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Fiscal integration and growth stimulation in Europe

Jacques H. Drèze and Alain Durré

DISCUSSION PAPER

Center for Operations Research
and Econometrics

Voie du Roman Pays, 34
B-1348 Louvain-la-Neuve
Belgium
http://www.uclouvain.be/core

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Jacques H. DREZE [1] and Alain DURRE[2]

with an Appendix by Jacques Drèze and Jean-François Carpantier[3]

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Abstract

With the current sovereign debt crisis, the incompleteness of economic integration in the Economic and Monetary Union (EMU) has become patent leading to an intense debate among academics and policy makers. Most of the debate focuses on the needs to strengthen fiscal rules and to restore fiscal imbalances through austerity measures which weigh on growth prospects. In this paper we analyse current economic developments within the euro area through the lens of general equilibrium theory. We address two issues (international sharing of macroeconomics risks and coordinated growth stimulation) which are essential to guarantee the sustainability of the EMU. More specifically, we propose mechanisms to cope with intergenerational and interregional risks while focusing on (fiscally neutral) investments meeting social needs and apt to break the vicious circle between fiscal imbalances and stagnation.

Keywords: general equilibrium model, risk sharing, growth stimulation, fiscal integration, EMU, indexed bonds.

JEL classification: E24, E63, H63

[1] Université catholique de Louvain, CORE, B-1348 Louvain-la-Neuve, Belgium. E-mail: Jacques.dreze@uclouvain.be. This author is also member of ECORE, the association between CORE and ECARES.
[2] IESEG-School of Management (Lille Catholic University) and LEM-CNRS (U.M.R. 8179), France. E-mail: a.durre@ieseg.fr
[3] CREA, University of Luxembourg. E-mail: jean-francois.carpantier@uni.lu

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Contents

1. Introduction

The current crisis of the Economic and Monetary Union (EMU) combines financial, economic and political difficulties that confirm the incompleteness of economic integration in the euro area[5] and could even question the sustainability of the EMU itself.

The current debate on crisis resolution underscores the importance of macroeconomic uncertainties. Indeed, the current crisis was not really anticipated, and short-to-medium term macroeconomic developments in Europe remain highly uncertain today. Although the current crisis has taken its roots in financial markets – due to excessive risk-taking behaviour by intermediaries and investors under inadequate monitoring – its macroeconomic impact today puts downward pressures on both the economic outlook and the public finances for the whole euro area. This reveals the urgency of deepening economic integration, a need that remained masked by the favourable developments until 2007, but that cannot be ignored by a set of countries no longer apt to rely on currency devaluation as an adjustment mechanism.

This paper aims at: (i) interpreting the current situation in the EMU within the framework of General Equilibrium Theory (GET); then (ii) advancing some policy proposals rooted in that analysis. In particular, two proposals emerge, that (we feel) do not receive proper attention in today's policy debates – namely international sharing of macroeconomic risks through mutual *insurance* (Section 2) and growth stimulation through international *public investment* programs (Section 3). Both proposals aim at completing the economic integration of the EMU, which appears necessary to guarantee the viability of the monetary union. Section 4 summarises our policy perspectives and immediate recommendations. Finally, Section 5 reviews some institutional steps related to their implementation.[6] [7]

Our main goal is to offer a comprehensive, theory-based approach to tackle the current problems of the EMU so as to strengthen market confidence in the irreversibility of the monetary union and to sustain more positive expectations about macroeconomic trends. To a large extent, our proposition for growth stimulation substantiates and concretises for the euro area the project of "Compact for Growth and Jobs" endorsed by the European Council on 18 October 2012 for the whole European Union. The present paper was written before the release of "Towards a genuine economic and monetary union" by Van Rompuy et al. (2012) – hereafter VRetal. Interestingly, the two texts are broadly complementary, in spite of sometimes distinct approaches. Thus, VRetal write: "*Stronger economic integration is also needed to foster coordination and convergence in different domains of policy between euro area countries, address imbalances, and ensure the capacity to adjust to shocks and compete in a globalised world economy".*

[5] As discussed in Drudi et al. (2012), the institutional framework of the EMU is incomplete as reflected in the on-going processes aimed at implementing the various decisions at the EU level since May 2010.

[6] Each section is largely self-contained and can be read independently.

[7] How to deal with asymmetric macroeconomic shocks within a monetary union received controversial attention at the launch of the Euro. For the sake of brevity, we do not review that process, well covered in the literature. See for instance De Grauwe (2012).

"International sharing of macroeconomic risks" is one of the central concerns in VRetal; we suggest a specific mechanism for such sharing, thereby complementing VRetal. Our concern for "growth stimulation" is also shared by VRetal, though without centerstage status and without reference to public investments. By contrast, VRetal deals extensively with the problems of sovereign overindebtedness and bank solvency, that we do not address. Furthermore, VRetal shares the view that demand stimulation requires international programs, but introduces the international dimension through *cooperation* rather than *central definition and implementation;* thus, they write *(p.10)*: "*An integrated economic policy framework is necessary to guide at all times the policies of Member States towards strong and sustainable growth*".

2. Fiscal Integration and risk sharing

Terminology: The term "fiscal integration" is (ab)used in the policy literature to mean sometimes coordinated constraints on fiscal deficits, sometimes full budgetary integration. Our contribution is intermediate, as it bears on budgetary transfers resulting from insurance contracts. We try to avoid confusion by using the term sparely.

2.1 Theoretical background

GET aims at modelling economies as consisting of a set of households that consume commodities and supply labour, a set of firms that produce commodities and employ labour, a set of financial intermediaries, a public sector that levies taxes and issues transfers, and a central bank that issues a currency (fiat money). Commodities and labour are traded on markets. The firms are owned by households, either directly or through shares traded on stock markets, together with other assets – including nominal bonds. The economy operates over time in a framework defined by exogenous states of the environment (political developments, technology...), the progressive realisation of which is described by an event tree.

Ideally, there could exist at any point in time markets for trading commodities, labour and assets *contingently* on *any* future event (set of states). Under that idealisation, retained by the neo-liberal creed, competitive clearing of all markets could entail "Pareto Efficiency" – that is, attainment of an allocation such that no household could be made better off without some other household becoming worse off.

Among the many departures from that idealisation that real world economies display, one stands out as universal: *markets are incomplete*; that is, markets for trading contingently on any event are notoriously absent. One trivial example concerns students at a college or university: they never engage in contingent contracts covering their full career under all conceivable circumstances!

This transparent example is trivial, but there are many important uncertainties for which market insurance does not exist, with serious macroeconomic consequences.[8] For instance, when the EMU was set up, none of the Member States could have *insured* against the kind of adverse developments that

[8] The lack of suitable instruments for sharing macroeconomic risks has been stressed early on by Shiller (1993).

puts some of them today at risk of default. In the same vein, we know today that almost no euro area Member State has built financial buffers in good times to face adverse macroeconomic shocks in bad times – a feature on which again no insurance was forthcoming.

The ubiquitous market failure labelled "incomplete markets" invites public policies aimed at implementing second-best allocations that improve upon those accessible through the existing markets. It is important to understand the general nature of such policies if one wishes to meet some of the challenges that we are facing today. We address that issue briefly in Section 2.2, before spelling out some of the direct implications of market incompleteness for microeconomics (Section 2.3) and macroeconomics (Section 2.4). We then address successively intergenerational (Section 2.5) and international (Section 2.6) risk sharing. And we conclude Section 2 with a remark on EMU membership.

2.2 Public policies under incomplete markets

Since we aim at defining policies apt to bring about more efficient risk-sharing under incomplete markets, it is appropriate to start from the general theory of risk-sharing efficiency. That brings us back to Borch's Theorem (1960):[9]

"Let N agents each be endowed with a random wealth prospect x_i of known probability distribution, and with preferences representable by the expectation of a concave function of wealth; then, every efficient risk-sharing arrangement calls for *pooling all risks* and *sharing the aggregate wealth* $X = \Sigma_i x_i$ among all the agents. The share of the aggregate risk borne by each agent is allowed to vary with the level of that risk, reflecting individual risk-tolerances. An immediate corollary of Borch's theorem asserts that efficient global risk-sharing could be organised on a two-tier basis, with individual risks pooled efficiently within nations or regions, and aggregate national or regional risks pooled at an upper tier."[10]

In a standard macroeconomic framework, the "two-tier basis" approach has two natural dimensions: the *international* dimension mentioned in the above quotation, and the *intergenerational* dimension. To this must of course be added the lower-tier *interpersonal* dimension, of a microeconomic nature, presiding over the final allocation among households (and firms) of the risks that remain to be borne nationally, after suitable sharing at the two macroeconomic levels mentioned above.

The intergenerational dimension is a matter of *public* policy within each country or region because living households are unable to share risks with their followers: they may bequest assets, but not net liabilities on which their heirs could always renege. In contrast, the public sector shifts liabilities forward through

[9] See Drèze (2000) for a brief overview.
[10] Quoted from Drèze (2013), p.3 and footnote 3.

the public debt.[11] Accordingly, the natural instrument of intergenerational risk-sharing is the *fiscal stance* that determines today's net addition (positive or negative) to the public debt.

Two ancillary remarks are worth listing:

- First, the "net addition" is net of debt-financed *productive investments* that entail no intergenerational transfer. That is, one must always distinguish the current fiscal stance from the capital account. The standard rule of a maximal deficit/GDP ratio computed for the *sum* of the current and capital accounts is thus misleading.

- Second, the "net addition" concerns not only the explicit public debt, consisting of government bonds. It also concerns the *implicit* public debt, consisting mostly of unfunded pension rights. In most advanced economies, the latter may amount to 2 or 4 (!) times the former. The standard (Maastricht) reference to a debt/GDP ratio reflecting only the explicit debt is thus grossly misleading.[12]

On both accounts, the current practice inspired by the Maastricht Treaty is unsatisfactory and should be mended. The goal should be to test whether the policy parameters that underlie the fiscal stance are compatible with a balanced budget *on average* – thus calling for surpluses in good times. Structural adjustments of these parameters should accordingly be based on the *average fiscal stance*, not on its current level. We return to that issue in section 2.6.

2.3 Microeconomic implications of market incompleteness

Among the microeconomic consequences of market incompleteness, two stand out forcefully.

First, *incomplete markets breed demand volatility*, because postponing either (both) consumption or investment may be desirable, under the prospect of more information tomorrow. Indeed, uncertainty about future resources induces more savings, under the generally accepted condition of diminishing absolute risk aversion.[13] It is thus natural to postpone expenditures that are time-flexible (e.g. an expensive vacation or a durable good replacement) whenever high uncertainty is apt to diminish over time (like today!). This holds in particular for investments, as implied e.g. by Dixit and Pindyck (1994). In both cases, the loss associated with postponement is second-order, whereas the gain associated with better informed decisions is first-order – a sort of "menu cost" effect. As a result, the balance between savings and investment is recurrently perturbed by the dynamics of *information*, a macroeconomic consequence of the first order.

Second, *incomplete markets breed wage and price rigidities*. The literature on "General Equilibrium with Incomplete Markets" (GEI) contains a striking result on the generic inefficiency of competitive equilibria, hence the generic second-best superiority of equilibria with price rigidities and quantity

[11] This property is obvious for foreign debt. Domestic debt just imposes on future generations the burden of raising taxes to service debt that is not matched by productive investments. Evaluating the net burden is a well-known issue in macroeconomics.
[12] At the end of 2007, the gross debt including contingent pension obligations represented up to four times the corresponding gross domestic product (GDP) in the euro area and twice the GDP in the United States. See ECB (2010) for further details.
[13] See Drèze and Modigliani (1972).

constraints.[14] The argument for downward wage rigidities cum unemployment benefits is transparent: when properly designed, they provide income *insurance*, and the gain in risk-sharing efficiency outweighs the loss of productive efficiency.[15] The argument for price rigidities under increasing returns or monopolistic competition or both is slightly more subtle; see Drèze (2001, sec. 3.3) for a non-technical outline.

A very important implication of nominal wage/price rigidities is the existence of *multiple equilibria*. This has been demonstrated for the GEI model in a number of papers, including for instance Citanna et al. (2001), Drèze (1997) or Herings (2012). Drèze (2013b) extends the main result to the more realistic Temporary General Equilibrium (TGE) model.

The picture is now closed: in economies with incomplete markets (and no others have ever existed!), exogenous uncertainties result in multiple equilibria, so that *endogenous uncertainties* compound the exogenous ones. Typically, most of the admissible equilibria display *demand failures* reflecting coordination failures and calling for coordinated macroeconomic stimulation policies. Today Europe, and the euro area in particular, unquestionably falls in that category – even if the prevailing wage/price rigidities need not correspond to second-best policies.

The property that debt-financed productive investments entail no intergenerational transfers suggests that the fiscal stance be geared to intergenerational redistribution and risk sharing while demand stimulation, when needed (like today!), be achieved through public investment.

2.4 Macroeconomic implications of market incompleteness: growth stimulation through public investment

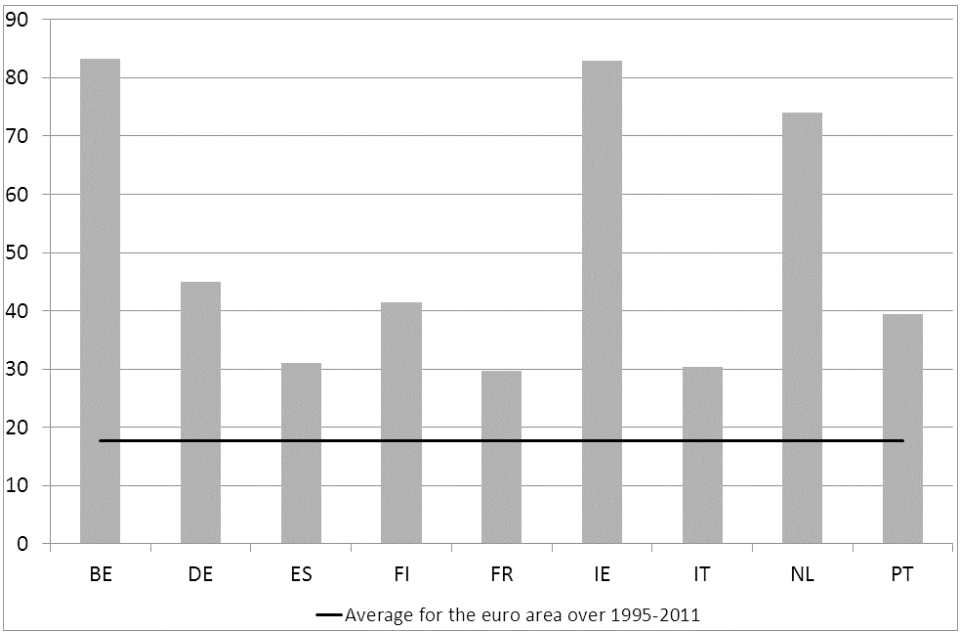
Regarding demand stimulation, it is important to realise that only *global* (namely EU or EMU*) programs* make sense: individual countries are too small for the programs to be effective, and too open for the programs to be attractive. Indeed, an individual country realises that its national program will largely benefit the countries from which it imports (see Figure 1), whereas a foreign deficit will develop at home[16]; see e.g. Drèze et al. (1988), also for reference to the "early Mitterand" and "German locomotive" failures. And of course the inclusion of debt-financed *investments* in the Maastricht-based deficit accounting limits out national initiatives.

As far as we know, *there is no alternative to an ambitious European investment program as a way out of the current recession*, which the prevailing austerity measures deepen and prolong. That is not to say that austerity measures are unnecessary or harmful. But they should be addressed to the *average* fiscal stance; and they should be temporarily *complemented* by growth enhancing measures, for which investments provide the

[14] See Geanakoplos et al. (1990) or Herings and Polemarchakis (2005).
[15] See Drèze and Gollier (1993). Just imagine how low market-clearing wages for unskilled labour would fall today in absence of minimum wages and unemployment benefits!
[16] A striking example of this phenomenon followed the German unification when excess private demand (with respect to capacity utilisation in West Germany) was met by an increase of production in neighbouring countries (Benelux, Italy and France in first instance).

only tool – because, as explained above, they are neutral from the viewpoint of intergenerational redistribution.

Figure 1 – Share of imports in percentage of GDP for the year 2011



Source: Eurostat

Of course, that does not say that any investment program will do, nor that implementing such programs is easy. The idea would be to advance in time the realisation of valid investment projects, and hence to stimulate aggregate activity, thereby also supporting more optimistic expectations leading to faster growth, in particular of employment, when a relatively closed economy (like the euro area) is suffering from persistent underutilisation of resources. It would not be reasonable in the current circumstances to propose stimulating the economy through budgetary deficits (fiscal expansion). Better identify real economic needs, i.e. investments that would be made anyway in the future, but whose realisation could be advanced in time through fiscally neutral subsidies.

We document summarily in section 3 that such a program could have a quantitatively significantly impact on current growth. For just the three sectors that we consider, some 12 to 15 million one-year jobs could be created – a definitely significant figure for EMU.

2.5 Intergenerational risk sharing

The distinction between intergenerational *redistribution* and *risk sharing* is relevant and deserves due attention. Ignoring short run fluctuations (including demand failures), a country should decide at each period (year?) whether its "net bequests" to future generations are excessive, adequate or insufficient. Ignoring provisionally the international dimension, the net bequests consist of human and physical capital plus or minus pre-committed transfers between the living and the newborn. (For instance, unfunded pension rights entail transfers from the newborn to the living.) The decision would suggest

adjustments in these bequests: negative if excessive, positive if insufficient. Such adjustments would be reflected in the fiscal stance: less surplus or more deficit for negative adjustments, and conversely. Think about the fiscal stance as determined primarily by such policy parameters as taxes and social contributions on the one hand, transfers or benefits (unemployment, pension, welfare..) and public goods on the other hand. Adjustments in these policy parameters would permit implementing the desired adjustments.

Ideally, a balanced budget could be associated with an adequate level of bequests, thus revealing adequate levels of the policy parameters. At worse, a budget deficit could be associated with insufficient bequests, revealing the need to adjust the policy parameters (to adopt "austerity" measures).

The foregoing is the subject matter of ongoing research labelled "generational accounting" since Auerbach et al. (1991). Aside from the difficulties linked to empirical measurement, there is the logical difficulty of defining "adequate bequests". One simple answer defines as adequate a level of bequests enabling future generations to maintain real per capita consumption levels similar to those prevailing today (with the possible conclusion that current net bequests might be excessive… popular perceptions notwithstanding?). This simple answer places a ceiling on the net transfers between the current and future generations such that (to a first approximation) the corresponding real interest charge does not exceed the expected growth of real national income.[17]

Be that as it may, the relevant point is that intergenerational redistribution should be controlled by the choice of policy parameters: this is a long run objective, to be pursued by permanent instruments. In contrast, intergenerational risk sharing is a short run objective, properly pursued by temporary adjustments of the fiscal stance.

This conclusion raises the difficult question of defining properly the fiscal stance that implements intergenerational *risk sharing*. An elementary example illustrates. Consider a community whose endowment is subject to a shock: a stationary zero-order Markov process entails a positive or negative fixed shock with given (say equal) probabilities. Let each of N successive generations adjust its consumption by (1/N)-th of the shock it experiences and shift the balance (positive or negative) forward. In a stationary state, each generation will adjust its consumption by the *mean* of N shocks, so that the *variance* of its consumption is divided by N.[18]

But there are pitfalls. As the number of generations and N tend to infinity, the cumulative balance of past shocks transferred to a new generation is unbounded. That is, for *any* positive real number R, the probability that the cumulative balance of unabsorbed past shocks (i.e. the outstanding debt) exceeds R is positive. And the probability that a future generation will have incentives to renege on the scheme is always positive.

[17] To a first approximation: this guarantees that the next generation is not prevented from attaining expenditure levels matching those of the current generation.

[18] This elementary example is discussed further in Gordon and Varian (1988).

It is thus appropriate that some EMU countries advocate structural reforms in those countries where intergenerational redistribution is biased against the future. And it is understandable that "fiscal integration" is seen by many as consisting in agreed ceilings on public deficits and public debt. But the basis on which these ceilings are currently defined leaves much to be desired! And "fiscal integration" calls primarily for international sharing of macroeconomic risks.

2.6 International risk sharing

Turning to international risk sharing, it follows from the contents of sections 2.2 and 2.3 above that we should not be surprised by the prevalence of idiosyncratic macroeconomic shocks at the national (and regional) level. With multiple equilibria resulting from both wage/price rigidities and savings/investment imbalances, there is ample scope for national shocks – as confirmed empirically. Looking at the economic developments in Europe over the past decades, there are signs of convergence among EU nations, but with ample departures from monotonicity. Figure 2 displays these features by plotting the percentage departures of incomes per capita from the EU average, for the so-called GIPS (Greece, Italy, Portugal and Spain). For comparison, Figure 3 presents comparable data for 8 US regions. These figures illustrate the fact that the US federation implements risk sharing and redistribution among its constituents, whereas the euro area does not!

Here again, the distinction between redistribution and risk sharing deserves attention. There are debates today in the euro area (and the EU to some extent) about the extent to which redistribution among Member States should be introduced. The current extent is minimal, with an EU budget of the order of 1% of GDP. A genuine fiscal *integration*, consisting not only of common fiscal rules but also of a common budget (possibly implemented stepwise), would entail substantial redistribution and is accordingly not in sight. But risk sharing is another matter: it needs not entail any ex ante redistribution, but carries definite benefits for all. According to Forni and Reichlin (1999), the extent of risk sharing (net of redistribution) among US states is of the order of 30 to 35%; it is minimal in the EU, but could potentially reach up to 45%.

How would one implement risk sharing, free of ex-ante redistribution, among euro area Member States? An ambitious scheme would invite each country to issue long term bonds indexed on its real national income. These bonds would be pooled, and each country would receive a share of the pool with present value equal to the present value of its own bonds. The scheme would thus implement international risk sharing free of ex-ante redistribution. It could, for instance, be applied to 36% of national incomes – a percentage close to that of public budgets in national incomes. An interesting feature of this scheme is that it entails transfers corresponding to *deviations* of national macroeconomic shocks from the EMU average thus summing to zero. Accordingly, national *risk premia* will reflect covariances of national GDP's with the EMU average (the CAPM formula), not variances of national GDP's (that might matter for standard issues). And an important feature is that the bonds issued by a

nation are almost entirely held by a pool of *foreigners* – which would not be guaranteed under a standard issue.

Figure 2 – Per capita GDP gap of Italy, Greece, Spain and Portugal *vis-à-vis* EU average[19]

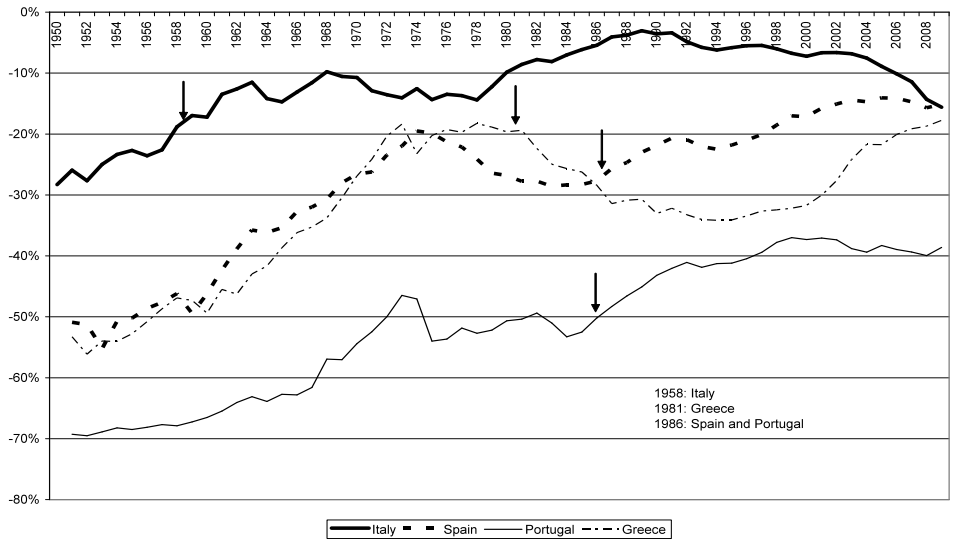
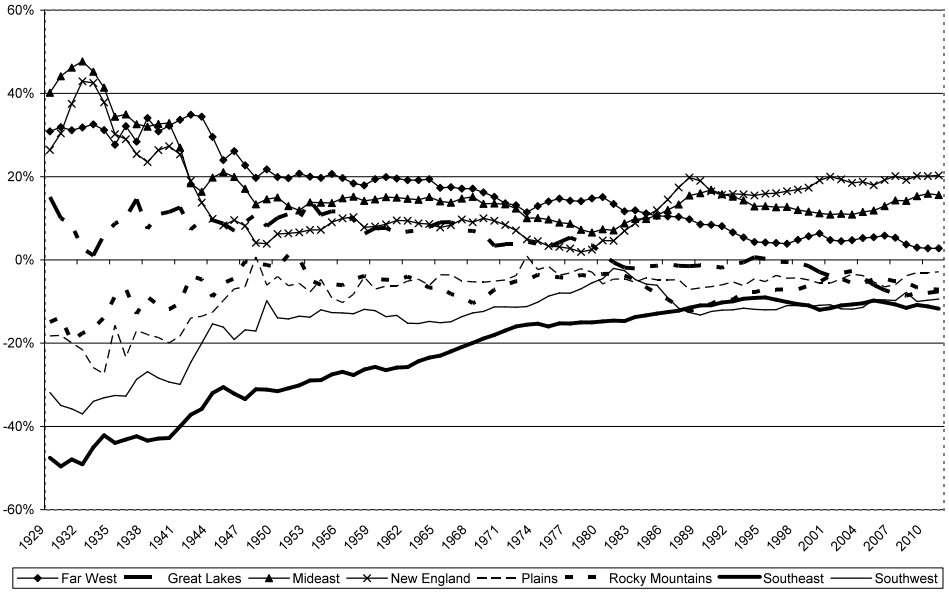


Figure 3 – Per capita GDP of US regions *vis-à-vis* US average



There are potentially two problems, however – one of principle, namely moral hazard (probably the main reason why this simple scheme is not part of today's policy debate); and one practical, the assessment of present values. Moral hazard is the fear that (partial) mutual insurance would induce Member States to seek immediate benefits at the cost of lower income tomorrow. Because the

[19] For each of the 4 countries, the "EU average" is computed over the (other) EU members at the time of joining (thus, EU6 minus Italy itself, for Italy; EU 9 minus Greece itself for Greece; a.s.o.) and remains such to the end.

mutualisation bears on aggregate national incomes, the moral hazard issue does not apply to benefits included in national income; it would only apply to such policies as reduced working time or increased pension rights, for instance. That observation reduces substantially the scope for moral hazard.

There is fortunately a further remedy, namely *progressive implementation* of the scheme. Instead of issuing at once perpetual indexed bonds for 36% of their national incomes, countries could agree to issue *annually*, over (say) the coming 12 years, indexed bonds of 12 years maturity for 3% of their national income – with successive annual assessments of present values. The partial mutualisation of national macroeconomic risks would thus itself be progressive, attaining the target (36%) over 12 years and remaining at target forever after. In that case, a policy entailing immediate benefits at the cost of lower income tomorrow would reduce the present value of the bonds issued tomorrow. Countries are now motivated to pursue growth-enhancing policies so as to improve the terms at which they will float bonds tomorrow – an argument already developed by Obstfeld and Peri (1998).

Admittedly, that progressive scheme reduces the extent of mutualisation for the risks materialising over the *initial* 12 years. This is a reasonable compromise, definitely superior to inaction. An ambitious way of overcoming that temporary limitation would consist in *backward implementation* for the EMU. Indeed, the problem raised by national macroeconomic risks was ignored at the launch of EMU, a failure for which all Member States share responsibility. Had that problem been recognised, and met by the progressive scheme outlined above, we would today (12 years later!) enter the permanent regime. It is possible to simulate ex post how initial adoption of the progressive scheme would have worked, and to proceed today *as if* the scheme had indeed been implemented from the start. In order to clarify that ambitious suggestion, it is necessary to consider first the problem of assessing present values. But the very idea of an "as if" approach is provocative. It is logically distinct from a redistributive move, even if it looks similar.[20]

There are two ways of implementing our suggestion ex post: with, or alternatively without, settlement of the transfers that would have taken place under early implementation. Under the less demanding "without" alternative, one simply records the outstanding debts that would have been issued under early implementation, and one executes henceforth the associated transfers until they mature (and are replaced by new issues); see the Appendix for details and numerical evaluation.

The issue of assessing present values is challenging. Indeed, medium to long term forecasts of national incomes are not available from either market data or official publications. Pending further contributions from research in progress, we limit ourselves here to a simple suggestion**,** developed in the Appendix. From existing data, one can estimate average *rates of convergence* ρ of national incomes per capita in individual countries towards mean incomes in a set of countries, like EMU. (Distinct rates are needed for convergence from below and from above, but global balance fixes the ratio of the two.) One can

[20] A similar logical distinction arises in standard mutualisation of personal risks: if a new disease is covered by compulsory medical insurance and all affiliates are covered irrespective of symptoms, is that redistributive?

then estimate the expected distance after t years between the national income per capita in country c, say y_{ct}, and the EMU average Y_t by applying to y_{c0}/Y_0 a correction factor equal to $(1 + \rho)^t$. That is, one can at time 0 estimate y_{ct} by $y_{c0}.(Y_t /Y_0).(1 + \rho)^t := \bar{y}_{ct}$, thereby reducing the forecasting problem to the single series Y_t and one (or two) average rates of convergence. Furthermore, forecasting errors on Y_t will be common to all Member States. But dealing properly with forecasting errors about rates of convergence remains an intriguing theoretical challenge, not addressed explicitly at this stage.

An important side remark concerns the possibility of assessing present values *conditionally on national policies*. An interesting recent contribution of Guntram B. Wolff (2012) recognises the need for some form of mutualisation of the national macroeconomic risks within EMU. Although he does not consider explicitly the mutual insurance scheme defined above, he would probably regard it as a potential alternative to his own proposals (not explicitly derived from efficient risk-sharing theory). In addition, Wolff stresses the desirability to "link support to structural reform" in a way "to promote change" where desirable. This opens the very intriguing, realistic possibility of linking the assessment of our present values to national reform programs through *contracts*. At the other end, the settlement of insurance transfers is automatic – a major advantage.

We conclude from the foregoing that partial *mutual insurance of macroeconomic risks among euro area countries is a definite possibility*, that should receive high priority on the agenda because otherwise EMU will remain recurrently threatened with the very problems that plague it today.

Remark 3 – VRetal is emphatic on the need to mutualise national macroeconomic shocks through some form of insurance – but they link such insurance to a "central fiscal capacity". Thus, they refer (p. 7) "*to the establishment of (a central) fiscal capacity to facilitate adjustments to economic shocks. This could take the form of an insurance-type mechanism between euro area countries to buffer large country-specific economic shocks... An EMU fiscal capacity... could take the form of an insurance-type system between euro area countries. Contributions from, and disbursements to, national budgets would fluctuate according to each country's position over the economic cycle*". Turning to the "specific design of such a function", VRetal mention "*two broad approaches. The first would be a macroeconomic approach... The second could be based on a microeconomic approach... such as unemployment insurance*"[21]. Our reliance on efficient risk-sharing theory leads to the more specific conclusion of opting for the macroeconomic approach, without requiring a "fiscal capacity".

2.7 A remark on EMU membership

Once the need to mutualise idiosyncratic macroeconomic shocks within a monetary union is accepted, the following general remark about EMU itself can be made.

Standard GET looks at money exclusively as a means of *payment*; see e.g. Drèze and Polemarchakis (2001). Recent developments have underscored the other role of money as a source of *liquidity*, in

[21] A similar duality appears in Wolff (2012), who does however conclude with a preference for the macroeconomic approach.

particular to the public sector. And the choice between national currencies and a monetary union brings in the foreign dimension.

A country facing today the choice between using a national currency or joining (or not quitting) EMU will have to weigh two aspects. The national currency entails automatic funding of fiscal or foreign account deficits, with some measure of international risk sharing, but at the cost of more inflation uncertainty. In principle, the exchange rate adjusts so that the present value of foreign balances matches the net value of foreign assets and liabilities.[22] Thus, a macroeconomic shock entailing a balance of payments deficit leads to devaluation of the national currency at a gain in competitiveness but at the cost of inflationary pressure. To the extent that foreigners hold assets denominated in the national currency, there is an element of international risk sharing. But the domestic inflation is costly under nominal rigidities, some of which may serve a useful function of domestic risk sharing. And one should not ignore the possibility of volatile, misinformed adjustments in exchange rates.

In order for a monetary union to improve upon these prospects, it is essential that the union be a realistic project. That requires a realistic starting point and a measure of macroeconomic risk sharing. EMU failed on both scores, and thus needs reshaping. One dimension concerns the foreign account. In a union, foreign deficits must be met through a combination of (i) domestic adjustments in prices, wages and the fiscal stance ("pervasive austerity"), and (ii) capital transfers from abroad. Both lines should be pursued today in the GIPS countries. The coordinated public investment programs discussed in Section 3 below could help on both counts. But there remains genuine uncertainty about the extent to which (the horizon over which) a country like Greece can balance its foreign account. Some definite assistance from EMU itself may well be needed**.**

Still, our main message remains that finding a mechanism to absorb idiosyncratic macroeconomic shocks does not require a fully integrated federal budget, as recommended for instance in Delpla and von Weizsäcker (2011) or in Chadha et al. (2012). And the risk of moral hazard stressed in Goodhart and Smits (1993) can be substantially reduced through our step-wise approach.

3. Stimulating growth in Europe through (public) investment

Most European investments take the form of (uncoordinated) national policies, sometimes geared to global objectives decided at the EU level (e.g. for energy policy). However, targeting some investments at the same time for several countries through coordinated policies – under which supply of inputs and outputs would be properly distributed among Member States – should entail positive externalities. Coordinating aggregate demand (macro-stimulation) policies at the global level would contain macroeconomic volatility and avoid windfall effects or free-rider behaviour across countries, which is highly desirable within a monetary union like the EMU (see Uhlig, 2002).

[22] See for instance Sarno and Taylor (2002).

3.1 Which investments to investigate?

Under a common program of growth stimulation through investment, two kinds of investments deserve attention, namely *public* investments[23] and selective *private* investments.

The three broad areas that appear most appropriate from our viewpoint are: (i) social housing; (ii) renewable energy; and (iii) transportation (from urban to cross-national). Social housing is the more transparent area. New low-cost dwellings already planned are readily identified and do not fall under our program. However, additional dwellings can be supplied by public agencies, or alternatively by private firms. In order to advance in time investments that would anyhow take place later, one needs to provide funding to the public agencies (more on this under 3.5 below), or incentives to the private firms. The rationale for private incentives rests on the gap between the private and the social cost of labour during a recession. A general case can be made for adjusting social security contributions cyclically so as to reduce that gap; see Drèze (1993). Short of a comprehensive program of cyclical adjustments, employers' social security contributions could be reduced *temporarily* on *additional investments* undertaken as part of a European demand stimulation program. If the reductions correspond to the associated savings for the public sector, namely more fiscal revenue and less unemployment benefits, then the program is *fiscally neutral* – yet generates net social benefits through less unemployment (a domestic benefit) and more demand (a partly exported benefit).

In order to reach our ambitious goals, the investments should meet some conditions or priorities:

a. the investments must be *economically valid,* i.e. entail social returns covering their social cost; with a preference for projects that entail financial rather than immaterial returns and are thus easier to finance;

b. the investments can be identified as *additional*, in the sense that their realisation is not planned for the immediate future, but could be advanced in time through either centralised public funding or temporary (additional) subsidies; ideally, such subsidies should be *fiscally neutral*;

c. identify valid investment projects which suffer from "market imperfections", i.e. which either (i) are not seen by the private sector as profitable at market prices, but would be undertaken if the fiscally neutral subsidy scheme is implemented; or (ii) are subject to externalities ignored by the private sector (including possibly external productivity gains);

d. look for labour intensive projects, with main reliance on types of labour that are definitely in excess supply;

e. look for projects that can be distributed across the Member States in a way that privileges the countries in greater need of demand stimulation.

[23] Recent evidence suggests that public investment stimulates growth more effectively than public consumption. For Japan during the 1990s, Brückner and Tuladha (2010) also show that while public investment may yield higher output effects than other spending, its effectiveness depends upon its composition, the level of government implementation, and supply side factors.

Although there are certainly other sectors worth investigating, the three sectors that we privilege are of particular interest for several reasons. *First*, they all meet social needs in every euro area country, as well as specific policy targets (including production of green energy and reduction of gas emissions). *Second*, investments in these sectors are all labour intensive. *Third*, they appear fiscally realistic, i.e. they require limited net financial support by the public sector (thanks in part to decreased unemployment). *Last* but not least, they could ensure a more balanced distribution of capital across euro area countries.

At this stage, our main purpose is not to offer a complete feasibility study, but rather to provide some order of magnitude to *quantify* the potential of our proposal – an order that proves very substantial. And we encourage the authorities to launch (or pursue) right now a detailed investigation of needs and of feasible projects in these three sectors of activity. A summary of some key features for each sector is provided by Table 7 in Annex I.

3.2 Low-cost housing

A first sector of interest is certainly low-cost housing. The reasons for privileging housing come from the combination of meeting unfilled needs[24], easily identifying marginal investments and stimulating relatively labour-intensive investments. In addition, the supply-response of the building sector is relatively elastic. At the same time the rents, capped on social grounds, are always insufficient to cover the corresponding building costs, hence reducing investment by the private sector under the prevailing price (labour cost) distortion. As a result, the burden of this type of investment falls primarily on the public sector, resulting in turn in relatively high unsatisfied demand due to states' budget constraints. By correcting the price distortion in a fiscally neutral way, the stimulation of private investment could be relatively important and hence significant for growth.

It lies beyond the scope of this article to detail a possible investment program in low-cost housing for the whole euro area. However, useful proxies can be derived from the experience of some countries. In France – where investing in low-cost housing is discussed by the newly elected government – it appears that some 3 million people are homeless or inadequately housed, corresponding to the lack of some 1.2 to 1.5 million dwellings.[25] With some 500,000 to 800,000 units currently in progress or plan, the deficit amounts to some 700,000 dwellings. Now, considering an average cost of some € 137,400 per dwelling, a total investment of about € 96.2 billion might be needed to respond to this unsatisfied demand. Since France has about one fifth of the euro area population, a similar program for the whole euro area would reach around € 500 billion.[26] Of course, this estimation assumes that similar unsatisfied needs

[24] This unsatisfied demand partly reflects the changing composition of population (e.g. due to a growing proportion of single parental families) and changing needs (e.g. to adjust to unemployment or lower salary).
[25] See "Logements sociaux. Un document unique pour les demandes à partir d'octobre". http://www.letelegramme.com/ig/generales/france-monde/france/logements-sociaux-un-document-unique-pour-les-demandes-a-partir-d-octobre-03-05-2010-897295.php. See also Social housing in EU II available at http://www2.lse.ac.uk/geographyAndEnvironment/research/london/pdf/Social%20Housing%20II/Social_Housing_in_Europe_II_A_review_of_policies_and_outcomes.pdf.
[26] If we plan 700.000 additional dwellings in France , this would amount to € bn 481=(137,400*700,000*5) in EMU.

prevail on average in other euro area countries. Yet, similar figures for the region of Wallony in Belgium already appeared in Drèze et al. (1999).[27]

The impact of such a program on employment could be considerable. Following recent estimates[28], building new dwellings could require 10 to 12 full-time equivalent (FTE) man-years per € million invested (against only 8.1 FTE for public investment in infrastructures). Therefore, a program for the whole euro area could create up to 5 million one-year jobs.[29] Another advantage of housing investment is that it requires a mix of skilled and non-skilled workers while offering to the latter the possibility of real-time training.[30]

On the financial side, a major advantage of social housing investment is that future benefits are matched by rent receipts, permitting the service of "project bonds" – that could in addition be covered by mortgages on the new buildings. Funding for public investments should thus be possible, in spite of the current budget constraints.

As for private investments, which could hopefully constitute the bulk of the program, the relevant question is: could fiscally neutral subsidies provide adequate incentives for additional investments? In light of the considerations in section 3.1, our proposal is to promote investment through reduced employer social security contributions by an amount equal to the difference between the private and the social cost of labour. One way to estimate the size of such a subsidy starts from rental costs. For France again, a normal market rental cost (for a house costing € 137,400) is about € 508 a month (thus representing a nominal return of 4.4% of the amount invested which seems reasonable by historical standards and well above current returns on financial investments). However, the rental cost for social housing is set at € 325 a month on average.[31] Based on these figures, a subsidy of about 35% (183/508) could be sufficient to encourage the private sector to participate in our housing program.[32] According to the estimation (under reasonable assumptions) of the wedge between the private and social labour costs, such a subsidy rate appears to be fiscally neutral.[33]

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[27] Indeed, figures for Wallony translated to the European level amounted to some € 373 billion for an average construction cost of about € 86,000 per dwelling. See Drèze et al. (1999) for details.

[28] Estimations made by National Federation of Public Works and the Ministry of Sustainable Development (on the basis of statistical data provided by the INSEE) reported in Cabinet Relance (2009). According to that source, one million € of investment in housing renovation would create 16.6 FTE in total (including both direct and indirect employment through outsourcing activities outside the construction sector and production of intermediate goods). From these calculations, the ratio between the total and direct employment effects would be 1.28 on average. Again this figure is very similar to that reported in Drèze et al. (1999) for Belgian data.

[29] Again this figure assumes an impact of housing investment on employment in other euro area countries similar to the ratios calculated for the French economy. Similar ratios were already obtained for the Belgian economy in Drèze et al. (1999).

[30] Past experiences reveal that unskilled workers could be gradually trained by skilled workers on specific sites. This strategy is regularly used by the construction sector when replacing retiring workers by new workers out of school and traineeship programmes.

[31] See http://www2.lse.ac.uk/geographyAndEnvironment/research/london/pdf/Social%20Housing%20II/Social_Housing_in_Europe_II_A_review_of_policies_and_outcomes.pdf

[32] Again, a subsidy of between 25-28% was obtained for Belgium in Drèze et al. (1999). Of course, it is important to note that the very high housing prices in some regions within the euro area may probably require higher a subvention rate at similar social rent due to the price of ground. Detailed case-by-case studies are needed.

[33] As recalled in Drèze et al. (1999), this wedge could be approximated by the following formula:

$$(1-RR/2)S+RR/2=S+(1-S)RR/2$$

where S denotes the share of social contributions and income taxes in the labour cost and RR the replacement ratio. Estimating it for France (in order to have comparable figures) and setting RR at 40%, we obtain a wedge of around 52% (using the labour costs estimation

Besides new dwellings, two other avenues should be investigated: (a) transformation of vacant houses into smaller dwellings for low-income households[34]; and (b) renovation of existing low-cost housing to equip them with more modern and less energy-consuming facilities. Such a possibility should not be ruled out given the employment content of renovation, which is often higher than for new construction.

3.3 Renewable energies

In January 2007 the European Commission put forward an integrated proposal that addressed the issues of energy supply, climate change and industrial development. Following the decision two months later by the European Heads of State to adopt an Energy Policy for Europe, a plan was agreed calling by the year 2020 for: (i) 20% energy saving; (ii) 20% reduction in greenhouse gas (GHG) emissions; (iii) 20% share of renewable energies in overall EU energy consumption; (iv) 10% renewable energy component in transport fuel.[35]

Today, the installed capacity of renewable energies amounts to 145.6 GW (with 64%, 34% and 2% respectively of wind power, photovoltaic PV systems and concentrated solar CSP systems), which represents slightly less than 10% of EU energy consumption. It is thus expected that this capacity will increase by 153 GW by 2020 to meet the EU's objective. Keeping unchanged today's proportion of each type of green energy in the total of renewable energies and using an average investment cost for each type, an increase in installed capacity of 153 GW would cost € 343 billion.[36]

Investment in renewable energies is labour intensive[37], although it requires skilled labour. According to available public information, any new MW installed in renewable energies could lead to the creation of about 11, 15 and 20 full-time equivalent (FTE) one-year jobs respectively for the CSP, the wind power and the PV systems. Given the average investment cost for each type of green energy[38], each new investment of € 1.6 million in wind energy would generate around 15 FTE one-year jobs on average - against 20 FTE for an investment of € 2.6 million in the PV system, but only 11 FTE for an investment of more than € 5 million in the CSP system. Consequently, an investment programme of € 600 billion

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from the OECD for the year 2011). With a share of labour in value added of residential construction of about 60%, the total private costs could exceed total social costs by some 30%.

34 In a country like Spain suffering from the burst of housing bubbles the feasibility of transforming vacant housing (due to the recession) into less expensive ones to meet demand by low-income population should be carefully studied. Unfortunately, the absence of data has impeded this exercise.

35 See also European Commission (1997, 2009).

36 This total is based on an average investment cost for each type of green energy calculated as the arithmetic average of upper price interval mentioned in footnote 34 below. In practice, an average cost of € 1825/kW, € 2690/kW and € 6800/kW have been used respectively for the wind power, PV system and CSP system. Such a calculation is approximate in nature and will have to be refined in a more detailed study.

37 According to the European Wind Energy Association (EWEA), a total of around 253,145 workers were employed by the European wind energy sector in 2012 – either directly (60%) or indirectly (40%). Similarly, the European solar industry employed 268,110 workers in 2012, according to the Observatory of renewable energies (EurObserv'ER).

38 More specifically, the investment cost in wind energy ranges from €1,000 to € 1,350/kW (for onshore installation) and from € 2,000 to € 2,300/kW (for offshore installation). This cost amounts to € 2,690/ kW on average for the PV system while it ranges from € 3,500 to € 5,600/kW (without storage) and from € 4,000 to € 8,000/kW (with storage) for CSP. See details in Table 7 in Annex I and in the corresponding sources.

(still short of the 1.000 billion foreseen by the European Commission[39]) could create up to around 5 million one-year jobs. Thus, the impact of investment in green energies on employment could be of the same magnitude as that in low-cost housing.[40]

European countries have set their own objectives within the guidelines adopted by the Heads of State without specific coordination in terms of investment path and subsidy policy. At the same time, many countries try to invest globally (namely in various green energies) whereas exposure to various types of renewable energy clearly differs from country to country[41] (see Annex II).

One of the key distinguishing features of renewable energy is that current investment is mostly made by the private sector, reflecting a high level of subsidies of various forms. Contrary to low-cost housing where private investment is lacking due to the profitability constraint, financial returns on investment in renewable energies appear to be high in comparison with other financial investments.[42] However, this profitability is entirely due to government support which is eventually paid by the final electricity consumer (either through taxation in case of lump sum subsidies or through higher price of electricity in case of feed-in tariffs). Consequently, the subsidies are pro-cyclical and tend to decrease in periods when support to economic growth is most needed.

Against this background, several elements call in favour of better cooperation at the EMU or EU level. *First*, the incentives for private investments are strongly dependent on the government support scheme. Changes in the conditions of government support may dramatically affect the expected investments in the energy sector. This is the case for instance of Spain today where decreases in the feed-in tariffs (to limit increases of electricity prices to final consumers) have led to a sudden stop of investments in the CSP sector.[43] *Second*, the complexity and country-specific characteristics of the legislation may reduce incentives of investors to have a cross-country approach for their investments. *Third*, setting targets by a certain deadline for green energy production while leaving the type and the speed of investments to national initiatives may imply two problems from the economic viewpoint in a monetary union. On the one hand, this may lead to misallocation of resources with investments not located optimally in the EMU (e.g. solar systems in the northern countries). On the other hand, uncoordinated timing of investments across countries may imply phases of overheating and subsequent sharp decline in demand

[39] See http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/investment_needs_en.htm.
[40] It is however worth noting that professionals in each sector of renewable energy expect decreasing investment costs in the future.
[41] For instance, 98% of the current capacity of wind energy consists of onshore wind power installations with Germany and Spain as the main producers (representing together 54% of the total capacity installed in the European Union) while the remaining 2% of wind power capacity are installed in northern European countries led by Denmark, Ireland, The Netherlands, Sweden and the United Kingdom (UK). For solar energy, 56% of PV systems are located in Germany while 75% CSP systems are located in Spain.
[42] Subject to the renewable energy considered, the gross return on equity provided by these arrangements may reach up to 12% according to calculations by Hoffmann (2011). It could then be advisable to encourage local public agencies (regions, cities…) to invest more in such profitable projects.
[43] See for instance
http://www.solarserver.com/solar-magazine/solar-news/current/2012/kw05/spanish-government-halts-pv-csp-feed-in-tariffs.html and
http://www.wind-works.org/FeedLaws/Spain/SpanishFITUpdateTemporaryHalttoNewRenewableEnergyProjects.html

of raw material for green energy investments. Ultimately, this may cause industrial failures which are socially and fiscally costly.[44]

Our recommendation for renewable energies is to advance in time expected investments while maintaining the national subsidy schemes in place. In addition, we strongly support the establishment of a framework for energy transportation across countries within the euro area.[45] And we recommend studying a flexible mechanism to smooth investment across business cycles. An illustrative example of such a mechanism is provided in Annex III.

3.4 Transportation

Another example of possible investment coordinated at the EMU (or EU) level is transportation, from urban to cross-national. Although transportation investment is foremost pursued for mobility purposes, it also generates positive externalities: reduction in pollution (e.g. greenhouse gas), in vehicle operating costs and in transportation-related accidents; and employment stimulation through improved labour market access for commuters.[46] Even if researchers in this field have warned against the danger to "double count" the benefits of a transportation project (see e.g. Wheaton (1977) and Boarnet (1997)) in a cost-benefit analysis (Gramlich 1997), it is recognised that investment in transportation may contribute significantly to increase economic growth and economic integration between countries. Both elements are of particular relevance in the case of a monetary union like EMU.

Investment prospects are sizeable. The European Commission estimates that the needs in infrastructures in Europe (such as roads, railways, broadband and gas pipelines) amount up to € 2,000 billion.[47] This amount includes at least € 500 billion to complete the trans-European transport networks in the context of the European Union's ten-year growth strategy (Europe 2020). This explains the launch of the seven flagships initiatives derived from Europe 2020. As a result, it has been decided to set transportation among the key priorities for the pilot phase of the Europe 2020 Project Bond Initiative. In this context, investments for an amount up to € 31.7 billion are expected by 2020 with a special focus on (green and sustainable) cross-nation modes.[48]

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[44] See for instance http://www.lemonde.fr/planete/article/2012/04/03/photovoltaique-l-offre-est-aujourd-hui-deux-fois-superieure-a-la-demande_1679531_3244.html and http://www.journaldunet.com/economie/energie/faillite-panneau-solaire.shtml
and http://www.huffingtonpost.fr/2012/07/16/solaire-photovoltaique-en-france-les-raisons-du-crash-en-plein-vol_n_1675372.html.

[45] The importance to strengthen the cross-border energy transportation has been emphasised by the European Commission since the early 2000s putting the trans-European energy networks among the priorities for infrastructure investments. See for instance European Commission (2007, 2010). This has been revived in July 2012 in the context of the pilot phase of the Europe 2020 Project Bond Initiative. In particular, it has been announced that investments of an amount of € 9.1 billion to facilitate transfer of (both traditional and renewable) energy between countries should take place by 2020 through this initiative in the context of the ten-year growth strategy. See also http://ec.europa.eu/europe2020/index_en.htm and http://ec.europa.eu/energy/index_en.htm.

[46] For a summary of the U.S. literature, see, e.g., Ihlanfeldt and Sjoquist (1998). See also World Bank (2007), Roy, R. (2008), Rodrigue et al. (2009), Gilbert, J. and Nilanjan, B. (2010).

[47] This estimation by the European Commission was provided in the context of the communication related to the establishment of the European Structural Funds and the launch of the pilot phase of the Europe 2020 Project Bond Initiative established by Regulation No. 670/2012, published in the Official Journal L 204/1 of 31/07/2012.
See http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/investment_needs_en.htm.

[48] See http://ec.europa.eu/transport/index_en.htm.

Interestingly, the work of European Commission services includes the definition of specific projects (30 for cross-nation road and rail[49]), so that the delay required to implement our program would be minimal in this case.

Unfortunately we were not able to find accurate estimates of employment ratios for investment in transportation, which should be assessed on a case-by-case basis. The only global estimations at our disposal are those reported in Cabinet Relance (2009) for the French economy. According to this report, the employment impact of investment in infrastructures could amount to between 8 and 10 FTE man-years per € million of investment, i.e. as labour intensive as the examples discussed in the previous sections. Indeed, an investment of about € 500 billion in transportation could create up to between 4 and 5 million one-year jobs. We only mention this example to encourage further investigation: the information at our disposal at this stage is too limited to provide any order of magnitude (even roughly) of possible investment amounts.[50]

3.5 Funding a public investment program

Given the objective of stimulating growth (and growth expectations) through investments, it is obvious that these investments should be financed by bonds, not by reduced spending elsewhere. That may well be the reason why our proposal receives so little attention today. Yet, it is undeniable that economically sound investments do not alter the allocation of resources between the current and future generations. The only sensible reservation one might have about bond-financed investments must accordingly come from the fear that financial markets could not readily absorb the corresponding bond issues. But that fear must be appraised at the *world level*: economically sound investments remain sound under external funding! At that level, there is no problem of size, the only concern bears on solvability of the issuers. Actually, euro-denominated safe bonds would be a welcome addition to the portfolio choices of surplus countries. So, the main issue is to decide who should issue the bonds financing an EMU integrated investment program.

One element of answer is immediate: the Member States whose sovereign bonds are currently under distrust should not be involved! How should then *public* investments in these countries be financed? (The question is all the more relevant that one would hope to privilege investments in the countries suffering most from the austerity dilemma.) The more natural answer is: by bonds issued *at the EMU level* – for instance through the EIB or the EBRD; or by *project bonds*.[51] But the size we have in mind

[49] See http://ec.europa.eu/transport/themes/infrastructure/maps/doc/ten-t_pp_axes_projects_2005.pdf.

[50] The only rough estimation known to us of investment costs for urban transportation in big cities in advanced economies fluctuates between € 10 million per km (for bus rapid transit) and € 60 million per km (for mass rapid transit like the metro). See AFD (2009) for more details. For cross-nation transportation, a recent estimation is related to the high-speed train (TGV) project between France (Lyon) and Italy (Turin) which could eventually cost € 26.1 billion (including the recent agreement between French and Italian government on 3 December 2012 for the sole tunnel of 57 km for an amount of € 8.5 billion). For the part of the project supported by the French government, the cost would amount to € 7.7 billion for 140km, i.e. € 55 million per km on average. More details available at http://www.lyon-turin.info/le-projet/le-trace.

[51] For the pilot phase of the Europe 2020 Project Bond Initiative, see http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/index_en.htm.

might exceed the scope of these channels. Direct issue of bonds by EMU itself may be called for, and the modalities of such issues should be investigated by instances in charge of these matters.

These modalities could be complex. Think about social housing investments in Spain, financed by bonds issued by some EMU-level instance. If the investment is public, so is the ownership of the dwellings. Does it go to the EMU instance, or to Spanish authorities with a mortgage for the EMU instance? Clearly, a *contract* is called for. And similar remarks will apply to many cases. A guiding principle should be to *mutualise risks* whenever possible. Beyond that, there is room for creativity!

Regarding *private* investments, we simply refer to the various possibilities developed under PPP (public/private partnerships – see for instance Alshawi (2009))

4. Policy perspectives and recommendations

On the basis of our theoretical survey in section 2, and of our verification in section 3 of the wide scope for programs of public investment at the euro area level, we may outline the major innovations in the economic organisation of the euro area that we would look for, as an intermediate step on the road to fuller integration. These innovations would, in our opinion, endow the EMU with structural characteristics ensuring its viability.

A. Organise *mutual insurance* of national macroeconomic risks through annual exchange of medium-term bonds indexed on a country's national income against similar bonds indexed on aggregate EMU income. In an ex ante non-redistributive spirit, the terms of exchange should reflect the present values of national incomes until maturity of the bonds. These terms of exchange could be embedded in *contracts* regarding national economic policies.[52]

B. Let EMU Member States issue *sovereign debt indexed on national incomes*, also to redeem (with haircuts) extant sovereign debt in those countries where it is currently under distrust.[53]

C. Locate responsibility for *demand stimulation* policies (when appropriate, as today) at the EMU level with *public investment programs* as the privileged instrument. The national implementation and funding of such EMU programs could be embedded in *contracts* regarding national economic policies.

D. Let the structural economic policies of Member States aim at a fair *intergenerational allocation* of resources implying *sustainable debt levels*. Deviations (positive or negative) from that rule on grounds of *intergenerational risk sharing* should be allowed on a strictly temporary basis. Ideally, these temporary departures from balanced budgets should be mutualised internationally. These principles should guide the *contracts* regarding national economic policies as well as the decisions about *demand stimulation*.[54]

[52] Backward implementation of this proposal is also possible, as explained in section 2.6 and the Appendix.
[53] These bonds would not be held by commercial banks, but bonds issued to finance public investments would provide substitutes.
[54] Although beyond the scope of this article, it is obvious that our proposals should ideally be accompanied by microeconomic measures favouring entrepreneurship and innovation.

Items A, B and C are transparent, and hopefully attractive. They correspond to genuine innovations, relative to current EU/EMU practices, and would accordingly call for some policy planning and institutional reforms. These will require time, so that we need to consider what immediate steps could pave the way for these reforms. Item D is less transparent, yet no less important. If national economic policies are to be evaluated and (re)oriented at EMU level, *a convincing theoretical basis is indispensable*. Item D points to the need of reconsidering in depth the logic of the Maastricht Treaty, while fully achieving that treaty's objective of debt sustainability. We do not expect that item to be readily accepted by all parties concerned. The immediate goal here should be to trigger in-depth analysis and debate.

The delays inherent in items A and C might be regarded by some as disqualifying. We regard these items as indispensable permanent improvements – and crucial strengthening – of the EMU structure, that need to be thought through in depth and promoted with vigour. The fact that delays are involved leads to a clear conclusion: let us start at once, without wasting a minute![55]

Regarding *immediate steps*, we (together with many others) assign top priority to escaping the blind alley of unilateral austerity and to restoring growth, also through more positive expectations. As stated in sections 2.2/2.3, we see no alternative to an ambitious EMU public investment program, i.e. item C. The idea of vesting responsibility for such a program with EU/EMU authorities is just a step forward along a familiar avenue. But the explicit demand stimulation aspect is new, and may call for institutional reform. The nature of these reforms should be explored at once. The implied delay should be used in parallel to explore and define specific investment programs. As a first step, we have documented in section 3 the wide possibilities opened by three broad domains. We call for immediate systematic exploration of these domains, so that specific programs be ready for launching as soon as the green light comes. And we invite others to suggest additional domains meeting the criteria outlined in section 3.1.

Concerning item A, the need to organise some mutualisation of national macroeconomic risks is widely recognised today; but the form of insurance advocated here is not considered explicitly, as far as we know. So the first step is to subject our proposal to discussion and further exploration. Hopefully, that could be part of the reactions to the VRetal report, within which our proposal fits naturally. In parallel, the issue of assessing the present values of medium term national incomes should be studied by experts. Also, experimental launching of bonds indexed on national incomes, and on aggregate EMU income, could be undertaken shortly.

As for item B, we bring it to the attention of those concerned with sovereign debt restructuring.

[55] Drèze wishes to share the following reminiscence: "In the fall of 2008, I invited three colleagues from other universities to join me in inviting the EU Commission to study joint investment programs that could be enacted from 2010 on IF the recession lingered. All three objected that excessive delays were involved and supported instead short run measures like VAT rebates. How sad that I did not pursue the invitation on my own!".

Taken together, these immediate steps would bring some fresh air to the current debates and could hopefully result in further innovative suggestions. They should impact positively the expectations about the future of EMU – and enhance the acceptability of the austerity measures where they remain needed.

5. Institutional considerations relating to the decision-making process

The above proposals would bring to the euro area an "economic policy" dimension, with associated institutional requirements. Although that dimension could be assumed by the EU itself, the euro area is the more natural level, because the policies would be geared to the specific needs of a set of countries sharing a common currency. Also, the prospects for effectiveness of a rather ambitious program are better in a tighter community also benefiting from the qualified majority voting rule (used for economic governance)[56]. And the recent creation of the EMU Summit, chaired by Herman Van Rompuy, provides the key institution needed to guide the whole process.

Ideally, we would plead for:

- an "Economic Council of the Euro Area", bringing together governmental representatives of the euro area Member States, along the lines of the Euro Group;

- an "Euro Area Economic Directorate", whose professional staff would assist the Council towards defining policies and implementing them, along the lines of the EFC;[57]

- an "Eurozone Economic Research Unit" (possibly integrated in the Joint Research Center of the Commission), in charge of mid-to-long term forecasts of national incomes, of desired levels of demand stimulation, of specific investment projects and their funding, and the like;

- an "Eurozone Council of Economic Advisers", modelled after the US Council though perhaps somewhat less ambitious budgetwise. This could be a welcome step towards closer cooperation between academic and staff economists, which remains underdeveloped in Europe. And it would provide the natural instance to take charge of item D above.

In a sense, these institutional proposals simply extend to the economic sphere the arrangements prevailing for the monetary/financial sphere of EMU. Their preparation will require time and effort; it could be entrusted by the EMU Summit to the Commission services (with an invitation to consult academics...). Their implementation could be subject to the double legal basis 136 TFEU and 121(6) TFEU, in which case the European Parliament (EP) would co-legislate the reforms. A realistic plan might be to program their prospective implementation after the 2014 EU elections, thereby giving to EU citizens a chance to express their support. But preparations should start right away.

[56] The voting rule under Article 136 TFEU – which allows the euro area countries to adopt measures specific to the EMU– is a qualified majority rule defined in accordance with Article 238(3)(a) TFEU.

[57] In the short run, the tasks to be performed by this Directorate could be assigned to DG-ECFIN.

6. References

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APPENDIX - Simulations of mutual insurance of macroeconomic risks

by Jacques H. Drèze and Jean-François Carpantier

In this appendix, we first outline a specific approach to the problem of assigning a present value to bonds indexed on national incomes issued in order to mutualise (partly) idiosyncratic macroeconomic risks. We turn next to an illustration of the backward implementation of our insurance scheme (introduced in section 2.6).

A.1 We consider bonds that promise to pay each year t = 0, 1,...T (= 11) a fraction γ of a country's national income.

We retain the notation introduced in section 2.6 and thus write: y_{c0}, $\bar{y}_{ct}$ for the national income of country c respectively observed at time 0 and estimated at time 0 for time t; Y_0, $\bar{Y}_t$ for the sum over c of national incomes (i.e. EMU aggregate income) similarly defined; and ρ_i for the annual rate at which national income per capita, in those countries where it is *inferior* to the EMU average at time 0, converges to that average. Label these countries *inf* and the remaining ones *sup*. It is implicitly assumed that $\rho_i > 0$ reflects unused resources and potential productivity gains in the inf countries. On the basis of data in Figure 2 and Table 1, we set $\rho_i = .005$ (that is, convergence at the rate of 1/2% per year). We did, however, try alternative values, which confirm near linearity of our main results with respect to this rate. Note that higher values lead to higher transfers from *sup* to *inf* countries. Redistributive goals embedded in insurance *contracts* could be implemented through higher rates of convergence.

For the remaining (*sup*) countries, the rate of convergence (downwards) towards the mean, ρ_s, is in the nature of a residual and will be estimated.[58] Additional notation consists of: α for the share of Y_0 made up by the *inf* countries; v_{ct}, V_t for the present value at time t of the national incomes of country c and of EMU respectively, as computed at time t for the relevant horizon of T + 1 = 12 years on the basis of the estimates at time t and of a discount rate r.

For transparency's sake, we assume in this illustration that population is constant in every country, so that the rates of convergence for incomes per capita also apply to national incomes. This implies, for *inf* country c:

$$y_{ct} = (y_{c0}/Y_0).\ \bar{Y}_t\,(1+\rho_i)^t,\ v_{c0} = (y_{c0}/Y_0).\Sigma_t Y_t\,(1+\rho_i)^t/(1+r)^t := (y_{c0}/Y_0).Y^*_0. \qquad (A.1)$$

Letting $V_0 := \Sigma_t\ \bar{Y}_t\,(1+r)^{-t} = \Sigma_c\ v_{c0}$ and assuming that present values within the group of *sup* countries are proportional to national incomes at 0 (on par with *inf* countries in the above formula), we obtain, for *sup* country d:

[58] In 2011, the aggregate national income for the sup countries amounted to roughly twice the aggregate for the inf countries. The absolute value of ρ for the sup countries should thus be about half that of the inf countries.

$$v_{d0} = (y_{d0}/(1 - \alpha)Y_0).\ [V_0 - \alpha\Sigma_t Y_t(1 - \rho_s)^t/(1 + r)^t]. \quad (A.2)$$

The transfers at time t call for each country c (or d) to pay to a central agency a fraction γ of its national income, in exchange for a fraction v_{c0}/V_0 of the EMU aggregate income.

These are the formulas used in our simulations. As for parameter values, we have used ρ_i = .005, r = .03 and R = growth rate of Y = .02 until 2007, 0 from 2008 onwards. The choice of the rate of convergence ρ_i is tricky, because the data available for empirical estimation are scanty: the 12 years 2000-2011, with 4 years of crisis... Any choice entails a margin of error, and it would be demanding to model how this parameter uncertainty should be included *formally* in the risk sharing analysis underlying our insurance scheme. Our choice of .005 reflects the data in Figure 2 and Table 1. We did, however, try alternative values, which confirm near linearity of our main results with respect to this rate.[59] As for the average euro area expected growth, .02 corresponds closely to the realised rate through 2007. But that realised rate fell to 0 from 2008 on. These figures (used in our tables) seem to reflect accurately the expectations entertained at the time.

A.2 In Table 1, we record the national incomes of euro area countries since 1999. In Table 2, we simulate for each year the terms on which mutual insurance would have been contracted, namely (v_{ct}/V_t). On that basis, we compute, and present in Table 3, the annual transfers for each year from 1999 to 2011. For 1999, the transfer is equal to the difference between 3% of a country's national income in that year and the fraction v_{c0}/V^*_0 of $\gamma V_0 = .03V_0$. For 2000, the transfer is equal to the difference between 6% of a country's national income in that year, namely v_{c1}, and a fraction of $2\gamma V_1 = .06V_0$ equal to the sum of v_{c0}/V_0 and v_{c1}/V_1. As can be seen from the table, the annual transfers increase from year to year as the relevant fractions of a country's income and of V. are multiplied by the number (t + 1) of elapsed years – thus reaching $12\gamma = .36$ in 2011.

It is interesting to look at the resulting evolution of the total transfers at stake. Table 4 expresses the data of Table 3 as percentages of realised national incomes, then in the last column as percentages of the sum over time of these incomes. Also, Table 4 expresses the sum across *inf* (or identically *sup*) countries of the transfers as a percentage of V_t. These figures invite the following comments:

a. The total transfers over the period 2000-2011 remain modest, averaging + .72% of cumulative national incomes for the *inf* countries and - .38% for the *sup* countries. These low figures reflect in part the progressive nature of our insurance scheme. For the single year 2011, where the full 36% of national incomes were insured, while the deviations from year 1999 expectations were maximal, the averages become 2.49% for the *inf* countries and 1.26% for the *sup* countries. [60]

[59] Compare Tables 4 and 6.

[60] With ρ_i = .01 (Table 6), the total percentages rise to 1.36 and .72 respectively, and the percentages for 2011 rise to 3.69 and 1.87.

b. It is interesting to check from what year on the transfers started exceeding 2% in the *inf* countries. The answer is: 2006 for Portugal, 2008 for Italy, 2011 for Greece; Spain remains below 1% throughout. This ranking corresponds to that obtained for the 12-year average transfers.

c. Among the *sup* countries, Austria and Finland stand out as the two countries with the highest contribution rates, attaining 2.2% in 2011 versus 1.6% for Germany and 1.3% for Belgium. Food for thought...

d. The "ex ante non-redistributive" property of our insurance scheme is illustrated by the positive transfers to Luxemburg (the per capita richest country) in 2009-2011.

Remarks b and c confirm the prevalence of *national* macroeconomic shocks in the euro area.

A.3 The next simulation bears on backward implementation under the "without" alternative mentioned in section 2.6. Assuming that the insurance scheme had been implemented throughout the 12 years period 1999-2011, there would exist today 11 contracts for the coming 1 to 11 years 2012/2022, entailing for each future year f fractions of $12\gamma V_f = .36V_f$ equal to the sum of v_{ct}/V_t over the past years t = f – 12 to 2012. Additional fractions (to keep the number of contracts in force equal to 12 for each f) will result from the new contracts agreed in 2013 and later. Table 5 gives the extant insurance basis due to past contract**s** for the years 2012 through 2022 (percentages of y_{ct} and Y_t defining the transfers).

Within each country, the figures are declining over time, in line with the number of contracts still in force. If we reflect on the acceptability of this backward insurance scheme for individual countries, we are led back to reflect on the issue of assessing properly the parameters underlying the estimation of present values. No doubt, that assessment as of today could rest on country-specific contractual agreements about structural policies, as discussed in section 2.6. On the whole, the figures are in line with 2011 national incomes, an argument for global acceptability.

Table 1 – Gross National Income at 2011 prices (M€)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	310,767	323,248	323,853	327,435	330,568	339,871	344,450	354,227	365,085	370,223	352,634	370,618	373,893
Germany	2,181,643	2,251,263	2,284,057	2,278,689	2,282,027	2,348,216	2,369,913	2,480,494	2,553,320	2,569,509	2,458,682	2,542,657	2,620,430
Ireland	94,477	103,973	107,723	111,646	119,109	124,777	132,935	142,470	148,942	145,685	130,858	129,504	125,146
Greece	176,015	182,264	190,547	196,360	206,338	215,066	216,358	225,295	231,613	233,434	231,184	220,056	208,243
Spain	818,475	861,152	885,642	911,003	942,288	971,045	1,005,323	1,043,477	1,072,328	1,078,118	1,042,538	1,049,757	1,048,131
France	1,723,017	1,783,040	1,814,680	1,819,218	1,841,758	1,894,328	1,933,326	1,985,210	2,030,070	2,028,567	1,966,717	2,000,400	2,034,214
Italy	1,455,326	1,505,271	1,533,663	1,541,221	1,539,837	1,572,279	1,593,086	1,631,872	1,654,053	1,617,418	1,538,358	1,565,497	1,569,735
Luxembourg	26,716	28,092	29,347	28,524	27,089	31,869	33,023	30,703	34,624	32,683	27,598	29,998	30,646
Netherlands	506,812	532,313	535,454	536,535	539,476	559,997	559,219	591,142	608,060	596,013	569,718	590,782	608,147
Austria	237,053	245,735	247,357	253,461	256,151	263,430	269,342	278,818	289,030	296,107	283,729	291,180	299,685
Portugal	155,442	159,684	162,077	164,929	164,483	166,885	167,403	167,231	170,886	170,200	164,362	168,077	164,800
Finland	145,547	154,136	158,618	162,024	163,743	173,103	177,691	186,423	194,542	196,100	181,446	188,345	193,671

Source : Eurostat

Table 2 – $(v_{ct}/V_t)Y_t$ (M€) for the following parameter values: $\rho_i = .005$, $r = .03$

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	317,624	323,826	321,047	325,462	334,951	340,024	351,203	357,739	358,772	349,526	355,025	370,312
Germany	2,229,781	2,255,291	2,264,262	2,264,959	2,312,281	2,349,267	2,416,376	2,505,086	2,509,172	2,425,860	2,475,352	2,540,559
Ireland	100,974	108,902	111,643	116,012	126,157	130,451	141,632	150,308	152,874	143,628	137,573	135,077
Greece	188,119	190,905	197,480	204,039	218,547	224,845	230,512	237,691	237,728	230,138	243,047	229,526
Spain	874,760	901,979	917,864	946,630	998,046	1,015,200	1,071,094	1,100,887	1,100,640	1,062,896	1,096,035	1,094,936
France	1,761,035	1,786,229	1,798,952	1,808,257	1,866,176	1,895,176	1,971,230	2,004,892	1,994,968	1,915,160	1,980,051	1,998,750
Italy	1,555,405	1,576,637	1,589,461	1,601,494	1,630,954	1,643,773	1,697,310	1,721,653	1,697,724	1,594,581	1,617,297	1,632,873
Luxembourg	27,305	28,142	29,093	28,352	27,449	31,883	33,670	31,007	34,025	30,855	27,786	29,973
Netherlands	517,995	533,265	530,813	533,302	546,628	560,248	570,183	597,003	597,546	562,693	573,581	590,294
Austria	242,284	246,174	245,213	251,933	259,547	263,548	274,622	281,582	284,032	279,553	285,653	290,939
Portugal	166,131	167,255	167,973	171,379	174,216	174,473	178,355	176,432	175,398	167,797	172,796	175,311
Finland	148,758	154,411	157,243	161,048	165,914	173,181	181,175	188,272	191,178	185,137	182,676	188,190

Source : Eurostat, own calculations. Note : Countries with national income per capita inferior to the EMU average: Ireland, Greece, Spain, Italy and Portugal. Countries with national income per capita superior to the EMU average: Belgium, Germany, France, Luxembourg, Netherlands, Austria and Finland

Table 3 – Annual transfers for incremental gamma=0.03 (M€) for the following parameter values: $\rho_i = .005$, $r = .03$

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	-169	-20	-291	-439	-547	-544	-193	-780	-2,528	-1,904	-5,456	-4,985
Germany	-644	-1,316	-475	722	-205	1,661	-4,827	-8,255	-15,146	-14,288	-25,410	-41,918
Ireland	-90	-114	-305	-974	-1,220	-2,233	-3,197	-3,826	-2,892	-13	1,508	3,872
Greece	176	37	-198	-993	-1,235	-669	-750	-693	-1,110	-3,096	2,406	8,008
Spain	408	625	-314	-2,197	-1,569	-4,066	-3,769	-3,415	-4,631	-6,267	-227	6,629
France	-660	-1,535	-1,662	-3,104	-3,833	-6,257	-3,774	-3,294	-4,898	-12,206	-10,068	-13,061
Italy	1,504	2,761	4,420	7,800	11,344	13,774	19,520	26,234	36,599	40,047	44,616	53,081
Luxembourg	-24	-83	-5	187	-417	-554	146	-616	-125	986	406	318
Netherlands	-430	-316	-330	-309	-1,273	223	-2,538	-3,286	-630	-374	-3,416	-6,962
Austria	-104	-60	-570	-720	-825	-1,255	-1,395	-2,288	-4,482	-4,388	-4,993	-6,769
Portugal	193	365	355	752	1,288	1,851	3,361	3,753	3,985	3,598	3,802	6,040
Finland	-161	-344	-627	-726	-1,507	-1,931	-2,584	-3,534	-4,141	-2,093	-3,169	-4,253

Source : Eurostat, own calculations.

Table 4 – Annual transfers for gamma=0.03 as percent of the Gross National Income for the following parameter values: $\rho_i = .005$, $r = .03$

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	00-11
Belgium	-0.05%	-0.01%	-0.09%	-0.13%	-0.16%	-0.16%	-0.05%	-0.21%	-0.68%	-0.54%	-1.47%	-1.33%	-0.43%
Germany	-0.03%	-0.06%	-0.02%	0.03%	-0.01%	0.07%	-0.19%	-0.32%	-0.59%	-0.58%	-1.00%	-1.60%	-0.38%
Ireland	-0.09%	-0.11%	-0.27%	-0.82%	-0.98%	-1.68%	-2.24%	-2.57%	-1.98%	-0.01%	1.16%	3.09%	-0.62%
Greece	0.10%	0.02%	-0.10%	-0.48%	-0.57%	-0.31%	-0.33%	-0.30%	-0.48%	-1.34%	1.09%	3.85%	0.07%
Spain	0.05%	0.07%	-0.03%	-0.23%	-0.16%	-0.40%	-0.36%	-0.32%	-0.43%	-0.60%	-0.02%	0.63%	-0.16%
France	-0.04%	-0.08%	-0.09%	-0.17%	-0.20%	-0.32%	-0.19%	-0.16%	-0.24%	-0.62%	-0.50%	-0.64%	-0.28%
Italy	0.10%	0.18%	0.29%	0.51%	0.72%	0.86%	1.20%	1.59%	2.26%	2.60%	2.85%	3.38%	1.39%
Luxembourg	-0.08%	-0.28%	-0.02%	0.69%	-1.31%	-1.68%	0.48%	-1.78%	-0.38%	3.57%	1.35%	1.04%	0.06%
Netherlands	-0.08%	-0.06%	-0.06%	-0.06%	-0.23%	0.04%	-0.43%	-0.54%	-0.11%	-0.07%	-0.58%	-1.14%	-0.29%
Austria	-0.04%	-0.02%	-0.22%	-0.28%	-0.31%	-0.47%	-0.50%	-0.79%	-1.51%	-1.55%	-1.71%	-2.26%	-0.85%
Portugal	0.12%	0.22%	0.22%	0.46%	0.77%	1.11%	2.01%	2.20%	2.34%	2.19%	2.26%	3.66%	1.47%
Finland	-0.10%	-0.22%	-0.39%	-0.44%	-0.87%	-1.09%	-1.39%	-1.82%	-2.11%	-1.15%	-1.68%	-2.20%	-1.18%
Inf countries	0.08%	0.13%	0.14%	0.15%	0.28%	0.28%	0.47%	0.67%	0.98%	1.10%	1.66%	2.49%	0.72%
Sup countries	-0.04%	-0.07%	-0.07%	-0.08%	-0.15%	-0.15%	-0.26%	-0.36%	-0.52%	-0.59%	-0.87%	-1.26%	-0.38%

Source : Eurostat, own calculations.

Table 5 - Ex-post simulation of the insurance scheme for the following parameter values: $\rho_i = .005$, $r = .03$

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EU	36.0%	33.0%	30.0%	27.0%	24.0%	21.0%	18.0%	15.0%	12.0%	9.0%	6.0%	3.0%
Belgium	1.4%	1.3%	1.2%	1.1%	0.9%	0.8%	0.7%	0.6%	0.5%	0.4%	0.2%	0.1%
Germany	9.7%	8.9%	8.1%	7.3%	6.5%	5.7%	4.9%	4.1%	3.3%	2.5%	1.7%	0.8%
Ireland	0.5%	0.5%	0.5%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%	0.1%	0.1%	0.0%
Greece	0.9%	0.8%	0.8%	0.7%	0.6%	0.5%	0.5%	0.4%	0.3%	0.2%	0.1%	0.1%
Spain	4.2%	3.8%	3.5%	3.2%	2.8%	2.5%	2.1%	1.8%	1.4%	1.1%	0.7%	0.3%
France	7.8%	7.1%	6.5%	5.8%	5.2%	4.5%	3.9%	3.2%	2.6%	1.9%	1.3%	0.6%
Italy	6.6%	6.0%	5.5%	4.9%	4.3%	3.8%	3.2%	2.7%	2.1%	1.6%	1.1%	0.5%
Luxembourg	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Netherlands	2.3%	2.1%	1.9%	1.7%	1.5%	1.3%	1.1%	1.0%	0.8%	0.6%	0.4%	0.2%
Austria	1.1%	1.0%	0.9%	0.8%	0.7%	0.6%	0.6%	0.5%	0.4%	0.3%	0.2%	0.1%
Portugal	0.7%	0.6%	0.6%	0.5%	0.5%	0.4%	0.3%	0.3%	0.2%	0.2%	0.1%	0.1%
Finland	0.7%	0.7%	0.6%	0.5%	0.5%	0.4%	0.4%	0.3%	0.2%	0.2%	0.1%	0.1%

Source : Eurostat, own calculations.

Table 6 – Annual transfers for gamma=0.03 as percent of the Gross National Income for the following parameter values: $\rho_i = .01,\ r = .03$

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	00-11
Belgium	-0.10%	-0.11%	-0.24%	-0.34%	-0.42%	-0.47%	-0.42%	-0.63%	-1.14%	-1.06%	-2.02%	-1.94%	-0.77%
Germany	-0.08%	-0.16%	-0.17%	-0.17%	-0.27%	-0.24%	-0.56%	-0.74%	-1.05%	-1.10%	-1.56%	-2.20%	-0.72%
Ireland	0.00%	0.07%	-0.01%	-0.47%	-0.55%	-1.18%	-1.66%	-1.90%	-1.21%	0.92%	2.23%	4.31%	-0.01%
Greece	0.19%	0.20%	0.17%	-0.13%	-0.13%	0.24%	0.31%	0.44%	0.35%	-0.45%	2.15%	5.09%	0.70%
Spain	0.14%	0.26%	0.24%	0.13%	0.29%	0.14%	0.28%	0.42%	0.40%	0.31%	1.00%	1.77%	0.46%
France	-0.09%	-0.18%	-0.24%	-0.37%	-0.46%	-0.63%	-0.55%	-0.58%	-0.71%	-1.13%	-1.07%	-1.26%	-0.62%
Italy	0.19%	0.37%	0.57%	0.89%	1.20%	1.45%	1.88%	2.38%	3.17%	3.62%	3.96%	4.61%	2.04%
Luxembourg	-0.13%	-0.38%	-0.17%	0.47%	-1.55%	-1.96%	0.10%	-2.17%	-0.85%	2.98%	0.75%	0.39%	-0.28%
Netherlands	-0.13%	-0.16%	-0.21%	-0.26%	-0.48%	-0.27%	-0.79%	-0.95%	-0.58%	-0.59%	-1.14%	-1.75%	-0.63%
Austria	-0.09%	-0.12%	-0.37%	-0.48%	-0.57%	-0.77%	-0.86%	-1.20%	-1.96%	-2.04%	-2.26%	-2.85%	-1.19%
Portugal	0.22%	0.41%	0.50%	0.84%	1.26%	1.69%	2.72%	3.01%	3.25%	3.19%	3.36%	4.90%	2.13%
Finland	-0.15%	-0.31%	-0.53%	-0.64%	-1.11%	-1.38%	-1.73%	-2.20%	-2.55%	-1.66%	-2.23%	-2.79%	-1.51%
Inf countries	0.17%	0.31%	0.41%	0.52%	0.75%	0.84%	1.14%	1.44%	1.85%	2.07%	2.74%	3.69%	1.36%
Sup countries	-0.09%	-0.17%	-0.22%	-0.28%	-0.41%	-0.46%	-0.62%	-0.78%	-0.99%	-1.10%	-1.43%	-1.87%	-0.72%

Source : Eurostat, own calculations.

ANNEX I: Table 7 – Summary statistics for investment projects

Parameters/Projects	Wind-power [b]	Solar energy		Low-cost housing
		PV	CSP	
Unsatisfied needs	N/A	N/A	N/A	1,200,000 units [i]
Marginal projects	N/A	N/A	N/A	700,000 units [i]
Labour content (man-years)	15.5 EFT/MW	20 EFT/MW	11 EFT/MW	10 EFT/m€
Supply response (risks of bottlenecks)	Potentially high (low)	Potentially high (low)	Potentially high (low)	Potentially high (low)
Investment cost	From 1,000€ to 1,350€/KW (onshore) From 2,000 to 2,300€/KW (offshore)	2,690€/KW	From 3,500€ to 5,600€/KW (without storage) From 4,000€ to 8,000€/KW (with storage)	137,400 €
LCOE (on average)[a]	From 5c€/KWh to 10c€/KWh	From 15c€/kWh to 29 c€/kWh	From 12.5c€/kWh to 25.9 c€/kWh	-
Sell or rent price (on average)	From 6.61c€/kWh to 14.33c€/kWh [c]	From 6.61c€/kWh to 14.33c€/kWh [c]	From 6.61c€/kWh to 14.33c€/kWh [c]	325 € per month
Subsidies	Various forms	50-60%	45%	30-35%
Localisation of input production	Europe [d]	Europe [f]	Europe [f]	Europe
Localisation of output production	Germany and Spain (onshore) Northern Europe [e] (offshore)	Southern Europe [g]	Southern Europe [h]	National level

Note: [a] For renewable energies, this relates to the levelised cost of electricity calculated by discounting and levelising investment and operation and maintenance (O&M) costs over the lifetime of the turbine (around 20 years), and then dividing them by the annual electricity production; [b] Figures are given for an average capacity per turbine of 2 Megawatt; [c] the lowest band is for Greece whereas the upper band is for Germany with other countries in between; [d] with Denmark, Germany and Spain as the most important European wind turbine manufacturers; [e] the most important producers are located in Denmark, Ireland, The Nederland, Sweden and the UK; [f] the main European manufacturers of solar material are companies from France, Germany, Italy, Spain and the Netherlands; [g] European countries having the highest solar irradiance are Cyprus, France (Southern part), Greece, Italy, Malta. Portugal and Spain but currently actual production is only located in France, Germany, Italy, Spain and the UK; [h] 75% of CSP production is currently located in Spain; [i] only for the HLM system on average in France.
Source: IRENA, IEA, EPIA, EPRI, Deloitte, ESTELA, European Commission, EWEA, INSEE, Cabinet Relance; own calculations.

ANNEX II: Table 8 – Composition of electricity production by sources: 2007 % of total

	DE	AT	BE	DN	ES	FL	FR	GR	IE	IT	NL	PT	UK	SE
Coal	20.5	9.7	7.3	50.8	22.4	17.2	4.3	0.0	19.5	14.1	23.7	26.2	34.4	0.4
Lignite	22.4	0.0	0.0	0.0	1.4	9.1	0.0	54.6	7.7	0.0	0.0	0.0	0.0	0.0
Solid subtotal	42.9	9.7	7.3	50.8	23.9	26.3	4.3	54.6	27.2	14.1	23.7	26.2	34.4	0.0
Fuel	1.4	2.0	0.9	3.3	6.1	0.6	1.1	15.2	7.0	11.3	2.1	10.3	1.2	0.7
Gas	11.9	15.3	28.6	17.6	31.1	13.0	3.9	21.7	54.8	55.0	58.0	27.8	41.8	0.6
Fossil subtotal	56.2	26.9	36.8	71.7	61.0	39.9	9.2	91.5	89.0	80.3	83.8	64.3	77.3	1.7
Nuclear	22.1	0.0	54.3	0.0	18.1	28.8	77.2	0.0	0.0	0.0	4.0	0.0	15.9	45.0
Hydr.	4.5	60.5	1.9	0.1	10.0	17.4	11.3	5.3	3.6	12.3	0.1	22.1	2.3	44.5
Wind	6.2	3.1	0.6	18.3	9.0	0.2	0.7	2.9	6.9	1.3	3.3	8.5	1.3	1.0
Biomass	4.5	6.9	3.5	9.9	1.2	12.4	1.0	0.3	0.5	2.2	5.3	4.5	2.5	7.1
Geo-thermal	-	-	-	-	-	-	-	-	-	1.8	-	0.4	-	-
Average cost of output	6.87	5.61	7.14	6.13	6.48	4.80	4.89	4.12	10.96	8.23	8.69	8.71	9.90	7.81

Source: Cruciani, M. (2010).

Table 9 – Composition of electricity prices (excluding taxes) in 2007

	DE	AT	BE	DN	ES	FL	FR	GR	IE	IT	NL	PT	UK	SE
In ct. €/kWh														
Supply	6.87	5.61	7.14	6.13	6.48	4.80	4.89	4.12	10.96	8.23	8.69	8.71	9.90	7.81
Routing	7.46	4.89	5.15	5.57	3.56	3.97	4.32	2.49	3.69	8.35	5.31	5.49	2.64	3.09
Total (rounded)	14.3	10.5	12.3	11.7	10.0	8.8	9.2	6.6	14.7	16.6	14.0	14.2	12.5	10.9
In % of total														
Supply	48	53	58	52	64	55	53	62	75	50	62	61	79	72
Routing	52	47	42	48	36	45	47	38	25	50	38	39	21	28

Source: Cruciani, M. (2010)

ANNEX III – Possible cyclical adjustments in the cost of renewable energy

In order to estimate the cost of producing energy, the calculation of the levelised cost of electricity (LCOE) is required, especially to allow comparisons between the different types of energies. This cost is calculated by discounting and levelising investment, operating and maintenance costs over the lifetime of here a turbine (expected to be around 15-20 years), and then dividing them by the annual electricity production as follows:

$$LCOE \quad \frac{\sum_{t=1}^{n} \frac{I_t \quad F_t \quad M_t}{(1 \quad r)^t}}{\sum_{t=1}^{n} \frac{E_t}{(1 \quad r)^t}}$$

with I for investment expenditures; M for operations and maintenance; F for fuel expenditure; E for electricity production; r for the discount rate; n for the life of the system and t denoting the year t for t=1, …, n. Consequently, the first approximation of the return to investor in renewable energy is:

$$p_t = \left(\frac{\gamma - LCOE_t}{LCOE_t} \right) * 100$$

where $\gamma = \mathrm{ps} + \mathrm{p}_{\mathrm{el,t}}^{\mathrm{conv}}$ is the sale price of renewable energies with ps denoting the premium from the government support (either the feed-in tariff or the quotas/green certificates) and $p_{el,t}^{conv}$ denoting the price of electricity for conventional energies. When ps is set to zero, the price of renewable energies is equal to that of conventional energies. Therefore, one way to smooth investment in renewable energies could be to find a mechanism for temporary support of feed-in tariffs in at times when the price of electricity to final consumers should be temporarily decreased due to a recession. In this case, one could imagine the following arrangement:

$$p_{el,t}^{c} = PS_{effective} + \gamma$$

where $PS_{effectiv}$ is the price guaranteed by the State to investors (which ensures a certain level of investment in renewable energies) and γ is the price of electricity from renewable energies in which ps could be set to zero during boom and ps>0 during recession.

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