnb.hr
Central Bank of Croatia	Jurica	Zrnc	jurica.zrnc@hnb.hr
Central Bank of Cyprus	Stephan	Haroutunian	StephanHaroutunian@centralbank.gov.cy
Central Bank of Ireland	Martina	Lawless	martina.lawless@centralbank.ie
Central Bank of Ireland	Derry	O'Brien	Derry.OBrien@ecb.europa.eu
Central Bank of Malta	Alfred	Demarco	demarcoa@centralbankmalta.org
Central Bank of Malta	Owen	Grech	grecho@centralbankmalta.org
Central Bank of Turkey	Soner	Başkaya	Soner.Baskaya@tcmb.gov.tr
Central Bank of Turkey	Aslihan	Atabek Demirhan	aslihan.atabek@tcmb.gov.tr
Central Bank of Turkey	Binnur	Balkan Konuk	Binnur Balkan@tcmb.gov.tr
Centro Studi Luca d'Agliano	Silvia	Cerisola	silvia.cerisola@guest.unimi.it
Centro Studi Luca d'Agliano	Veronica	Lupi	veronica.lupi@guest.unimi.it
Česka Národni Banka	Tomas	Adam	tomas.adam@cnb.cz
Česka Národni Banka	Kamil	Galuscak	Kamil.Galuscak@cnb.cz
Česka Národni Banka	Lubos	Ruzicka	Lubos.Ruzicka@cnb.cz

Institution	Name	Surname	E-mail
Citi Research	Benjamin	Mandel	Benjamin.Mandel@citi.com
Danmarks Nationalbank	Kim	Abildgren	kpa@nationalbanken.dk
De Nederlandsche Bank	Eva	Perridon	e.a.perridon@dnb.nl
De Nederlandsche Bank	Steven	Poelhekke	s.poelhekke@dnb.nl
De Nederlandsche Bank	Robert	Vermeulen	r.j.g.vermeulen@dnb.nl
Deutsche Bundesbank	Elena	Biewen	elena.biewen@bundesbank.de
Deutsche Bundesbank	Sven	Blank	sven.blank@bundesbank.de
Deutsche Bundesbank	Boele	Bonthuis	boele.bonthuis@bundesbank.de
Deutsche Bundesbank	Christoph	Fischer	christoph.fischer@bundesbank.de
Deutsche Bundesbank	Ulrich	Grosch	ulrich.grosch@bundesbank.de
Deutsche Bundesbank	Sabine	Hermann	sabine.herrmann@bundesbank.de
Deutsche Bundesbank	Heinz	Herrmann	heinz.herrmann@bundesbank.de
Deutsche Bundesbank	Axel	Jochem	Axel.Jochem@bundesbank.de
Deutsche Bundesbank	Kirsten	Lommatzsch	kirsten.lommatzsch@bundesbank.de
Deutsche Bundesbank	Philipp	Meinen	philipp.meinen@bundesbank.de
Deutsche Bundesbank	Arne	Nagengast	arne.nagengast@bundesbank.de
ECB	Katarzyna	Bankowska	katarzyna.bankowska@ecb.europa.eu
ECB	Nicola	Benatti	Nicola.Benatti@ecb.europa.eu
ECB	Benjamin	Bluhm	benjamin.bluhm@ecb.europa.eu
ECB	Elena	Bobeica	Elena.Bobeica@ecb.int
ECB	Christian	Buelens	christian.buelens@ecb.europa.eu
ECB	Styliani	Christodoulopoulou	Styliani.Christodoulopoulou@ecb.europa.eu
ECB	Vlad	Demian	calin-vlad.demian@ecb.int
ECB	Filippo	di Mauro (Chair)	filippo.di_mauro@ecb.europa.eu
ECB	Alistair	Dieppe	alistair.dieppe@ecb.europa.eu
ECB	Annalisa	Ferrando	annalisa.ferrando@ecb.int
ECB	Frauke	Skudelny	frauke.skudelny@ecb.europa.eu
ECB	Julia	Fritz (Admin)	julia.fritz@ecb.europa.eu
ECB	Georgiadis	Georgios	georgios.georgiadis@ecb.europa.eu
ECB	Gräb	Johannes	johannes.graeb@ecb.europa.eu
ECB	Pavlos	Karadeloglou	pavlos.karadeloglou@ecb.int
ECB	Tohmas	Karlsson	tohmas.karlsson@ecb.europa.eu
ECB	Pierre	Lamarche	pierre.lamarche@ecb.europa.eu
ECB	Ana	Lamo	ana.lamo@ecb.europa.eu
ECB	David	Lodge	david.lodge@ecb.europa.eu
ECB	Giovanni	Lombardo	giovanni.lombardo@ecb.europa.eu
ECB	Paloma	López-García	Paloma.lopez-garcia@ecb.europa.eu
ECB	Lucia	Orszaghova	Lucia.Orszaghova@ecb.europa.eu
ECB	Chiara	Osbat	chiara.osbat@ecb.europa.eu
ECB	Carlos	Sanchez Munoz	Carlos.Sanchez_Munoz@ecb.int
ECB	Selin	Özyurt	Selin.Ozyurt@ecb.europa.eu
ECB	Sebastien	Perez Duarte	sebastien.perez-duarte@ecb.europa.eu
ECB	Beatrice	Pierluigi	beatrice.pierluigi@ecb.europa.eu
ECB	Gabor	Pula	gabor.pula@ecb.europa.eu
ECB	Matthias	Rau-Goehring	Matthias.Rau-Goehring@ecb.europa.eu
ECB	Antonio	Rodriguez	Antonio.Rodriguez_Caloca@ecb.europa.eu
ECB	Lionel	Savelin	li.savelin@ecb.europa.eu
ECB	Beatrice	Scheubel	Beatrice.Scheubel@ecb.europa.eu
ECB	Martin	Schmitz	Martin.Schmitz@ecb.europa.eu
ECB	Bernd	Schnatz	bernd.schnatz@ecb.europa.eu
ECB	Immo	Schott	immo.schott@ecb.europa.eu
ECB	Willem	Schudel	Willem.Schudel@ecb.europa.eu
ECB	Roberta	Serafini	roberta.serafini@ecb.europa.eu
ECB	David	Sondermann	david.sondermann@ecb.europa.eu
ECB	Melanie	Ward-Warmedinger	melanie.ward-warmedinger@ecb.europa.eu
ECB	Nico	Zorell	nico.zorell@ecb.europa.eu
ECB	Ettore	Dorucci (co-head of WS1)	ettore.dorrucci@ecb.europa.eu
Eesti Pank	Liina	Malk	Liina.Malk@eestipank.ee
Eesti Pank	Jaanika	Merikyll	jaanika.merikyll@eestipank.ee
Eesti Pank	Tairi	Rõõm	Tairi.Room@eestipank.ee

Institution	Name	Surname	E-mail
Eesti Pank	Karsten	Staehr	karsten.staehr@eestipank.ee
Eesti Pank	Natalja	Viilmann	natalja.viilmann@eestipank.ee
EU Commission	Jorge	Duran-Laguna	jorge.duran-laguna@ec.europa.eu
EU Commission	Isabel	Grilo	Isabel.Grilo@ec.europa.eu
EU Commission	Benedicta	Marzinotto	benedicta.marzinotto@ec.europa.eu
EU Commission	Josefa	Monteagudo	Josefa.MONTEAGUDO@ec.europa.eu
EU Commission	Dominique	Simonis	dominique.simonis@ec.europa.eu
EU Commission	Nuno	Sousa	Nuno.SOUSA@ec.europa.eu
EU Commission	Alessandra	Tucci	Alessandra.TUCCI@ec.europa.eu
EU Commission	Hylke	Vandenbussche	Hylke.VANDENBUSSCHE@ec.europa.eu
EU Commission	Stefan	Zeugner	Stefan.ZEUGNER@ec.europa.eu
EU Commission /Trade	Henrik	Isakson	henrik.isakson@ec.europa.eu
FRB	John	Rogers	john.h.rogers@frb.gov
HEC Montreal	Federico	Ravenna	federico.ravenna@hec.ca
Hungarian Academy of Sciences	László	Halpern (consultant)	halpern@econ.core.hu
IMT Institute for Advanced Studies	Armando	Rungi	armando.rungi@imtlucca.it
Institut für Wirtschaftsforschung Halle	Hubert	Gabrisch	Hubert.Gabrisch@iwh-halle.de
Institute of Applied Economic Research (IAW)	Katja	Neugebauer	katja.neugebauer@iaw.edu
Institute of Confindustria	Matteo	Pignatti	M.Pignatti@confindustria.it
KU Leuven	Jozef	Konings	joep.konings@kuleuven.be
KU Leuven	Christophe	Croux	christophe.croux@kuleuven.be
Latvijas Banka	Konstantins	Benkovskis	konstantins.benkovskis@bank.lv
Latvijas Banka	Oleg	Tkacevs	Olegs.Tkacevs@bank.lv
Latvijas Banka	IMF	Rudolf	Bems	RBems@imf.org
Lietuvos bankas	Vetlov	Dabušinskas	adabusinskas@lb.lt
Lietuvos bankas	Ernestas	Virbickas	evirbickas@lb.lt
London School of Economics	Gianmarco	Ottaviano	g.i.ottaviano@lse.ac.uk
Magyar Nemzeti Bank	Aurelijus	Andras Kovacs	adabusinskas@lb.lt
Magyar Nemzeti Bank	Marianna	Endrész	valentinyinem@mnb.hu
Magyar Nemzeti Bank	Péter	Harasztosi	harasztosip@mnb.hu
Magyar Nemzeti Bank	Gabor	Katay	katayg@mnb.hu
Merrill Lynch	Chiara	Angeloni	angeloni.chiara@gmail.com
Národná banka Slovenska	Tibor	Lalinský	tibor.lalinsky@nbs.sk
Narodowy Bank Polski	Michal	Gradzewicz	Michal.Gradzewicz@nbp.pl
Narodowy Bank Polski	Jan	Hagemejer	Jan.Hagemejer@nbp.pl
Narodowy Bank Polski	Wojciech	Mroczek	Wojciech.Mroczek@nbp.pl
National Statistics Institute of Finland	Satu	Nurmi	satu.nurmi@stat.fi
Nationale Bank van België /Banque Nationale de Belgique	Hans	Dewachter	hans.dewachter@nbb.be
Nationale Bank van België /Banque Nationale de Belgique	Emmanuel	Dhyne	emmanuel.dhyne@nbb.be
Nationale Bank van België /Banque Nationale de Belgique	Martine	Druant	martine.druant@nbb.be
Nationale Bank van België /Banque Nationale de Belgique	Cédric	Duprez	cedric.duprez@nbb.be
Nationale Bank van België /Banque Nationale de Belgique	Catherine	Fuss	catherine.fuss@nbb.be
Nationale Bank van België /Banque Nationale de Belgique	Glenn	Schepens	Glenn.Schepens@nbb.be
Nationale Bank van België /Banque Nationale de Belgique	Marie Denise	Zachary	mariedenise.zachary@nbb.be
OECD	Sónia	Araújo	sonia.araujo@oecd.org
OECD	Giuseppe	Berlingieri	giuseppe.berlingieri@oecd.org
OECD	Chiara	Criuscuolo	chiara.criscuolo@oecd.org
OECD	Koen	de Backer	Koen.DeBacker@oecd.org
OECD	Peter	Gal	peter.gal@oecd.org
OECD	Carlo	Menon	carlo.menon@oecd.org
OECD	Anita	Wölfl	anita.woelfl@oecd.org
Oesterreichische Nationalbank	Maria	Silgoner	maria.silgoner@oenb.at

Institution	Name	Surname	E-mail
Oesterreichische Nationalbank	Alfred	Stiglbauer	alfred.stiglbauer@oenb.at
Oesterreichische Nationalbank	Julia	Wörz	julia.woerz@oenb.at
Stanford University	Kalina	Manova	manova@stanford.edu
Suomen Pankki	Juuso	Vanhala	juuso.vanhala@bof.fi
Suomen Pankki	Jouko	Vilmunen	jouko.vilmunen@bof.fi
University of Lausanne	Francesco	Pappada	francesco.pappada@unil.ch
University of Maryland	John	Haltiwanger	haltiwan@econ.umd.edu
University of Milan	Giorgio	Barba Navaretti	barba@unimi.it
University Pompeu Fabra	Ramon	Xifré	ramon.xifre@esci.upf.edu
US International Trade Commission	Tani	Fukui	tani.fukui@usitc.gov
US International Trade Commission	Robert	Koopman	robert.koopman@usitc.gov
US International Trade Commission	William	Powers	William.Powers@usitc.gov
US International Trade Commission	Zhi	Wang	zhi.wang@usitc.gov
Vrije Universiteit	Eric	Bartelsman	e.j.bartelsman@vu.nl
WIIW	Robert	Stehrer	stehrer@wiiw.ac.at
World Bank	Daria	Taglioni	dtaglioni@worldbank.org

2 COMPNET WORKSHOP

CompNet Workshop 2-3 April 2012, European Central Bank, Frankfurt am Main

CompNet Workshop 20-21 September 2012, Banque de France, Paris

CompNet Workshop 10-11 December 2012, European Central Bank, Frankfurt am Main

CompNet Workshop 12-13 March 2013, Central Bank of Ireland, Dublin

CompNet joint conference with the Peterson Institute for International Economics and the World Bank, 16-17 April 2013, Washington, DC

CompNet Workshop 24-25 June 2013, European Central Bank, Frankfurt am Main

CompNet Workshop 19-20 September 2013, Joint Vienna Institute, Vienna

CompNet Workshop 11-12 December 2013, European Central Bank, Frankfurt am Main

CompNet Workshop 13-14 March 2014, Banca d'Italia, Rome

3 COMPNET RESEARCH OUTPUT

COMPNET WORKING PAPERS

CompNet Task Force (2014), "Micro-based evidence of EU competitiveness: the CompNet database", Working Paper Series, No. 1634, European Central Bank, February.

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Berthou, A. and Vicard, V. (2013), "Firms' export dynamics: experience vs. size", Working Paper Series, No. 1616, European Central Bank, November.

Timmer, M. P., Los, B., Stehrer, R. and de Vries, G. (2013), "Fragmentation, incomes and jobs: an analysis of European competitiveness", Working Paper Series, No. 1615, European Central Bank, November.

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Amador, J. and Soares, A. C. (2013), "Competition in the Portuguese economy: insights from a profit elasticity approach", Working Paper Series, No 1603, European Central Bank, November.

Castagnino, T., D'Amato, L., Sangiácomo M. (2013), "How do firms in Argentina get financing to export?", Working Paper Series, No 1601, European Central Bank, November

G. Mion and L. D. Opromolla (2013), "Managers' mobility, trade performance, and wages", Working Paper Series, No 1596, European Central Bank, October.

Soares Esteves, P., Rua, A. (2013), "Is there a role for domestic demand pressure on export performance?", Working Paper Series, No 1594, European Central Bank, September.

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Huemer, S., Scheubel, B. and Walch, F. (2013), "Measuring institutional competitiveness in Europe", Working Paper Series, No 1556, European Central Bank, June.

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Corbo, V. and Osbat, C. (2013), "Trade adjustment in the European Union – a structural estimation approach", Working Paper Series, No 1535, European Central Bank, April.

Corbo, V. and Osbat, C. (2012), "Optimism bias? The elasticity puzzle in international economics revisited", Working Paper Series, No 1482, European Central Bank, October

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Huemer, S.; Scheubel, B. and Walch, F. (2014) "Measuring institutional competitiveness in Europe", CompNet Policy Brief, No 5, 20 January.

Benkovskis, K.; Silgoner, M., Steiner, K. and Wörz, J. (2014) "Mapping competitive pressure between China and EU countries", CompNet Policy Brief, No 4, 21 January.

di Mauro, F., Plamper, H. and Stehrer, R. (2013), "Global Value Chains: A case for Europe to cheer up", CompNet Policy Brief, No 3, 12 August.

Gaulier, G. and Vicard, V. (2013), "The signatures of euro-area imbalances: export performance and the composition of ULC growth", CompNet Policy Brief, No 2, 12 July.

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