Dealing with external imbalances and public debt objectives in the euro area: a dilemma?

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Abstract
The question of macro imbalances has gained importance in the European governance. The Macroeconomic imbalances procedure (MIP) provides incentives for EA members to improve their competitiveness when current account deficit are considered as excessive. Consequently, EA countries should achieve simultaneously the reduction of public debt and the reduction of current account imbalances. Achieving these objectives may be a source of internal inconsistencies. To illustrate these trade-offs, we simulate a simple macroeconomic model developed Blot et al. (2014), which takes into account the main macro elements of debt sustainability and output dynamics, the composition effects and the external trade linkages. To this end, we first quantify the price adjustment compatible with a stable and sustainable international investment position. Then, regarding whether the correction of external imbalances is symmetric – countries with external surpluses implement reflation policies – or asymmetric – only deficit countries implement internal devaluation – we assess whether Euro area countries are able to meet the 60% ratio for public debt at a 20-year horizon. Our simulations illustrate that under the non-cooperative solution – where countries with fiscal space do not implement expansionary policies and surpluses countries do not accept an internal reevaluation – the euro area systematically undershoots its inflation objective and suffers from a sustained economic slack.

Keywords: Fiscal rules - Deflation – Macroeconomic imbalances
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I. Introduction

The current European crisis has long focused on sovereign debts. The question of macro imbalances came out more recently and appeared as being as important as public imbalances leading European countries not only to reinforce the Stability and growth pact (SGP) but also propose a new tool – the Macroeconomic imbalances procedure (MIP) – for the macroeconomic surveillance. Though the MIP encompasses a large set of indicators, it is mainly dedicated to the external imbalances, through indicators related to current account, price competitiveness and

export market shares. Given the current level of debt and remaining current imbalances, Euro area members' states are expected to pursue fiscal consolidation and to implement internal devaluations through structural reforms. Achieving these objectives may entail trade-offs, which have not been recognized and emphasized so far. This paper deals with this issue and asks whether it is possible to close the output gap, achieve public finance sustainability and reduce macro imbalances.

Achieving these different objectives is very difficult because of internal inconsistencies. The closure of the unemployment gap and the reduction of macro imbalances can be fulfilled thanks to an improvement in competitiveness, which can be reached via wages cuts or low wage growth. This kind of structural reforms, if they are exclusively related to the labour markets, are no panacea. They may feed deflation pressures in the Euro area. The first two objectives are not only inconsistent with the objective of price stability of the EU, but also inconsistent with the achievement of fiscal sustainability: deflation increases the real value of debts and thus slow-downs the ability of countries to reduce actually their debt-to-GDP ratios.

To illustrate these trade-offs, we simulate a simple macroeconomic model developed Blot et al. (2014), which takes into account the main macro elements of debt sustainability and output dynamics, the composition effects and the external trade linkages. To this end, we first quantify the price adjustment compatible with a stable and sustainable international investment position. Then, regarding whether the correction of external imbalances is symmetric – countries with external surpluses implement reflation policies – or asymmetric – only deficit countries implement internal devaluation – we assess whether Euro area countries are able to meet the 60% ratio for public debt at a 20-year horizon.

Until the outbreak of the global financial crisis (GFC), macro imbalances in the Euro area were largely overlooked. The relative lack of interest about macro imbalances in the Euro area was initially related to the perceived disappearance of the external constraint for countries sharing the same currency. The situation of a country in a monetary union was considered as being similar to that of a region in a country, hence the following reasoning: most of the time, no one draws on regional imbalances to analyze the sustainability of the domestic monetary regime; hence, no one should draw on domestic imbalances to analyze the sustainability of the monetary regime. Moreover, higher public and trade deficits in some peripheral countries (Spain and Ireland were exceptions with their public surpluses) were considered as parts of a catching up process where new public and private investments were required. A kind of benign neglect attitude towards twin deficits thus arose (see, e.g. Blanchard and Giavazzi, 2002; Ahearne et al., 2007; Giavazzi and Spaventa, 2010).

The GFC has proved that a benign neglect attitude towards current account imbalances was ill-suited to the Euro area. Peripheral countries were both concerned with rising external imbalances before the crisis and sharp soaring public debts –somewhat mitigating the drop in private aggregate demand and private deleveraging – after its outbreak. The pass-through from external (lack of) demand to (higher) public deficits has been empirically strong and macro imbalances have finally weakened peripheral economies to such an extent that it impinged on the whole Euro area. Recent evidence presented by Alessandrini et al. (2012) suggests that past current account

deficits have contributed to the surge in sovereign debt spreads. European governments and institutions, like the Commission and the Parliament, have thus elaborated a new economic governance approach in the Euro area, ambitioning to monitor macro imbalances. External deficits have now shrunk in line with the fall of internal demand and with improving competitiveness. The internal adjustment may not have been completed if it has resulted from a slack in demand. Consequently, closing the output gap in former deficit countries may lead to the emergence of new current account deficits. Likewise, though fiscal consolidation has been significant so far, it may not be sufficient to achieve the 60% debt-to-GDP ratio. Though, it has been recognized that current account imbalances and the debt overhang were interconnected, the solutions to address these problems do not account for a potential conflict between the objectives of debt sustainability and the correction of external imbalances. Besides, the institutional arrangements in the Euro area are prone to an asymmetric correction of imbalances (debt and current account). This paper provides comparisons of the macroeconomic dynamic under a cooperative solution – countries with fiscal space implement expansionary policies and surpluses countries accept an internal reevaluation – and the non-cooperative solution. Under the non-cooperative solution, the euro area systematically undershoots its inflation objective and suffers from a sustained economic slack.

The rest of the paper is organized as follows. The second section provides a short reminder and a critical discussion on the new institutional arrangements in the euro area focusing on external imbalances. In the third section, we aim at quantifying the price-adjustment needed to stabilize the net international investment position (NIIP) at a sustainable level. The calculations are based on small trade model, which consists of equations linking import and export volumes to output variations and to competitors' prices. Considering that euro area members succeed in reducing relative price, the fourth section determines the path for fiscal consolidation in two polar cases – cooperative solution versus non-cooperative solution – though simulations of a macroeconomic model for 11 Euro area members.

II. European governance to deal with macroeconomic imbalances: the 6-Pack

In December 2011, the EU established a new set of rules, the "6-pack", which adds to the preventive and corrective tools of the Stability and Growth Pact a Macro Imbalance Procedure (MIP) drawing on indicators pertaining to current account positions, competitiveness, and financial stability. The envisaged purpose is "to establish a surveillance procedure to prevent and correct macroeconomic imbalances" and "to provide an early-warning signalling of potentially harmful macroeconomic imbalances in MS". The surveillance is based implicitly on a 2-step procedure. First, the scoreboard provides a "reliable signalling device for potential harmful imbalances". Then it is followed by an "economic reading" taking into account country specific circumstances and institutions. This second step implicitly relies on an in-depth analysis to assess precisely whether or not the signalled disequilibria may challenge future prospects for growth, price and financial stability. In-depth analyses are then published by the European Commission and they may give rise to economic policy recommendations to address macroeconomic imbalances.

The list of indicators (see table 1) fits well in the purpose of signalling macro imbalances. But it must be stressed, first, that there is a risk that the surveillance puts too much emphasis on the respect of numerical thresholds which might lead to fallacious recommendations. Second, part of the assessment will rely on an asymmetric view of imbalances.

A new exercise in numerology?

A first stage of the MIP resorts to pinpointing the position of countries regarding thresholds, an approach close to the one already used for identifying excessive deficits in the Stability and growth pact (SGP). A first remark relates to the numerology embedded in the old and new thresholds. Within the SGP, the rule of conduct has long focussed on a public deficit at 3% of GDP, though this threshold lacks a theoretical and empirical basis. The proposed thresholds of the MIP are not based on sound theoretical or empirical conclusions which may show that breaching the thresholds echoes an unsustainable macroeconomic situation. A second remark relates to the identification of imbalances: it should not only rely on figures but it has to be based on in-depth economic analysis. The financial crisis has made clear that countries like Spain and Ireland which fulfilled the 3%-of-GDP limit on public deficit have also undergone a deep crisis.

Eventually, the general surveillance of a Member state's macro imbalances must go beyond a few targeted numbers which are without clear economic rationale and it should rely on an in-depth economic analysis. Yet, we must recognise that the MIP makes it clear that a thorough "economic" reading will complement the surveillance. In that view, the list of indicators will only serve as an early-warning signal. The scoreboard is an alert system but main decisions and major recommendations will result from "economic reading" and "in-depth analysis". Considering the distinction between indicators of the scoreboard and in-depth analysis, questions about the hierarchy can emerge. On the one hand, if surveillance of macro imbalances relies mainly on the scoreboard, it will be difficult to avoid an excessive number of false alarms: a so-called "excessive" current account deficit may finally reflect a catching-up process. On the other hand, if surveillance relies mainly on "in-depth analysis", recommendations by the Commission will be discretionary. In case of discrepancy between recommendations and the scoreboard, the MIP will not deliver a clear and transparent message to the misleading country.

Table 1. Indicators and thresholds of MIP

Label	Threshold Geo Area	Threshold Lower Value	Threshold Upper Value
3 year average of Current Account balance as % of GDP	EU27	-4	6
Net International Investment Position a % of GDP	EU27	-35	
% change (3 years) of Real Effective Exchange Rates (42 IC) with HICP deflators	EA	-5	5
% change (3 years) of Real Effective Exchange Rates (42 IC) with HICP deflators	Non EA	-11	11
% change (5 years) in Export Market Shares	EU27	-6	
% change (3 years) in Nominal ULC	EA		9
% change (3 years) in Nominal ULC	Non EA		12
% y-o-y change in Deflated House Prices	EU27		6
Private Sector Credit Flow as % of GDP – consolidated	EU27		14
General Government Debt as % of GDP	EU27		60
3 year average of Unemployment Rate	EU27		10
% y-o-y change in Total Financial Sector Liabilities	EU27		16.5

Source: European Commission, Economic and Financial Affairs

An asymmetric assessment of imbalances

Currently, most indicators are asymmetric. For instance, the current account threshold is set between a surplus of 6% of GDP and a deficit of 4% of GDP. There is no economic rationale for that numbers in particular; and there is no economic rationale as well for introducing an asymmetry in the current account threshold. What makes a deficit above 4% more dangerous to the stability of the Euro area than a surplus above 4% (but below 6%)? It seems difficult to argue that German current account surpluses, above 4 %, are more innocuous to the Euro area than a deficit above 4% in a small country like Greece. The reverse is certainly more correct.

To make things clear, let us switch from ratios to levels. The *level* of external debt that a German surplus of 4% of its GDP entails is far higher than the level of external debt that a small-country deficit of 4% of its GDP entails. Hence, the disequilibrium forces, and thus the systemic risk, of a large country surplus are stronger than a small country deficit's. An indicator of trade imbalances which manages to monitor their impact on growth, price and financial stability should rely on levels rather than percentage points of GDP. The trade surplus of a large country will fuel credit by domestic banks to smaller countries; if it is huge, the availability of credit in the latter countries will produce easy money and a boom-bust situation. Portugal, Greece, Cyprus and even Spain are certainly good examples in this respect. Their external deficits were largely financed by capital flows from Northern countries and notably Germany and France (Chen et al., 2013). To illustrate this point further, one can compare the respective amounts of (current) euros that a current account surplus of 6% of 2013 GDP in Germany and current account deficits of 4% of

2013 GDP in Greece, Portugal and Spain mean. The German surplus will amount to more than 160 € billion (109 € billion if the surplus achieves only 4% of the German GDP), whereas the deficits will amount to € 7, 6 and 40 billion in Greece, Portugal and Spain respectively. It is straightforward that the impacts on the Euro area are not comparable! Then, if the German surpluses mirrored weak investment opportunities and weak internal demand, the deflationary forces would have been very powerful in the Eurozone if they had not been partially absorbed by deficits in other Euro area countries.

In comparison with the indicator referring to the current account position, others relating to competitiveness and market shares are even more asymmetric: the burden of responsibility is exclusively borne by deficit/debtor countries. This is notably the case for the net international investment position which is, by construction, the accumulation of past current account balances. Because of this bias in signalling only a certain type of imbalances, it is possible to miss the fact that a market share loss by a given Euro area country may have as counterpart a market share gain by another one. Therefore, there is a risk that recommendations will be geared toward deficit countries urging them to adjust wage costs downward or to implement restrictive policies. Conversely it will fail to signal that surplus countries have run competitive disinflation policies, as confirmed recently. Indeed, the European Commission decided not to put Germany into surveillance for macroeconomic imbalances despite its current account surplus exceeding 6% for two consecutive years. As stressed by De Grauwe (2012), the current governance of macroeconomic imbalances in the Euro area endorses the "tyranny" of creditor countries. The result will be that the Euro area as a whole will continue to implement a global deflationary policy. By only signalling competitiveness losses, the MIP will actually miss to signal a coordination problem among Euro area countries.

The same remarks hold for indicators of internal imbalances. By considering only the increases in private sector credit flows, the scoreboard will only signal member states facing overheating although weaknesses in internal demand may also be a source of disequilibrium. For macro surveillance to be consistent with article 2 of the Consolidated EU Treaty (stipulating that the general objectives of the EU are to promote a high level of employment and social protection, the raising of standard of living and quality of life, and economic and social cohesion and solidarity among Member states), it should not only point out the risks of an excess development in credit and asset prices. For instance, a growth slowdown in credit flows may signal a situation of credit crunch or weakness in internal demand. It would then be useful to consider a lower limit to the credit flows to the private sector.

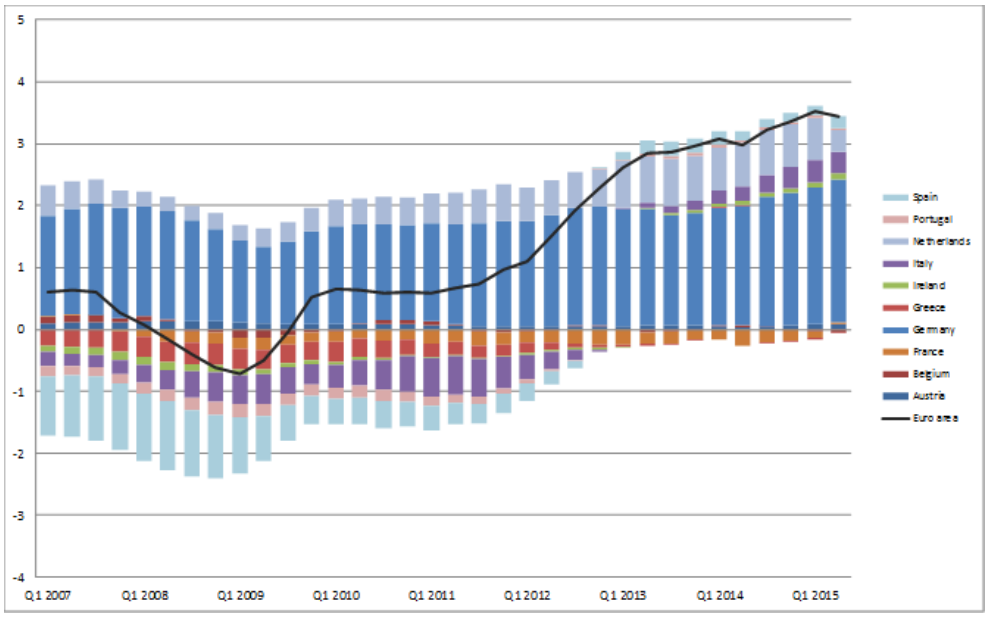
III. How much adjustment of relative prices do we need?

To assess the need for adjusting the internal exchange rates, we start the analysis by looking at current trade balances in euro area countries. Then we discuss the nominal price adjustments that would be necessary in order to correct these imbalances, both between the Euro area countries and with third party countries.

External disequilibrium in the Euro Area countries

Since the start of the crisis, the current account of the Euro area has strongly increased, starting from a current account deficit of –0.7% of GDP in 2009, to a surplus of +3.4% of GDP in 2014 (Figure 3.3). Almost all countries are in surplus in 2015-Q2, except Belgium, Cyprus, Finland and Greece. This apparent improvement mainly comes from the harsh reduction of current account deficits in southern countries – Spain, Italy, Greece and Portugal – and from the fall in oil price in since 2014-Q3. However, weak internal demand and imports explain a substantial part of the improving trade balances. On the other hand, the shrinkage of exports due to trade partners' internal demand collapse worsens the trade balance.

Figure 1. Current accounts developments in the Euro Area since 2007 (% of EA GDP)



Source: Eurostat.

Starting from these remarks, we study current external imbalances in Euro area countries taking into account the fact that these countries and the world economy have not yet fully recovered from the crisis. The external disequilibrium of a country can be assessed by computing the gap between the structural trade balance and the trade balance that stabilizes the net international investment position (NIIP thereafter) at a desired level expressed as a % of GDP. The structural trade balance of a country depends on the output gap of the economy: a negative output gap signals a weak internal demand that diminishes imports. Closing the output gap would then worsen the trade balance of that country. The structural trade balance also depends on the output gaps of trade partners: if they face a negative output gap, they import less from the country. Closing their output gap would then improve the trade balance of the country.

In Table 2 we report the structural trade balances (STB thereafter) for eleven Euro area countries (see Appendix for computation details). STB are generally lower than current trade balances, since almost all Euro area countries face a more negative output gap than that of their partners. Greece has an actual trade balance which is moderately negative in 2014 (–2.1% of GDP), but its STB amounts to –8.3% of GDP due to its strongly negative output gap (–12.6% of GDP). On the contrary, Germany has a higher STB (+7.5% of GDP) than its trade balance (+6.5% of

GDP) in 2014, since its output gap is nearly closed while that of its main trading partners is on average wider.

Table 2. Trade balance gap for 11 Euro Area countries in 2014 (% of GDP)

	Net international investment position	Current account	Trade balance	Output gap (%)	Potential growth (%)	Weighted output gap of trade partners (%)	Structural trade balance	Structural trade balance target*
	(1)	(2)	(3)	(4)	(5)	(6)	(7) = (3) - Θ x (6) + Ω x (4)	(8) = [(5) – r] x (1) – [(2) – (3)]
Austria	2	2.0	3.7	-1.5	1.5%	-1.6	3.7	1.7
Belgium	57	0.1	0.3	-1.2	2.0%	-2.2	1.1	0.7
Finland	-1	-0.9	-0.3	-2.8	2.0%	-1.1	-0.6	0.6
France	-20	-0.9	-0.8	-2.3	1.7%	-1.8	-1.3	0.0
Germany	42	7.4	6.5	-0.9	1.1%	-1.8	7.5	-0.8
Greece	-124	-2.1	-2.2	-12.6	1.5%	-1.9	-8.3	-0.7
Ireland	-107	3.7	18.7	-3.6	2.0%	-1.7	18.2	13.9
Italy	-28	1.9	3.0	-6.1	0.9%	-1.4	-1.1	1.1
Netherlands	61	10.7	11.5	-2.7	1.8%	-1.6	12.2	1.3
Portugal	-113	0.6	1.3	-6.3	1.6%	-2.7	-3.0	0.0
Spain	-94	1.0	2.4	-6.4	1.7%	-2.1	-2.6	0.7

Sources: OECD Economic Outlook 97, IMF WEO October 2015, Oxford Economics, IMF International Financial Statistics, Eurostat, OFCE-IMK-ECLM calculations.
** The structural trade balance target is the structural trade balance that is compatible with NIIP stability at its 2014 level. We assume that the gap between the current account and the trade balance (revenues, current transfers, the capital account and the financial account) is constant. We assume r = 1%. Θ and Ω are sensitivity estimates of the trade balance to the country's output gap and to the weighted output gap of trade partners*

We also report the STB target, i.e. the STB compatible with a stable NIIP. The STB target is computed as the current NIIP adjusted by the gap between the potential growth rate and the long run real interest rate, and corrected for the gap between the current account and the trade balance. Defining the target of the external adjustment of Euro area countries is a critical task. It is clear that an ever increasing or decreasing external position is not sustainable over the long run, and stabilizing the NIIP is therefore a necessary condition. Here, for sake of simplicity we stabilise the NIIP in the long run at its current level.

The gap between the STB and its target reveals external disequilibria. Some countries need to strongly increase their STB to reach the target. It concerns first and foremost Greece: a strong improvement in Greek competitiveness is needed to improve the trade balance in the long run and to stabilise the NIIP. Finland, France, Italy, Portugal and Spain are concerned to a lesser extent. Conversely, Germany and the Netherlands, which already have the highest NIIP, should reduce their STB, since the current ones imply still increasing NIIP.

A trade model for computing the nominal price-adjustment in the Euro Area

Having quantified the disequilibria, we now turn to the study of the means by which these disequilibria could be reduced. Our analysis concentrates on price competitiveness, both on

domestic and foreign markets. In order to properly think about the needed nominal adjustments, one cannot analyse the imbalance of each Euro area country taken in isolation, as if it were a small open economy, because trade flows are quite significant between Euro area countries. An analysis of the simultaneous nominal adjustment of all Euro area countries is needed. To that end, we build a small trade model that computes the required price adjustment of every Euro area country. The core of the model consists of equations linking import and export volumes to output variations and to competitors' prices. Imports react positively to domestic activity and to domestic prices, and negatively to competitors' prices. Exports react positively to foreign activity levels and to competitors' prices, and negatively to domestic export prices. The model also incorporates equations for export and import prices in order to reflect the pricing strategies (in the space between local currency pricing on one extreme and producer currency pricing on the other extreme). The critical parameters that we use in our quantitative assessment are therefore trade elasticities to exports and import prices. We choose to abstract from non-price competitiveness, because of the lack of widely available and well established index embodying that concept.

The first step is, for given NIIP targets, to compute the corresponding trade balance targets. Let i denote the country index, TB_i the trade balance to GDP ratio of country i, CA_i the current account to GDP ratio, $NIIP_i$ the NIIP to GDP ratio, r the real interest rate, π the inflation rate. We then compute the part of the current account R_i (expressed as a ratio of GDP) that is not explained by trade or by interest payments on the external position:

$$R_i = CA_i - TB_i - (r + \pi)NIIP_i$$

That residual is non zero either because of transfers (remittances, debt cancellation…), errors and omissions, or because the assumed interest rate r does not correspond to the effective average interest rate on the net external position. Then, given potential growth g_i, the adjustment horizon h and the NIIP target $\overline{NIIP_i}$, the target trade balance is defined by:

$$\overline{TB_i} = \frac{\overline{NIIP_i} - NIIP_i\left(\frac{1+r+\pi}{1+g_i+\pi}\right)^h}{\sum_{t=0}^{h-1}\left(\frac{1+r+\pi}{1+g_i+\pi}\right)^t} - R_i$$

This target trade balance is such that, if the country were adjusting to this new value today, then the NIIP would reach the target NIIP in h years, provided the hypotheses on growth, real interest rate and inflation are realized. It is important to note that this calculation incorporates several other assumptions. First, the residual R_i is assumed constant over time; as a side effect, if the value that we assumed for r is wrong, then our interest payment computations are wrong only on the difference between the initial NIIP and its target. Second, we assume that changes in the NIIP are only due to current account surpluses or deficits and not to valuation effects: this seems like a reasonable approximation since there is no time pattern or trend in those valuation effects over time (see Pupetto and Sode, 2012, p. 30 for more details). We now describe the trade model that is at the core of the computation. All the endogenous variables denoted by lower letters are log-deviations from a reference level (defined as the actual values at the end of 2013).

The volume of exports x_i of country i depends on the foreign demand d_i^{EX} and on the difference between p_i^{EX}, the index of competitors' prices on export markets of country i, and p_i^X, the export prices of country i:

$$x_i = d_i^{EX} + \varepsilon_i^X (p_i^{EX} - p_i^X)$$

where ε_i^X is the price-elasticity of exports. Note that the elasticity of exports with respect to the foreign demand is equal to one, which means that this is a specification in terms of market shares.

Similarly, the volume of imports m_i of country i depends on the domestic output y_i and on the difference between domestic VA prices p_i^{VA} and import prices p_i^M:

$$m_i = y_i + \varepsilon_i^M (p_i^{VA} - p_i^M)$$

where ε_i^M is the price-elasticity of imports. Again, the elasticity with respect to demand is equal to one, which is necessary to ensure homogeneity.

The foreign demand d_i^{EX} faced by country i is a function of import volumes of trade partners and of the output of the rest of the world y^{RoW} (the latter being a proxy for the imports of the rest of the world):

$$d_i^{EX} = \sum_j wx_i^j \, m_j + wx_i^{RoW} y_{RoW}$$

where wx_i^j is the share of country j in the exports of country i.

The price p_i^X of exports of country i depends on domestic VA prices and on competitors' prices on export markets:

$$p_i^X = (1 - \varepsilon_i^{PX}) p_i^{VA} + \varepsilon_i^{PX} \, p_i^{EX}$$

where ε_i^{PX} is the price-elasticity to competitors' prices. On one extreme if $\varepsilon_i^{PX} = 1$ then the producers of country i entirely adjust to competitor's prices, potentially at the expense of their margins. On the other extreme if $\varepsilon_i^{PX} = 0$ then the producers focus exclusively on their margins, potentially at the expense of their competitiveness.

Similarly the price p_i^M of imports of country i depends on domestic VA prices and on a price index p_i^{EM} of exporters to country i:

$$p_i^M = (1 - \varepsilon_i^{PM}) p_i^{VA} + \varepsilon_i^{PM} \, p_i^{EM}$$

where ε_i^{PM} is the price-elasticity to export prices. On one extreme if $\varepsilon_i^{PM} = 0$ then the exporters to country i entirely adjust to domestic prices, potentially at the expense of their margins. On the other extreme if $\varepsilon_i^{PM} = 1$ then the exporters focus exclusively on their margins, potentially at the expense of their competitiveness.

The index of competitors' prices on export markets of country i is defined by:

$$p_i^{EX} = \sum_j wc_i^j p_j^X + wc_i^{RoW} e$$

where e is the nominal effective exchange rate of the Euro, and the weights wc_i^j are computed by double weighting. Note that we make here the assumption that export prices (in foreign currency) of countries outside the Eurozone do not change, so e can be understood as non-euro competitors' price expressed in euros.

The price index of exporters to country i is defined by:

$$p_i^{EM} = \sum_j wm_i^j p_j^X + wm_i^{RoW} e$$

where wm_i^j is the share of country j in the imports of country i.

Given the changes in exports, imports, prices and output, one can infer the percentage point variation in the trade balance ratio, which is given by:

$$\Delta TB_i = X_i(p_i^X + x_i) - M_i(p_i^M + m_i) - TB_i\left(p_i^{VA} + y_i\right)$$

The solution of the model is defined as a set of vectors $x, m, p^{VA}, p^{X}, p^{M}, p^{EX}, p^{EM}, d^{EX}$ satisfying the equations of the model, under the constraint that the trade balances reach their target (i.e. $\Delta TB_i = \overline{TB_i} - TB_i$ for all countries) and given the assumptions for the output changes and the exchange rate (in the baseline, the output gaps are supposed to close, so the output changes y are set to the opposite of the 2013 output gaps, and the exchange rate of the Euro is supposed to remain unchanged, so $e = 0$).
Finally, for a given solution of the model, one can compute the REER changes for every country:

$$reer_i = p_i^{VA} - \left(\sum_j \left(\frac{wm_i^j + wx_i^j}{2} \right) p_j^{VA} + \left(\frac{wm_i^{RoW} + wx_i^{RoW}}{2} \right) e \right)$$

Note that again this calculation assumes that prices of countries outside the Eurozone (expressed in foreign currencies) remain unchanged.

For calibration we use data stemming from Eurostat for the 2013 NIIP, TB and CA. The 2013 output gaps come from the OECD database. The potential growth rates are the same as those used for the iAGS model. The bilateral import and export shares come from CEPII's CHELEM database. The inflation rate π is set at the ECB target of 2%. In the baseline, the real interest rate r is 1% and the horizon h is 20 years. Finally, Table 3 shows the values assumed for the price-elasticities of export and import volumes and prices.

Table 3. Price-elasticities of export and import volumes and prices

Elasticities	ε^X	ε^M	ε^{PX}	ε^{PM}
Austria	0.60	0.16	0.18	0.51
Belgium	0.47	0.28	0.57	0.79
Finland	0.60	0.31	0.57	0.79
France	0.58	0.74	0.52	0.72
Germany	0.42	0.79	0.53	0.77
Greece	0.47	0.37	0.41	0.40
Ireland	0.60	0.33	0.28	0.51
Italy	0.43	0.57	0.44	0.43
Netherlands	0.60	0.28	0.41	0.36
Portugal	0.47	0.56	0.77	0.79
Spain	0.85	0.81	0.44	0.76

Source: Ducoudré and Heyer (2014) for France, Germany, Italy and Spain and OECD (2005)[1] for other countries.

We therefore compute the nominal price adjustments that should be made simultaneously by all EA countries in order to correct their individual external imbalances. In this framework, a country is considered to have reached its external balance if its STB is equal to its STB target. Compared to the previous section, we use a slightly different definition of the STB target: it is the STB that stabilizes the NIIP at its current level, or at –35% of GDP if the current NIIP is below this threshold. The –35% threshold corresponds to the lower limit incorporated in the scoreboard of the Macroeconomic Imbalance Procedure (MIP) that all member states are supposed to respect (the scoreboard and its underlying economic legitimacy are discussed in the appendix). As of 2014, four countries were beyond the limit: Spain (–94%), Greece (–124%), Ireland (–107%) and Portugal (–113%). Their STB target in our quantitative exercise therefore corresponds to an improvement of their NIIP towards the –35% level, followed by a stabilization at that level.

Table 4 shows the nominal adjustments required by all countries to reach their NIIP target at a 20-year horizon. The calculation also takes into account the need for the internal rebalancing of all countries, because it is based on structural trade balances, i.e. balances reached when domestic and foreign countries have closed their output gap. The computation is done under the hypothesis that prices of competitors outside the EA remain constant when expressed in euros.

As expected, surplus countries (Germany, Austria, the Netherlands) must achieve a substantial real exchange rate appreciation to reach their external equilibrium; on the other hand, Greece, and to a lesser extent Belgium and Finland, must achieve a significant real depreciation.

[1] Pain N., A. Mourougane, F. Sédillot and L. Le Fouler (2005): "The new OECD international trade model", OECD, Economics Department Working Papers, n°440.

Table 4. Price adjustments needed to correct external imbalances (as of end of 2014)

	NIIP target (% of GDP)	REER adjustment (%)	VA price adjustment (%)	VA price adjustment relative to Germany (%)
Austria	2.2	+17.4	+31.5	+1.4
Belgium	57.2	−10.2	−0.4	−23.2
Germany	42.3	+23.5	+29.7	0.0
Spain	−35.0	−0.4	+5.7	−18.5
Finland	−0.7	−7.4	−2.3	−24.7
France	−19.5	−2.5	+4.9	−19.1
Greece	−35.0	−25.8	−22.0	−39.8
Ireland	−35.0	+5.6	+10.4	−14.9
Italy	−27.9	+10.1	+16.8	−9.9
Netherlands	60.8	+22.9	+30.8	+0.8
Portugal	−35.0	−4.6	+2.0	−21.4

Source: OFCE-IMK-ECLM calculation

Turning to the required adjustments in terms of value added prices, the striking fact is that almost all countries are expected to increase their prices. Only Greece, Belgium and Finland should decrease their prices, and by a rather low amount. This reflects the fact that the area on an aggregate level has a substantial current account surplus, which must be reduced in order to achieve a stable NIIP for the area as a whole. Under this scenario, the current account of the EA would diminish by 2.8% of GDP, resulting in a current account with a small surplus of 0.4% of GDP, which sustains an aggregate NIIP of 4.6% of GDP.

Of course, instead of increasing VA prices, another way of achieving the same aggregate objective would be to have the euro appreciate. There is of course a perfect substitutability between nominal price increases and euro depreciation: a 10% appreciation of the nominal effective exchange rate of the euro would decrease by 10 percentage points the required VA price increases in all EA countries.
Whether it is done through an average nominal price increase or through a nominal appreciation of the euro, the external rebalancing of the EA as a whole does not however automatically lead to the correction of disequilibria within the EA. In order to disentangle the two dimensions, and to isolate the second one, the last column of Table 3.5 reports the required nominal adjustments relative to Germany.

Several groups of countries emerge through this exercise. Austria and the Netherlands are almost on the same level as Germany, and need no relative adjustment. On the other extreme, Greece needs to depreciate by almost 40% relative to Germany, despite all the sacrifices already made. Between these two polar opposites, there is a large group of countries requiring a depreciation of about 20% relative to Germany, which includes France, Spain, Portugal, Belgium, and Finland. Note that Italy is in a slightly better position (only 10% relative depreciation required), because of its current account in surplus (1.9% of GDP in 2014) and its relatively favourable NIIP.

IV. Illustrating incompatibilities

In the previous section, we have illustrated the adjustment, which is needed to deal with current account imbalances. It has shown that some countries need to decrease relative price. Besides, Blot et al. (2014) also show that comply with fiscal rules would imply additional fiscal consolidation for some countries. There is a risk that that countries, which are supposed to implement further consolidation are also those that will need to adjust relative prices. Based on a model very closed to Blot et al. (2014), we provide simulations of the path of public debt-to-GDP ratios until 2035, which is the horizon of the 1/20th debt rule incorporated in the revised SGP and in the Fiscal Compact taking into account the price-adjustment needed to reduce current account imbalances.

A model for assessing fiscal consolidation and current account adjustment in the Euro area

The key features of the model are the following:

- It represents 11 euro area countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain.
- On the demand side, the output is determined by fiscal policy, interest rate, which are directly linked to the common monetary policy, external demand (a channel for intra EU interdependencies), real effective exchange rate and exogenous shocks on the output gap (the gap between actual and potential GDP). The equation is written as an error-correction model. Nominal exchange rate is exogenous.
- The size of fiscal multipliers is state-dependent and it changes with the level of the output gap.
- External demand is modelled using a bilateral trade matrix representing interdependencies between countries. The trade matrix is also used as a basis for imbalances analysis.
- Inflation is determined by a generalized Phillips curve relating current and expected inflation to the output gap, imported inflation and other exogenous shocks. Expectations can be modelled as adaptive (backward-looking) or rational (forward-looking).
- Inflation expectations are supposed to be anchored to a target. In the baseline scenario, the target corresponds to the ECB official 2% target. When, relative price adjustment are analysed, national inflation targets are different and set according to the needed adjustment.
- Monetary policy is described by a Taylor rule. The ineffectiveness of monetary policy is made possible when the economy hits the zero lower bound (ZLB).
- The long- term public rate for Germany is considered risk free, and long-term public rates for other countries include a risk premium that is set exogenously. The risk premium is equal to zero in the baseline scenario and may be positive when we consider a persistent financial fragmentation of the sovereign bond market in the euro area.

- Due to hysteresis effect, the output level may be permanently affected by a negative demand shock. Trend growth of the potential output will always converge to an exogenously set path.
- The public balance is the sum of interest payments, cyclically-adjusted balance and cyclical components. Fiscal stance (impulse) is measured by the change in cyclically-adjusted balance.

To sum up, the model may boil down to 6 main equations describing demand, potential output, inflation, expected inflation, the short term interest rate set by the central bank and long-term interest as a weighted sum of future short-term interest rates.

The demand equation is the driven by real interest rates, real effective exchange rate, external demand and fiscal policy, which is captured here by EFI, the effective fiscal impulses (with a distinction based on the composition of the fiscal stance between expenditures and taxes), cumulating past and current ex ante fiscal impulses on public expenditures and taxes.[2] R is the long term real interest rate and $\overline{R}$ is the long run equilibrium value of interest rate. tcer is the real effective exchange rate and $\overline{tcer}$ is the long run equilibrium real effective exchange rate. The term (β_l. ad) stands for the impact of external demand by trade partners. The dynamics of the current level of output is then represented by an error correction equation:

$$(1)\ d(\tilde{y}_t) = \lambda\left(-EFI^g_{t-1} - EFI^t_{t-1} - \delta_{1,l}.(R_{t-1} - \bar{R}_{t-1}) - \delta_{2,l}.(tcer_{t-1} - \overline{tcer_{t-1}}) - \beta_l.ad_{t-1}\right) + d\left(EFI^g_t\right) + d(EFI^t_t) + \delta_{1,c}.d(R_t - \overline{R_t}) + \delta_{2,c}.d(tcer_t - \overline{tcer_t}) + \beta_c.d(ad_t)$$

The dynamics of the potential output is described by the following equation:

$$(2)\ y^*_t = y^*_{t-1} + H.y_t + \varepsilon^S_t$$

where H is an hysteresis parameter and ε^s_t is an exogenous shock on aggregate supply. The output gap is then written as the difference between $(\tilde{y}_t)$ and (y^*_t). GDP prices are set according to a hybrid Phillips curve where inflation depends on past inflation, expected inflation, output gap, and imported inflation:

$$(3)\ \pi_t = \eta_1.\pi_{t-1} + (1-\eta_1).E\pi_{t+1} + \eta_2.y_t + \eta_3.\sum_j w_{m,j,c}\left(\pi^f_t\right) + \varepsilon^\pi_t$$

Expectations are supposed to be anchored on a target, which is equal to 2% in the baseline case.

$$(4)\ E\pi_{t+1} = \pi_t + \lambda_a.\left(\pi_t - \pi^{cible}\right)$$

where $\pi^{cible} = 2 + \epsilon^{cible}$

Actually, a distinction is made between short-term (or one-period ahead forecast) entering the Philipps curve equation (3) and long-term forecasts, which is used for the long term real interest rate. For one-period ahead forecast (π^e_t), we rely on backward-looking expectations as

[2] It is an *ex ante* multiplier in the sense that it does not take into account monetary policy effects and spillover effects from external trade on GDP.

represented by (3), and we assume that inflation is expected to converge to the target. To account for the adjustment in relative prices, we introduce a deviation for each country in the target. For financial markets, long-run expected inflation is modelled as the discounted sum of forward-looking inflation rates, in a similar fashion as nominal long-term rates, in order to keep expectations consistent at this (more than one-year ahead) horizon.

Monetary policy is described through a non-linear Taylor rule where, under non-ZLB circumstances, the short term interest rate moves with the gap between euro area inflation π_t^{EA} and the ECB target π^* on the one hand, and with the euro area output gap y_t^{EA} on the other hand. The ZLB is fixed at 0 %. The central bank is equal to 2% in the baseline scenario.

(5) $i_t^{EA} = Max(0,\ \rho.i_{t-1}^{EA} + (1-\rho).[r^* + \pi_t^{EA} + \Psi_1.(\pi_t^{EA} - \pi^*) + \Psi_2.y_t^{EA}])$

The long-term sovereign interest rate for the euro area is written the expectations theory. It is equal to the expected sum of future short term interest rates for which expectations are supposed to be rational (following Shiller, 1979):

(6) $r_t^{EA} = \tau.r_{t+1}^{EA} + (1-\tau)i_t^{EA}$
(7) $r_t = r_t^{EA} + \varepsilon_t^{I_{pub}}$
(8) $tcer_t = \sigma.(\pi_t - \pi_t^f)$

where r_t^{EA} is the nominal long-term sovereign interest rate for the euro area. For each country, the sovereign yield is equal to the euro area interest rate and an exogenous risk premium. Finally, imports of each country increase with the output gap (eq.(9)). Then, as imports in each country are exports for other countries, we define external demand to country c as the weighted sum of imports of the other EMU countries (eq.(10)). As the model considers only Eurozone countries, the external demand only accounts for intra-Eurozone trade.

(9) $m_t = \Omega.y_t$
(10) $ad_t = \sum_j w_{m,j,c} m_t$

FS is the fiscal balance in % of nominal GDP. We decompose it between a structural primary balance SPS and a cyclical balance CS, minus government interest payments on public debt GIP:

(11) $FS_t = SPS_t + CS_t - GIP_t$
(12) $SPS_t = SPS_{t-1} - EFI_t^g - EFI_t^t + \Phi.\Delta y_t^*$
(13) $CS_t = \Phi.y_t$
(14) $GIP_t = \overline{i_t^B}.B_{t-1}/(1+\Delta Q_t)$
(15) $\overline{i_t^B} = mat^{-1}.R_t^{pub} + (1-mat^{-1}).\overline{i_{t-1}^B}$
(16) $B_t = B_{t-1}/(1+\Delta Q_t) - FS_t + SFL_t$

The structural primary balance evolves according to the fiscal impulse and changes related to the potential output (eq.(12)). This latter point means that a permanent downward shift of potential production relative to the baseline would entail a permanent fall in taxes, then a permanent fall in the structural primary balance. The cyclical balance depends on Φ, the overall sensitivity of revenues and expenditures to the business cycle (eq.(13)). Interest payments on debt (in % of

GDP) depend on the stock of debt times its average interest rate, and deflated by the nominal GDP growth rate (eq.(14)). The average interest rate on debt evolves according to the long term nominal interest rate on newly issued public bonds. (mat) stands for the average maturity of public debt, and is assumed to be constant. $(\text{mat})^{-1}$ then gives the share of debt refinanced every year (eq.(15)). Public debt (in % of nominal GDP) increases with past debt deflated by the nominal growth rate of GDP, fiscal deficits and with an exogenous stock-flow adjustment variable (eq.(16)). The model is then calibrated as follows:

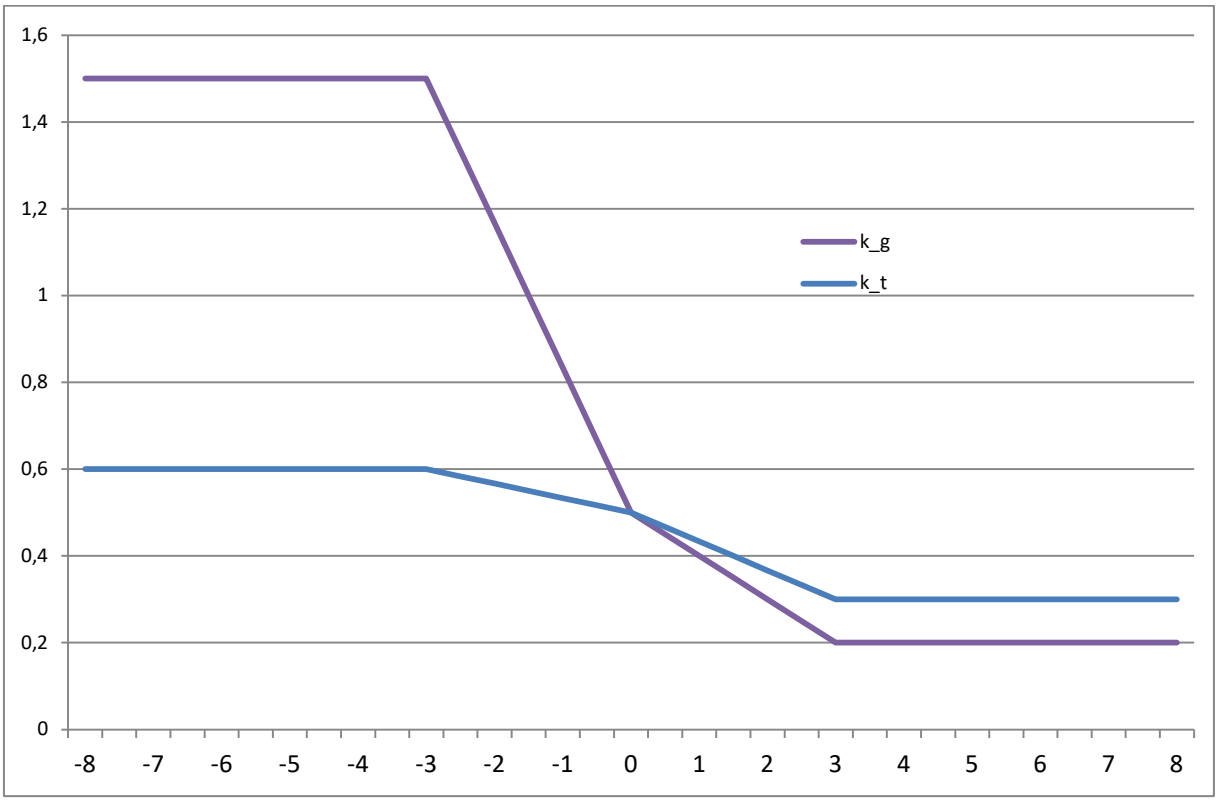
Table 5. Calibration of parameters

	DEU	FRA	ITA	ESP	NLD	BEL	GRC	PRT	IRL	AUT	FIN
δ_1, l	-1.25	-1.25	-1	-1	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
δ_2, l	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
δ_1, c	-0.9	-0.9	-0.9	-0.9	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
δ_2, c	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15
β_1, l	1.05	1.03	1.07	0.49	1.23	0.81	0.73	0.73	1.86	0.61	1.65
β_1, c	1.05	1.03	1.07	0.49	1.23	0.81	0.73	0.73	1.86	0.61	1.65
λ	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
η_1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
η_2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
η_3	0.44	0.3	0.28	0.3	0.71	0.84	0.31	0.39	0.81	0.52	0.42
λ_a	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65	-0.65
σ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
H	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Ω	0.87	1.0	0.92	0.94	0.47	0.8	0.59	1.0	1.0	0.66	0.74
Φ	0.51	0.49	0.5	0.43	0.55	0.54	0.43	0.45	0.4	0.47	0.5
mat	6.1	6.9	6.6	6.8	7.0	6.8	11.3	6.1	6.9	8.1	5.0

ρ	ψ_1	ψ_2	τ
0.6	0.5	0.5	0.8166

Finally, the effective fiscal impulses depend on the level of the output gap. Fiscal multipliers are higher when the output gap is weaker. The calibration is detailed in figure 2 representing the shape of the fiscal multipliers.

Figure2. Fiscal multipliers for public spending and taxes according to the output gap



Note: $\mu^G_{max} = 1.5$, $\mu^G_{min} = 0.2, \mu^G_o = 0.5$, $\mu^T_{max} = 0.6$, $\mu^T_{min} = 0.3$, $\mu^T_o = 0.5$. $y_{inf} = -3\%$, and $y_{sup} = 3\%$. Values are supposed to be identical across countries.

Source: iAGS model.

Simulations begin in 2016. To do so, we need to set some starting point values in 2015 for a set of specific variables. Output gaps for 2015 come from OECD database (EO97). Long-term projections for growth rates are OFCE hypotheses. These hypotheses, as well as those for long-term growth projections are necessarily open to debate. Concerning fiscal policy and budget variables, Public debt and public balance in 2015 come from OFCE-ECLM-IMK forecasts.

Coping with imbalances: the cooperative versus the non cooperative solution

It must be emphasized that the adjustments may be cooperative or not. They may be cooperative if countries with fiscal space implement positive impulses and if countries with current account surplus accept to overshoot the inflation target (so that inflation rate for the euro area remains close to 2%). The adjustment may also be non-cooperative if fiscal space is not used and if the price adjustment is asymmetric; with surplus countries unwilling to run reflation policies and still targeting a 2% inflation rate so that, for the euro area as a whole, inflation rate would undershoot the 2% target.

In table 6, the relative price adjustment, needed to achieve a correction of current account imbalances is computed according to two alternative assumptions: symmetric or asymmetric adjustment. The latter (asymmetric) adjustment stems from the computations which have been reported above. As the required adjustment is computed relatively to German prices, it is easy to

determine the relative decrease in inflation which is required from each country provided inflation is itself stable in Germany. Inflation in France would for example need to be 1.1 point inferior to German inflation to reach an adjustment of 21.2% over 20 years. Thereafter, it is supposed that for each country, we set heterogeneous inflation targets so that inflation and expected inflation converge to the new target, which is compatible with the relative price adjustment. When the adjustment is symmetric, inflation target increases in Germany, Italy, Netherlands and in Austria. The relative adjustment is determined so that euro area average inflation target is still equal to 2%, the ECB target. In the asymmetric scenario, inflation target for the euro area is reduced by 0.6 point. We assume that the ECB adopts this new target.

Table 6. Price adjustments

	DEU	FRA	ITA	ESP	NLD	BEL	GRC	PRT	IRL	AUT	FIN	**EA**
Symmetric	0.6	-0.5	0.1	-0.5	0.6	-0.7	-1.9	-0.6	-0.3	0.7	-0.8	**0**
Asymmetric	0	-1.1	-0.5	-1.0	0.0	-1.3	-2.5	-1.2	-0.8	0.1	-1.4	**-0.6**

Source: OFCE-IMK-ECLM

First, we analyse the effect of relative price adjustment on debt dynamics without introducing constraints on the achievement of the debt objective within 20 years at the latest. This scenario illustrates the ability of euro area countries to comply with fiscal rules. Do they meet the 60% debt ratio? Simulations suggest that a long-lasting slow-down of inflation in France, Spain, Belgium, Greece and Portugal would coincide with public debt ratios exceeding 60% in 2035 (table 7). In this scenario, inflation would increase above the 2% target in Germany, Netherlands and Austria where it would stand at 2.6%. This first simulation stresses that if euro area members aim at reducing current account imbalances, it may be detrimental to public debt and then to their ability to comply with the fiscal rules. Thereafter, we show that these two objectives may be reached but at the price of additional consolidation and to the detriment of recovery.

In the former scenario, relative prices are adjusted but not all countries comply with the fiscal rule since debt is above the 60% debt-to-GDP ratio for France, Italy, Spain, Belgium, Greece and Finland. For those countries, we implement a yearly fiscal consolidation of 0.5 point until public debt reaches 60% in 2035. Yet, two cases deserve attention. In the first one, we suppose that a cooperative solution is implemented. Countries for which debt would decrease below 60% by 2035 implement expansionary fiscal policies. This would mainly concern Germany and Ireland since debt is close or equal to 60%. Besides, in the cooperative solution the price adjustment is symmetric and surplus countries accept higher inflation during the 20-year adjustment period so that for the euro area as a whole, the inflation rate remains compatible with a 2% target as illustrated in table 8. Fiscal impulses would be negative until 2025 for France and 2021 in Spain. For Greece, despite -0.5 point impulses from 2016 to 2035, public debt would be far from the objective and Greece would be in deflation during all the period. Though it must be recognized that Greece is a special case, it suggests that debt reduction and current account imbalances might not be compatible objectives. France, Italy, Spain and Finland would also be threatened by deflation. In France, inflation rate would not exceed 1% from 2016 to 2026 whereas Italy and Spain would register a short period of deflation. For the euro area, the yearly average output gap would be -0.2 lower. It would notably remain negative as long as national fiscal impulses are negative. In this scenario, inflation would be significantly higher in Germany and in the

Netherlands: 2.8% and 2.7% respectively. In the euro area, inflation would increase from 0.2% in 2015 to 1.8% in 2022. The 2% target would be undershot for a long period of time. Monetary policy would then have to remain expansionary. Finally, it must be stressed that, from 2015 to 2035, the euro area current account surplus would decline by 1 point.

Table 7. Baseline scenario with (symmetric) price adjustments

	Public debt (% of GDP)		Structural balance (% of GDP)		Cumulative fiscal impulse	Average output gap	Inflation rate (%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	2020	2035	2020	2035	2015-2035	2016-2035	2016-2020	2021-2035
Germany	56	19	0.8	1.6	0.7	0.2	2.2	2.6
France	96	105	-2.8	-3.8	-1.1	0.0	0.9	1.6
Italy	122	79	0.3	1.2	-0.2	-0.3	0.8	2.0
Spain	98	97	-2.4	-2.9	-0.7	0.0	0.8	1.6
Netherlands	65	55	-1.4	-1.6	-0.1	0.0	1.6	2.6
Belgium	105	100	-2.1	-2.6	-1.0	0.0	0.4	1.3
Portugal	113	60	0.9	2.1	-1.2	-0.3	0.4	1.4
Ireland	77	24	0.9	2.5	-1.2	0.4	1.6	1.8
Greece	189	171	0.1	-1.1	-1.4	-0.8	-2.1	0.1
Finland	67	85	-2.5	-3.6	-0.6	-0.3	0.7	1.2
Austria	81	60	-1.3	-1.2	0.7	-0.3	1.7	2.6
Euro area	87	65	-0.8	-0.7	-0.3	0.0	1.3	2.0

Source: iAGS model

Table 8. Correction of fiscal and external imbalances in the cooperative (symmetric price adjustment) case

	Public debt (% of GDP)		Structural balance (% of GDP)		Cumulative fiscal impulse	Average output gap	Inflation rate (%)		Current account adjustment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2020	2035	2020	2035	2015-2035	2016-2035	2016-2020	2021-2035	2035-2015
Germany	58	60	-1.3	-2.5	3.8	0.5	2.5	2.8	-3.1
France	100	60	-0.8	1.5	-5.5	-0.8	0.3	1.2	2.0
Italy	127	60	1.7	3.2	-1.6	-0.6	0.2	2.0	-2.9
Spain	98	60	-0.2	0.8	-3.2	-0.4	0.2	1.4	-0.4
Netherlands	63	60	-2.0	-2.4	1.1	0.3	2.1	2.7	-2.7
Belgium	102	60	0.3	0.9	-2.6	-0.1	0.2	1.3	3.7
Portugal	109	60	0.7	1.7	0.1	0.0	0.8	1.5	-3.2
Ireland	76	60	-1.0	-1.3	3.2	0.8	2.1	2.0	-0.9
Greece	221	245	1.0	2.5	-8.7	-3.6	-3.6	-1.6	9.8
Finland	67	60	-1.0	-1.3	-1.6	-0.5	0.2	1.2	3.0
Austria	76	60	-1.6	-1.7	1.5	0.2	2.4	2.8	-2.9
Euro area	88	61	-0.5	-0.4	-0.6	-0.2	1.1	1.9	-1.0

Source: iAGS model
The adjustment of current account is computed as the change in the current account between 2015 and 2035.

Alternatively, we may consider a scenario where fiscal space, for countries with debt below 60% in table 7, is not used and where the adjustment in relative prices is asymmetric. Fiscal policy is supposed to be neutral from 2016 onwards in Germany, Netherlands, Portugal, Ireland and Austria and the target for inflation rate is capped at 2% in Germany, Netherlands and Austria. Consequently, the required decrease in the inflation rate is larger for the other countries in order to reduce external disequilibria as shown in table 3.6. Countries that need to implement negative fiscal impulses to reach a 60% debt-to-GDP ratio do not benefit from the positive spillover effects resulting from expansion in the countries having fiscal space. Moreover, in the absence of cooperation between EMU countries, constraints (fiscal and current account) become more binding bringing adjusting countries to reduce further inflation rate and to increase further fiscal consolidation to cope with the different objectives.

Fiscal impulse for the euro area as whole is now much more restrictive (-2.9 points instead of -0.6 point) as positive impulse for Germany is reduced by 3.4 points (table 3.9) and negative impulse in France is amplified (from -5.5 points to -10 points). Negative impulse also increases for Italy (-1.2 point) and Spain (-0.5 point). Besides, inflation in the euro area undershoots the 2% target and several countries would suffer from deflation. This is the case until 2035 for France and Greece, two countries that would also be unable to reach a 60% debt-to-GDP ratio. As a result, the average output gap for the euro area would be more negative than in the former cooperative solution. Therefore, this scenario clearly highlights the need for a cooperative adjustment and the risk that a trade-off between debt, current account and growth objectives will emerge. Here, we have considered two instruments (fiscal impulse and relative prices) to cope with the debt objective and current account adjustment. For the euro area as a whole, monetary policy would

still be expansionary but it would only partially cushion the negative impacts of consolidation on growth. Consequently, the growth objective would not be reached, recovery would be delayed and euro area would enter into secular stagnation, characterized by low inflation (and even deflation for some countries) and a period of low growth.

Table 9. Correction of fiscal and external imbalances in the non-cooperative (asymmetric price adjustment) case

	Public debt (% of GDP)		Structural balance (% of GDP)		Cumulative fiscal impulse	Average output gap	Inflation rate (%)		Current account adjustment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2020	2035	2020	2035	2015-2035	2016-2035	2016-2020	2021-2035	2035-2015
Germany	54	12	1.1	2.1	0.4	0.4	1.9	2.2	-1.9
France	102	65	-0.8	4.8	-10.0	-1.5	-0.2	0.0	5.4
Italy	131	60	2.2	4.2	-2.8	-0.8	-0.3	1.3	-1.8
Spain	100	60	-0.1	1.4	-3.7	-0.4	-0.1	0.8	-0.1
Netherlands	61	41	-0.8	-0.3	-0.2	0.4	1.5	2.3	-1.9
Belgium	102	60	0.5	1.3	-2.6	0.1	-0.2	0.8	3.9
Portugal	112	54	1.3	2.8	-0.8	0.0	0.1	1.0	-2.9
Ireland	74	13	1.4	3.3	0.0	0.7	1.5	1.5	0.5
Greece	224	245	1.1	3.4	-8.7	-3.2	-4.0	-1.9	9.5
Finland	67	60	-1.1	-1.2	-1.3	-0.2	-0.1	0.7	3.5
Austria	77	46	-0.7	0.0	0.4	0.2	1.7	2.3	-2.5
Euro area	88	42	0.5	2.4	-2.9	-0.4	0.6	1.2	0.4

Source: iAGS model.
The adjustment of current account is computed as the change in the current account between 2015 and 2035.

V. Conclusion

We show in this paper that the current account surplus increases the links between Euro area countries. It is well known that openness of trade in a fixed currency framework is important. In the current context of high public debt and current account imbalances, there is a critical need to take into account potential trade-offs when addressing imbalances. Our analysis also suggests that a cooperative strategy is preferable.

Appendix. Computing structural trade balances

Structural trade balances can be computed by correcting trade balances from the differentiated effects of business cycle among countries. The idea is to estimate trade balances with closed output gaps, while neglecting the effect of relative prices adjustments, that is to say that we assume constant market shares in the long run (this assumption is relaxed in the second part of the chapter).

Assume that the volume of exports x_i of country i depends on the foreign demand d_i^{EX}:

$$x_i = d_i^{EX}$$

Similarly, the volume of imports m_i of country i depends on the domestic output y_i:

$$m_i = y_i$$

The long run volume of imports is equal to the potential domestic output $\overline{m_i} = \overline{y_i}$. It follows that $\overline{m_i} = m_i - (y_i - \overline{y_i})$.

As bilateral trade imposes $m_{ij} = x_{ji}$ we deduce:

$$d_i^{EX} = \sum_j wx_i^j \, m_j = \sum_j wx_i^j y_j \qquad \text{and} \qquad \overline{d_i^{EX}} = \sum_j wx_i^j \overline{y_j}$$

where wx_i^j is the share of country j in the exports of country i.

The structural trade balance is then $STB = \overline{x_i} - \overline{m_i} = x_i - m_i + \underbrace{(y_i - \overline{y_i})}_{output\ gap\ of\ country\ i} - \underbrace{\sum_j wx_i^j (y_j - \overline{y_j})}_{\substack{weighted\ output\ gap \\ of\ trade\ partners}}$

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