

# Document de travail

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**« Country size, economic performance and the political economy of the euro zone : an empirical study of the size divide »**

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**COUNTRY SIZE, ECONOMIC PERFORMANCE AND THE POLITICAL ECONOMY OF THE EURO ZONE:  
AN EMPIRICAL STUDY OF THE SIZE DIVIDE**

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**ABSTRACT:**

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The topic of how country size influences a country's economic performance has received renewed interest lately, especially with Rose (2006)— who found no clear pattern between a country's size and its economic performances at the world level . However, when assessing economic performances of euro area countries, a “size divide” emerges between small, well faring and reform-implementing economies on the one hand, and bigger laggard economies on the other. I explain this phenomenon, first by the structural higher efficiency of the euro zone smaller economies and second by the institutional settings of the euro zone—namely, the Stability and Growth Pact (SGP) and the policy led by the European Central Bank (ECB). In this respect, this paper follows and completes some of the arguments made by Laurent and Le Cacheux (2006). To empirically test these “political economy” hypotheses, I use panel data from 1998 to 2008 for the fifteen countries of the euro zone. The econometric analysis confirms structural differences between small and large economies of the euro zone and growth strategies of small countries are proved more efficient in the framework of the monetary union.

## INTRODUCTION: STYLIZED FACTS ON THE EURO ZONE AND THE SIZE DIVIDE

The topic of how country size influences a country's economic performance has received renewed interest lately, especially with Rose (2006)—who found that size does not seem to determine economic performance in one way or another (with the exception of a correlation between small size and trade openness). However, when assessing economic performances of euro area<sup>1</sup> countries, a “size divide” emerges between small, well faring and reform-implementing economies on the one hand and bigger laggard economies on the other. Indeed the topic of country size and its effects in the monetary union is a developing field for economic research and fits into the larger one of the study of heterogeneities and their consequences in a monetary union. Sources of heterogeneity in the euro zone are manifold: economic, political, institutional, cultural, to name only a few, and represent as many challenges for ambitious common policies and the institutions implementing them. I will focus on the economic consequences of different country sizes—sources of structural heterogeneity—in the framework of the monetary union.

Before we delve into our analysis of country size and its economic implications in the euro zone, let us start with some stylised facts of the economic performances of euro zone members in relation with their size. The discrepancies, these stylised facts highlight motivate this paper and base the assumption of a “size divide” in the euro zone—a concept on which we will elaborate in the following sections.

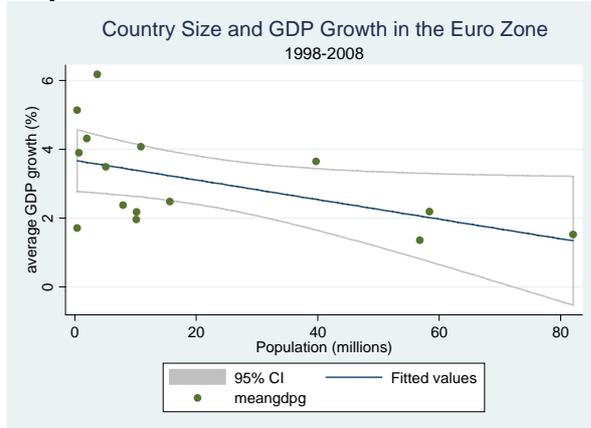
What we call economic performance is measured by four indicators: the growth rate, the inflation rate, the unemployment rate, the external balance. (In other words, the components of Kaldor's magic square, 1971). We also add government general structural balances as this is a key feature of the EMU. Our timeframe covers the last decade (1998-2008) and so starts one year before the launch of the final phase of the monetary union.

As a proxy for country size we take population (as in Rose, 2006 and other empirical works on this topic) so that out of 15 countries, Germany, France and Italy qualify as big, others are considered “small” (other rankings and determinants of country size will be discussed in the following section). In Graphs 1 to 6, we observe inverse relationships between country size and GDP growth, inflation, external balance and general government balances as well as a positive one between country size and unemployment (see graphs 1-5), so that one can talk of a “size divide” in the euro zone in terms of economic performance.

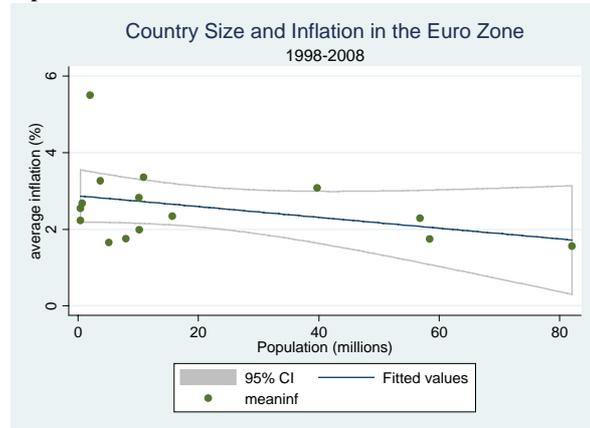
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<sup>1</sup> In this paper euro area, euro zone and Economic and Monetary Union (EMU) all denote the fifteen countries of the euro zone as of January 2008 and will be used interchangeably. Confusingly enough all members of the European Union are part of the Economic and Monetary Union, but at different stages! When referring to EMU, we thus mean the countries of the final stage (or the euro adoption stage).

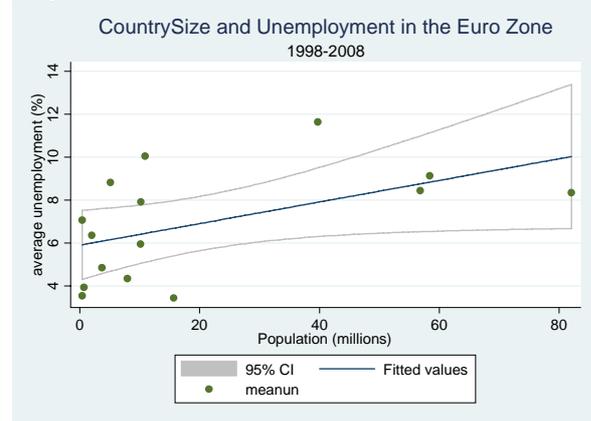
**Graph 1**



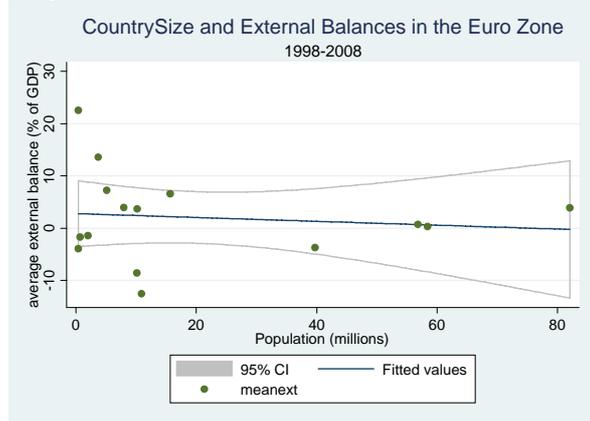
**Graph 2**



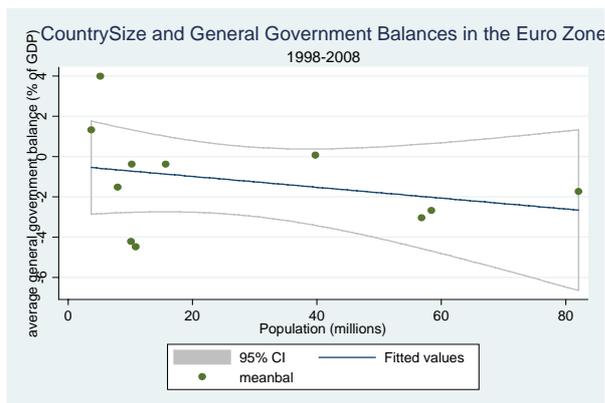
**Graph 3**



**Graph 4**



**Graph 5**



Of course our aim is not to claim that the relationship between sound economic performance and country size is a perfect inverse one in the euro zone. It would be foolish to draw a black and white picture especially when such complex interactions between politics and economics are at play. The graphs speak for themselves as they display various regression fits and the inner country variance of the data is sometimes even larger than that between different countries. Undeniably each country is a peculiar case per se; however it is possible to identify groups. Outliers are in the first place new euro zone entrants—Slovenia, Cyprus and Malta. These small countries are still in a phase of catching up and so are bound to differ from their Benelux counterparts or Ireland. To a lesser extent, Greece and Portugal do not fit the “size divide” picture as these small countries are still in the process of overcoming the competitiveness drop the euro parity entailed.

That being said, there is already a literature highlighting this size divide in the euro zone. Laurent and Le Cacheux (2006) run an analysis of the impact of size within the euro zone based on Mill's reciprocal demand theory which states that when reaping the benefits of international trade the small and open country has a structural advantage over the bigger and relatively closed one. Their econometric results highlight a systematic negative correlation between large size and sound economic performance with regards to growth, inflation, public deficit and unemployment between 1996 and 2004. Similarly, Feldmann (2006) showed that country size in the EU and unemployment are positively correlated.

This paper furthers the analysis of the interactions between country size and economic performance in the euro zone. To this purpose, I describe different specifications for country size and detail the structures and benefits it determines within both the EU and EMU (Section 1). I then sketch a brief political economy of size in the euro zone, that is I examine how country size impacts on the conduct of economic policy with focus on the Stability and Growth Pact (SGP) and the European Central Bank (ECB) (Section 2). Subsequently, I test the hypotheses previously presented running a thorough econometric analysis (Section 3) before concluding.

## **SECTION 1: COUNTRY SIZE IN THE EMU: DEFINITIONS, STRUCTURES, BENEFITS**

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### *Country size: definitions and relativity*

History had it that the European Union be composed of countries of very different demographic and economic sizes. Population varies from 400.000 inhabitants (Malta) to some 82 millions (Germany); GDP (2007 figures) from roughly €5000 million to €2500 billion for the same countries. Country size encompasses a large number of dimensions: territory, demography, economic and political power. One of the core difficulties of our analysis is that the relationships between these dimensions are not linear. Large countries maybe sparsely populated and the other way around for instance. Consequently one may rank countries in almost as many ways as there are indicators. While GDP is a good measure of economic power (and not necessarily of economic development which is better captured by GDP per

capita), population proves to be a better proxy for country size for our economic analysis. Indeed explaining economic performance by resorting to GDP is somewhat tautological and bound to create endogeneity problems.

A crucial point already highlighted by Laurent and Le Cacheux (2006) is that country size and its impact in the euro zone are to be understood in relative terms. Indeed in absolute terms, Germany, France and Italy are medium countries, only the euro zone or the European Union taken as a whole would qualify as “big” in the world economy. But in the euro zone, these three countries make up 70% of the GDP of the area and so are labelled “big”. Laurent and Le Cacheux (2006) adopted the following classification: countries with a population up to a quarter of the most populated Member State fall into the small category; up to a half, into the medium; more than a half into the large one. By this token in the euro zone, there are three big countries—Germany, France, Italy—, one medium—Spain—, the rest being small countries. The recent adhesion of Cyprus and Malta also prompts the question whether an additional “extra small” category should be added. However in terms of population Luxembourg would also fall into that category despite a much bigger economic size. For the purpose of clarity we will consider only three different size groups according to population figures.

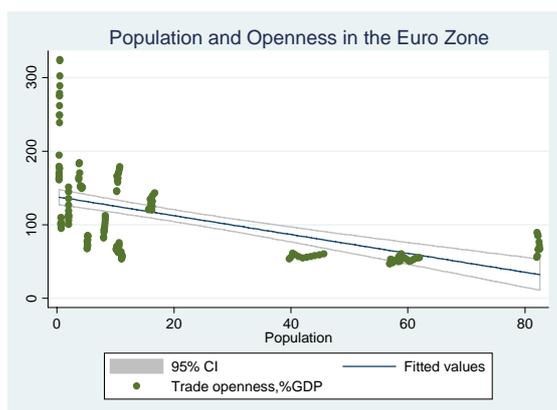
#### *Country size and economic structures*

Now that we have specified country size in different ways, let us turn to its impact on the economic structures of countries. Following Salmond (2006), one can define large countries as countries accounting for a large part of EMU economic activity, tending to act as *price makers* on this market. Conversely, small countries represent a low proportion of the EMU economy and behave as *price takers*.

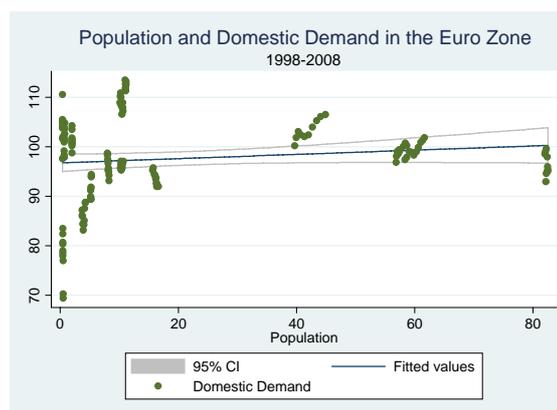
By and large, small countries tend to be more *open to trade* (this has been documented on numerous occasions, most notably by Rodrik, 1998 and Alesina et al., 2005), while large ones rely more on *internal demand* for growth. It follows that small countries are more vulnerable to external developments and more prone to lead competitiveness strategies in order to expand exports. In larger countries, policy makers must address internal stabilisation. This is one of the core structural differences between the two groups but this is a blunt picture: on the international level, large euro zone economies are in fact only middle size economies coping simultaneously with what we defined as small and large countries challenges. They are not big enough not to care about their competitiveness and too big to care only about it and sacrifice internal stabilisation.

The graphs 6 and 7 illustrate the structural differences in terms of openness (ratio of the sum of exports and imports to GDP), and domestic demand (as a percentage of GDP) as components of the economy between small and large countries of the euro zone. Trade openness offers a more clear-cut inverse relationship than domestic demand does.

Graph 6



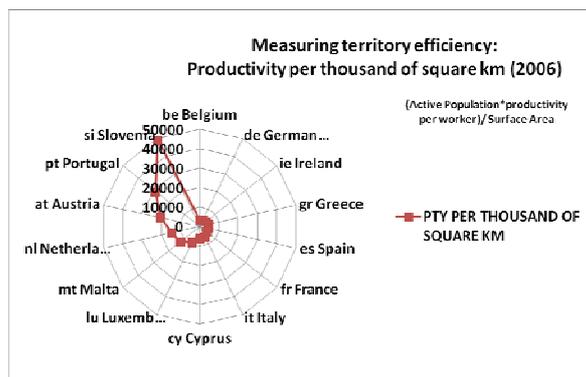
Graph 7



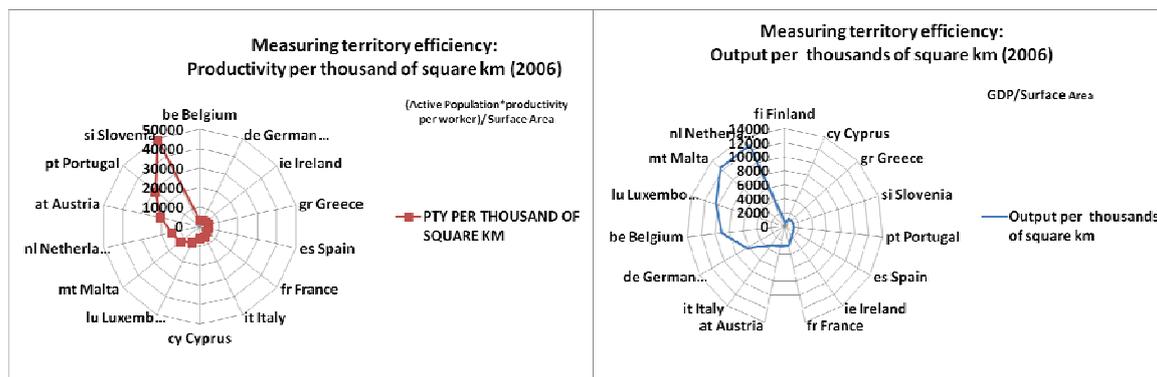
An additional structural difference stems from small countries' vulnerability to international conditions. The smallness of their own domestic market does not allow them to lose exports share and so they are bound to produce and implement economic change in a more efficient manner.

One has also argued that smaller countries, having more homogenous population and smaller territories to control, have better institutions and are more prone to reach political consensus as documented in Robinson (1960) for instance. To illustrate this efficiency advantage of small countries, I have computed measures of output or similarly productivity per square kilometre. This gives a picture of what I refer to as "*territorial efficiency*". The importance of territory effects has indeed been highlighted by the new economic geography approach (Krugman, 1991). While it posits the importance of increasing returns to scale and thus a priori bestows an advantage to large countries, it also takes into account the location, structure and density of "economic activity" (usually higher in smaller countries). With this measure, I intend to depart from a mono-variable representation of country size. Using population as a proxy for economic size is convenient in that the relationship between population and GDP is roughly linear. (In other words, when one ranks euro zone countries in terms of population or GDP, the results are roughly similar.) However, as stated earlier, country size encompasses several dimensions. Besides, a population alone does not make an economy: key ingredients also include material resources and a territory. Hence the need to sophisticate our analysis by adding two additional size rationales—GDP and surface area—as the ratio of economic size over geographic size. Again, because countries are differently ranked along the population, GDP and territory dimensions, this measure does not provide a straightforward "size ranking" as population does and should not be understood as such. Instead, it is meant to capture countries' structural differences in terms of economic organisation over a given territory. Graphs 8 and 9 offer a snapshot picture of territorial efficiency. According to the indicator chosen, rankings differ. However one may note the relative territorial inefficiency of small southern and new Member States, the medium territorial efficiency of the big three, and the higher efficiency of the Netherlands and Luxembourg.

Graph 8



Graph 9

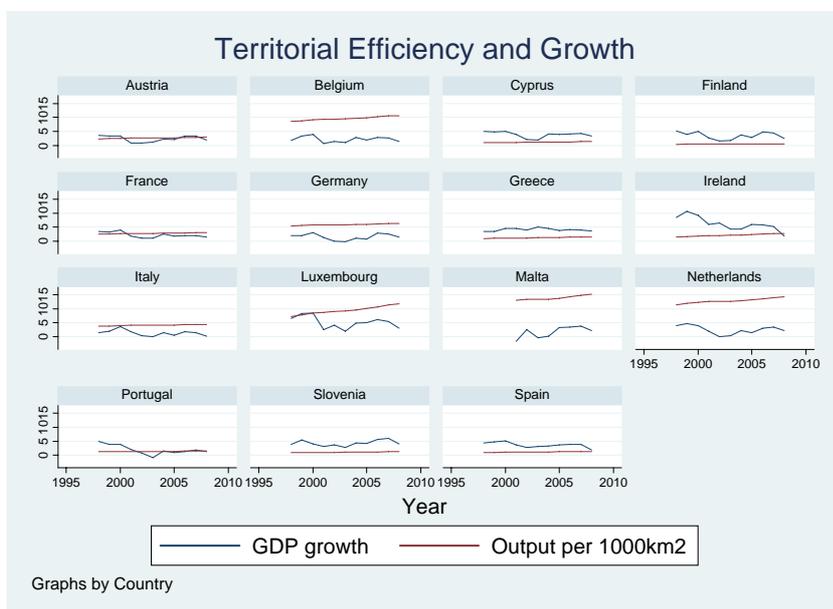


For this analysis, I retain the rather simple ratio of GDP over land area (output per 1000km<sup>2</sup>) as a measure for territorial efficiency<sup>2</sup>. This measure is far from perfect and one should be aware that it can be driven up or down by a relatively small, respectively large, territory (as compared with the size of the economy) as the polar cases of Malta and France highlight. But it offers a relevant picture of the density of economic activity and of where there is still room and potential for improvement. Graph 12 allows us to distinguish between three groups. First those with high territorial efficiency are made up of the Benelux countries and Malta. The former are located at the very heart of the Blue Banana (or the European economic core that spans from Southern England to England via the Rhine region) and are typically very open and efficient small economies; it goes without saying that their smallness does not leave room for territorially extensive growth. At the other end of the spectrum, we find the least territorially efficient group, mostly made up of countries that are either new and less developed entrants (Cyprus, Slovenia) or still catching up in terms of economic structures (Greece, Portugal, Spain). Germany performs well but is certainly advantaged by its relatively small territory (the fourth in the European Union). The middle group comprises the following four countries Austria, France, Ireland and Italy. France and Italy, the two large countries of this group have different territorial structures: France still develops decentralisation policies to overcome Paris' macrocephaly, while Italy displays a denser network of industrial centres, it is struggling with obsolete industrial structures and the South is still lagging behind. Ireland and Austria are the two small countries with intermediate territorial efficiency: Austria lies at the heart of continental Europe and has based a development strategy that fully takes advantage of its geographical situation as it became a hub for exchanges and investment with the new East European Members. Ireland also certainly internalised its geographical situation: it overcame its relative remoteness and isolation by leading an attractive fiscal policies for multinationals and outsourced service centres. There remain two peculiar outliers: Malta is here

<sup>2</sup> Gallup, Mellinger and Sachs (1999) develop a similar indicator: GDP density, calculated by multiplying GDP per capita by the number of people per square kilometer.

pushed up by its very small territory, and conversely Finland pulled down by its large one, so that we cannot correctly presume of their respective territorial efficiency.

**Graph 10**



As for how territorial efficiency is related to GDP growth, graph 10 offers a mixed picture that only reflects our topic's complexity as a number of variables are interacting at the national and euro zone levels to explain national discrepancies in terms of economic performance. However, it is clear that if a country experiences a protracted period of GDP growth, the ratio of GDP to surface area will also rise overtime and because it is less sensitive to cyclical fluctuations (indeed GDP is an economic aggregate and we do not include growth variations in this ratio), it offers a more structural or long term oriented picture of a country's economic evolution. Strikingly enough, over the decade we study (1998-2008), a majority of countries stagnate in terms of territorial efficiency and only small economies (the Benelux countries, Ireland and Malta) see it increase—with the notable exception of Germany, that phenomenon being possibly explained by its wage moderation policy as well as the catching up of the new Bundesländer.

Adding this territorial efficiency dimension to our panel enables us to flesh out our analysis of country size and economic performance as it captures what is done at the national level on a given territory with its human and material resources. Also the fact that the relationship between territorial efficiency and country size (taken as population) is not evidently positive or negative is an asset for our analysis as it will prevent the occurrence of simplistic or caricatured results with regards to the economic effects of country size.

As pointed out by Buisan and Restoy (2006), causes of divergences in economic performance are also *different exposure to shocks and policy transmission mechanisms*. The origin of shocks may induce a

“size conditioned” reaction. For instance, the sensitivity to external demands shocks depends on openness which as we saw depends on size. In the euro zone, the less open countries are France, Italy, Portugal and Greece; the more open being Belgium, Finland, Ireland and the Netherlands. Likewise oil prices shocks affect the three big countries according to similar dependency ratios, ratios that are higher in small countries like Greece, Portugal, Belgium and Spain. Export specialisation is also an important source of heterogeneity in reactions to external shocks, but identifying a size pattern here proves harder. Germany for instance, as we will detail in the next section, has an export specialisation that differs significantly from those of its French or Italian counterparts.

#### *Structural heterogeneity and convergence*

We have briefly described the heterogeneities in terms of size of the euro zone Member States and how these translate into heterogeneous economic structures and reaction patterns. Nevertheless, common policies of the European Union and in particular the Economic and Monetary Union are based on the premise of convergence in nominal (guaranteed by the Maastricht criteria) as well as in real terms (The process seems to have taken a halt since the late 1990s.). One assumed that legally binding Member States into nominal convergence would also prompt their convergence in real terms. Indeed, a shared pool of interests and structures is necessary to implement and sustain any common policy. This assumed convergence legitimates resorting to “one-size-fits-all” rules. The problem is that real convergence has taken a halt in the last decade. Member States are also considered equally sovereign and thus of course granted the same status. This furthers the non-acknowledgement of size differences in EU and EMU institutional rules. We will see, in this section and the following, how this leads to an unequal repartition of the gain and losses of euro zone membership.

#### *The EU and EMU frameworks bestow small countries institutional advantages...*

Because of their greater vulnerability to external developments and so potentially to the institutions of European Union (whereas internal shocks are a greater issue for large countries) and the fear they be smothered by larger countries, smaller countries have been granted a number of advantages and protections upon joining the European Union. Interestingly enough, at its creation the European Coal and Steel Community (ECSC) included the “three big” and three small countries, so that one comprehends, why then, these guarantees really mattered. The original six have mechanically have had more opportunities to influence the institutional system in their favour; and while there was only one large country left (the United Kingdom) to join the EU, there were plenty of small ones. The *institutional protections* bestowed to small countries are unanimity ruling; the generalised search for consensus even if it is not legally necessary; overrepresentation in voting rights granted relative to population figures; the possibility to form blocking minorities (and as each enlargement changes the relative power of each Member State, it automatically increases the number of possible coalitions, thus

augmenting the likelihood that small countries impact on collective decisions); the Commission's logistical help and recognition of special interests (Luxembourg in banking, Cyprus in shipping, etc). In terms of political and decision-making power, EU membership enables these small states to punch above their weight. Rose (2006) highlighted the new *sovereignty scale* for small countries within the EU. Conversely large states are shrunk, especially Germany. The *overrepresentation* of small states and conversely the shrinkage of large ones can be precisely assessed: Laurent (2006) showed that 70% of the economic size of the EU was represented by 40% of its political size, this discrepancy holding paradoxically also for the EMU, where political cooperation is sizeably deeper.

The *alliance strategies* of small countries vary overtime according to their national interest. Some rally with a bigger neighbour to carry more clout, others go it alone and sometimes turn against one another as is often the case between Belgium and the Netherlands (especially on the issue of voting rights). In the diverse fields of the European Union policies, there is almost never a clear split line between large and small countries. One seldom occurrence though, seems to be macroeconomic policy and the implementation of the Stability and Growth Pact. It has often been argued by small countries that the sanctions have been delivered with double standards, as the two big offenders France and Germany were pardoned and smaller offenders (Greece, Portugal) treated less mercifully. This is a widespread but erroneous impression that ignores the fact that Greece and Portugal (contrary to France and Germany) were punished for communicating tampered statistics and signalling their excessive deficits too late. However, the fact that smaller members of the EMU rose up in arms to defend the Stability and Growth Pact allegedly against the larger sinful Member States (the Netherlands, Austria, Finland and Spain voted for sanctions to be carried out against France and Germany) illustrates the fact that the size divide is at play precisely in the economic policy realm.

*...which turn into economic gains*

Casella (1995) asks the question of whether "there are systematic forces such that countries of different sizes participating in a free trade bloc gain differently from the entry of new members". Assuming increasing economies of scale, she shows that not big countries (where firms enjoy lower costs) but small countries (whose internal market and competitiveness increases with enlargement) benefit more from enlargement because the domestic markets of large countries proportionally shrink with each enlargement. In fact the increase in internal market will be more significant for firms in small countries than for firms in big countries, and the same goes for competitiveness. The EU, as it plays down the importance of the size of the domestic market in offering its members access to a very large *single market*, clearly favours the development of small countries (for which domestic market size was the weakness to overcome) over that of bigger ones (for which domestic market size used to be one of the main assets).

Furthering Casella's analysis, Baldinger and Breuss (2006), however, argue that this *small country bonus* is not significantly larger than the advantages of large countries in terms of high-market power

and terms of trade, market size, group ties, endowments in human capital and technologies, product varieties, and scale economies. Thus different economic forces are at play in the distribution of the gains of trade bloc enlargement without one dominating the others, leaving the outcome in terms of country size undetermined.

Furceri and Karras (2007), also underline that small size is positively correlated with *business cycle volatility*, which explains part of the small Member States vulnerability but also their larger gains from the EMU, as business cycles are anchored.

All in all, small protected states gain economic and political power in entering the EU and the EMU, while the contrary goes for large ones. For instance, before joining the euro no small country had a currency that could be used as a “monetary weapon”. Conversely Germany gave up a lot with the deutschmark: not only an international currency, but also the ability for the government to borrow at lower rates than their European peers. With the euro, Germany has lost this exclusive *comparative advantage*, while small countries gained lower interest rates and greater credibility. As Robinson (1960) pointed out, referring to large countries’ advantages in terms of defence: large countries hold a comparative advantage in terms of public good provision as long as they do not share it. In short, one may contend that larger countries—especially Germany—traded monetary weapons (the deutschmark against the euro) and economic advantages (undisputed leadership against reinforced economic stability outside German borders) in joining the EMU, while small countries made a net gain in terms of economic power and protection.

Now that we have studied how the general frameworks of the EU and EMU favour small countries, it is time we turn to the conduct of economic policy and examine how country size interacts with the Stability and Growth Pact and the policy of the European Central Bank.

## SECTION 2: A POLITICAL ECONOMY OF SIZE IN THE EURO ZONE

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The European Union or for that matter, even the Economic and Monetary Union cannot be considered as a solely economic organisation. Their political essence makes a sheer economic analysis of their functioning obtuse. I will not for instance level criticism at the functioning of the euro zone on the basis that it is not an optimal currency area. The creation of the monetary union was overwhelmingly motivated by political reasons, not by optimality in the economic theory sense. As the previous section casted a light on how politics and institutions mar economic outcomes it is sensible to now sketch a political economy of size in the euro zone. In other words, examine how country size as a non-internalised source of heterogeneity predetermines the way national economies will fare within the EMU.

*The 'instrument gap' and the conduct of economic policy*

Economic policy is carried out with the help of instruments: in the EMU, as explained by Milewski (2004), there is a double specialisation of instruments (monetary and fiscal) and objectives (inflation and growth), which is, as we will see, in many regards suboptimal. There is also a commensuration problem between the goals assigned to these instruments and their scope, an '*instrument gap*' so to speak. Certainly, the 3% deficit permit and a central bank addressing almost exclusively excessive inflation are meagre tools to resort to high unemployment rates and sluggish growth. What is striking and also motivates the topic of this paper is that the economic policy instruments provided for in the settings of the euro zone are precisely those of small countries. The latter are helped by the structural activism of the ECB for their competitive growth strategies as open economies.

Conversely, these same rules forbid big countries to resort to policy instruments they usually favour. They can no longer resort to proactive fiscal policies to stabilise the economy or boost demand except under exceptional circumstances. That in turn, may explain their relatively poor economic performances and so, their reluctance to implement the necessary structural reforms in labour and products markets, for these need to be accompanied by stabilisation measures. Consequently, within the framework of the EMU, small and large countries face a "strategic asymmetry" (Fitoussi and Le Cacheux, 2005) in regards to their growth strategies. Large countries are left with small countries' growth strategies, which bear a much lesser yield for them. Fitoussi and Le Cacheux (2005) explain that the competitiveness gains acquired through wage moderation have substantial positive effects in small countries whose exports and capital flows depend largely on external demand, and the other way around, the same policies are less effective in large countries where exports and capital inflows are less sensitive to cost differentials and their effect on GDP relatively smaller. Additionally, while domestic competitive gains have strong supply side effect in small countries, they flower internal inflation in large countries and thus push their real interest rate up.

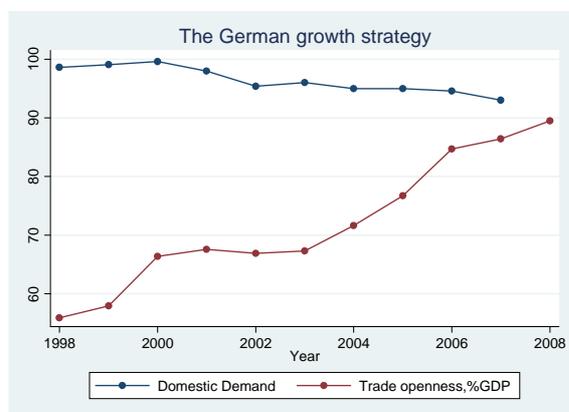
In addition to that and as noted by Calmfors (1998), *internal devaluations* can substitute for the impossibility in a monetary union, to devalue the currency or drop interest rates. Fiscal policy (also encompassing tax policy) should take up the function of "switching expenditures between foreign and domestic output, just as an exchange-rate change does". By this token, a cut in employers' payroll tax would decrease labour costs and thus affect exports, output and employment like a currency devaluation would. The loss in government income (from the tax cut) can be recovered by a rise in other taxes, such as the VAT. This kind of policy raises several issues. First, the up- and downward flexibility of the internal exchange rate is probably too limited to substitute for the loss of national monetary policies because of wage rigidities. Second, the political cost of an internal devaluation may also be prohibitive. Third and more importantly, internal devaluations are also akin to currency devaluations in their harmful international effects as they boost national exports and penalise imports. In other words, from an international or Euro zone perspective, this is a beggar-thy-neighbour policy.

The next subsection illustrates how Germany has been carrying out such an internal devaluation policy over the last few years.

*Up against the wall: the German example*

In that respect, Germany is a case in point: the wage moderation or *internal devaluation* strategy it has followed for a decade (partly to compensate the loss of competitiveness caused by reunification), did not have trickle down effects on internal demand and even in a way led to the actual social strife as many workers had to renounce to pay rises. Needless to say that Germany's economic policy has been detrimental to its euro zone partners. For instance, the three-point increase of the VAT (January 2007) was earmarked as such: one point to replace social contribution and two points to finance the decrease in the tax rate on firms from 25% to 15%, thus furthering international tax competition. As Graph 11 illustrates, Germany's exports boomed (openness overshoot from 55% to almost 90%, a figure usually found in small countries) over the last decade, while domestic demand has been on the wane. Germany's exports performance was hailed as the "German comeback" but as noted by the *Economist* ("The teetotallers' hangover", December 6<sup>th</sup> 2008), "a persistent current-account surplus is a symptom of unbalanced growth, just as a big deficit is. [...] countries that save too much are at the mercy of foreign demand".

**Graph 11**



So that in following a typical small country export-led growth strategy at the expense of domestic demand in particular its consumer spending component (domestic demand is made up of final consumption, investment of the private sector and the government, and stocks), Germany has made itself more vulnerable to external crises. Even fiscal virtue and high saving ratios cannot shelter the German economy from negative external demand shocks. All in all, Germany is engaging in a tax and labour costs- race to the bottom. In doing so, it competes with other EMU countries, not with emerging ones, so that if it wins anything in the process (external and domestic market shares), it will be at the expense of other Member States. As underlined by Cochard (2008), the improvement of the

German trade balance since 2001 was mostly made against France and Italy, not Asia<sup>3</sup>. Strikingly enough, over the same period unit labour costs, trade openness, domestic demand in France—roughly equal to those of Germany at the onset of the 2000s— follow opposite paths. This beggar-thy-neighbour policy is not even propitious for Germany itself as it depresses internal demand<sup>4</sup>, which in turn depresses the whole of EMU, as German GDP accounts for one-third of that of the EMU. The risk is that all EMU countries embark on such strategies and aggregate demand will falter, dragging down growth along.

#### *Country size and the economic government of the euro zone*

We have briefly evoked the adverse effects of EMU institutional setting on the policies of large countries. Let us now carry a more thorough analysis with regards to the two main devices of economic policy in the euro zone, namely the Stability and Growth Pact (SGP), and the European Central Bank (ECB).

#### *The Stability and Growth Pact and the global demand externality*

The Stability and Growth Pact was designed with the launch of the monetary union on the tenet that *fiscal externalities* had to be contained so as not to jeopardise the conduct of a common monetary policy (through a raise of the common interest rate). One agreed on the threshold limits of respectively 3% and 60% of GDP for the public deficit and the public debt, as it seemed to accommodate the figures of the time. The Pact has received numerous criticisms and was reformed in March 2005 in order to (among others) better take into account the cyclical position and national peculiarities when assessing the deficit, but it did not change in essence. We have seen that it represents a bigger burden for larger states in regards to countercyclical fiscal policies restrictions; the benefits they may reap from enhanced fiscal credibility are also relatively smaller.

But let us come back to the negative externality containment logic behind the SGP. It prevents that bigger countries may impose the consequences of their fiscal policies on others. In that sense, smaller countries have rose up in arms against the alleged fiscal laxness of their larger counterparts. Indeed fiscal consolidation is not necessarily easier for smaller countries. As noted by Bonnaz (2003), the relative easiness of fiscal consolidation applies only to very open small economies such as Ireland, Portugal, Belgium and the Netherlands since their public finances Keynesian multiplier is lower. But small countries such as Greece, Finland or Spain have conditions that are similar to those of France and Germany. Nonetheless it does not mean they have been more virtuous from a common interest perspective, Bonnaz (2003) emphasizes the need to consider “*global demand*”. Indeed, through their higher inflation they are responsible for more negative externalities as their bigger counterparts

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<sup>3</sup> Cochard (2008) further details that German exports’ shares outside of the European market actually declined even if this was at milder rates than for the exports’ shares of their Euro zone counterparts.

<sup>4</sup> Cochard (2008) again highlights that the German contribution of internal demand to GDP growth was halved between the 1997-2002 and the 2002-2007 period.

through their “lax” fiscal stance. Small countries benefit from an asymmetry in real interest rates within the monetary union and generate a sizeable inflation externality<sup>5</sup> (Spain, Ireland are among the countries with higher inflation rates) which is not internalised by way of sanctions and is a real burden for larger countries of the euro zone that have to put up with less favourable real interest rates. The ECB monitors inflation rates and may issue warnings but it cannot carry out sanctions as in the excessive deficit procedure. There is thus a clear institutional imbalance that favours smaller countries free-riding on the common monetary policy while larger countries are disempowered of their traditional economic policy instruments by the SGP.

#### *The European Central Bank and country size*

Similarly to other EU institutions, economic size is blatantly misrepresented in the ECB’s decision instances as there is, once again, a clear mismatch between the political and economic weights of regional governors. The “one country, one vote principle” has led to larger degrees of *misrepresentation* than in the Fed and the Bundesbank (Berger, 2006). What is worse is that enlargement of the EMU will accentuate that trend. The 2003 reform—that is the limitation to 15 national central bankers and 6 board members— attempted to tamper this effect but it will not reverse it. Rotation will also help check misrepresentation but will cause discontinuities in voting frequencies between large and small countries. Even if our earlier economic definition of small, respectively large, countries as price takers, respectively makers may hold here: developments in large countries are indeed closely monitored by the ECB and those in small countries unlikely to change its policy stance. The underlying tenet that a national representative will systematically push its own country’s interest (as is assumed for instance in Dixit and Lambertini (2003)) is moot. As a consequence, the representation and governing system of the ECB does not tell us much about the impact of the central bank’s policies on countries of different sizes as the decisions processes are not public and one can only speculate about what goes on behind closed doors.

To analyse how country size and the policy led by the ECB interact, one should consider the impact of country size in the classical output/inflation trade-off or *Phillips Curve*. That trade-off is affected by openness and so possibly by country size (as the three big are relatively more closed and a number of small economies—among which those of Benelux—are significantly more open). In fact, Sanchez (2006) documented that small countries, because of their greater openness and larger inflation effects, tend to have a steeper supply curve and conversely, larger countries a flatter one. The monetary union is from this perspective more propitious to small countries with steep supply curves, and for larger ones, monetary autonomy outperforms monetary union.

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<sup>5</sup> Bonnaz(2003) calculated that between 1999 and 2002, small countries generated on average 1% more inflation than the big three, which given their weight in the euro zone translated into an additional 0.3% to the inflation of the zone. Following a Taylor rule, and all other things being equal, the author computed that this pushed interest rates 50 base points over their level, had the small countries had similar inflation rates as the large ones.

Additionally, the position of the larger economies is worsened by the single currency: they can no longer rely on their exchange rate policies to accommodate *structural reforms*, thus increasing the costs of the latter. Also Sibert and Sutherland (2000) have shown that *rigidities* vary with the stance of monetary policy: the less a central bank engages in stabilisation, the more are nominal rigidities in labour markets likely phase out. By the same token (and if we assume this relation holds symmetrically), the more the ECB lays the emphasis on macroeconomic stability, the more prone are governments to become adverse to structural reforms. This could be one of the perverse effects of ‘institutionalised virtue’.

Finally, another pitfall for large euro zone economies with regards to the ECB is analysed by Marzinotto (2008). Considering the determinants of *wage growth* in the EMU, she shows that country size (measured by total employment which increases the size of Germany relative to the other big countries of the euro zone) plays a part. The relationship she finds is not linear but hump-shaped meaning that wage growth is especially restrained in the very big (in this case Germany) and very small countries of the monetary union. In her view German wage restraint results from unions’ dread of an interest hike by the central bank (which would restrain domestic as well as external demand), should they push wages up; and she concludes that “the largest EU labour market, Germany, is constrained in a straight-jacket”. (This of course, sheds a different light on the German growth strategy and how we previously described it.) As for middle-sized countries, they are not big enough to influence euro-area inflation and not small enough to care only about decreasing their labour costs, so that their wage growth is on average larger than that of small countries and Germany.

We have thus explained how the economic government of the euro zone is adverse to growth strategies of large countries and conversely boosts those of small one. But this theoretical analysis needs being completed and confirmed by an empirical one.

### SECTION 3: ECONOMETRIC ANALYSIS

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Now that we have explained the workings of the euro zone and how it made country size play a part in economic performance from a theoretical viewpoint, it is time we empirically test our arguments.

#### *The data, the variables and their correlation structure*

The data we use covers the 1998-2008 period for the fifteen countries of the euro zone (though the three latest entrants, do not necessarily fit the “size divide” as we previously explained) and comes from Eurostat. To measure economic performance we focus on GDP growth. One could argue that the indicator is only quantitative and does not necessarily capture the quality of growth (possibly better displayed by GDP per capita); however for the purpose of simplicity, we will use it as our dependent variable. We further include unemployment, the external balance as a percentage of GDP (Bal\_pro) and inflation (i.e. the three other components of Kaldor’s magic square) in our correlation structure analysis (see Table 1) to complete it.

To measure country size we rely on population and to a lesser extent population squared so as to test whether one may observe quadratic relationship between country size and economic performance (this does not prove very conclusive). We also include determinants of economic performance we believe are either negatively (openness, the general government structural balance) or positively (domestic demand) correlated with country size.

The correlation structure displayed in Table 1 shows negative correlations between indicators of country size (population, GDP) and economic performance (GDP growth and unemployment being respectively negatively and positively correlated with population). Also the correlation between the economic motor of large economies (domestic demand, here taken as a percentage of GDP) and economic performance is negative; the deficit gap ( $\Delta\text{Deficit} = \text{Budget deficit} + 3$ , is negative for countries running deficits larger than the 3% limit and positive for those within the Maastricht bounds) is positively correlated with growth. This hints at a possible growth impediment for countries relying heavily on domestic demand and running large deficits, i.e. usually large countries. Conversely openness and the inflation gap ( $\Delta\text{Inflation} = \text{Inflation rate} - 2$ , measures whether the country’s inflation is above or under the 2% threshold that the ECB uses to define price stability) are positively correlated with growth, which confirms the small countries’ advantages in the euro zone. Domestic demand and trade openness are complementary economic aggregates and to some extent superposed (imports are also a part of domestic demand for instance); so for the sake of simplicity and to avoid misspecification, we use them as alternative controls (i.e. the performance of big countries is regressed on domestic demand and that of the smaller ones on trade openness). However as we have seen previously, the three large euro zone economies are in fact medium sized economies and our purpose

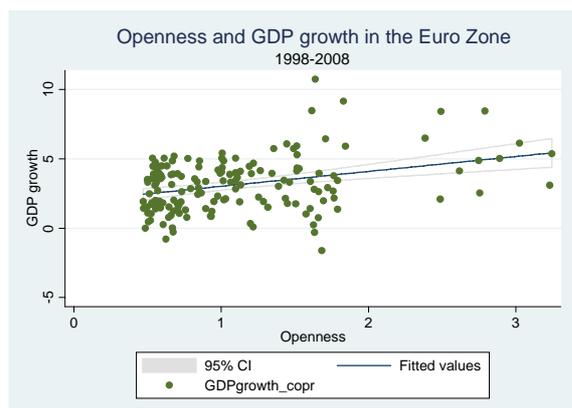
is not to deny their heavy reliance on exports (especially in the German case). Thus, to draw a subtler picture, we pay heed to the different intensities with which these two categories of economies depend on various economic aggregates for their growth. The correlation structure of our indicator of territorial efficiency indicator—output per 1000km<sup>2</sup>— is not so straightforward with regards to country size but as we have seen earlier (see p.7), it is because the relationship between both variables is not linear.

TABLE 1 : CORRELATION STRUCTURE OF VARIABLES

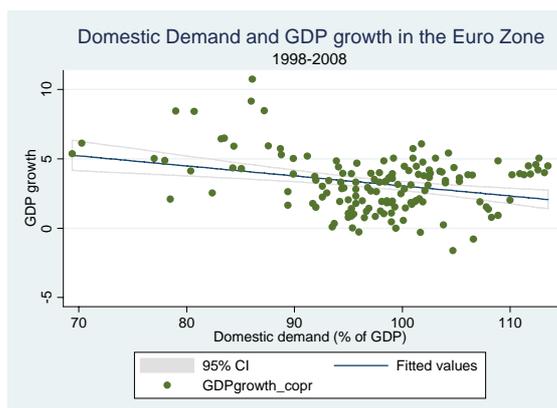
Variables	GDP	GDP growth	Unemployment	Population	Trade Openness	Domestic Demand	Output per 1000km <sup>2</sup>	Δ Inflation	Δ Deficit
GDP	1.0000								
GDP growth	-0.4008	1.0000							
Unemployment	0.2759	0.0001	1.0000						
Population	0.9732	<b>-0.3881</b>	0.3945	1.0000					
Trade Openness	-0.4147	<b>0.3261</b>	-0.5177	<b>-0.5278</b>	1.0000				
Domestic Demand	-0.0033	<b>-0.2067</b>	0.3036	<b>0.1183</b>	-0.6188	1.0000			
Output per 1000km <sup>2</sup>	0.1482	-0.2896	-0.3676	0.0589	0.5305	-0.2820	1.0000		
Δ Inflation	-0.3081	0.2512	-0.1009	-0.2379	0.1095	0.2073	-0.1657	1.0000	
Δ Deficit	-0.2277	0.3839	-0.0840	-0.2694	0.4267	-0.6912	0.0250	-0.1317	1.0000

Graph 12 and 13 cast a light on the fact that openness seems to be a better motor for growth than domestic demand in the EMU, thus partly explaining the discrepancies in terms of economic performance along the size divide.

Graph 12



Graph 13



*Panel data analysis*

In addition to our variables capturing size (population), economic motors (trade openness, domestic edmand) and territorial efficiency (output per 1000km<sup>2</sup>),  $\Delta Inflation$  or the ‘inflation gap’ and  $\Delta Deficit$  or the ‘deficit gap’ (both defined earlier) are meant to reflect the institutional settings of the euro zone and how far economies lie away from the macroeconomic stability targets or bounds of the ECB and

the Stability and Growth Pact. These variables often bear opposite signs according to whether a country is big or small (especially  $\Delta Inflation$ , because of small countries' inflationist tendencies). Larger countries, on the other hand, for reasons we previously detailed, tend to run larger deficits.

I use panel data to estimate the effects of the previously detailed independent variables on GDP growth. The analysis relies on GLS (Generalised Least Squares, so as to obtain the best linear unbiased estimators) regressions with fixed effects<sup>67</sup> (FE model) and robust standard errors specification for conditional heteroscedasticity of the following form:

$$GDP\_Growth_{it} = \beta_0 + \beta_1 Population_{it} + \beta_2 Trade\ Openness_{it} / Domestic\ Demand_{it} + \beta_3 Output\_per1000km^2_{it} + \beta_4 \Delta Inflation_{it} + \beta_5 \Delta Deficit_{it} + u_i + \epsilon_{it}$$

Where  $u_i$  and  $\epsilon_{it}$  respectively denote country effects and the error term. *Population* is the population for a given country in a given year in millions. *Trade Openness* is the the sum of exports and imports as a percentage of GDP, alternatively we control for *Domestic Demand* as a percentage of GDP.

Indeed these two variables, as we explained earlier are roughly speaking either the motor of small or large economies and can be seen as converse representations of the same economic aggregate.

*Output\_per1000km<sup>2</sup>* is the ratio of GDP over surface area and is our measure of territorial efficiency.

$\Delta Inflation$  and  $\Delta Deficit$  are the two measure of inflation and deficit in relation with the policy of the ECB and the Maastricht criterion we use to assess the impact of the euro zone “economic government” (as we discussed in the precious paragraph).

The small number of countries oriented our choice for a fixed effect regression—confirmed by a Hausman test<sup>8</sup> as well as by high correlation values of the individual intercept term  $u_i$  and the constant term. We also introduced time effects so as to possibly capture the effects of a “euro zone business cycle”. Using a usual F-test, time effects are proved to be overall significant but not individually, and given the limited number of observations and so degrees of freedom, we considered the results less relevant (see table in appendix C) and favoured estimations including only individual effects.

Table 2 presents the results of the GLS regressions for the 1998 to 2008 period, for the fifteen countries of the euro zone. Model 1 tests the relationship between growth and country size (taken as population); the results confirm a significant inverse relationship. Model 2 adds openness and exhibits a positive significant relationship with growth. Model 3 tests an alternative to trade openness with domestic demand taken as a percentage of GDP but lacks significance. Model 4 and 5 add territorial efficiency to either of these alternative regressions, and model 6 and 7 include the inflation and deficit gaps and yield mixed significance results. Overall, coefficients on trade openness are more significant than those on domestic demand, also given our assumptions on the different roles they play in the

<sup>6</sup> The FE model allows for the intercept term in the regression function to vary over time and space, while the slope estimates are constrained across units.

<sup>7</sup> Additionally the panel was checked for serial autocorrelation in the idiosyncratic errors, as this particular issue proves problematic for fixed effects regressions as explained in Drukker (2003).

<sup>8</sup> The Hausman test indicates that the individual effects and our explanatory variables are related, so that the fixed effects (also called within) estimator is the appropriate one.

growth strategies of small versus large countries, it is sensible to run regressions for both groups and see whether these differences are empirically confirmed.

**TABLE 2 : REGRESSION TABLE FOR DETERMINANTS OF GDP GROWTH IN THE EURO ZONE, 1998-2008**  
GLS with fixed effects for panel data, robust to heteroscedasticity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth
Population	-0.500** (-3.02)	-0.532* (-2.87)	-0.520* (-2.57)	-0.389* (-2.86)	-0.529 (-2.12)	-0.342* (-3.01)	-0.748** (-4.40)
Trade		0.0176 (1.12)		0.0514** (3.27)		0.0798*** (8.79)	
Openness					0.0910 (0.99)		0.215* (2.41)
Domestic Demand			0.0876 (1.39)				
Output per 1000km2				-1.092 (-1.90)	0.0300 (0.07)	-1.431** (-4.46)	-0.257 (-0.47)
Inflation Gap						-0.542*** (-7.42)	-0.124 (-0.77)
Deficit Gap						0.198 (1.34)	0.386* (2.55)
Constant	13.70** (3.92)	12.48** (3.33)	5.757 (0.95)	10.69*** (4.31)	5.473 (0.66)	10.96** (3.57)	3.368 (0.46)
Observations	162	160	145	160	145	119	108
R <sup>2</sup> within	0.0564	0.0774	0.0509	0.164	0.0510	0.365	0.262
sigma_u	12.54	13.95	12.99	11.28	13.23	11.42	20.08
sigma_e	1.370	1.366	1.371	1.305	1.376	1.091	1.141
rho	0.988	0.991	0.989	0.987	0.989	0.991	0.997

*t* statistics in parentheses \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Data: Eurostat.

#### *Assessing the 'size divide'*

To capture the structural effects of country size on growth and test our 'size divide' hypothesis, we run the same regression as before separately for big and small countries (Spain is dropped as it is the only middle-sized country falling in neither categories). Table 3 details the results for large countries: country size gains significance confirming our inverse relationship hypothesis. Since openness was not always significant, in line with the fact that large countries are comparatively more closed, we dropped the variable from the regressions and replaced it with domestic demand. Domestic demand is thought to capture two presumed assets of larger economies: a more vigorous consumption force and a greater ability to make large investments. The fact that it is not always significant can be explained by Germany's idiosyncratic strategy resulting in a significant decrease in consumer spending as detailed in Section 2. The coefficient on the deficit gap is positive and significant, confirming our hypothesis. However, given the high correlation between the deficit gap and domestic demand (-0.69) as well as the significance interactions on their coefficients, multicollinearity cannot be ruled out.

**TABLE 3 : PANEL DATA : DETERMINANTS OF GDP GROWTH IN LARGE COUNTRIES OF THE EURO ZONE, 1998-2008**

GLS with fixed effects regressions for panel data, robust to heteroscedasticity

	(1)	(2)	(3)	(4)	(5)
	GDP growth				
Population	-0.576*	-0.784**	-1.744	-0.826*	-1.367***
	(-6.56)	(-12.91)	(-2.64)	(-6.63)	(-91.62)
Domestic Demand		0.178	0.417	0.229*	0.347**
		(1.89)	(2.17)	(5.38)	(18.21)
Output per 1000km2			4.023		2.873**
			(1.53)		(15.43)
Inflation Gap				0.541	0.144
				(2.22)	(0.97)
Deficit Gap				0.742*	0.633**
				(7.01)	(24.71)
Constant	40.10*	36.52*	59.89	34.03	46.27**
	(6.85)	(4.74)	(3.39)	(3.53)	(30.48)
Observations	33	30	30	30	30
R <sup>2</sup> within	0.213	0.225	0.386	0.581	0.637
sigma_u	7.710	10.84	19.30	11.20	15.11
sigma_e	0.935	0.967	0.879	0.742	0.705
rho	0.985	0.992	0.998	0.996	0.998

t statistics in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Data: Eurostat.

Table 4 shows the results for small countries: the country size effect bears an even larger coefficient, hinting at a stronger ‘size advantage’; comparatively to large countries and as expected, openness is more significant (here, domestic demand proves insignificant and is therefore dropped from the regressions); but the hypothesis that their larger inflation rates foster their growth is not confirmed by regressions 4 and 5. On closer inspection of the data, it seems that small euro zone economies tend to go through episodes of short-lived inflationary growth (ie inflation soars with high growth rates, and in the next period high inflation eats up growth). The *Economist* (“Dangers ahead”, February 16<sup>th</sup> 2008), assessing the repercussions of the American recession on the European economy, noted that “the parts of the economy that are most exposed to non euro zone demand are doing better than those that rely on domestic spending”, confirming our arguments. This statement also implies that euro zone small countries are more apt to withstand recession than the bigger ones, defeating both the ideas that dependence on exports make small countries more vulnerable to unpropitious international conditions and that bigger countries had “the domestic firepower to withstand a recession in America.”

**TABLE 4 : PANEL DATA : DETERMINANTS OF GDP GROWTH IN SMALL COUNTRIES OF THE EURO ZONE, 1998-2008**

GLS with fixed effects regressions for panel data, robust to heteroscedasticity

	(1)	(2)	(3)	(4)	(5)
	GDP growth				
Population	-3.495*	-4.053**	-3.086	-4.931***	-7.758***
	(-2.38)	(-3.24)	(-1.48)	(-7.81)	(-12.62)
Trade Openness		0.0246	0.0397*	0.0874**	0.0714**
		(1.29)	(2.57)	(4.89)	(3.94)
Output per 1000km2			-0.537		1.434**
			(-0.61)		(4.18)
Inflation Gap				-0.662***	-0.666***
				(-6.83)	(-7.50)
Deficit Gap				0.0979	0.123
				(0.53)	(0.68)
Constant	25.92*	26.01**	20.56	39.67***	61.32***
	(2.75)	(3.31)	(1.84)	(6.64)	(10.85)
Observations	118	116	116	75	75
R <sup>2</sup> within	0.124	0.174	0.190	0.495	0.528
sigma_u	18.01	21.70	17.25	19.94	27.27
sigma_e	1.436	1.411	1.405	1.096	1.068
rho	0.994	0.996	0.993	0.997	0.998

t statistics in parentheses \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Data: Eurostat.

Having a separate “medium sized” category for Spain proved *a posteriori* sensible. Though Spain does not exactly fit the large euro zone country profile, a regression including the “three big” and Spain was run so as to rely on more observations. The  $R^2$  dropped slightly; the significance results were roughly the same: the coefficient on size was less negative and the inflation gap coefficient changed signs without gaining significance. The inclusion of Spain in the small countries regression proved even less appropriate:  $R^2$  dropped to a maximum 0.35, population and trade openness lost any significance except in the third model while the significance of the inflation gap was boosted. These result confirm that Spain falls into a size category of its own, sharing with the large countries a weaker reliance on exports and displaying inflationary growth as is the case of several smaller countries, but having overall economic structures pertaining neither to small or large economies.

Table 5 presents a comparison of the regression coefficients in terms of range and significance: Since the coefficients in the FE model regression are constrained across units, comparing regression coefficients obtained for large countries and small countries is a good way to check the empirical incidence of country size on economic performance. While coefficients always bear the same sign for both groups, there still are a number of sizeable differences. As far as population is concerned (our proxy for country size), it seems to have an more negative impact on growth for our eleven small countries than for the large ones, confirming an advantage to micro-states in the likes of Luxembourg, Malta and so forth. Trade openness yields the best significance results and the coefficient on it is larger for the small countries. Domestic demand displays no significant coefficient for small countries and a moderate positive impact on the growth variations in large ones.

**TABLE 5 : COMPARISON OF REGRESSION COEFFICIENTS : RANGE AND SIGNIFICANCE**

	Large countries	Small countries	Eurozone (15 countries)
<b>Population</b>	[-1.367***; -0.576*]	[-7.758***; -3.495*]	[-0.748***; -0.342*]
<b>Trade Openness</b>	0.0524**	[0.0397*; 0.0874**]	[0.0514**; 0.0798***]
<b>Domestic Demand</b>	[0.229*; 0.347**]	No significance	0.215*
<b>Output per 1000km<sup>2</sup></b>	2.873**	1.434**	-1.431**
<b>Inflation Gap</b>	No significance	[-0.664***; -0.662***]	0.542***
<b>Deficit Gap</b>	[0.633**; 0.742*]	No significance	0.386*
<b>Sigma_u</b>	[7.710; 15.11]	[17.25; 27.27]	[11.28; 20.08]

Our measure for territorial efficiency has a positive and significant coefficient in both small and large countries regressions and a negative sign in the common one. This is partly explainable by the fact, that as we have seen in Section 1, this variable does not have a linear relationship with size, as large countries are more territorially efficient than some small countries still catching up with their European counterparts. The most interesting differences are in the inflation and deficit gaps. Overall, inflation does not seem to be much related to growth fluctuations (correlation coefficient -0.3081). On

closer inspection however, there is a strong positive correlation in small countries between growth and future (at  $t+1$ ) inflation (0.5751). Indeed for new entrant countries or some that have been catching up (most notoriously Ireland), either the Balassa-Samuelson effect has been at play or rapid growth has fuelled inflation. In large countries the between inflation and growth is negative but small (-0.2774), the coefficient on the inflation gap is not significant, so that we cannot make strong assumptions in this regard. If anything, the correlation between past inflation and present growth is larger (-0.4312), hinting at a possible braking role of inflation on growth. Different interaction mechanisms between growth and inflation in large and small countries of the euro zone thus seem at play, and the existence of an inflation externality generated by small countries is empirically confirmed, even if it does not appear to buoy up their growth. Turning now to the deficit gap, the analysis is reversed: no significance as well as low correlation levels with past and future values of the deficit with growth are found for small countries, in line with the expectation that these countries rely on external and not domestic demand for their growth. For large countries (notwithstanding multicollinearity between the deficit gap and domestic demand as explained earlier), on the contrary the present and past deficits are positively correlated with growth (at the respective levels of 0.4090 and 0.5135), thus corroborating our domestic demand based growth argument.

Notwithstanding that we can only identify correlations and not directly causal effects; country size seems to have a sizeable explanatory power in accounting for growth differences in the euro zone<sup>9</sup>. Our analysis encompasses components of growth and corroborates that the economic structures of small countries seem more apt to foster growth in the framework of the euro zone. By and large, the econometric results also confirm our assumptions about the differentiated effect of the euro zone economic government. Namely, regarding inflation, virtue, in the monetarist sense of the term, has little effect in large countries and seems to dampen growth in small ones. No strong justification for the deficit limits with regards to national growth rates is found as deficit appears conducive to growth in large countries and has no effect in small ones.

Nevertheless when we introduce country and time effects, the estimated pair wise correlations exhibit less significance in a complex panel data analysis. One way to improve the reliability of our econometric results would be to temporally widen our data set: gathering data for the last fifty years would allow us to assess the effects of European integration on the relationship between country size and growth strategies and see whether the implementation of the euro zone has had significant effects in that matter. Additionally, extending the number of years included in our data set would enable us to run seemingly unrelated panel regressions (SUR) and so relax the homogeneity assumptions on the regression coefficients of the fixed effects estimation.

Country effects (measured by  $\sigma_u$ ) and their incidence on the total variance (measured by  $\rho$ ) are in all cases large, meaning that national peculiarities in the variables we control for play a great part in

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<sup>9</sup> The same regressions were run excluding the potential outliers that are Ireland and Luxembourg (small countries with very high growth rates over the decade) and yielded roughly the same significance levels.

growth differences, and there are certainly other reasons possibly explaining economic performances, not taken into account in our analysis. There is for instance a national responsibility in conducting or not reforms, using economic policies to cater to re-election purposes, etc, that cannot be blamed on flawed EMU institutional design.

### CONCLUDING REMARKS

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Country size determines a number of economic structures; in particular greater openness is to be observed in smaller countries and heavier reliance on internal demand in larger ones. In the context of the EMU and its economic rules, these features influence economic performance precisely because the “one-size-fits-all” rules are biased in favour of the growth strategies of small countries. One should indeed take stock of global demand when internalising externalities. This means for instance, taking into account small countries’ negative externalities in terms of inflation and not just large countries’ fiscal externalities. Ironically enough, Germany and France, two large countries, presided over the making of the monetary union and so bear a responsibility for their own disadvantaged economic fate in the euro zone.

The financial crisis currently unfolding has been revealing of the effects of country size within the euro zone. The German refusal of a common rescue plan demonstrated again Germany’s reluctance to assume its *de facto* biggest power role. Ireland’s unilateral decision to raise guarantees on bank deposits and thus distorting competition illustrated some small countries’ new abilities to punch above their weight and go it alone, once they have entered the European Union. The crisis also highlighted the shelter role of the euro. Had it not been for its euro area membership, we may surmise that Ireland and other countries would have been in a much worse position as prove the fate of Hungary or Iceland and also the second-thoughts countries like Sweden or Denmark are giving to euro adhesion.

The emergence of a ‘size divide’ within the euro zone is confirmed by a thorough econometric analysis, also led separately for large and small countries. Enlarging the time scope of the data would be useful to assess comparatively the effects of the monetary union and so be the object of another paper.

The fact that large countries are economically disadvantaged by the workings of the EMU is a problem for the euro zone as a whole. Harming members representing together 70% of the area’s GDP, as well as absorbing a substantial share of other euro zone economies’ exports will eventually also hurt smaller economies. Under such a scenario, the euro zone won’t be able to live up to its role as a key international economic power and the euro will also lose some of its international appeal.

Finally, it is sensible to extend our analysis of the impact of country size to the enlargement of the euro zone. Integration is a ‘shrinking process’, and with each enlargement, relative sizes of Member States within the monetary union diminish. Another factor affecting country size is demographic change. Indeed, if the population of some euro zone countries is on the wane, while that of others

grows, in the long run the relative sizes of Member States will change. Does this mean that size effects will evolve, bringing about new economic policy constraints? This question remains to be investigated. What remains certain is that euro zone membership is clearly more propitious to small countries and it should not come as a surprise, if among the new Member States, the bigger three (Poland, Hungary and the Czech Republic) are the more reluctant to introduce the euro soon, while smaller ones have already entered the zone.

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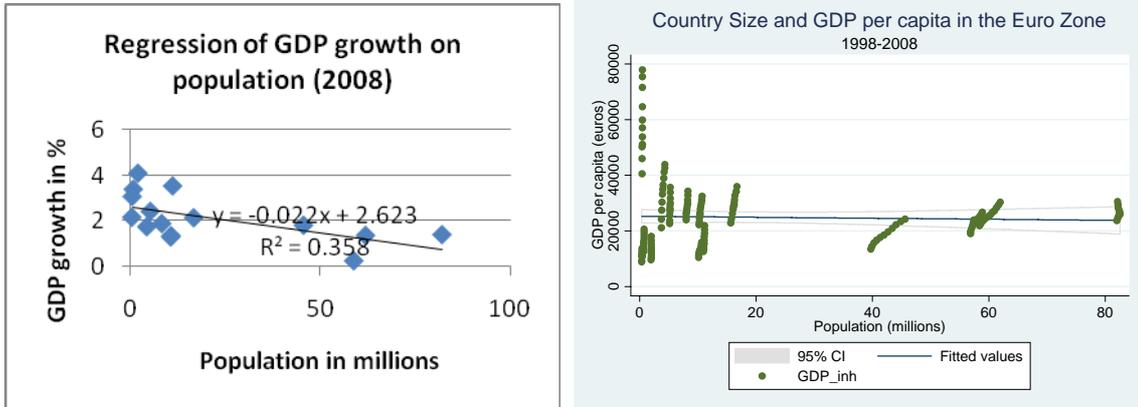
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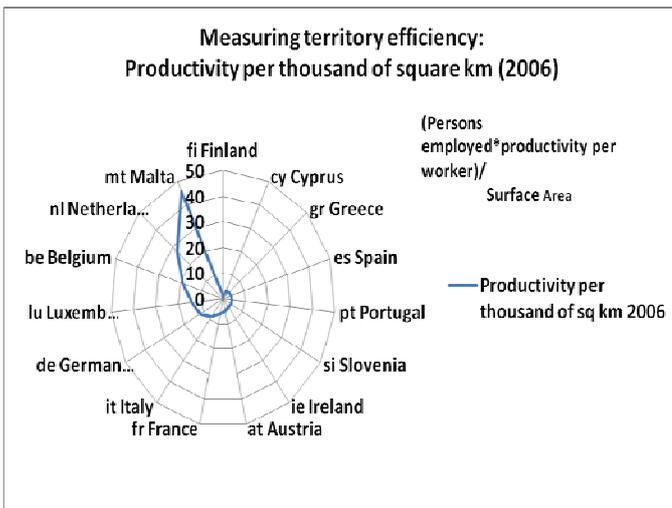
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**APPENDIX A :**

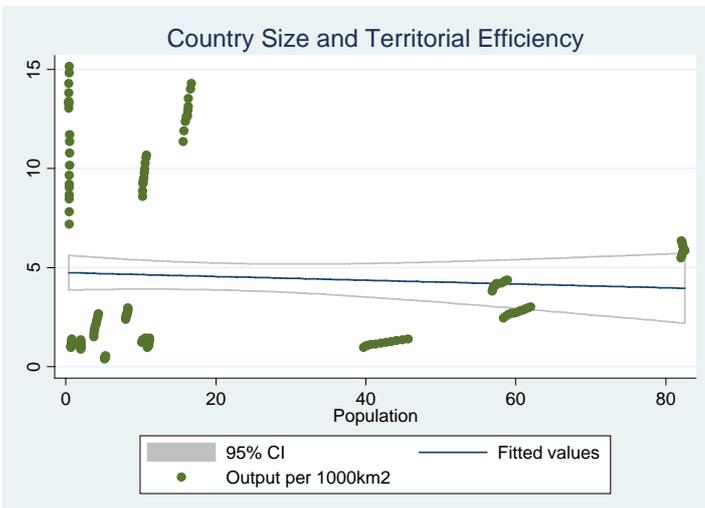


**APPENDIX B :**

**Productivity per thousand of square km**



**Country size and territorial efficiency : a non-linear relationship**



## APPENDIX C :

TABLE 6 : PANEL DATA: DETERMINANTS OF GDP GROWTH IN THE EURO ZONE, 1998-2008

GLS with fixed effects regressions for panel data with time effects, robust to heteroscedasticity

	(1)all eurozone countries GDP growth	(2)all eurozone countries GDP growth	(3)small countries GDP growth	(4)large countries GDP growth
Population	0.113 (1.86)	-0.143 (-0.67)	-2.973** (-4.45)	-0.595 (-2.22)
Trade Openness	0.0850*** (15.10)		0.0763*** (11.94)	
Output per 1000km2	-0.0575 (-0.37)	0.281 (0.55)	0.774*** (8.59)	7.227 (2.17)
Inflation gap	-0.0224 (-0.22)	0.240 (1.55)	0.0360 (0.33)	0.0685 (0.61)
Deficit gap	0.0243 (0.31)	0.0674 (0.80)	0.0508 (0.59)	-0.247 (-1.64)
Year==1999	0.173 (0.51)	0.193 (0.51)	0.251 (0.44)	-0.397 (-0.79)
Year==2000	-0.533 (-1.09)	0.0121 (0.02)	-1.102 (-1.99)	-0.443 (-0.39)
Year==2001	-2.450*** (-5.08)	-2.016** (-3.68)	-3.027*** (-6.85)	-2.797 (-2.30)
Year==2002	-2.819*** (-7.36)	-2.623*** (-5.61)	-2.962*** (-6.90)	-3.945 (-3.18)
Year==2003	-2.810*** (-6.29)	-2.732*** (-4.61)	-2.833*** (-7.37)	-4.187 (-3.50)
Year==2004	-1.900*** (-4.66)	-1.497* (-2.47)	-1.811** (-4.30)	-3.119 (-2.24)
Year==2005	-2.533*** (-6.47)	-1.942** (-3.54)	-2.347** (-5.52)	-3.909 (-2.34)
Year==2006	-1.950** (-4.14)	-1.130 (-1.34)	-1.759** (-3.71)	-3.097 (-1.32)
Year==2007	-2.223*** (-5.31)	-1.222 (-1.51)	-1.867** (-4.35)	-3.666 (-1.57)
Year==2008	-3.757*** (-7.80)	0 (-)	-3.483** (-5.62)	0 (-)
Domestic Demand		0.0259 (0.24)		0.100 (1.60)
Constant	-5.901* (-2.76)	4.442 (0.52)	21.01* (3.23)	3.613 (0.14)
Observations	119	108	75	30
R <sup>2</sup> within	0.765	0.656	0.807	0.952
sigma_u	3.675	3.700	10.64	6.441
sigma_e	0.698	0.821	0.744	0.332
rho	0.965	0.953	0.995	0.997

*t* statistics in parentheses\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Data: Eurostat.