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Research Report

Competitiveness of EU vs. US: Part 1, 2, 7, 9 of the study Competitiveness under new perspectives

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Competitiveness of EU vs. US

Part 1, 2, 7, 9 of the study

Competitiveness under New Perspectives

Policy Paper no 29

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*Socio-economic Sciences and Humanities Europe
moving towards a new path of economic growth
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Abstract

This paper aims to redefine the term competitiveness to enhance its usefulness for the evaluation of country performance and for policy conclusions. We attempt to establish a definition that is adequate if economic policy strives for a new growth path that is more dynamic, socially inclusive and ecologically sustainable. We tentatively apply the proposed definition to evaluate the "competitiveness" of EU member states as well as to compare Europe's "competitiveness" with that of the US (and, where possible, with Switzerland, Japan and China).

In the first part of the paper, we examine the evolution of the concept from a focus on "inputs" at the firm level (price or cost competitiveness) to economic structure and capabilities at the country level and finally to "outcome" competitiveness, where outcomes are defined in a broad sense and in the context of the WWWWforEurope project. We propose to define competitiveness as the "ability of a country (region, location) to deliver the beyond-GDP goals for its citizens".

In the second part of the paper, the performance of the EU-27 countries is assessed along the dimensions described above. We begin with price competitiveness and then proceed to economic structure and countries' capabilities regarding innovation, education, the social system, institutions and environmental ambition. We conclude with outcome competitiveness in terms of economic, social and ecological outcomes. Overall, we compile a database of 68 indicators that describe these different aspects of competitiveness.

In the third part of the paper, we investigate empirically the relationship between "outcome" and "input" competitiveness for the EU-27 using panel data analysis for the period from 2000 to 2010. We construct a composite indicator for outcome competitiveness consisting of income, social and ecological pillars, following the beyond-GDP literature. This measure is then econometrically related to composite indicators of the three groups of input indicators: price competitiveness, economic structure, and capabilities. The results of panel OLS regressions suggest that both economic structure and capabilities on aggregate are positively related to our measure of outcome competitiveness, while a negative relationship is found for the wage component of price competitiveness. Among the different dimensions of capabilities, ecological preferences and – less robustly – institutions appear to be positively associated with outcome competitiveness.

Keywords: Competitiveness, economic growth path, industrial policy, social capital as growth driver, sustainable growth

Jel codes: O25, L16

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1. Aims and outline

The aim of this paper is twofold: first, to establish a concept of competitiveness that is adequate for the transition of economies to a socially inclusive and ecologically ambitious growth path – as envisaged by the WWWforEurope project – and relevant to Europe as an industrialised high-income region. Second, we apply this new concept to assess the competitiveness of the EU member states, to learn on which pillars it rests and which policy actions might improve it. The second goal is particularly important since growth in Europe has been disappointing over the past decades (and after the financial crisis) and unemployment is above 10 percent.

The paper is organised as follows. In the next section, we discuss the evolution of the term competitiveness from the firm perspective to the industry and macro level. Early analyses focused on low costs and soon included productivity (by itself or in relation to costs); this notion is known as price or cost competitiveness. Later, assessments of economic structure, technology and other capabilities (enablers) were added, and the result was called quality or technological competitiveness. Attention then shifted to evaluating outcomes instead of costs or capabilities. Competitiveness became associated with the ability of a region or country to create value added and employment or to improve living standards (see, for example, *European Commission*, 1998). Given that the aim of the WWWforEurope project is to analyse the preconditions necessary for a transition to a more socio-ecological European growth path, it makes sense to define competitiveness, specifically its "outcome" component, from the perspective of the ultimate aims of society. A similarly broad approach has recently been taken in the discussion on "beyond GDP", and the OECD has set up the "Better Life Index" to make this operational.¹

In sections 3 to 5 of the paper, we assemble and analyse indicators on the different dimensions of competitiveness outlined above, combining traditional indicators used in the literature to date with new ones that emphasise the social and ecological aspects of input and outcome competitiveness. Section 3 analyses price competitiveness. Section 4 investigates the sophistication of production and exports as revealed by the structure of an economy (e.g. the share of technology-driven or high-skill industries). Section 5 looks at capabilities, that is, enablers of a "high-road", non-price concept of competitiveness. We collect indicators on (i) innovation, (ii) education, (iii) the social system as a "productive" force, (iv) incentives and preferences for ecologically sustainable behaviour, and (v) institutions.

Section 6 analyses outcomes. First, we report traditional outcomes like GDP and employment and then broader sets of outcome goals, among them social inclusiveness and ecological sustainability. We follow the literature on "beyond GDP" and the OECD Better Life Index in our evaluation of outcome competitiveness. Section 7 summarises our main findings on competitiveness under new perspectives for the European economies in comparison to the US.

¹ OECD (2011); see also European Commission (2007), *German Sachverständigenrat* (1981).

Section 8 analyses econometrically the relationship between outcome competitiveness (success in achieving the beyond-GDP goals) and input competitiveness (costs/structure/capabilities). Building on the database compiled for sections 3 to 6, we apply panel data estimation methods to the EU-27 countries over the period 2000 to 2010. This provides information on the importance of different drivers of competitiveness and therefore on the instruments that may be used to improve competitiveness under new perspectives. Section 9 concludes.

2. Developing a meaningful concept for the transition

2.1 From crisis towards a new growth path

Competitiveness of nations or regions is an evasive concept. It is usually not well-defined but persistently used by politicians, economists, business people and media.² It has regained attention in today's era of globalisation and - after the financial crisis - particularly in countries struggling to return to growth and limit unemployment. This holds for Southern Europe but also for other European economies and the US, which all attempt to stabilise and restructure their financial sectors and to refocus on their shrinking industrial base. The purpose of this paper is to define competitiveness from the perspective of an economy in transition to a new path of growth and development with high dynamics, more social inclusion and environmental sustainability. These are the goals of the EU 2020 strategy, and the WWWforEurope project has the mission to provide analytical support for the transition of Europe to a new growth path until 2020 and beyond. This transition should take place in an environment in which industrialised countries face multiple challenges including globalisation, tight public budgets, costly welfare systems, and ageing populations. Persistent disequilibria exist across countries within the euro area; high income differences (often increasing at least within countries) and climate change are additional challenges. We venture to link competitiveness to drivers of economic growth and to the ultimate aim of societies: to increase the welfare of their citizens, which we measure by means of the so-called "beyond GDP goals".

2.2 The many facets of "competitiveness"

2.2.1 Price competitiveness

Historically, the term competitiveness has been used primarily to draw attention to the cost position of firms or countries. It is still often used today when an economy (or a firm or industry) is challenged by new low-cost competitors. It is this narrow focus on costs that was criticised by *Krugman* (1994A, 1994B) as "elusive and meaningless" at the conceptual level and as "misleading or even dangerous" at the policy level, since this narrow interpretation implies that cost reduction is the only effective policy response. Complaints about losing competitiveness focus on wages as the main cost component, but they also extend to high energy prices and taxes. To some degree, this preoccupation with costs comes from the origin of the concept of competitiveness at the level of the firm. However, even at the firm level, the theory of the firm and management theory emphasise that success in oligopolistic markets depends on "competitive advantage" and capabilities generated by innovation (*Aiginger*, 2006).

Absolute cost levels decide neither about the survival of firms nor about the health of an economy; instead, they should be set in relation to productivity. The profitability of firms and the

² See *Aiginger* (1997, 1998, 2000); *Fagerberg* (1994), *Hölzl – Reinstaller* (2011), *Grilo – Koopman* (2006), *Grupp* (1995), *Krugman* (1996), *Krugman – Hatsopoulos* (1987), *Orlowski* (1982), *Oughton* (1997), *Peneder* (1999, 2003).

ability of an industry to sell internationally are not limited by costs if productivity is also high (and/or high prices can be charged). Profit margins are positive if the productivity lead (plus price advantage) of a firm or region is larger than the cost disadvantage. These "relative costs" are summarised in the concept of unit labour costs. On the practical side, it is not easy to find data for the absolute level of productivity (per capita or per hour) *and* the wage level in a consistent way.³ Monitoring *changes* in unit labour costs is much more common and easier, although it also involves a number of statistical issues.⁴

The role of productivity is sometimes emphasised to the extent that some authors consider productivity as the only meaningful concept of competitiveness (*Porter*, 1990; *Kohler*, 2006). This may de-emphasise costs too much and distract from quality components.

Concepts of cost competitiveness in the narrow sense (costs only) or in the more balanced approach (looking at costs and productivity simultaneously) are complicated when all cost components (labour, capital, energy, taxes) or all productivity components (labour productivity, capital productivity, resource productivity, government efficiency) should be addressed. These extensions are usually implemented in cost benchmark studies, which look at individual cost components sequentially, or in studies on total factor productivity (TFP), which use a production function approach.⁵

2.2.2 Quality competitiveness

Later, competitiveness came to be seen as more than an accounting result comparing costs and revenues at one point in time. A broader interpretation of the term evaluates the sources of competitiveness of firms and countries as well as their future prospects. This involves examining the processes that lead to a favourable cost or productivity position and the opportunities to sustain or improve it. Competitiveness in this sense is about processes and abilities.⁶ In the literature, terms like "quality competitiveness" or "technological competitiveness" are used to describe this broader interpretation, although both expressions could be seen as narrowly focusing on two specific aspects (quality and technology).

We investigate two components of this broader notion of competitiveness. The first is the *structure* of an economy, and the second are its *capabilities*, for instance in terms of the innovation and education system. The structural composition of the manufacturing sector, for example, can be analysed by breaking down value added or exports (i) by the main input used

³ In unit labour cost calculations, productivity is usually measured in real terms, while wages are measured in nominal terms. If both were measured in nominal terms, the relationship between the level of value added per employee and the wage level per employee degenerates into an inverse "wage ratio" (Y/W), which is traditionally interpreted as a result of industrial relations, market structure and capital intensity rather than as an indicator of price competitiveness.

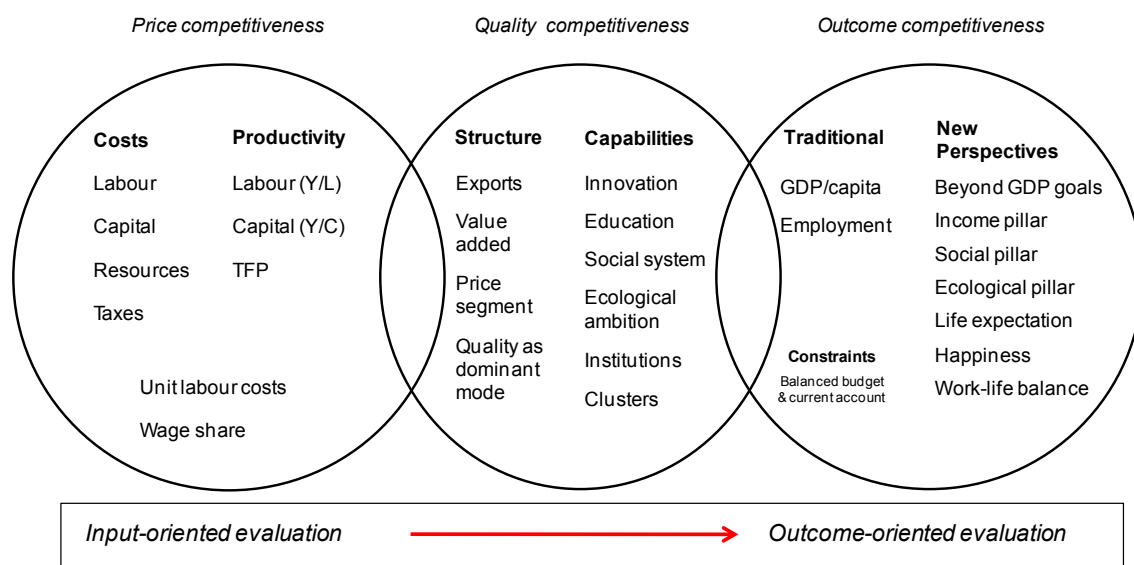
⁴ These begin with the question whether to account for changes in currency values or not. Further, price indices used to deflate value added or production on the one hand and wages on the other hand can also differ.

⁵ Information on TFP is more commonly provided *for* changes over time (e.g. in the EU KLEMS database) than for absolute comparisons, and practically never in a way that allows comparing TFP with a comprehensive cost evaluation ("total costs").

⁶ This is reflected in the German expression for competitiveness, "Wettbewerbsfähigkeit" – literally, "the *ability* to compete".

in an industry (differentiating for example between labour-intensive and technology-intensive industries), (ii) by the sophistication of inputs (e.g. low-skilled or high-skilled labour), (iii) by the extent and characteristics of services used/provided (transport services vs. knowledge input), (iv) according to whether competition takes place mainly along the price or the quality dimension, and (v) according to whether a country/region's exports are positioned in the highest or lowest price segment of its product market (this indicator is available for exports only). We also report the share of production and exports in (vi) innovation-intensive sectors and (vii) education-intensive sectors. Lastly, we assess the importance of ecological and renewables industries.⁷

Figure 1 **Towards a concept of competitiveness under new perspectives**



Source: Own conceptualisation for WWForEurope.

Capabilities provide information about the sources of success and failure of firms or industries and pave the ground for assessing their future prospects. Innovation and education affect firm growth, market positions and GDP growth, especially in industrialised countries. Indicators on research inputs and outputs, as well as on investment and participation in human capital formation at various stages are instrumental for this purpose. The importance of institutions has received increased attention over the past years (Acemoglu, 2003; Rodrik et al., 2004; Bouis et al., 2011). This includes the role of governance and the extent to which the public sector and regulation support or hinder firms in the long run. The rule of law, absence of corruption and trust in institutions are widely accepted as determinants of efficiency and growth for firms and countries. The importance of clusters (cooperation between firms in "related industries") for

⁷ To assess economic structure, we mainly rely on taxonomies provided in Peneder (2001), which refer to manufacturing. Two taxonomies – those on innovation and education intensity – include services. Examples of studies that use these taxonomies to examine the structural dimension of competitiveness at the European level are Janger et al. (2011) and Janger (2012).

competitiveness has been analysed by *Porter* (1990, 2004), *Ketels* (2006), and *Ketels – Protsiv* (2013).

In the context of transition to a new growth path, the capability of the social system to enhance the productive capacity of an economy becomes important. Productivity-enhancing measures include retraining people if qualifications become obsolete, reducing inherited differences in education or increasing female labour force participation. As to the ecological aspect, *Porter* (2004) emphasises the sophistication of consumers providing incentives for firms to improve technologies and products in order to gain a first-mover advantage.⁸ Demand by economic actors for alternative energy sources, changing habits in light of climate change, and environmental taxation could all contribute to environmental innovation and lower energy intensity. Thus, social and ecological activities may turn into productive forces that do not limit incomes and production but increase welfare. In other words, social inclusion and ecological ambition can be drivers of growth and development.

2.2.3 Outcome competitiveness

Competitiveness should not be assessed by looking at inputs proper (costs and productivity) or inputs more broadly (structure and capabilities) alone. Rather, it ought to be complemented by assessing outcomes ("the proof of the pudding is the eating").

Outcome competitiveness was initially measured using trade or current account balances, with deficit countries judged to be uncompetitive. The importance of the external-balance benchmark subsequently declined: on the one hand, fast-growing countries tend to have trade deficits; on the other hand, the current accounts of member countries were seen as meaningless in a currency union, where no currency reserves are necessary to compensate deficits and there is no national currency that can be devalued. Further, some countries' large surpluses were sometimes seen as the result of politically-motivated prevention of currency appreciations ("currency manipulation") and a resurgence of mercantilist policies. In the wake of the financial crisis, this neglect of rising current-account deficits proved a mistake (see *Aiginger*, 2010); the difference in the depth of the crisis in individual countries was found to be correlated with their current-account position (and its change). The current-account deficits of Greece, Portugal and Spain (accrued in the pre-crisis period) added to the problems of these Southern peripheral countries, as financial markets added up public and private debt as well as current-account deficits in calculating the risk of governments bonds (see *Aiginger et al.*, 2012).

However, balancing the current accounts is not the ultimate aim of society (at least as long as there are no large deficits). The ultimate aim of an economy should be to enable high and rising incomes, to provide employment opportunities and to improve living conditions. Current accounts (as well as public deficits) are thus shifted into the position of constraints that could destabilise growth. A typical definition of outcome competitiveness along these lines is offered by the *European Commission* (2001): "the ability of an economy to provide its population with high and rising standards of living and high rates of employment on a sustainable basis".

⁸ See also *Vernon* (1966).

Fundamental assessments of outcomes thus began with GDP per capita as the main indicator of outcome competitiveness. Employment and unemployment indicators were then added to the analysis.⁹

In the context of transition to a more socially inclusive and environmentally sustainable path, the goals of social inclusion and sustainability are particularly important. The "social pillar" includes poverty reduction through transfers, limiting differences in net incomes through progressive taxation, guaranteeing pensions above poverty level, achieving gender equality and providing broad access to the health system. Ecological sustainability can be evaluated in terms of low CO₂ emissions and energy intensity or a large share of energy produced from renewable sources. If the growth path should be sustainable, i.e. in line with the biophysical limits of the world, these goals need to be added to GDP in an analysis of outcome competitiveness.

The critique of GDP as central measure of economic performance and meaningful indicator of welfare is closely related to the "beyond GDP" debate (*Stiglitz et al.*, 2009). This approach measures the achievements of a society using a broader set of goals. Since the ultimate purpose of an economy's competitiveness is to serve the aims of its citizens, the beyond-GDP approach is a good point of departure to re-evaluate the concept.¹⁰

An alternative to broad sets of indicators as in "beyond GDP" is to measure welfare using comprehensive indicators that summarise many components contributing to well-being. Life expectancy is an example of a quantitative indicator; survey responses to questions on life satisfaction or personal "happiness" are subjective indicators.¹¹

2.3 Proposed definition

Given the evolution of the concept over time, we propose to define competitiveness in light of the envisaged new growth path as the "ability of a country (region, location) to deliver the beyond-GDP goals for its citizens today and tomorrow".

The competitiveness of a country or region requires a set of viable firms and industries that are able to compete internationally, building on balanced costs and productivity. They have to be embedded in the structure of an economy and driven by capabilities developed privately or by the government. Current accounts as well as public-sector revenues and expenditures need to be balanced in the long run, but balanced accounts are not the ultimate aim. Given the objective of transition to a more socially inclusive and environmentally sustainable growth path, investments in the social and ecological system that make an economy more productive (in creating incomes and welfare) are an important part of competitiveness from the perspective of

⁹ *Aiginger* (2006B) defines evaluations of GDP as operationalisation 1 of output competitiveness, and evaluations of employment as operationalisation 2.

¹⁰ There is much ongoing research on the measurement of "beyond GDP" to improve the approach and to customise it to the preferences of different societies. For example, the indicators making up the OECD's Better Life Index contain the following categories: housing, health, work and life balance, education and skills, social connections, civic engagement and governance, environmental quality, personal security and subjective well-being.

¹¹ The UN's human development index is a further example. It consists of three indicators: GDP per head, education and life expectancy.

the new growth path. The social system and environmental ambitions of (public and private) institutions can become a "productive force". The outcomes to which firms and countries should contribute are the beyond-GDP goals. Our definition is therefore an extension – particularly important for the aim of a transition – to those defining competitiveness as value added plus employment or high and increasing living standards in the Annex for an overview on definitions proposed in literature).

2.4 Discussion of the proposed definition

2.4.1 Relation to theory

Our definition starts from the notion of a welfare function as defined in welfare theory. Social welfare consists of a bundle of goals, both material and immaterial. Material goals comprise income and employment, while immaterial goals may contain fairness of distribution, health, justice, freedom or the ability to follow personal preferences. It is open to choice which goals to include in the welfare function, which weights to give to these goals, and whether to emphasise dynamic or static aspects. Our operationalisation of the welfare concept is close to the "beyond GDP" debate – currently one of the most active branches of welfare theory – and to the aim of the WWWforEurope project, which is to support transition to a more dynamic, inclusive and sustainable growth path. The importance we attach to capabilities is based on strategic management theory, which emphasises competitive advantage, innovation and firm-specific capabilities, and on modern growth theory, which emphasises human capital, innovation and institutional quality. Our definition therefore comprises many elements of a "high road" to competitiveness (*Aiginger, 2012*) based on quality and innovation.

2.4.2 Monitoring the transition to a new growth path

The definition proposed involves important choices. Defining competitiveness as an ability to create welfare in general and to deliver the beyond-GDP goals in particular moves away from the emphasis on costs as a main driver of competitiveness and external balances as a main indicator of success. A low cost position derived from currency devaluations, cost-cutting and beggar-thy-neighbour policies are, in this view, ineffective tools for raising the long-run competitiveness of an industrialised country. Problems may arise when costs are too high relative to productivity, but when they are broadly in line – and the current account is balanced – further cost-cutting is an unhelpful strategy for rich countries. Reducing social expenditures and environmental ambition, together with other elements of a "low road" to competitiveness, are counterproductive for the transition to a new growth path.

Productivity is an important part of competitiveness, but it loses its singular relevance if the growth path should become more inclusive and sustainable. Higher resource productivity may be more important for welfare if sustainability is among the goals.

Economic structure is crucial for assessing competitiveness since it offers an outlook on future prospects. A country's capabilities (innovation and education system etc.) determine its welfare

position today but even more so in future. Emphasising structure and capabilities changes the nature of competitiveness from ex-post evaluation to an ex-ante concept.¹²

2.4.3 Dividing indicators into enablers and outcomes

Allocating indicators on the social system and sustainability to costs, capabilities or outcomes is difficult. In early competitiveness rankings, social expenditures and environmental standards were regarded as costs that diminished the price competitiveness of countries and locations. In the meantime, the literature has developed concepts of the social system as a "productive force" and of environmental sophistication as a creator of first-mover advantages, green jobs and export potential.

We should therefore distinguish between "enablers" and "corrective strategies". Some social measures like education and training, lifelong learning and childcare institutions may increase capabilities and thus productivity. On the other hand, social expenditures like unemployment benefits and pensions change the ex-post distribution, aiming at reducing poverty and income differences. Their purpose is not to increase an economy's productive capacity.

Similarly, some indicators on ecological sustainability may be seen to represent a productive force. Examples include subsidies for renewable energy fostering innovation and technical progress, or consumers' preferences for recycling and organically produced food. Other environmental expenditures could be counted on the cost side, such as expenditures on the noise insulation of motorways, clean-up of pollution and reconstruction after environmental disasters. These are corrective measures that restore environmental quality, thus improving welfare albeit at rather high costs.

2.4.4 Relation to welfare assessments

Defining competitiveness as the ability to deliver on the beyond-GDP goals is certainly unusual from the point of view of the firm or industry level, and it also differs from popular use in policy discussions. With the definition we propose here, the term competitiveness has arrived at the country level. A legitimate question that may arise is why we do not simply talk of "welfare analysis"¹³ and abandon the term competitiveness when comparing economies.

The answer has different dimensions:

- Firstly, the notion of competitiveness (instead of welfare or living standards) engenders a focus on market processes, which is particularly relevant for open economies exposed to international competition. Welfare, on the other hand, tends to be regarded as a policy goal of the public sector, associated with public support and redistribution.

¹² When trying to separate the components of competitiveness into costs, structure, capabilities and outcomes, we acknowledge that they are to an extent related. Productivity is partly determined by structure and capabilities, and labour productivity can be seen as a component nested in traditional outcomes as well as outcomes under new perspectives.

¹³ D'Aspremont - Gevers (2002).

- Secondly, competitiveness emphasises the bottom-up character of welfare creation. Ultimately, welfare comes from firms and industries that compete successfully and generate jobs and income.
- Thirdly, using the term competitiveness to assess the contribution of firms and industries to the ultimate aims of society could help to reduce the misuse of the term to describe only cost factors. A case in point are claims that Europe loses competitiveness if taxes on energy or emissions are implemented, without taking into account that this may enhance long-term welfare by fostering innovation and mitigating climate change.

2.4.5 Relation to competitiveness rankings

A large and rapidly expanding number of competitiveness rankings are available today.¹⁴ They use a multitude of indicators – partly hard data, partly survey results – to assess the competitiveness of countries. This has the advantage of measuring a wide range of economic aspects, which potentially reduces measurement error and helps cope with the complexity of the problem, such as differences in countries' starting position and socio-economic systems. A disadvantage of "large indicator approaches" is that they sometimes lack a clear concept.¹⁵ Rankings usually combine indicators of outcome competitiveness with those of input or process competitiveness, and indicators on price competitiveness with data on external balances. In addition, they mix indicators on performance levels with indicators on changes in performance dynamics. Sometimes they implicitly favour the size of an economy.

2.4.6 Relation to *Delgado et al. (2012)*

The approach taken here resembles that of *Delgado – Ketels – Porter – Stern* (2012; henceforth also DKPS). They define outcome competitiveness using a modified concept of labour productivity: GDP per capita, where the denominator is the working-age population as a proxy for the potential instead of the actual labour force. Outcome is thus – in contrast to our approach – not a set of indicators containing social and ecological goals. The only outcome goal indirectly included in DKPS is, apart from productivity, maximum labour force utilisation. Hence in principle we could interpret DKPS' dependent variable as a two-goal welfare function, containing total labour productivity plus some employment measure (utilisation of labour market potential).

Further, DKPS derive a competitiveness index first by regressing this modified measure of labour productivity on its determinants, and then using the estimated coefficients to compute a competitiveness score for each country. This inspires the approach we take in section 8, regressing a set of beyond-GDP indicators on the determinants outlined above.

As determinants of "modified labour productivity", DKPS use composite indicators of macroeconomic performance (MACRO), microeconomic performance (MICRO) and of social and political institutions (SIPI). The composite indicators for MICRO and SIPI are constructed

¹⁴ Examples include those of the International Institute for Management Development (IMD, a business school) and the World Economic Forum.

¹⁵ This was the case especially in the beginning; lately, some rankings also provide theoretical underpinnings.

using principal component factor analysis. MACRO essentially consists of fiscal and monetary policy as well as output volatility. This category does not exist on its own in our approach, but some elements may be incorporated in institutional quality, and the absence of volatility and disequilibria is a side condition of our outcomes. MICRO is a broad set of indicators from corporate strategy to the business environment, and both MICRO and SIPI are captured by our capability indicators.

Thus a common ground exists between DKPS and our approach, with DKPS focusing more on productivity as the outcome goal, while our approach is motivated by a focus on the transition of the current economic system to a more inclusive and sustainable one (measured by beyond-GDP indicators). DKPS consider macroeconomic performance, microeconomic performance and institutions as drivers of competitiveness. We investigate costs (relative to productivity), economic structure and capabilities as driving forces.

2.5 Empirical setup

In sections 3 to 7, we use our proposed concept of competitiveness to provide a descriptive analysis of the EU member states' current performance. In addition, we compare the EU-27 to the US, and - where data are available - to Japan, Switzerland and, in rare instances, to China.

We start with price competitiveness (section 3) and proceed to economic structure (section 4), capabilities (section 5) and outcomes (section 6), where we begin with GDP per capita and employment and then include broader social and ecological outcomes.

For some indicators, data are available over a longer time period than for others. Our approach is to examine the most recent year available (2011 or 2012, but sometimes only 2008). For comparisons over time, we relate this to the year 2000. We mainly use data on the EU-27 countries, which serve as a benchmark and which we sometimes generally refer to as "Europe". If possible, we also show data for the EU-15, which comprise all EU member states until 2004, and for the euro area, which currently has 17 members. The "new member states" complement the EU-15. They consist of ten Central and Eastern European countries (CEECs) as well as Cyprus and Malta. Section 7 relates "Europe" to the US.

In section 8, we analyse econometrically the relationship between outcomes and the input groups costs, structure and capabilities. To this end, we compile a panel dataset on the indicators described in sections 3 to 6, covering the period 2000 to 2010 for the EU-27. The main statistical information is extracted from each group of input and outcome competitiveness indicators by means of principal components factor analysis. We then use panel data analysis to investigate the relationship between the different input factors and outcome competitiveness under new perspectives.

7. Competitiveness of the EU relative to the US

We now use the framework to compare the competitiveness of the European Union with that of the US, and add information on Japan and Switzerland.

7.1 Price competitiveness

Wages and per capita productivity are about one third lower in the EU than in the US, and even more in comparison to Switzerland. The comparison between the EU-27 and Japan also reveals a gap, but compensation per capita is about equal in Japan and the euro area. The wage spread is however large within the European Union. Wages are higher in four small countries (Luxemburg, Denmark, Belgium and Netherlands) than in the US. In new member countries they are less than 30 percent of the US level. The wage gap Europe's vs. the US is even larger for manufacturing, since compensation in manufacturing in the US is about 20 percent higher and in Europe it is only 4% higher than in the total economy.¹⁶

Since the productivity gap is of the same magnitude, the unit labour cost (level) is about equal. The productivity gap is somewhat smaller for Europe than the wage gap for the total economy and larger for manufacturing. Indicating, a potential for Europe to increase productivity specifically in manufacturing. Looking at the dynamics between 2000 and 2011, wages as well as productivity increased faster in the US for the total economy but marginally faster in Europe for manufacturing.

7.2 Export structure

Europe had trailed the US in the sophistication of its export structure for a long time, but by 2011 it had caught up or even taken the lead.

The share of technology-driven industries and that of skill-intensive industries is now about equal; Switzerland has in both respects much higher shares in exports and Japan is near the European figures. As far as industries with knowledge-based service input are concerned, the US and Japan have slightly higher export shares than Europe. Europe and the US have equal shares of quality dominated industries. Switzerland excels in quality dominated industries as well as in skill-intensive industries.

As far as eco industries and renewables are concerned Europe has a higher share than the US, Switzerland has lower shares, and China and Japan are definitely one step ahead in both types of industries. In Europe only Denmark and Cyprus have higher shares (and Hungary and Germany are close to these leaders).

The relative position of the US in structure is even more negative if trade instead of exports is analysed. Since the US imports are rather sophisticated too, the US has a trade deficit in all four sophisticated sectors. The US deficit in technology-driven industries amounts to 178m euro,

¹⁶ The wage premium in the US vs. EU-27 increases for manufacturing therefore to 65 percent (34 percent for euro area), in manufacturing only Belgium has wages rather similar to the US.

while Europe in this sector enjoys a trade surplus of 101 m euro. The same results – deficits for the US and surpluses for Europe – holds for skill-intensive industries, knowledge-based industries and quality-dominated industries.

Summing up Europe is concentrating on sophisticated industries; Switzerland is the champion in this regard and has improved its structure, while the EU and the US have now lower shares in sophisticated industries than in 2000. This in part reflects the inroads of China which increased its share in sophisticated industries. The US lost export shares to an extent that trade balances became negative.¹⁷

7.3 Capabilities

However, Europe is still trailing the US, Japan and Switzerland in *innovation and education*. Expenditure for R&D as well as attainment in tertiary education is much lower. In R&D it is firms' expenditure which are much lower in Europe; government spending is about equal. For total R&D only Sweden and Finland are ahead of Japan and the US. Denmark, Germany and Austria are near to the US. The share of graduates in mathematics, science and technology is large in Europe.

Education expenditure is about the same in relation to GDP, but somewhat less in Japan. Preschool education gets more money and more children are involved in Europe than in the US. The share of women in higher education is somewhat larger in the US (above 50 percent as in EU), slightly less in Switzerland and Japan. Enrolment in vocational and dual programs is about 50 percent in Europe, very low in Japan and rather unknown in the US. Country differences are very large in the EU ranging from 75 percent in vocational programs in Austria to less than 30 percent in new member countries.

For productivity enhancing elements of the *social system* – like active labour market policy¹⁸ and social expenditures on children (and family and disability) – Europe spends more. Social benefits on sickness and health care are about the same in Europe and the US; they are lower in Japan and much lower in Switzerland. Disability benefits are much higher as are social benefits for children and family, so that total social expenditure is higher in Europe. Benefits on sickness and health care vary between less than 5 percent in many new member countries and more than 10 percent in Ireland and the Netherlands. The EU is not able to exploit the potential of its well educated female workforce; the female employment rate is 64 percent, still four percentage points lower than in the US and 12 percent lower than in Switzerland. Sweden and Denmark have female employments rates higher than 75 percent, it is about 50 percent only in Italy and Greece.

Europe leads in most indicators on *environmental ambition*. Tax revenues from environmental taxes are three times higher in EU-27 than in the US and one third higher than in Japan. The

¹⁷ China has the highest share in eco industries and in renewable exports, with Europe second and Switzerland and the US behind. Only Denmark has consistently higher export shares than China in "green" industries.

¹⁸ For active labour market policy double the money is spent relative to Japan and four times relative to the US, it varies more than 10 to 1 between Denmark and UK (as well as new member countries).

share of organic farming is 5 percent in the EU; it is near zero in the US and Japan¹⁹ The share of eco patents is highest in Japan (7 percent), followed by Europe (5 percent) and about 4 percent in Switzerland, the US and China. Recycling rates are 63 percent in the EU-27, about 34 percent in Switzerland, 26 percent in the US and 19 percent in Japan. Municipal waste generation is about equal in all regions reported. The share of oil and gas imports in GDP is lowest in Switzerland, and somewhat higher in EU than in the US. It does not reflect attempts to supply renewable but also or even more domestic resources

As far as *institutions* are concerned, the EU has stronger regulated labour markets with a large margin behind the US, Japan, and Switzerland and stricter business regulation (with a smaller margin). As far as labour market regulation is concerned even the most liberal countries in the EU-27 (UK, Ireland and some new member) have stricter regulation than in the US. In some European countries (Scandinavian, Anglo-Saxons, the Netherlands and Austria) business is less regulated than in the US, China and Japan (which are very close), Switzerland's business is least regulated. Governance indicators show better "voice and accountability" and better corruption control for EU-27, but lower regulatory quality and less rule of law. In all indicators Switzerland excels, Japan is behind Europe and the US with the exception of corruption control.

7.4 Traditional outcome indicators

The traditional output indicators report a lead by the US: GDP per capita (less in GDP per hour)²⁰ and employment rates are higher²¹, unemployment²² is lower. Limits to Europe's lead in the set of traditional indicators exist, since public deficits and debt is higher and the current account is negative in the US²³. The better performance of Japan is shown by traditional indicators with the exception that public debt is extremely high; Switzerland leads in all five indicators.

¹⁹ Shares are very different across countries in Europe ranging between 0.5 percent in Bulgaria and 18 percent in Austria.

²⁰ GDP per capita at PPS is 50 percent higher in the US than in EU-27 (40 percent vs. euro area), EU-27 is also trailing Japan (10 percent) and Switzerland (42 percent). GDP per capita at PPS in China is one fourth of Europe. The countries with highest GDP in Europe (Switzerland outside EU-27 and Netherlands and Austria inside) have about 15 percent lower per capita income than the US.

²¹ Employment rate is highest in Switzerland and Japan, Europe trails the US by two percentage points (with Scandinavian countries, Germany, the Netherlands and Austria above the US rate).

²² THIS SENTENCE DOES NOT MAKE SENSE...I tried splitting it...The unemployment rate is in the long-run about the same in the EU and the US. Who was "leading" changed several times during the financial recession. It increased more strongly and became higher in the US, in the most recent data it is considerably higher in EU-27. Unemployment is definitely lower in Switzerland as well as in Japan in the short and long run, best performers in EU-27 (Austria, the Netherlands) can cope with the low rates of Japan, despite an increasing population and much less prohibition of dismissals.

²³ Budget deficits and debt are much higher in the US and in Japan as compared to EU-27; Switzerland has the least deficit but cannot reach the very low rates of several new member countries or the balanced budget of Sweden or China. The current account is deeply in the red in the US, all other regions have surpluses, the largest relative to GDP in Switzerland, followed by Japan; EU-27 current account is balanced, with deficits in the south and large surpluses in Sweden, the Netherlands, Germany and Denmark.

Table 1 **Labour costs and productivity relative to the US, 2011**

	Compensation per employee Current prices		Output per person employed Current prices		Unit labour costs	
	Total economy	Manufacturing	Total economy	Manufacturing	Total economy	Manufacturing
	US = 100				Levels (wage share)	
EU-15	80.8	77.1	85.8	73.0	0.582	0.696
EA-17	79.2	74.7	84.6	69.8	0.573	0.667
EU-27	70.0	60.8	74.7	59.9	0.584	0.680
Switzerland	138.8	.	133.3	131.8	0.672	.
Japan	82.0	74.7	85.7	86.8	0.619	0.553
United States	100.0	100.0	100.0	100.0	0.593	0.544
EU-27 = 100						
EU-15	115.4	126.9	114.8	122.0		
EA-17	113.2	122.9	113.2	116.7		
EU-27	100.0	100.0	100.0	100.0		
Switzerland	198.1	.	178.5	220.2		
Japan	117.1	122.8	114.8	145.0		
United States	142.8	164.5	133.9	167.1		

Source: Eurostat (AMECO), WIFO calculations.

Table 2 **Export structures and trade balance, 2011**

	Exports				Trade balance				
	Technology-driven industries	High-skill industries	Knowledge-based services	High RQE	Technology-driven industries	High-skill industries	Knowledge-based services	High RQE	Manufacturing
	Percentage shares				mn euro				
EU-15	33.2	27.9	18.8	51.4	93,427	181,308	23,486	298,116	252,637
EA-17	33.0	26.3	17.8	50.9	108,276	169,473	22,296	304,991	323,804
EU-27	34.2	28.5	19.6	52.1	101,173	165,938	12,008	304,250	261,594
Switzerland	41.0	41.1	16.7	69.0	22,037	33,318	5,731	41,882	30,865
Japan	35.4	22.0	22.7	51.4	82,740	52,952	50,437	134,326	167,893
United States	32.0	23.2	22.3	45.0	-177,993	-79,886	-33,874	-192,297	-367,757
China	30.4	19.9	19.9	35.4	128,877	92,350	13,079	158,774	519,460

Source: Eurostat (Comext), UNO (Comtrade), WIFO calculations.

Table 3 **Outcomes under new perspectives: income pillar EU vs. US, 2011**

	GDP at PPS	Net national income	Net disposable domestic income	Household final consumption expenditure
		NNI	NDDI	HFC
Per capita data				
US = 100				
EU-15	72.7	70.2	58.9	58.6
EA-17	70.7	67.5	58.3	56.4
EU-27	65.5	63.1	53.5	52.9
Switzerland	92.9	88.8	74.9	76.1
Japan	72.2	66.3	59.4	60.3
United States	100.0	100.0	100.0	100.0
EU-27 = 100				
EU-15	110.9	111.3	110.3	110.7
EA-17	108.0	107.0	109.0	106.6
EU-27	100.0	100.0	100.0	100.0
Switzerland	141.8	140.7	140.0	143.9
Japan	110.2	105.1	111.2	114.0
United States	152.6	158.6	187.0	189.0

Source: Eurostat (AMECO), WIFO calculations.

7.5 Outcome indicators under new perspectives

For Beyond GDP goals the picture is different. The US still leads in the income pillar, trails in equity and poverty prevention, but has lower youth and long-term unemployment giving a mixed result in the social pillar. And the US definitely trails in the ecological pillar.

7.5.1 Income pillar

The indicators on the income pillar are highly correlated; therefore the picture does not change if we use net national income (instead of GDP) to rank the regions. The US's lead is increasing if we use disposable domestic income or consumption data.

7.5.2 Social pillar

Poverty is much higher in the US as compared to Europe, the spread is a little bit less for old age poverty (since the employment rate is higher in this age category). The reduction of poverty through social transfers is one third less in the US. Switzerland has a somewhat lower at risk of poverty rate and a marginally higher redistributive effect of social transfers, but old age poverty is higher than in EU-27. In Japan the overall poverty rate is a little bit smaller than in the US due to high redistributive transfers, but old age poverty is high.

Indicators on income distribution show more equality in EU-27 relative to the US, with even more equality in Switzerland and higher inequality in China. Differences in Europe exist, but no single member country has a gap between the top 20 percent and the lowest 20 percent income bracket or a Gini coefficient as high as in the US. Inequality of incomes in Japan is in between Europe and the US.

The long-term unemployment rate, the youth unemployment rate as well as the gender gap are definitely larger in the EU-27 than in the US. Within the important unemployment figures Europe is trailing recently by a far margin and is behind all regions (Europe has the highest youth unemployment). This is a severe sign that labour markets do not work perfectly in Europe inspite of high expenditure on active labour market measures. In nine EU countries however youth unemployment is as low as in the US, in six countries the long-term unemployment rate is lower. The employment gender gap is about one third larger in Europe (EU-27 as well as Switzerland) than in the US, in Japan it is even higher than in Europe.

Life expectancy is higher in Europe than in the US. It is even higher in Switzerland and Japan. Health coverage is near 100 percent in Europe, China, Japan, and Switzerland, and 84 percent in the US.

7.5.3 Ecological pillar

Emissions of carbon dioxide as well as energy intensity (both relative to GDP) are about 50 percent higher in the US as compared to Europe, Japan is near to Europe; and Switzerland has lower rates for each of these indicators. For both indicators the new member countries have about the same high rates as the US.²⁴

7.6 Comprehensive indicators

Life expectancy at birth is higher in Europe than in the US, and even higher in Switzerland and Japan. Survey respondents in the US report life satisfaction as well as a good work-life balance more frequently. As far as happiness is concerned Europe reports the lowest happy life years (51.8), Japan reports 53.5 years and the US 57.9. Switzerland registers much higher happy life years (65.2), China 45.8 years only.

7.7 Conclusions on outcomes under new perspectives

Summing up, for traditional indicators on macro performance, Europe trails the US in GDP, and to some degree in employment/unemployment figures. But fiscal sustainability as well as the ability to cover imports by exports yields better results for Europe.

Adding the indicators on social inclusion and on ecological performance indicate that Europe is achieving a better position in evaluation of the Beyond GDP Goals than if we only use the traditional indicators. As far as comprehensive indicators are concerned Europe leads in life expectancy, but trails in subjective indicators.

²⁴ Taking the Yale evaluation on ecological performance (as an alternative evaluation including many more indicators) shows the US on rank 49, the average rank for EU-27 is rank 28, with top 5 ranks within Europe of Latvia, Luxembourg, France and Austria (Yale University, Environmental Performance Index).

9. Executive summary

We redefine the term competitiveness for the purpose of monitoring the process of transition to a more dynamic, socially inclusive and ecologically ambitious economy. We then apply the new definition to assessing the post-crisis competitiveness of European countries, which we compare using individual indicators as well as a composite indicator on outcome competitiveness under new perspectives. This new competitiveness indicator is useful for monitoring socio-ecological transition; it is based on an income, a social and an ecological pillar. We provide a descriptive analysis of outcome competitiveness under new perspectives as well as traditional outcome competitiveness (incomes per head and employment only). Finally, we employ factor analysis and panel data econometrics to relate outcome competitiveness to its potential determinants.

Proposed definition

We define competitiveness as the "ability of a country (region, location) to deliver the beyond-GDP goals for its citizens". With this definition competitiveness has arrived at the country level, and the term is now closely connected to a welfare assessment in the tradition of the beyond-GDP literature. It combines an evaluation of inputs or processes on the one hand with an assessment of output and goals on the other. This approach has an advantage over welfare functions derived in social welfare theory in that it connects outcomes with measures that can be influenced by economic policy. Our new definition should help to avoid the misuse of the term by media and politicians in the narrow sense of price (cost) competitiveness, which has led to the foregone conclusion that wages, taxes or energy costs should be reduced ("low road" to competitiveness). For high-income countries, growth and strategic management theory predict that productivity and capabilities determine long-term economic success. A productivity-enhancing social system and technology-based environmental ambition can support transition to a new path of development ("high road" to competitiveness).

Outcome competitiveness: traditional indicators

Traditionally, outcome competitiveness has been measured by GDP per capita, employment and unemployment rates (which represent goals of the social welfare function) and public deficits, debt and current account positions (which are not goals but become important policy issues and threaten welfare if not balanced in the long run).

According to this definition, Luxembourg, Sweden, the Netherlands, Denmark and Austria lead in terms of outcome competitiveness. The Netherlands lead on employment and come second on GDP and unemployment, but only occupy an average position on budget deficit and debt; the current account is in surplus. At the other end, Hungary has a low employment rate and GDP; Italy follows, also with a low employment rate accompanied by large public debts and a large current-account deficit. Interestingly, the Southern European countries register much higher unemployment and a lower performance on social indicators generally than the new member countries from Central and Eastern Europe. Germany and Finland are close to the top

group, while France takes a middle position for most indicators and an even less favourable one on its large public debt.

Outcome competitiveness under new perspectives

We relate competitiveness to the beyond-GDP goals, which is particularly relevant in view of the socio-ecological transition envisaged by the WWWforEurope project. We measure three pillars of outcome competitiveness: first, the income pillar starts with GDP but moves beyond it towards household income and consumption expenditure. Second, the social pillar reports on social indicators considered as an output of the social system. Third, the ecological pillar evaluates resource productivity, emissions, energy intensity and the share of renewable energy. All three pillars are constructed from sets of individual indicators using principal components analysis.

Income pillar

Deducting depreciation - a cost that does not contribute to welfare - from GDP to obtain net national income improves the position of countries with a large services sector. For example, the United Kingdom gains some ranks. Correcting for income transfers (profit shifting, remittances) limits to an extent the excellent GDP positions of Ireland and the Netherlands. Ranking countries by household consumption still leaves Luxembourg on top, followed by Germany, Austria and France. The Netherlands, which do very well on GDP per capita, drop to rank 10. The Scandinavian countries Denmark, Finland, and Sweden fall back to middle positions. Greece is in the top ten due to its high consumption share. This raises doubt whether the consumption indicator really gets us closer to welfare than GDP, as some of the beyond-GDP literature claims, since in some countries where household consumption is high, it is debt-financed and governments do not balance their budgets. In general, there is a high degree of correlation between the indicators in this group.

Social pillar

Scandinavian countries including the Netherlands take the first four places, closely followed by Austria. Some new member countries do rather well, such as the Czech Republic which leads on the three poverty indicators (poverty risk in the general population and amongst the elderly, poverty reduction through transfers). Slovenia and Hungary are among the top ten, scoring highly on poverty and distributional indicators. Germany and France hold middle positions. At the lower end are the two Eastern European countries Bulgaria and Romania, closely followed by Spain, Greece and Portugal. Italy's position is somewhat better due to high life expectancy and comprehensive health insurance. Youth and long-term unemployment are high in the Baltic countries; on the positive side, the gender employment gap is very small. This group of indicators appears uncorrelated with the income group, partly because some indicators are negatively related to income (unemployment, poverty, inequality, gender gap in employment).

Ecological pillar

Resource productivity is high in very small countries (Luxemburg and Malta) but also in large countries with a small manufacturing base (United Kingdom, France and Italy). It is lowest in the new member countries. Further, CO2 emissions are low in countries that use nuclear energy, hydropower or solar energy (Spain and Portugal). The share of renewable energy is highest in Austria, Sweden, and Portugal; in the first, this is driven by a high share of hydropower; Portugal actively promotes alternative energies. The use of renewables is low in new member countries but also in the United Kingdom.

Sweden is among the top countries due its ambitious environmental policy. Other countries score highly for diverse reasons (climate, use of nuclear energy, a small industrial sector). The indicators are not closely correlated with each other within this pillar, but overall, the ecological pillar is positively related with the income pillar.

Comprehensive indicators

As far as catch-all indicators are concerned, life expectancy at birth is highest in Southern Europe (Spain, Italy, Cyprus). The countries with the lowest life expectancy are the Baltic and new member countries. Healthy life years at birth are particularly high in Sweden and Denmark, and Greece jumps from eleventh place in life expectancy to fifth place. Surveys on life satisfaction yield the best results for Sweden, Denmark and Finland, three countries with welfare states of the Scandinavian type. The Netherlands and Austria are also among the top five. On the other hand, Greece, Portugal and the new member states are at the bottom. Work-life balance as measured by employees usually working over 50 hours a week is best in the Netherlands, Sweden and Denmark; Luxembourg, Hungary and Italy also do well. Unfavourable results are reported in Portugal, Austria, France and the United Kingdom.

Sweden, the Netherlands and Denmark are among the top for several comprehensive indicators, followed by Ireland and Luxemburg. Germany, France, and the United Kingdom take middle ranks. Most of the comprehensive indicators are positively correlated with income and overall competitiveness under new perspectives. Happiness is loosely correlated with the other indicators within the group; work-life balance is least related to income. Comprehensive indicators may be helpful as complementary information alongside our other indicators on competitiveness under new perspectives.

Determinants of competitiveness

As drivers of competitiveness (inputs), we start with elements of price competitiveness (costs and productivity). However, we emphasise elements of quality competitiveness as more important for industrialised countries with high incomes aiming for socio-ecological transition. In turn, quality competitiveness may be divided into structure of production and exports and five types of capabilities or sources of competitive advantages.

Prices and costs

Wages vary widely across Europe. For example, they are four times higher in the top-ranking countries compared to the new member countries. However, the wage differences are for the most part paralleled by differences in productivity, so that unit labour costs are not too dissimilar. In Ireland, Sweden and Finland, the productivity lead is larger than the margin in wages. For most new member countries, the lag in productivity is much smaller than that in wages, yielding an excellent overall position in terms of unit labour costs. The UK, France and the Netherlands, on the other hand, have a rather unfavourable relationship between wages and productivity. Following their wage restraint since the crisis, Southern European countries currently still lag behind on productivity, but wages relative to productivity are now back to 2000 levels (with the exception of manufacturing in Italy).

Structure of production and exports

We assess countries' economic structure by analysing the shares of sophisticated industries (technology-driven, high-skill, eco industries etc.).

Five countries have very advantageous production structures: Sweden, Germany, Ireland, the UK and France. Ireland excels in manufacturing; its main weakness is an underrepresentation in industries in which quality competition dominates. France and the UK have deficits in innovation-intensive sectors and to some extent also in industries with high skill intensity. Finland has a deficit in high-skill industries and in those with high educational intensity. Greece is the country with the largest structural problems. The share of innovation-intensive sectors is particularly low, while the country's position in education and knowledge-based services is somewhat better. For Lithuania, Romania, Bulgaria, Poland, but also for Portugal and Spain, most rankings indicate structural problems. Large countries and those in the Northern periphery seem to be in the top league more often than small countries.

Country rankings of export sophistication resemble those on production. Ireland obtains the top rank according to many export indicators due to high ICT and pharmaceuticals exports. Finland, Latvia and Estonia's export structures are much less favourable than their production structure. A more sophisticated export structure relative to production structure is reported for Hungary, Slovakia and the Czech Republic (due to export-oriented multinational firms). Regarding exports of eco- and renewables industries, the Scandinavian countries are in the lead, while France and the United Kingdom clearly lag behind, indicating a lower priority on sustainability.

Capabilities as sources of competitive advantage

We analyse five enablers of change and future growth discussed in modern growth and strategic firm theory. Denmark, Sweden and Finland excel in capabilities, closely followed by Austria and the Netherlands. Germany and France are in the top five on innovation and social capabilities, but they obtain less favourable ranks on education, ecological ambition and institutions. The positions of Greece, Italy, Romania and Bulgaria suggest that competitiveness could be improved especially if trust in government and governance structures were higher.

The lead of Finland in *innovation* is outstanding. Together with Sweden and Denmark, it excels in R&D expenditures and patent applications, followed by Germany and Austria, which have some weaknesses in tertiary education.

For *education* the positions of Germany, the United Kingdom and Ireland are less favourable than for innovation. France has deficits in vocational training, lifelong learning and women's share in tertiary education. Latvia has a good position due to high preschool expenditures and female shares in tertiary education. Slovenia does well because of its top-ten ranks in vocational training, lifelong learning and women's participation in tertiary education.

The country that stands out as a star performer regarding an enabling *social system* is Denmark: it is at or near the top regarding all indicators studied. Belgium, Sweden, France and the Netherlands also do well, while the new member states, especially from Central and Eastern Europe, lag behind considerably. Denmark also leads in terms of *ecological ambition*, followed by Slovenia and Austria. With Hungary, Romania and Bulgaria, several new member countries lag behind on environmental ambition; similarly, Finland registers low recycling rates, few environment-related patent applications and low environmental investment. Ecological ambition is the only indicator group among capabilities where Finland is not ranked in first place.

On the *institutional indicators*, the three Scandinavian countries (Denmark, Sweden, Finland) are in the lead, closely followed by Austria and the Netherlands. The positions of Greece, Italy, Romania and Bulgaria suggest that competitiveness could be improved if governance structures and trust were higher. Institutional convergence occurs insofar as the five countries with the fastest improvements in institutions between 2000 and 2010 are all new members (Czech Republic, Slovakia, Latvia, Bulgaria and Estonia).

Comparison between EU and US

Wages and per-capita productivity in the EU-27 are, on average, about one third lower than in the US, so that overall unit labour costs are similar. Productivity differences are smaller for the total economy but larger in manufacturing. Differences to Japan are smaller, but differences to Switzerland are larger than to the US. Regarding technology-driven and skill-intensive exports, Europe no longer trails the US; rather, it enjoys trade surpluses in all sophisticated sectors, while the US has deficits. Europe has a far larger export share in eco-industries and renewables. It lags behind the US on R&D expenditure and higher education. On the other hand, Europe invests more in early education, vocational training and active labour market policies. As far as institutions are concerned, Europe has stricter rules for labour and business, lower regulatory quality, and the rule of law in general is seen to be less stringent than in the US. On the other hand, voice and accountability (quality of the parliamentary system) is better in Europe and control of corruption is considered to be stricter. Environmental ambition is much more pronounced in Europe, as shown by higher environmental taxes, more recycling, a higher share of environment-related technology patents and a high share of organic farming. Summarizing all five capability groups, Switzerland does well on all. Europe, Japan and the US have different strengths, with Europe lagging on R&D and higher education – the two most important indicators for frontier countries – while it leads on indicators that are important for the transition to a more socially inclusive and ecologically sustainable economy.

The traditional output indicators give a lead to the US: GDP per capita (less in GDP per hour) and employment rates are higher, unemployment is lower. Higher public deficits and debts, as well as a negative current-account balance are limitations. Japan does better than Europe on the traditional indicators, the exception being its extremely high public debt ratio; Switzerland performs best on all traditional indicators. For the beyond-GDP goals, the picture is different. The US still leads on the income pillar; it trails on poverty prevention and equality but has lower youth and long-term unemployment, thus overall yielding mixed results on the social pillar. The US clearly lags behind Europe on the ecological pillar. Regarding comprehensive indicators, Europe does better on life expectancy, while self-reported life satisfaction, work-life balance and happiness are higher in the US.

Explaining outcomes econometrically

The variety of indicators used and their correlation with each other suggest extracting information using principal components factor analysis. We do this for outcomes (traditional and new perspectives) and for the groups of determinants (price competitiveness, structure, capabilities). Regressing outcomes on the determinants confirms that structure and capabilities are important for outcomes. We cannot add price competitiveness as defined, since it includes productivity indicators and would as such be highly correlated with outcomes. Taking the wage component of price competitiveness only renders this component significant in reducing the impact primarily of the capability indicators. The innovation and education capability component is insignificant probably due to multicollinearity in the structure variable (in which technology, education and innovation intensity is included). The partial correlation between innovation and education capabilities and traditional outcomes as well as new perspectives outcome is positive and close.

Conclusion

This is work in progress. We have developed a new definition of competitiveness that we hope will be useful for assessing transition to a new path of more dynamic, socially inclusive and ecologically sustainable growth. In addition, the definition should be useful for revealing individual countries' strengths and weaknesses, particularly those related to a "high road" to competitiveness. We have applied the new framework to analyse the performance of the EU-27 member states and to compare it to the US. Both descriptive and econometric analyses have offered new insights that the old concept of cost competitiveness and traditional outcome evaluations could not provide.

References

- Acemoglu, D. (2003), "Root Causes: A Historical Approach to Assessing the Role of Institutions in Economic Development", *Finance and Development*, 40(2), pp. 27-30.
- Aghion, P. and Howitt, P. (1992), "A model of growth through creative destruction", *Econometrica*, 60(2), pp. 323-351.
- Aiginger, K. (1987), *Die internationale Wettbewerbsfähigkeit Österreichs*, WIFO, Wien.
- Aiginger, K. (1997), "The use of unit values to discriminate between price and quality competition", *Cambridge Journal of Economics*, 21(5), pp. 571-592.
- Aiginger, K. (1998), "A framework for evaluating the dynamic competitiveness of countries", in *Structural Change and Economic Dynamics*, 9(2), pp. 159-188.
- Aiginger, K. (2000), *Europe's Position in Quality Competition*, Enterprise paper for European Competitiveness Report 2000.
- Aiginger, K. (2006), "Competitiveness: From a Dangerous Obsession to a Welfare Creating Ability with Positive Externalities", *Special Issue on Competitiveness, Journal of Industry, Competition and Trade*, 6(2), pp. 161-177.
- Aiginger, K. (2010), *The Great Recession versus the Great Depression: Stylized Facts on Siblings That Were Given Different Foster Parents*, *Economics: E-Journal*, 4, 2010-18.
- Aiginger, K. (2011), "Why Growth Performance Differed across Countries in the Recent Crisis: the Impact of Pre-crisis Conditions", *Review of Economics and Finance*, 1(4), pp. 35-52.
- Aiginger, K. (2012), *A systemic industrial policy to pave a new growth path for Europe*, WIFO Working Paper 421/2012.
- Aiginger, K., Huber, P., Firgo, M. (2012), *Policy Options for the development of peripheral regions and countries of Europe*, WwfEurope European Policy Brief 2.
- Annoni, P., Kozovska, K. (2010), *EU regional competitiveness index 2010*, JRC Scientific and Technical Reports, *EUR 24346 EN*, Luxembourg, Publications Office of the European Union.
- Bock-Schappelwein, J., Eppel, R., Mühlberger, U. (2009), *Social policies as drivers of productivity*, WIFO, Vienna.
- Bouis, R., Duval, R., Murin, F. (2011), *The Policy and Institutional Drivers of Economic Growth Across OECD and Non-OECD Economies: New Evidence from Growth Regressions*, OECD Economics Department Working Papers, No. 843, OECD Publishing (<http://dx.doi.org/10.1787/5kghwnhxwkhj-en>).
- Competitiveness Policy Council (1994), *Promoting long term productivity*, Third report to the President and the Congress, Government Printing Office, Washington.
- D'Aspremont, C., Gevers, L. (2002), "Social welfare functionals and international comparability", in Arrow, K.J., Sen, A.K., Suzumura, K. (eds.), *Handbook of Social Choice and Welfare*, Vol. 1, Amsterdam, North Holland.
- Delgado, M., Ketels, Ch., Porter, M.E., Stern, S. (2012), *The determinants of national competitiveness*, NBER Working Paper No. 18249.
- ECORYS (2011), *Study on the cost competitiveness of European industry in the globalisation era: Empirical evidence on the basis of relative unit labour costs (ULC) at sectoral level*, Final report for DG Enterprise, Cambridge, United Kingdom.
- European Commission (1995), *Annual Economic Report for 1995*, No. 59, Brussels.
- European Commission (1998), *European Competitiveness Reports*, Brussels.
- European Commission (2001), *Competitiveness of European Manufacturing*, DG Enterprise, Brussels.
- European Commission (2007), *Beyond GDP, Measuring progress, true wealth, and the well-being of nations*, Brussels.
- European Commission (2011), *European Competitiveness Report 2011*, Brussels.

- European Commission (2013), Innovation Union Scoreboard 2013, Brussels.
- Fagerberg, J. (1988), "International Competitiveness", *Economic Journal*, 98(391), pp. 355-374.
- Fagerberg, J. (1994), "Technology and International Differences in Growth Rates", *Journal of Economic Literature*, 33(3), pp. 1147-75.
- Giddens, A. (1998), *The Third Way: The Renewal of Social Democracy*, Polity Press, Cambridge.
- Griffith, R., Redding, S., Van Reenen, J. (2004), "Mapping the two faces of R&D: productivity growth in a panel of OECD industries", *Review of Economics and Statistics*, 86(4), pp. 883-895.
- Grilo, I., Koopman, G.J. (2006), "Productivity and microeconomic reforms: strengthening EU competitiveness", *Journal of Industry, Competition and Trade*, 6(2), pp. 67-84.
- Grupp, H. (1995), "Science, high technology and the competitiveness of EU countries", *Cambridge Journal of Economics*, 19(1), pp. 209-223.
- Gwartney, J., Lawson, R., Hall, R. (2012), *Economic Freedom of the World 2012 Annual Report*, Vancouver, http://www.freetheworld.com/datasets_efw.html.
- Hanushek, E. A., Woessmann, L., Zhang, L. (2011), "General education, vocational education, and labor-market outcomes over the life cycle", NBER Working Papers 17504, National Bureau of Economic Research.
- Hatsopoulos, G.N., Krugman, P.R., Summers, L.H. (1988), "U.S Competitiveness: Beyond the Trade Deficit", *Science*, 241(15), pp. 299-307.
- Heckman, J. J., Raut, L. K. (2013), Intergenerational long term effects of preschool – structural estimates from a discrete dynamic programming model, NBER Working Papers No. 19077, National Bureau of Economic Research.
- Hemerijck, A. (2012), Retrenchment, redistribution, capacitating welfare provision, and institutional coherence after the Eurozone's austerity reflex, *Sociologica*, 1, doi: 10.2383/36893.
- Hölzl, W., Reinstaller, A. (2011), "On the heterogeneity of sectoral growth and structural dynamics: Evidence from Austrian manufacturing industries", *Applied Economics*, 43(20), pp. 2565-2582.
- IMD (1994), *The World Competitiveness Yearbook*, IMD World Competitiveness Center (WCC), Lausanne.
- Janger, J. (2012), "Strukturwandel und Wettbewerbsfähigkeit in der EU", *WIFO-Monatsberichte*, 8/2012, pp. 625-640.
- Janger, J., Hölzl, W., Kaniovski, S., Kutsam, J., Peneder, M., Reinstaller, A., Sieber, S., Stadler, I., Unterlass, F. (2011), *Structural Change and the Competitiveness of EU Member States*, WIFO, Vienna.
- Kaiser, H. F. (1974), "An index of factorial simplicity", *Psychometrika*, Vol. 39(1), pp. 31-36.
- Kaufmann, D., Kraay, A., Mastruzzi, M. (2010). *The Worldwide Governance Indicators: Methodology and Analytical Issues*. World Bank Policy Research Working Paper No. 5430.
- Ketels, Ch.H.M. (2006), "Michael Porter's competitiveness framework – recent learnings and new research priorities", *Journal of Industry, Competition and Trade*, Vol. 6(2), pp. 115-136.
- Ketels, Ch.H.M., Protsiv, S. (2013), *Clusters and the New Growth Path for Europe*, WWWforEurope Working Paper No. 14.
- Kohler, W. (2006), "The "Lisbon Goal" of the EU: Rhetoric or Substance?" *Journal of Industry, Competition and Trade*, Vol. 6(2), pp. 85-103.
- Köppl, A., Kletzan-Slamanig, D., Köberl, K. (2013), *Österreichische Umwelttechnikindustrie, Export und Wettbewerbsfähigkeit*, WIFO, Vienna.
- Krugman, P. (1994A), "Competitiveness: A Dangerous Obsession", *Foreign Affairs* 73(2), pp. 28-44.
- Krugman, P. (1994B), "The fight over competitiveness: A zero sum debate: Response: proving my point", *Foreign Affairs*, 73(4), pp.198-203.
- Krugman, P. (1996), "Making Sense of the Competitiveness Debate", *Oxford Review of Economic Policy*, 12(3), pp. 17-25.

- Krugman, P.R., Hatsopoulos, G.N. (1987), "The Problem of U.S. Competitiveness in Manufacturing", *New England Economic Review*, January/February, pp. 18-29.
- Lucas, R. E. (1988), "On the mechanics of economic development", *Journal of Monetary Economics*, 2(1), pp. 3-42.
- OECD (1995), *Competitiveness policy: A new agenda*, DSTI/IND (95) 14, Paris.
- OECD (2008), *Handbook on constructing composite indicators: Methodology and user guide*, OECD Publishing, Paris.
- OECD (2011), *How's life? Measuring well-being*, OECD Better life Initiative, Paris.
- OECD (2012), *OECD Compendium of Productivity Indicators 2012*, OECD Publishing.
- OECD, Eurostat (1999), *The Environmental Goods and Services Industry. Manual for Data Collection and Analysis*, OECD, Paris.
- Orlowski, D. (1982), *Die internationale Wettbewerbsfähigkeit einer Volkswirtschaft*, Vandenhoeck & Ruprecht, Göttingen.
- Oughton, C. (1997), *Competitiveness Policy in the 1990s*, *Economic Journal*, 107(444), pp. 1486-1503.
- Oughton, C., Whittam, G. (1997), "Competition and Cooperation in the Small Firm Sector", *Scottish Journal of Political Economy*, 44(1), pp. 1-30.
- Peneder, M. (1999), "Wettbewerbsfähigkeit und Standortqualität. Eine Kritik der Länder-Ranglisten", *Wirtschaftspolitische Blätter*, 46(3), pp. 170-177.
- Peneder, M. (2001), *Entrepreneurial Competition and Industrial Location*, Edward Elgar, Cheltenham, UK.
- Peneder, M. (2003), "Wirtschaftliche Entwicklung und Strukturwandel in Österreich aus heutiger Sicht", in: Pichler, R. (Hrsg.), *Innovationsmuster in der österreichischen Wirtschaftsgeschichte*, StudienVerlag, Innsbruck, pp. 26-40.
- Peneder, M. (2007), "A sectoral taxonomy of educational intensity", *Empirica*, 34(3), pp. 189-212.
- Peneder, M. (2010), "Technological regimes and the variety of innovation behaviour: Creating integrated taxonomies of firms and sectors", *Research Policy*, 39(3), pp. 323-334.
- Porter, M.E. (1990), *The Competitive Advantage of Nations*, Free Press, New York.
- Porter, M.E. (2004), "Building the Microeconomic Foundations of Prosperity: Findings from the Business Competitiveness Index", in Porter, M.E. et al. (eds.), *Global Competitiveness Report 2003-2004 of the World Economic Forum*, Oxford, Oxford University Press, pp. 29-56.
- Porter, M.E., van der Linde, C. (1995), "Toward a New Conception of the Environment-Competitiveness Relationship", *Journal of Economic Perspectives*, 9(4), pp. 97-118.
- Rodrik, D., Subramanian, A., Trebbi, F. (2004), "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development", *Journal of Economic Growth*, 9(2), pp. 131-165.
- Romer, P. M. (1990), "Endogenous technological change", *Journal of Political Economy*, 98(5), pp. 71-102.
- Schlotter, M., Wößmann, L. (2010), "Frühkindliche Bildung und spätere kognitive und nichtkognitive Fähigkeiten: Deutsche und internationale Evidenz", *DIW-Vierteljahreshefte zur Wirtschaftsforschung*, 79(3), pp. 99-120.
- Schröder, Ch. (2012), "An international comparison of productivity and unit labour costs in industry", *IW Trends*, 39(4), Cologne Institute for Economic Research.
- Scott, B., Lodge, G. (eds.) (1985), *US competitiveness and the world economy*, Harvard Business School Press, Boston MA.
- Stiglitz, J.E., Sen, A., Fitoussi, J.-P. (2009), *Report by the Commission on the Measurement of Economic Performance and Social Progress*, Paris.
- The German Sachverständigenrat (1981), *Investieren für mehr Beschäftigung, Begutachtung der wirtschaftlichen Entwicklung*, Deutscher Bundestag, Bonn.
- Tukey, J. W. (1977), *Exploratory Data Analysis*, Reading, MA, Addison-Wesley.
- Uri, P. (1971), *Bericht über die Wettbewerbsfähigkeit der Europäischen Gemeinschaft*, Luxembourg.

- Vandenbussche, J., Aghion, P., Meghir, C. (2006), "Growth, distance to frontier and composition of human capital", *Journal of Economic Growth*, 11(2), pp. 97-127.
- Vernon, R. (1966), "International investment and international trade in the product cycle", *Quarterly Journal of Economics*, 80(2), pp. 190-207.
- Von Tunzelmann, G.N. (1995), "Government policy and the long run dynamics of competitiveness", *Structural change and economic Dynamics*, 6(1), pp. 1-21.
- Wind, I. (2010), *HS Codes and the Renewable Energy Sector*, ICTSD, Geneva.
- World Economic Forum (2000), *Global Competitiveness Report 2000*, New York, Oxford University Press.
- WWWforEurope, <http://www.foreurope.eu/>.

Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs change. The financial crisis has exposed long-neglected deficiencies in the present growth path, most visibly in the areas of unemployment and public debt. At the same time, Europe has to cope with new challenges, ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWWforEurope – a European research consortium is laying the analytical foundation for a new development strategy that will enable a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four-year research project within the 7th Framework Programme funded by the European Commission was launched in April 2012. The consortium brings together researchers from 34 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). The project coordinator is Karl Aiginger, director of WIFO.

For details on WWWWforEurope see: www.foreurope.eu

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