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THE MACROECONOMIC PERFORMANCE OF NATIONS MEASUREMENT AND PERCEPTION

by

Wim MOESEN
Laurens CHERCHYE

Public Economics

Center for Economic Studies
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Katholieke Universiteit Leuven
Departement Economie
Naamsestraat 69
B-3000 Leuven

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MEASUREMENT AND PERCEPTION

Wim MOESEN

Laurens CHERCHYE

Centre for Economic Studies

Catholic University of Leuven

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Abstract

It is common practice to summarise the economic performance of countries in terms of four dimensions (real growth, inflation, unemployment and the external account), which are visually captured by the magic diamond of the OECD. In this paper we present a synthetic performance measure which merges the four separate indicators into one single statistic. The relative importance of each indicator, representing another macroeconomic objective, may vary across countries and over different subperiods. Therefore we want to construct an indicator which allows unequal weighting of its components, using a data envelopment analysis (DEA)-inspired linear programming model which exhibits 'benefit of the doubt weighting'.

These synthetic macroeconomic performance scores reveal interesting information. They confront measurement with perception. In this paper we use our measure to check empirically whether the strict Maastricht convergence criteria actually have led to a relative economic performance deterioration of the EU-candidates compared to the rest of the world. This viewpoint is often articulated in the theoretical literature. In particular, we investigate the performance of twenty OECD countries, half of which belongs to the EU, in the quinquennial period before and after the Maastricht Treaty.

Keywords: macroeconomic performance, data envelopment analysis, convergence criteria

1. INTRODUCTION

Measurement is knowledge. The language of measures can be very seductive. There is a common interest in measuring and comparing the macroeconomic performance of nations. A synthetic macroeconomic performance measure should capture the relevant information about the overall economic performance of a nation in one single statistic. The growth of real Gross National Product (GNP) or real Gross Domestic Product (GDP) offers such a statistic. The official announcement of the yearly or quarterly results affects the economic agents, stirs the stock exchange and drives policy makers towards euphoria or despair.

It is clear, however, that also other dimensions should be considered, such as unemployment, inflation and the position on the current account. In the past one has witnessed some attempts to construct a 'synthetic' indicator, e.g. the Okun-index [Mc Cracken et alii, 1977] and the Calmfors-index [Calmfors and Driffill, 1988]. The Okun-index is obtained as the sum of the unemployment and inflation rate and reflects the 'misery' of a nation. The Calmfors-index, on the other hand, takes the difference between the unemployment rate and the surplus on the current account (as a percentage of GDP). Why consider only two dimensions where one would expect four? Next, there is the interesting problem of (un)equal weighting. By a simple addition or subtraction of two indicators one assigns an equal weight to both dimensions. Yet it is plausible that the relative weight of each indicator, each representing another macroeconomic policy objective, may vary across countries and over different subperiods. Intuitively it seems attractive to design a procedure for unequal weighting.

In this study a technique for unequal weighting will be developed when only limited information is available. Of course, one should have the standardised data for the four indicators which are mentioned above. But no further information is required about the stated or revealed preferences of the policy makers with respect to the macroeconomic goals. Moreover, on the field it is hard to find systematic and adequate information about the 'true' macroeconomic objectives of each and every nation for a longer period of time.

This handicap of limited information forces us to develop a mathematical technique which, for each country, attaches higher weights to those indicators for which that country under consideration performs relatively better. Lower weights are attributed to those dimensions for which the performance is worse. One could refer to this procedure as 'benefit of the doubt'-weighting. The calculation of the weighting coefficients boils down to a linear

programming problem which is inspired by Data Envelopment Analysis (DEA). This technique was introduced by Charnes, Cooper and Rhodes (1978,1979 and 1981) within the framework of operations research. The basic idea of DEA will be applied to the measurement of macroeconomic performance in section 3, which constitutes the core of this study.

This study has, other than the construction of a synthetic performance indicator, also a second more policy-oriented objective. Several authors have warned that the budgetary norms in the Maastricht Treaty will induce economic contraction in the transition to the EMU. The benefits of the EMU itself are not questioned but rather the stringent nature of the budgetary constraints: a public deficit below 3 percent of GDP and a public debt that may not exceed 60 percent of GDP. At the time the Maastricht Treaty was signed the public deficit of the EU averaged 5 percent. In a few years time this deficit had to be reduced to 3 percent. Anyhow, this requires a substantial reduction in expenditure and/or tax increases, leaving aside the pure cosmetic budgetary operations which are more and more applied as it becomes increasingly difficult to meet the 3 percent norm.

Such a restrictive budgetary intervention, concentrated on such a large scale, should generate deflationary effects. On the other hand, also the monetary policy, under the moral supervision of the German Bundesbank, is restricted. Different authors, among which Buiter, Corsetti and Roubini (1992), have argued from the beginning that such a fiscal overkill would have a negative impact on economic activity. Also De Grauwe (1996) has stressed the deflationary effects of a “wrong” policy mix. One should ask therefore whether the transition to the EMU has indeed led to a lower production growth within the EU-countries. Europe often objects that also other indicators, like the lower inflation, should be considered in a more general assessment. That is why we would like the synthetic indicator to incorporate several dimensions of economic policy, with special attention for those indicators for which the country considered performs relatively well. One could then compare the synthetic performance score of the EU-countries with that of non-EU-countries. That is what we intend to do for two subperiods. A first quinquennial period goes from 1987 to 1991, just before the Maastricht Treaty. A second period covers the years 1992-1996, which are characterised by the tight budgetary prescriptions of Maastricht.

The paper is organised as follows. In section 2 we describe the single performance indicators which provide the data for our macroeconomic performance measure. In section 3 we articulate the methodology beyond the synthetic performance indicator. Section 4

presents the empirical results. These will allow us to identify the impact of the Maastricht criteria on the relative macroeconomic performance of the EU-countries. In section 5, finally, we present the conclusions of our analysis.

2. SINGLE AND SIMPLE SYNTHETIC MACROECONOMIC PERFORMANCE INDICATORS

Traditionally the macroeconomic performance of a nation is measured as the extent to which the macroeconomic policy goals are realised [Crockett and Goldstein, 1987]. A first economic aim of a country's authorities consists in achieving a high real GDP growth rate. It could be argued that real growth is more desirable when it is accompanied by a high degree of income equality [Asher, Defina and Thanawala, 1994]. Real GDP growth as an indicator of macroeconomic performance should then be corrected by a measure of distributive justice, such as the Gini-coefficient. There are, however, a number of difficulties related to the incorporation of the Gini-coefficient as a performance measure, as was already mentioned by Asher et alii. Limited data availability is a first problem of a more practical nature. A second and more fundamental problem concerns the question what level of income distribution should be regarded as optimal. Income differences also generate incentives in a market economy. For the moment, distributive considerations will not be regarded explicitly when calculating the performance measure. Nevertheless, it would be recommended to somehow take them into account when interpreting the performance results.

Along with real GDP-growth also low unemployment can be seen as an important policy aim. Thus the unemployment rate provides a second performance indicator. However, a low level of unemployment could be reached by a high level of inflation, a relation which is represented by the well-known Phillips-curve. Inflation is, like unemployment, generally conceived as a 'bad' for an economy. That is why, besides the unemployment rate, also the inflation rate should be taken into consideration. One finds this idea in the 'discomfort'- or 'misery'-index [Mc Cracken et alii, 1977], designed by Okun and therefore also known as the Okun-index. This index is obtained as the sum of the unemployment and the inflation rate. The interpretation is straightforward: lower values reflect a better macroeconomic performance and vice versa.

In his seminal work On the Theory of Economic Policy. Contributions to Economic Analysis (1952) Tinbergen introduces a fourth performance indicator, i.e. the balance of payments. In particular a surplus or deficit on the current account is regarded as a good respectively bad signal. Tinbergen argues that this indicator represents to a lesser extent an element of well-being, than a more technical expression of a 'sound policy'. Note, however, that one could view the positive appreciation of a surplus on the current account as a mere articulation of the European mercantilist nature. Nevertheless, the current account is widely used as a macroeconomic performance measure. For example the Calmfors-index, constructed by Calmfors and Driffill (1988), adds the unemployment rate to the deficit on the current account (as a percentage of GDP). A better macroeconomic performance is again associated with a lower index value. In fact, one wants to penalise countries which pursue a low level of unemployment through an expansionary policy that leads to a deficit on the current account.

In tables 1 and 2 the four single performance indicators are presented for 20 OECD-countries for the two subperiods 1987-1991 and 1992-1996. The symbols y, p, u and f represent respectively the average real GDP growth, the average change in the GDP-deflator, the average unemployment rate, expressed as a percentage of the active population, and the average surplus (+) or deficit (-) on the current account as a percentage of GDP. These notations will be used throughout the paper. Each separate indicator provides useful information. It remains nevertheless difficult to rank the countries according to their global macroeconomic performance. It often occurs that one country performs better than another according to one indicator while the opposite holds for another indicator.

To get a global visual picture of the macroeconomic performance the magic rectangle, a concept often applied by the OECD, may be used[1]. The magic rectangle represents the four single indicators in the same diagram. On the horizontal axis we measure f from the origin to the right and u from the origin to the left. On the vertical axis, starting from the origin, we measure y upwards and p downwards. By drawing a perpendicular through the four points we obtain a rectangular. A rectangular situated more towards the north-east quadrant is associated with a better macroeconomic achievement.

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[1] In some OECD-publications the four indicators are presented in a single diagram taking the shape of a diamond. See e.g. OECD, Economic Outlook, 41, 1987, p.4.

The magic rectangle can be used to compare the macroeconomic performance of nations, as is illustrated by figure 1. Comparing the rectangle of one single country for different subperiods allows an intertemporal performance evaluation, as figure 2 illustrates. From figure 1 we find that in the period 1992-1996 Japan performed significantly better than the USA, Germany and France. However, the latter three can hardly be ranked mutually, as the results for the several single performance indicators diverge substantially. Also from panel a and b of figure 2 it is difficult to conclude whether Belgium performed better or worse in the period 1992-1996 compared to the period 1987-1991. Both disappointing results indicate a first weakness of the magic rectangle as an instrument for macroeconomic performance evaluation, i.e. its limited selective power.

Table 1: Single indicators for macroeconomic performance period 1987-1991 (average values)

	y	p	u	f
Australia	2.6	6.0	7.5	-4.4
Austria	3.3	2.8	4.8	0.1
Belgium	3.1	2.9	9.9	2.2
Canada	1.9	4.0	8.5	-3.6
Denmark	1.0	3.4	9.2	-0.5
Finland	1.4	5.2	4.8	-4.0
France	2.9	3.0	9.6	-0.6
Germany	3.9	2.6	7.0	3.1
Ireland	5.3	2.4	15.2	-0.4
Italy	2.0	6.2	7.5	-2.8
Japan	4.8	1.6	2.4	2.3
Netherlands	3.0	1.3	6.8	3.0
New Zealand	0.1	6.5	7.0	-3.0
Norway	1.5	4.7	4.2	-0.6
Portugal	4.5	11.7	5.4	-0.4
Spain	4.3	6.6	18.0	-2.1
Sweden	1.6	7.2	2.0	-1.4
Switzerland	2.2	4.1	0.7	4.6
United Kingdom	2.6	6.9	9.7	-1.2
USA	2.1	3.9	5.9	-1.9

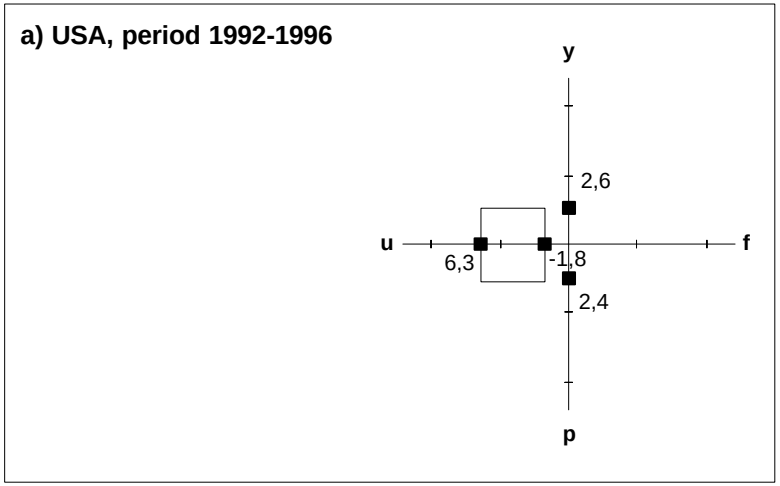
Source: OECD, *Economic Outlook*, June 1997

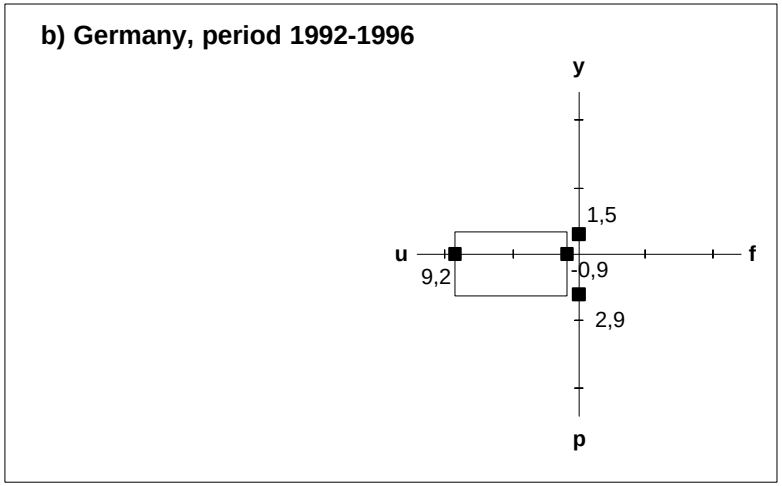
Table 2: Single indicators for macroeconomic performance period 1992-1996 (average values)

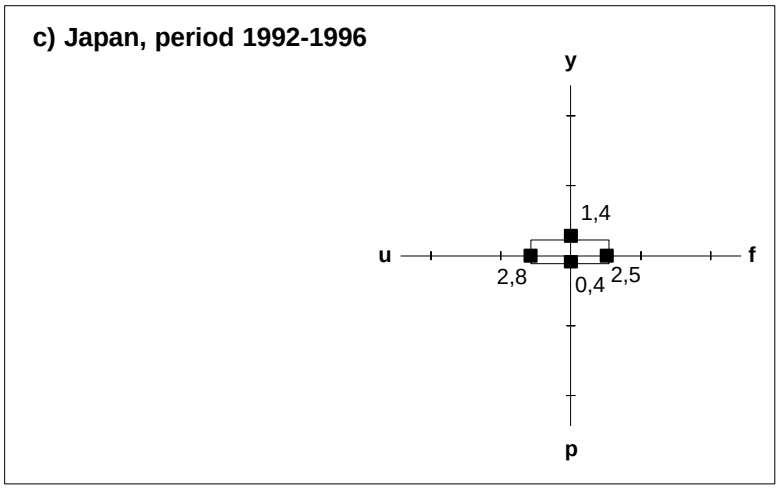
	y	p	u	f
Australia	3.9	1.7	9.7	-4.2
Austria	1.7	3.0	5.9	-1.0
Belgium	1.2	2.6	12.3	5.1
Canada	2.2	1.1	10.4	-2.5
Denmark	2.3	1.8	11.0	2.3
Finland	1.4	1.5	16.6	0.7
France	1.3	1.8	11.7	0.8
Germany	1.5	2.9	9.2	-0.9
Ireland	6.2	6.2	13.8	2.3
Italy	2.0	3.0	9.0	-0.9
Japan	1.4	0.4	2.8	2.5
Netherlands	2.2	1.8	6.7	4.3
New Zealand	3.2	2.0	8.1	-2.7
Norway	3.8	1.8	5.6	3.9
Portugal	1.5	6.2	6.2	-0.4
Spain	1.3	4.7	22.3	-0.9
Sweden	0.9	2.1	7.4	-0.1
Switzerland	-0.1	1.8	4.1	7.1
United Kingdom	1.0	4.4	10.9	1.3
USA	2.6	2.4	6.3	-1.8

Source: OECD, *Economic Outlook*, June 1997

Figure 1: The magic rectangle of the USA, Germany, Japan and France for the period 1992-1996







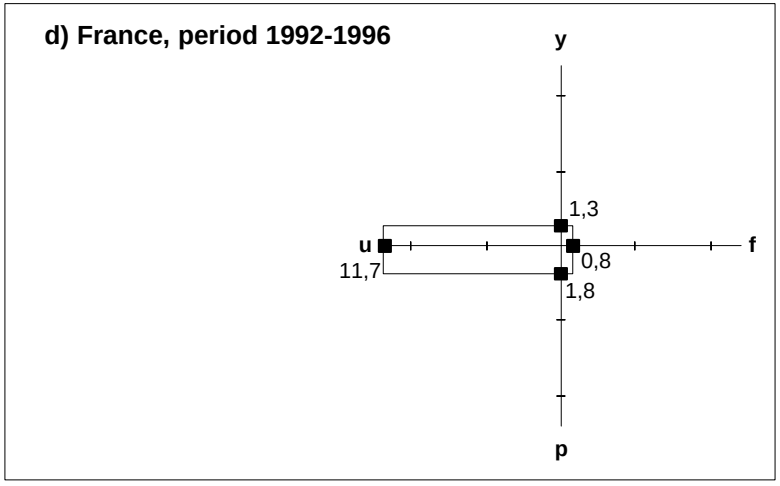
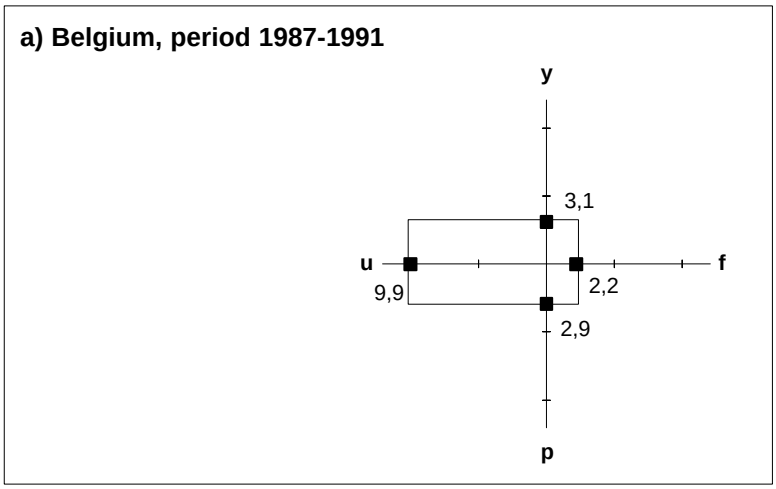
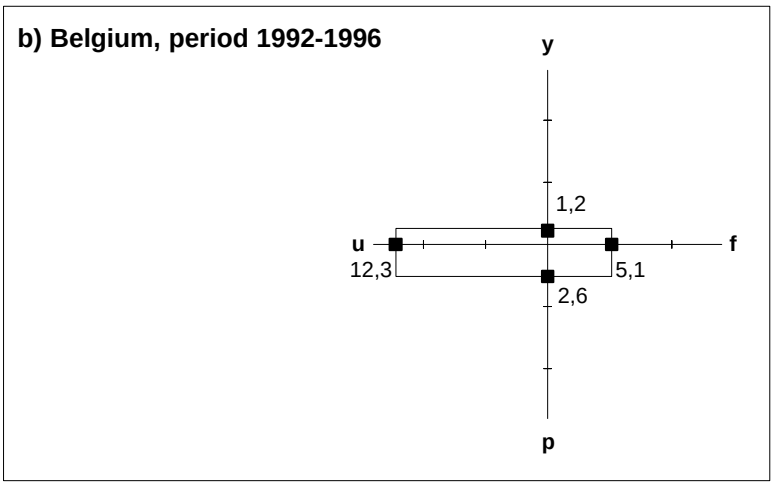


Figure 2: The magic rectangle of Belgium for two subperiods (1987-1991 and 1992-1996)





In this section two simple synthetic indicators were introduced: the Okun- and the Calmfors-index. Both have the quality to combine two single indicators. However, they

capture only two dimensions of macroeconomic performance. The magic rectangle does not suffer from this inconvenience and seems, from this point of view, more adequate. But we have already pointed out the limited selective power of this concept. Moreover, by evaluating macroeconomic performance through the magic rectangle one attaches equal weights to every indicator. This equal weighting also applies for the Okun- and the Calmfors-index. It reflects the implicit assumption that the policy makers attribute the same priority to each policy aim. It seems, on the contrary, more realistic to assume that a country's authorities will accord different weights to distinct policy goals. In the next section we will construct a synthetic indicator which allows for unequal weighting.

3. TOWARDS A SYNTHETIC MACROECONOMIC PERFORMANCE INDICATOR

The synthetic macroeconomic performance measure that will be applied in this paper is the LIMEP, introduced by Melyn and Moesen (1991).[2] This index attempts to capture the four dimensions of macroeconomic performance with unequal weighting of the single indicators. The technique used to calculate the LIMEP is inspired by Data Envelopment Analysis (DEA), first introduced by Charnes, Cooper and Rhodes (1978, 1979 and 1981).

Since then several studies have already appeared in economic literature applying DEA to measure the macroeconomic performance of countries. Färe, Grosskopf, Norris and Zhang (1994) constructed a Malmquist productivity index for 17 OECD-countries for the period 1979-1988. The DEA-technique was also used by Lovell (1995) to evaluate the performance of 10 Asian countries for the period 1970-1988. The evaluation occurred in terms of the four indicators from section 2. Also Lovell, Pastor and Turner (1995) employed a DEA model to compare the macroeconomic performance of European and non-European OECD-countries. The authors constructed two indices: a first index capturing the four traditional single indicators, a second measure taking into account also two environmental indicators (carbon and nitrogen emission). Finally there is the recent study of Lovell and Pastor (1995), in which DEA was applied to analyse the performance of sixteen Ibero-American countries. Again the four single indicators from the previous section were considered.

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[2] LIMEP stands for Leuven Index of Macroeconomic Performance.

1. Unequal weighting[3]

We have put forward that an equal weighting of the different components is one of the major shortcomings of the Okun- and the Calmfors-index. The question now is how to weight unequally the different components of a synthetic performance measure. To what extent do the policy makers consider each objective as important? Although a government sets out official goals when it takes office, it remains difficult to attach a precise numerical weight to each of the four objectives. Assuming that all weights should sum up to 1, how should the weights then be allocated? The priorities may be stated, but a numerical value which represents the relative importance of each separate indicator, is usually absent. One could examine the government memoranda assuming that policy priorities are to be found at the beginning of the memoranda while the less important goals come later. Examining the place and the space occupied by the different policy aims, one could then calculate numerical values which reflect the relative importance of the macroeconomic objectives.

This procedure is time-consuming and requires a lot of information. For each country and each subperiod the government memoranda should be investigated. Not only at the empirical level, also at the conceptual level there are a number of drawbacks. There is e.g. the possibility that the government changes its policy during tenure, or that another government with a different program takes office during that subperiod. There remains, however, the more fundamental question whether the publicly announced objectives coincide with the true goals of the policy makers. In other words: the stated preferences may deviate from the revealed preferences.

For all these problems we will abandon this avenue and take a shortcut, developing a mathematical technique which allows to allocate the relative weights when only limited information is available. The technique that will be used is based on DEA. This technique weighs the components of the synthetic performance indicator in such a way that each country gets the benefit of the doubt. The latter implies that the highest weights are attached to those indicators for which that country performs relatively better. In other words, a particular dimension is deemed to be important for a country if the country performs well in that dimension. For example, it is assumed that the policy-makers of a country that performs well on the field of inflation will probably attach a high weight to a low inflation rate. As it is not always easy to infer the policy priorities quantitatively from

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[3] The arguments of this section stem from Melyn and Moesen (1991).

the policy declarations, it may be efficient to design a technique which only requires information about the actual performances. Indeed, it is plausible that the actual figures somehow reflect "true" policy priorities[4].

2. The LIMEP

To calculate the LIMEP one has to solve a linear programming problem for each country [Melyn and Moesen, 1991]. The unknowns are the weights a_1 , a_2 , a_3 and a_4 that are to be assigned to the four single indicators discussed in the second section. For each nation these weights are calculated in such a way that its objective function is maximised. There are two constraints: (1) the weights should sum up to one, and (2) priorities should be attributed. The latter constraint means that each weight should take a value of either 0.10, 0.20, 0.30 or 0.40.

In a first step the data are normalised[5]. The procedure looks as follows for each country i. For y and f the difference is taken between the actual performance of the country and the minimum performance in the sample. Then this difference is divided by the difference between the maximum and minimum performance in the sample. The normalised values y^n and f^n can thus be expressed as:

$$y^n_i = (y_i - y_{min}) / (y_{max} - y_{min}) \qquad f^n_i = (f_i - f_{min}) / (f_{max} - f_{min})$$

A higher numerical value reflects a better relative performance, with 0 and 1 as the polar values.

The economic 'bads', i.e. p and u, are converted into 'goods'. The normalisation is similar to the one applied for y and f:

$$p^n_i = (p_{max} - p_i) / (p_{max} - p_{min}) \qquad u^n_i = (u_{max} - u_i) / (u_{max} - u_{min})$$

Once more the numerator is given by the difference between the maximum value and the minimum value in the sample. In the denominator, however, now the difference is taken between the maximum value and the value achieved by the country under consideration.

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[4] Remark that that this procedure neglects the impact of asymmetric shocks. See e.g. Easterly, Kremer, Pritchett and Summers (1993).

[5] The normalisation technique that is used here has already been applied by Smets (1985).

This implies that also here a better relative performance is associated with a higher value. Again, this value varies between 0 and 1.

The model can now be expressed formally for each country i as:

$$\max_{a_{1i},\, a_{2i},\, a_{3i},\, a_{4i}} \quad LIMEP_i = a_{1i}\ y^n_i + a_{2i}\, p^n_i + a_{3i}\, u^n_i + a_{4i}\, f^n_i$$

s.t.

$$a_{1i} + a_{2i} + a_{3i} + a_{4i} = 1$$
$$a_{1i} + a_{2i} + a_{3i} \geq 0.60$$
$$a_{1i} + a_{3i} + a_{4i} \geq 0.60$$
$$a_{2i} + a_{3i} + a_{4i} \geq 0.60$$
$$a_{1i} + a_{2i} + a_{4i} \geq 0.60$$
$$a_{2i} + a_{4i} \geq 0.30$$
$$a_{3i} + a_{4i} \geq 0.30$$
$$a_{1i} + a_{2i} \geq 0.30$$
$$a_{1i} + a_{3i} \geq 0.30$$
$$a_{1i} + a_{4i} \geq 0.30$$
$$a_{2i} + a_{3i} \geq 0.30$$
$$a_{1i} \geq 0.10$$
$$a_{2i} \geq 0.10$$
$$a_{3i} \geq 0.10$$
$$a_{4i} \geq 0.10$$

The benefit of the doubt weighting is obvious from the model. The model allows each country to calculate its weights so that the LIMEP is maximised. No other combination of weights would result in a higher LIMEP-value for country i. It is also clear that $1 \geq LIMEP \geq 0$. This is an attractive characteristic of this procedure. Each country obtains a numerical score between 0 and 1. The higher the numerical value, i.e. the closer to 1, the better the global performance is evaluated.

Note that the normalised values can cause problems for the interpretation of the relative weights. Suppose e.g., that the same country has the highest growth rate and the lowest unemployment rate. In this case both the normalised values y^n and u^n would have the polar value 1. The LIMEP would be maximised when the highest weights (0.30 and 0.40) are assigned to these indicators. The relative weights a_1 and a_3 are then interchangeable without affecting the LIMEP-value. If we follow the reasoning of this paper both a_1 and a_3 should

be given the value 0.35, which would imply the same LIMEP-score. An analogous remark holds when a country performs worst (i.e. reaches the polar value 0) for more than one variable. Considered over the two subperiods there are only two such cases, which will be indicated by an asterisk in tables 3 and 4.

4. RESULTS

The outcomes of our procedure for the period 1987-1991 are presented in table 3. The best global performances are achieved by Japan, Switzerland and the Netherlands in that order. These findings probably map with the general intuition, at least for and in that period. Germany is ranked fourth, followed by Ireland, Austria and Belgium, that precedes Portugal. The five lowest scores are obtained by -in decreasing order- Spain (sixteenth), Australia, Italy, the United Kingdom and New Zealand, which occupies the last position.

Remarkable and perhaps unexpected is the observation that the United States are only ranked eleventh. This big economy is preceded by Norway (ninth) and France. It is followed by Sweden (twelfth), Denmark, Finland and Canada.

Countries apparently earn a reputation on the basis of a number of heterogeneous dimensions. In our paper only the most frequently used macroeconomic indicators are investigated. When the general public forms an idea of a country's macroeconomic performance they usually associate this with qualitative characteristics, such as the work ethics of the population, the quality of the public administration, the degree of political corruption, the attitude towards laws and regulations,... These features, or their (subjective) perception, shape the image of a country's macroeconomic performance. From table 3 it seems that this public opinion is often confirmed by the synthetic scores (see e.g. Japan, Switzerland or Italy). There are, however, also counter-intuitive results, such as the disappointing scores of the United States and Canada. That's why it is useful to confront measurements with opinions.

It is also instructive to check how the macroeconomic performance of countries improves or deteriorates over time. Therefore the exercise was repeated for a second quinquennial period, going from 1992 to 1996. Here we note some striking movements, as we learn from table 4. New Zealand and Australia realise the biggest jumps forward, both gaining 10 places. Also Norway apparently succeeds in improving its performance substantially: now a

fourth place, coming from a ninth position in the previous period. Switzerland and Japan switch position. Belgium gains one place and is now preceded by the Netherlands.

The three worst performers are Portugal (eighteenth), the United Kingdom and Spain, that closes the ranking. The United States are now ranked eight, just behind Australia but before Denmark (ninth) and New Zealand (tenth). Apparently, the unification of Germany has had a dramatic negative impact on the global economy. Germany tumbles from a comfortable fourth place in the first subperiod to a seventeenth place now. This is just behind Italy, which in turn is preceded by France, that falls back to a fourteenth place, and Finland (fifteenth).

The German experience requires clarification. The German real GDP growth of 1.5 percent is already below the sample average, which amounts to 2.1 percent. Germany, with an inflation rate of 2.9 percent compared to a sample average of 2.5 percent, also performs moderately bad on the field of price stability. There is a medium performance with respect to unemployment: a 9.2 percent unemployment rate in Germany versus an average 8.5 percent in the OECD. The heaviest blow that Germany has to take, and which causes the fall to the lowest quarters of the classification, is to be attributed to the current account: Germany registers a deficit of 0.9 percent in comparison with an average surplus of 0.7 percent for the whole OECD-sample.

As a means of control, we have calculated an alternative synthetic score by according an equal weight of 0.25 to each 'normalised' indicator. For convenience we will label this measure as SIMEP, which stands for Synthetic Indicator of Macroeconomic Performance. For the second subperiod the correlation between the LIMEP- and the SIMEP-scores is 0.976. The correlation between the rankings amounts to 0.961. For the first subperiod both correlation coefficients show similar magnitudes. This high correlation supports the robustness of the results when compared with a less sophisticated synthetic indicator.

This finding, however, also raises the question whether the construction of the more complex LIMEP is still rewarding. Personally we think that it is preferable to stick to unequal weighting for the reasons that were explained in section 3. Moreover, the LIMEP provides useful additional information. The principle of benefit of the doubt weighting guarantees that every country achieves the highest attainable score. Every other weighting scheme produces a lower numerical score. To illustrate for the most recent subperiod: the average LIMEP-score amounts to 0.612, whereas the average SIMEP-score is only 0.521,

which is 9 percentage points lower. The calculated LIMEP-weights also reveal interesting information. The interpretation of the weighting coefficients will be commented below.

Let us first check whether the transition to the EMU has actually had a negative effect on the performances of the EU-countries compared to the other OECD-countries[6]. In table 5 the summary statistics are presented for the first subperiod 1987-1991. It appears that the average LIMEP-score of the EU-countries (0.648) hardly differs from that of the non-EU-countries (0.643). The situation differs after the Maastricht Treaty, as is clear from table 6, which presents the summary statistics for the period 1992-1996. The global macroeconomic performance, measured by LIMEP, is now only 0.558 on average for the EU-countries versus 0.665 for the other OECD-countries, which means a handicap of 11 percentage points. In other words, even if we take into consideration that EU-countries e.g. would attach a greater importance to the current account and inflation - possibly at the expense of lower real growth and higher unemployment - even then the EU-countries are outperformed by the non-EU-countries after Maastricht. Before Maastricht, on the contrary, the average LIMEP-scores were in the same neighbourhood.

One could test the robustness of this result using the Wilcoxon signed rank test. We find that, at a 5 percent significance level, the null hypothesis that the relative performance scores of the EU-countries remains the same in both periods should be rejected with respect to the alternative hypothesis of a relative performance deterioration. Further, it seems that the analogous null hypothesis for the non-EU-countries can be rejected with respect to the hypothesis of a relative performance amelioration at a significance level of at least 22 percent. The contention of a relative performance deterioration of the EU-countries compared to the other OECD-countries thus has a strong statistical foundation.

Is it really true that EU-countries are more concerned about “monetary” goals (inflation and current account, i.e. $a_2 + a_4$) than about “real” goals (real growth and unemployment, i.e. $a_1 + a_3$)? The LIMEP again provides information, which is presented in tables 5 and 6. Indeed, EU-countries seem to emphasise monetary indicators. In the first subperiod the sum of the weights is 52 percent versus 48 percent for the real indicators. In the second subperiod the difference is more pronounced: 54 percent for the monetary compared to 46 percent for the real dimensions of macroeconomic performance. Non-EU-countries apparently have somewhat other interests. In the first subperiod real objectives seem to

[6] Countries are here considered as a member of the EU for a subperiod if they belonged to the EU for more than half the subperiod.

dominate (52 versus 48 percent). In the second subperiod the non-EU-countries move towards a more balanced fifty-fifty proportion.

Table 3: LIMEP-results, period 1987-1991

Country	Objective function value	Weights			
		a_1 (y^n)	a_2 (p^n)	a_3 (u^n)	a_4 (f^n)
1. Japan	0.919	0.3	0.4	0.2	0.1
2. Switzerland	0.889	0.1	0.2	0.4*	0.3*
3. Netherlands	0.833	0.1	0.4	0.2	0.3
4. Germany	0.810	0.2	0.4	0.1	0.3
5. Ireland	0.776	0.4	0.3	0.1	0.2
6. Austria	0.746	0.2	0.4	0.3	0.1
7. Belgium	0.722	0.2	0.4	0.1	0.3
8. Portugal	0.645	0.4	0.1	0.3	0.2
9. Norway	0.637	0.1	0.3	0.4	0.2
France	0.637	0.3	0.4	0.2	0.1
11. USA	0.618	0.2	0.4	0.3	0.1
12. Sweden	0.595	0.1	0.3	0.4	0.2
13. Denmark	0.576	0.1	0.4	0.3	0.2
14. Finland	0.546	0.2	0.3	0.4	0.1
15. Canada	0.540	0.2	0.4	0.3	0.1
16. Spain	0.523	0.4	0.3	0.1	0.2
17. Australia	0.501	0.2	0.3	0.4	0.1
18. Italy	0.494	0.2	0.3	0.4	0.1
19. U. Kingdom	0.467	0.4	0.2	0.3	0.1
20. New Zealand	0.438	0.1	0.3	0.4	0.2

*: Weights are interchangeable.

Table 4: LIMEP-results, period 1992-1996

Country	Objective function value	Weights			
		a_1 (y^n)	a_2 (p^n)	a_3 (u^n)	a_4 (f^n)
1. Switzerland (2)	0.829	0.1	0.2	0.3	0.4
2. Japan (1)	0.824	0.1	0.3*	0.4*	0.2
3. Ireland (5)	0.782	0.4	0.3	0.1	0.2
4. Norway (9)	0.773	0.1	0.3	0.4	0.2
5. Netherlands (3)	0.732	0.1	0.3	0.4	0.2
6. Belgium (7)	0.637	0.1	0.3	0.2	0.4
7. Australia (17)	0.631	0.2	0.4	0.3	0.1
8. USA (11)	0.630	0.2	0.3	0.4	0.1
9. Denmark (13)	0.626	0.1	0.4	0.3	0.2
10. New Zealand (20)	0.622	0.2	0.3	0.4	0.1
11. Canada (15)	0.618	0.2	0.4	0.3	0.1
12. Sweden (12)	0.602	0.1	0.3	0.4	0.2
13. Austria (6)	0.585	0.2	0.3	0.4	0.1
14. France (9)	0.576	0.1	0.4	0.3	0.2
15. Finland (14)	0.536	0.1	0.4	0.2	0.3
16. Italy (18)	0.534	0.2	0.3	0.4	0.1
17. Germany (4)	0.519	0.1	0.3	0.4	0.2
18. Portugal (8)	0.479	0.2	0.1	0.4	0.3
19. U. Kingdom (19)	0.457	0.1	0.2	0.4	0.3
20. Spain (16)	0.240	0.2	0.3	0.1	0.4

*: Weights are interchangeable.
( ) Ranking in previous subperiod.

Table 5: Summary statistics for the LIMEP, period 1987-1991

	Objective function value	Weights			
		a_1 (y^n)	a_2 (p^n)	a_3 (u^n)	a_4 (f^n)
All countries					
mean	0.646	0.220	0.325	0.280	0.175
st. Dev.	(0.144)	(0.111)	(0.085)	(0.115)	(0.079)
EU					
mean	0.648	0.270	0.320	0.210	0.200
st. Dev.	(0.133)	(0.125)	(0.103)	(0.110)	(0.082)
non-EU					
mean	0.643	0.170	0.330	0.350	0.150
st. Dev.	(0.161)	(0.067)	(0.067)	(0.071)	(0.071)

Table 6: Summary statistics for the LIMEP, period 1992-1996

	Objective function value	Weights			
		a_1 (y^n)	a_2 (p^n)	a_3 (u^n)	a_4 (f^n)
All countries					
mean	0.612	0.155	0.305	0.325	0.215
st. Dev.	(0.139)	(0.076)	(0.076)	(0.102)	(0.104)
EU					
mean	0.558	0.160	0.290	0.300	0.250
st. Dev.	(0.153)	(0.097)	(0.088)	(0.125)	(0.097)
non-EU					
mean	0.665	0.150	0.320	0.350	0.180
st. Dev.	(0.104)	(0.053)	(0.063)	(0.071)	(0.103)

5. CONCLUSION

The macroeconomic performance of nations remains a topic of general interest. It is commonly postulated that a low unemployment and inflation rate and a high real GDP growth and surplus on the current account constitute the major objectives. A synthetic performance indicator ambitions to bring together these four dimensions into one single statistic. The crucial step then consists in weighting the different components of the synthetic indicator. Otherwise stated, to what extent is each policy goal regarded as important by the policy makers of the different nations ?

In this paper we used a DEA-inspired model characterised by benefit of the doubt weighting, in the sense that higher weights are assigned to those indicators for which the country under consideration performs relatively better. The argument being that adequate information about the true objectives of each and every country is usually not available for a longer period of time.

We have assumed in our model that priorities should be attributed. A challenging exercise would be to develop a model which allows more freedom in choosing the weights. Yet we believe that the weights somehow still should be restricted. Moreover, it is recommended that the synthetic macroeconomic performance scores should provide, like the LIMEP-scores, an attractive intuitive and cardinal interpretation.

Synthetic macroeconomic performance scores reveal interesting information. They can be confronted with the general intuition. In casu, we used the LIMEP to check empirically whether the convergence criteria of the Maastricht Treaty have actually induced a relative performance deterioration in the EU-nations compared to the rest of the world, as is suggested in a number of studies. Our exercises seem to support the view of these authors. This does not mean that one should reject the EMU as such. But it does indicate that EU-countries had to suffer from a performance deterioration before being able to harvest the fruits of EMU-membership. One may also conclude that the Maastricht criteria, particularly those with respect to excessive deficits, were too restrictive, thereby generating unfortunate macroeconomic welfare losses.

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