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Trade Imbalances and Fiscal Policy in the Eurozone: An Analysis of Economic Interrelations with a Global Supermultiplier Input-Output Model

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We investigate the potential of European-wide Keynesian policies as an alternative to the current neoliberal response to trade imbalances. In particular, we examine the implications for balancing trade of an uncoordinated fiscal policy expansion, and whether coordinated reflationary measures in core Eurozone countries could promote balanced trade and significant growth in peripheral countries. Accordingly, we analyse the structural interdependencies in income and trade between peripheral and central Eurozone countries, such as Spain and Germany. To this end, we employ a comprehensive set of accounting multipliers derived from a Keynesian supermultiplier model that accounts for interindustrial and interregional relations in a global setting. Computations rely on global input-output tables and national accounts that cover the years 1995 to 2014. We conclude that scepticism about the effectiveness of relying solely on Keynesian measures as an alternative to neoliberal policies in Europe is in order.

Key words: Fiscal policy, External constraint, Eurozone, Supermultiplier, Global Multiregional Input-Output Analysis
JEL Classifications: F42, E16, E12

1. Introduction: European Keynesianism as an alternative to austerity

It is now clear that the European Economic and Monetary Union (EMU), as forecasted, for example, by Kaldor (1971) and Godley (1992), generates pressures that undermine the sustainability of the whole project. Today, these stem mainly from the turmoil caused by the financial crisis and the subsequent neoliberal austerity measures implemented with particular force in the periphery of the EMU (Lehndorff, 2015).

These policies have been largely successful in the EMU's objective to reverse the current account deficits in the periphery,[1] which EU institutions interpret as a root

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[1] At the time of writing, September 2017, only Greece had a negative current account (–0.6% of GDP).

cause of the crisis (e.g. Draghi, 2012A; European Commission, 2009, 2011).[2] Indeed, the pro-cyclical current account deficits in the periphery which have existed from the birth of the euro to the crisis, and which were mirrored by large surpluses in the core, had cumulatively worsened their external financial position to unsustainable levels. Illustrating such a view, the President of the European Central Bank (ECB) argues that 'it is inevitable that a union of sovereign states can become fragile if some states are permanent creditors and others are permanent debtors' (Draghi, 2012B).

The burden of rebalancing foreign accounts has mostly fallen on deficit countries. This is not the result of mere market forces, but it has required the active intervention of EU institutions (see Frieden and Walter, 2017). Therefore, we may speak of an 'institutionally enforced external constraint' on peripheral countries' economic policy.[3]

In this article we examine the implications of such 'adjustments' and the potential for what we call 'European Keynesianism', that is, economic cooperation among Eurozone states to guarantee that foreign accounts rebalance through a reflation led by creditor countries. The case for the alternative has been made as follows: it would have spurred growth in core countries without endangering the sustainability of their financial balances (see for example Horn *et al.* [2017] for the German case), while fostering and allowing for the reflation of the periphery and the correction of their trade deficits (e.g. Picek and Schröder, 2017).

Such demand management at the EMU level seems crucial for managing trade balances. Evidence indicates that the Eurozone imbalances chiefly responded to relative domestic demand growth, while c*hanges* in competitiveness, especially in price competitiveness, played a secondary role (Felipe and Kumar, 2014; Portella-Carbó, 2015; Schröder, 2015; Storm and Naastepad, 2015, 2016).

Furthermore, coordinated reflation avoids the economic limitations of 'Keynesianism in one country'. Significant and sustained reflationary policies in peripheral countries in isolation would entail the worsening of the trade balance, like in France in 1983. Unless the EMU backs such a policy by providing some form of mutualisation of debt, the country would eventually be exposed again to the sort of financial markets' 'discipline' that led to the sovereign debt crisis (Barba and de Vivo, 2013). On the other hand, if the country was to leave the euro, it seems likely that the pressure of financial markets would be even more intense.

In order to assess the potential of European Keynesianism as an alternative to neoliberal austerity to regulate current accounts, we analyse the structural interdependencies in income and trade of peripheral and core Eurozone countries, both among them and with other major economic regions. To this aim, we make several contributions.

[2] All of this despite the controversy over whether the external imbalances were the origin of the crisis or rather a manifestation of excessive *private* sector debt. For example, for Stockhammer *et al.* (2015), the post-Keynesian consensus holds that excessive private debt and the deficient architecture of the Eurozone are to blame, while for Cesaratto (2017), the consensus view (among mainstream and heterodox economists) understands the crisis as akin to a traditional balance-of-payments crisis.

[3] As Cesaratto (2015A, p. 148) puts it: in the absence of a fully integrated and redistributive federal union and 'of a legal limit to T2 imbalances, a political limit has been set by core countries by imposing a reversal of the current account position of the peripheral countries (albeit not to themselves!) through a paraphernalia of fiscal regulations'. However, the external constraint needs not be binding under ample margins, because most debt is denominated in euros and thus the ECB has the capacity to guarantee the necessary liquidity to the financial and government sectors in the Eurozone (see Godley and Lavoie, 2007). Along these lines, payment system TARGET2 operates in a similar manner, but with less restrictions, to the International Clearing Union devised by Keynes (Cesaratto, 2013; Lavoie, 2015).

The first contribution is methodological. We build a Keynesian supermultiplier model (see Bortis, 2011; Dejuán, 2005; Serrano, 1995) integrated in a global multiregional input-output (GMRIO) structure. In this way, we extend Metzler's (1950) and Goodwin's (1980) multiplier analyses of global income and trade interdependencies, and generalise the supermultiplier relation and the foreign trade multiplier to the global multiregional and multisectorial case. Above all, the model uses a social-accounting methodology to assess cross-border spillovers and the potential for international macroeconomic policy coordination, an issue that has recently attracted much-deserved interest (e.g. Obst *et al.*, 2017; Onaran and Galanis, 2014; Onaran and Obst, 2016; Storm, 2016). In addition to spillovers, and in connection with the Balance of Payments Constrained Growth (BoPCG) literature, we derive the level of government expenditure consistent with balanced trade and the maximum GDP growth rate relative to trade partners, consistent with an unchanged trade balance (Section 2).

The second contribution is analytical. We provide the empirical counterpart to these measures for the years 1995 to 2014, with recourse to the latest GMRIO tables and statistics from National Accounts (Section 3 discusses the data used). These metrics allow us to examine the implications of uncoordinated fiscal policies to balance trade in individual Eurozone-12 countries; the consequences of both a German and a coordinated expansion among core Eurozone countries; the relative dependence of GDP on domestic and foreign demand; and the relative growth rate of Eurozone-12 countries, consistent with an unchanged trade balance (Section 4). Overall, leaving aside issues of political feasibility (see Cesaratto, 2017), we confirm the argument (cf. Simonazzi *et al.*, 2013) that European Keynesianism is necessary but far from sufficient.

2. Theoretical approach

This section explains the origins, rationality and features of the model that grounds the empirical analysis, while its mathematical formulation is presented in the Supplementary Information available online.

2.1 Origins and rationale of the global multiregional supermultiplier input-output model

To tackle the problem of coordinating an international expansion consistent with the sustainability of foreign accounts, 'the foreign trade multiplier, appropriately more complex than Harrod's original formulation, provides an illuminating framework' (Coutts, 1987, p. 3662). In its simplest version, it determines the national income consistent with balance in the current account given export performance.

We build a model based, in particular, on Metzler's (1950) and Goodwin's (1980) extension of Harrod's formulation to the global multiregional case, which crucially accounts for income interdependencies between countries operating through the trade network. To this end, we also start the analysis by representing the world economy as a 'world payments matrix' (in Goodwin's words). This is akin to what we nowadays call a GMRIO table. For example, for the simple two-region (A and B) and two-industry (1 and 2) case, a possible table is the following (Figure 1):

This accounting departure allows us to incorporate into the analysis the interconnected production and demand structures of the *n*-countries forming the world economy and the whole trade network that unites them. Thus, we explicitly account for

			Use by country-industries				Final demand uses by country						Gross output
			A		B		A			B			
			1	2	1	2	c	g	h	c	g	h	
Supply from country-industries	A	1	u_{11}^{AA}	u_{12}^{AA}	u_{11}^{AB}	u_{12}^{AB}	c_1^{AA}	g_1^{AA}	h_1^{AA}	c_1^{AB}	g_1^{AB}	h_1^{AB}	x_1^A
		2	u_{21}^{AA}	u_{22}^{AA}	u_{21}^{AB}	u_{22}^{AB}	c_2^{AA}	g_2^{AA}	h_2^{AA}	c_2^{AB}	g_2^{AB}	h_2^{AB}	x_2^A
	B	1	u_{11}^{BA}	u_{12}^{BA}	u_{11}^{BB}	u_{12}^{BB}	c_1^{BA}	g_1^{BA}	h_1^{BA}	c_1^{BB}	g_1^{BB}	h_1^{BB}	x_1^B
		2	u_{21}^{BA}	u_{22}^{BA}	u_{21}^{BB}	u_{22}^{BB}	c_2^{BA}	g_2^{BA}	h_2^{BA}	c_2^{BB}	g_2^{BB}	h_2^{BB}	x_2^B
Value added			va_1^A	va_2^A	va_1^B	va_2^B							
Gross output			x_1^A	x_2^A	x_1^B	x_2^B							

Fig. 1. Example of a GMRIO table for a world composed of two regions with two industries in each of them.

Notes: x denotes gross output, u circulating capital, c consumption of households, g public consumption, h gross fixed capital formation and va value added. The first superscript indicates the country of origin and the second the country of destination. The first subscript indicates the industry of origin and the second the industry of destination. Just one super- or subscript denotes origin.

trade in intermediates. This is crucial, because this type of trade represents more than half of the world's non-fuel exports (World Trade Organization, 2013, p. 183), which entail much stronger income interdependencies between countries than those arising from final exports alone.[4] On the other hand, trade statistics count multiple times the value of intermediates that cross borders more than once (Koopman *et al.*, 2014). Thus, empirical applications of 'international trade and macroeconomic models, which are typically cast in value-added terms', should be wary of equating gross trade flows with net income flows (Johnson, 2014, p. 199). Indeed, we observe a growing gap between growth in gross trade flows and the generation of incomes (Timmer *et al.*, 2013).

Our model accounts for these features by incorporating the global multiregional extension of Leontief's input-output model. GMRIO analysis can accurately track the effects of final demand on domestic supply and imports of both intermediate and final goods, thus providing a workable empirical basis for Keynesian counterfactual analysis of the effects of changes in demand on income and the trade balance (e.g. Timmer *et al.*, 2013, 2014).

The input-output information, in addition, is crucial for incorporating accurate Keynesian multipliers. As Miyazawa (1960) highlighted, because the Keynesian income-generating process involves production, which typically requires imports of intermediate goods, the 'leakages' in the multiplier also depend on the particular production coefficients and import intensities of the industries that meet the new consumption demands.[5] However, Miyazawa notes, like Pasinetti (1977, pp. 59–61), that consumption and production techniques are of a different nature, and therefore cannot be lumped together. Thus, following Miyazawa (1960), and particularly Dejuán (2006), we introduce the standard Keynesian consumption function disaggregated by industry and country, which then interacts with Leontief's propagation process.

[4] See UNCTAD (2013) and, for the particular case of the Eurozone, see Garbellini *et al.* (2014).

[5] Along these lines, see also the arguments of Kennedy and Thirlwall (1979) and Giovannetti and Siniscalco (1986).

We also follow Kaldor's (1970) suggestion to treat private productive investment as endogenous to the system by incorporating the Hicksian supermultiplier into the foreign trade multiplier, that is, the extension of the Keynesian multiplier with the accelerator principle. The rationale is that inter-capitalist competition leads entrepreneurs to constantly seek for the optimum level of productive capacity to meet effective demand. In other words, given the desired or 'normal' capital-output ratio, investment is 'led' by demand. Thus, we follow the view adopted also by most Sraffian authors, which can be summarised as follows: 'if effective demand is expanding, whether normal profit margins and rates happen to be "high" or "low", competition and the search for maximum profits impel the firms collectively to expand productive investment' (Serrano, quoted in Cesaratto, 2015B, p. 168).[6]

A simple function that captures such a view in a multisectorial model is the acceleration investment function in Dejuán (2006, pp. 281–82), which we extend to the global multiregional case. The *normal* fixed capital to gross output ratio in each industry and country is assumed to be adequately approximated by the *actual* matrix of fixed capital coefficients. Given such a 'technique', gross investment adjusts to the growth of output in each industry. The remaining components of gross fixed capital formation, mainly household residential investment and government investment, are modelled as exogenous ('autonomous') to current incomes.

Kaldor posited that 'the "autonomous component of demand" is the demand emanating from *outside* the region' (Kaldor, 1970, p. 342, emphasis in original). In our global formulation, however, there is no 'outside region', but instead interconnected countries in a world economy. In other words, even from the viewpoint of single countries, some foreign demands are to be regarded as endogenous in a global model because they are systematically related to the world's income. For example, some Spanish exports of automotive components to Germany may respond to a greater Spanish final demand for 'German cars', in turn induced by the higher incomes in Spain. These German exports raise household income in Germany, which, to some extent, may leak in the form of consumption goods from Spain. In the literature, this is known as a multiplier approach with foreign repercussions in an n-country world with different requirements of intermediate goods (e.g. Gandolfo, 2016, Ch. 8).

Therefore, the foreign (super)multiplier informs us of the extent to which 'autonomous' foreign demands (i.e. foreign demands not systematically linked to income in any country) drive domestic income.[7] Similarly, the domestic (super)multiplier relates autonomous domestic demands (i.e. non-endogenous domestic demands, including government consumption, households' autonomous consumption and residential and public investment) to domestic income.

[6] Empirical studies generally report that private investment is overwhelmingly ruled by the accelerator, while the impact of possible explanatory variables such as profit are minor if significant (e.g. Arestis *et al.*, 2012; Chirinko, 1993; Onaran and Obst, 2016; Stockhammer *et al.*, 2009; Stockhammer and Stehrer, 2011). Still, the specification of the investment function is a highly controversial issue, more so for a global model (see, e.g., Cesaratto (2015B) for a review of the main controversies on the theory of accumulation among heterodox schools). Here we adopt a function in line with the so-called Sraffian supermultiplier approach for the mentioned reason, but also to make our model more tractable both in analytical and empirical terms.

[7] Therefore, we interpret the relationship between Harrod's foreign trade multiplier and Hicks's supermultiplier differently from McCombie (1985, 1993), for whom the supermultiplier reflects the long-run increase in output through both the standard foreign trade multiplier and the expansion of domestic autonomous expenditure *permitted* by the relaxation of the balance-of-payments constraint. In our interpretation, these multipliers are merged in order to obtain the impact of changes in foreign autonomous demand on domestic income, and we do not assume that the expansion of domestic autonomous expenditure permitted by the relaxation of the balance-of-payments constraint will take place.

2.2 Features of the global multiregional supermultiplier input-output model

The model is thus composed of three endogenous mechanisms that interact: Leontief's 'production' multipliers, Keynesian 'consumption' multipliers and the 'investment' accelerator, all accordingly disaggregated to fit our accounting GMRIO framework. Thus, the model falls under the umbrella of structuralist computable general equilibrium models, which employ social accounting matrices for describing the specification and database of the model (see Taylor, 1990).[8] We call the combined operation of these mechanisms the global multiregional input-output supermultiplier (GMRIO-SM). Because these mechanisms interact at the global multiregional level, the GMRIO-SM also captures the feedback effects between countries.

Domestic autonomous demands are government consumption, households' autonomous consumption and residential and public investment. Note that there must be a specific GMRIO-SM for each autonomous demand because the commodity composition of these demands varies. For example, we cannot expect that government consumption induces the same amount and type of imports as households' investment in dwellings, hence the import leakages induced by each autonomous component differ, and thus also the GMRIO-SMs. In sum, value added generated in each industry in each country is broken down into the sum of the product of the supermultipliers and the autonomous component of demand to which is linked.

The features of the model derive from its structure. To illustrate them, let us examine, for example, the income effect of an extra unit of Spanish government expenditure on textiles. Because a proportion of these textiles are supplied by domestic textile industries, such expenditure not only supports the Spanish textile sector but also, indirectly, all industries providing inputs to textiles, and the industries that produce the inputs of the inputs, and so on. This is the working of Leontief's multipliers. A proportion of the incomes generated in all these production processes is distributed to Spanish households. According to consumption propensities, such income then feeds household expenditure on a variety of consumption goods. A proportion of these consumption goods are domestically produced with inputs from different domestic industries. Again, all of this economic activity generates incomes, some of which are distributed to households, which spend a proportion of them on consumption goods. And so on. This is the working of the Keynesian multiplier mediated by Leontief's propagation process. In addition, all of this production not only requires circulating capital, but also fixed capital. Thus, the industries involved in meeting the new demands also raise their investment demand. This is the working of the acceleration principle. In addition, the production of investment goods requires circulating capital and generates incomes that induce further consumption. Clearly, all three endogenous mechanisms interact.

But these are not all the consequences of our initial government expenditure on textiles. A proportion of it may be satisfied by imports. Similarly, some of the induced demands in Spain for consumption, investment and intermediate goods mentioned above are met with imports. Such imports support production and incomes abroad

[8] For reasons of space, we cannot here compare our model with those used in the literature to examine income and trade interdependencies between countries. For a summary of the main characteristics and results of such recent studies, see, for example, Schröder and Picek (2017) and Storm (2016). For the approach and main results of the IMF, see Gaspar *et al.* (2016). See also Onaran and Obst (2016) for a recent study that emphasises cross-country effects of a simultaneous decline in the wage share. Nonetheless, in Section 4 and in Appendix A3 we show that our results are in line with those of reputable studies.

directly, but also indirectly by activating the same propagation mechanisms described for the Spanish case. In turn, some of these new incomes generated abroad may leak in the form of imports from Spain, which again activate the GMRIO-SM causal chain in Spain. More indirectly, the imports from third countries may, in turn, induce imports from Spain. Furthermore, these may induce further demands in Spain. And so on.

Ultimately, the model allows us to isolate the effects of changes in autonomous demands and/or parametric changes in induced demands, consumption baskets and the global trade structure on income and the trade balance, both retrospectively and counterfactually. From it, we derive income and trade spillovers, the level of government consumption that balances trade, the share of domestic income attributable to own and foreign demands, the extent to which domestic demands can be stimulated for a given increase in foreign demands if the trade balance is not to worsen, and the maximum GDP growth rate of the country relative to trade partners, consistent with a constant trade balance. The mathematical definition of these metrics and their connection with results from the Balance of Payments Constrained Growth literature are presented in the Supplementary Information available online.

3. Description of data and methodological issues

The World Input–Output Database (WIOD) is our source for the GMRIO tables. We use both the 2013 and the November 2016 release of GMRIO. The first covers 40 countries (the 28 European Union countries except Croatia, and 13 other major economies) and the 'Rest of the World' at a 35-industry level of disaggregation for the years 1995 to 2011 (see Dietzenbacher *et al.*, 2013; Timmer *et al.*, 2015). The second covers 43 countries (the 28 European Union countries and 15 other major economies) and 'the Rest of the World' at a 56-industry level of disaggregation for the years 2000 to 2014 (see Timmer *et al.*, 2016). This database is now the main staple for I-O analysis. To our knowledge, however, ours is the first study that employs both releases, and the second after Timmer *et al.* (2016) to use the latest. Complementary data come from the WIOD's Socio Economic Accounts, released in July 2014, and official national accounts and balance-of-payments statistics.[9] In total, we compiled more than 140 million statistics for the computations.

Like any computable general equilibrium model, the parameters are calibrated to a social accounting matrix, and it is thus in accounting equilibrium until it is shocked to examine how macro- and sectoral flow variables react. To summarise the results, we typically aggregate them so as to obtain a 15-region world (see Appendix A1). The database and the coding of the computations are available upon request (see also Appendix A2).

Before proceeding with the discussion of the results, particular caveats are in order. First, the simulation of counterfactuals assumes a fixed-price scenario and thereby rules out relative price effects. Second, we compute accounting multipliers. These are based on average expenditure propensities instead of marginal propensities, and imply unitary expenditure elasticities (Pyatt and Round, 1979). Thus, the commodity composition of demand and international market shares remains constant as income varies in our simulations. Third,

[9] In addition, we source the information on gross fixed capital information by industry in Brazil for the years 2000 to 2013 from Miguez (2016). This information will soon be available publicly as part of the LA-KLEMS project in Brazil.

like Goodwin's 1980 study, '[t]hough it could—and ideally should—be made dynamic, this is a static analysis. Therefore, the results of a change in exogenous demand are to be interpreted either as the sum of all effects over time of a single burst of spending, or as the steady state that is approached as a result of a steady rate of spending' (p. 322).

4. Discussion of results

4.1 Uncoordinated fiscal policy for balancing foreign trade

As stated in the introduction, fiscal contraction in peripheral countries has been a main tool to rebalance their trade account. Here we confirm that such a task is extremely difficult and costly to achieve for each government individually. To prove this point, we compute the level of a government's consumption expenditure that would balance trade in the country under the *ceteris paribus* clause (i.e. given the actual state of the rest of autonomous demands and global production, consumption and trade structures). In Table 1 we report the results, together with the corresponding GDP change and the actual balance of trade (BoT) for the years 2009 to 2011, when the crisis was at its worst and austerity policies started to be implemented systematically.

For southern Eurozone (S-EZ) countries (Greece, Italy, Portugal and Spain), the necessary contraction in government expenditure to close the trade gap is daunting. Indeed, it is outright impossible for Portugal and Greece to reach it because government expenditure should be far more than halved, thereby inducing a tremendous crisis as GDP falls by between 23% and 49%. Conversely, surplus C-EZ countries (Austria, Belgium, Finland, France, Germany and the Netherlands) should raise government expenditure to implausible levels in order to close their trade balance, with the exception of France and Finland in 2011—which are not clearly C-EZ countries. For example, Germany and the Netherlands should have done so by more than 75%, Austria by some 30% or more and Belgium by around 20% in 2009 and 2010.

It is thus clear that the burden of closing the trade balance cannot fall exclusively on non-cooperative fiscal policy. It may be objected that this counterfactual exercise leads to too pessimistic conclusions because we allow the government to determine only the

Table 1. *Percentage change in government consumption required to balance trade, its consequence for own GDP and the balance of trade in percentage of GDP*

	2009			2010			2011		
	%Δ g	%Δ GDP	BoT	%Δ g	%Δ GDP	BoT	%Δ g	%Δ GDP	BoT
DEU	77	27	4,9	81	27	6,1	76	24	5,5
FRA	–16	–8	–1,4	–22	–10	–1,9	–29	–13	–2,6
AUT	35	12	2,9	38	12	3,2	29	9	2,4
FIN	24	10	2,0	16	6	1,3	–8	–3	–0,9
BEL	24	8	2,2	19	6	1,7	6	2	0,4
NLD	76	29	7,3	87	31	8,2	88	31	12,8
ESP	–14	–6	–1,2	–15	–6	–1,3	–2	–1	–0,2
ITA	–8	–4	–0,7	–25	–11	–2,0	–21	–8	–1,6
PRT	–74	–33	–8,5	–83	–35	–9,5	–58	–23	–6,4
GRC	–97	–49	–10,7	–87	–43	–9,7	–79	–38	–8,8

Source: Own computations based on Equations S.10 and S.16 and WIOD release 2016.

level of public consumption, while in reality it also influences other domestic autonomous components of demand (public and residential investment and household consumption). Thus, we carry out a second counterfactual exercise: we evaluate the effect of a 1% of GDP increase in total domestic autonomous demand on GDP growth and the trade balance (Table 2).

For S-EZ countries, such an increase translates into a GDP growth of around 2%, while the trade balance worsens by between –0.32 and –0.46 pp of GDP. For C-EZ countries, the change in the balance of trade is more significant (generally around –0.5 pp of GDP), while the effects on own GDP are somewhat lower, except for France, which in these regards rather resembles S-EZ countries. Of course, these differences reflect that S-EZ countries are less integrated with the global economy than C-EZ countries.

Given these results, Table 3 extrapolates the GDP costs of closing the trade balance via adjustments in total domestic autonomous demands. The GDP changes under this and

Table 2. *Percentage change in GDP and percentage point change in the balance of trade in proportion to GDP due to a 1% of GDP increase in domestic autonomous demand*

	2009		2010		2011	
	%Δ GDP	Pp Δ BoT	%Δ GDP	Pp Δ BoT	%Δ GDP	Pp Δ BoT
DEU	1.74	–0.48	1.64	–0.50	1.59	–0.51
FRA	1.89	–0.33	1.83	–0.34	1.78	–0.35
AUT	1.53	–0.53	1.47	–0.55	1.44	–0.56
FIN	1.56	–0.44	1.53	–0.44	1.51	–0.43
BEL	1.34	–0.53	1.25	–0.55	1.22	–0.55
NLD	1.38	–0.51	1.26	–0.53	1.25	–0.54
ESP	1.99	–0.37	1.98	–0.39	2.00	–0.43
ITA	2.07	–0.36	1.98	–0.38	1.98	–0.40
PRT	1.95	–0.40	1.85	–0.42	1.90	–0.46
GRC	1.97	–0.32	2.01	–0.36	2.01	–0.38

Source: Own computations based on the WIOD 2016 release. GDP is computed according to Equation S.10 and the BoT as the difference between Equation S.10 and Equation S.15.

Table 3. *Percentage GDP change due to closing the trade balance via adjustments in total domestic autonomous demands*

	2009	2010	2011
DEU	18	20	17
FRA	–8	–10	–13
AUT	8	9	6
FIN	7	4	–3
BEL	6	4	1
NLD	20	20	30
ESP	–6	–7	–1
ITA	–4	–11	–8
PRT	–41	–42	–26
GRC	–67	–55	–47

Source: Own computations based on the WIOD release 2016.

the previous scenario are very close (compare Tables 1 and 3). Thus, it is again apparent that closing the trade balance via lowering domestic demand for each peripheral government individually is extremely costly, if not impossible to achieve, while core governments have ample margin to pursue expansionary policies without provoking trade deficits.

How do these results relate to other studies? Stockhammer and Sotiropoulos (2014) estimate an 'old Keynesian model' for a panel of 12 Eurozone countries and conclude that eliminating the *average current account deficit* in Greece, Ireland, Portugal, Spain and Italy in 2007 (8.4% of GDP) would entail an *average* GDP cost of 47% (or 24% if the estimates are based on a small sample of recession years since 1990). While our results are not directly comparable to theirs, they are certainly not in contradiction. Nonetheless, our study makes apparent that the *average* GDP cost for peripheral countries is not representative of individual country costs, since their economies are far from homogeneous.

Our results are more easily comparable to and in closer agreement with Picek and Schröder's (2017), because they employ a GMRIO model with fully endogenous household consumption and investment calibrated with data from the WIOD 2013 release. They report that, 'as a rule of thumb', for countries that systematically run large current account surpluses, such as Germany and the Netherlands, an exogenous increase in final demand of 1% of GDP reduces the trade balance in GDP terms by two-thirds of a percentage point. According to our model, as stated, the reduction is closer to half a percentage point (see Table 2). For S-EZ countries, they report that the trade balance worsens by a third of a percentage point in a situation when the other EU-27 countries expand as well. In our case, the variation is generally slightly above a third of a percentage point, because in our scenario the other countries do not expand.

It is difficult to put our results in relation to further studies because, among other reasons, they answer different questions and rely on other quantitative techniques. Nonetheless, in Appendix A3 we show that the multipliers underlying our results are in line with those of other demand-led models such as the United Nations Global Policy Model.

In sum, balancing trade in deficit countries via fiscal policy in an uncoordinated manner is extremely costly, if not impossible, while core countries (except France, and Finland since 2011, if they are considered core countries) have ample margin to raise expenditure without causing a trade deficit.

4.2 Impact on the southern Eurozone of a fiscal expansion in Germany and the core of the Eurozone

To examine the potential effectiveness of the Keynesian proposal, we hypothesise a 10% increase in government consumption expenditure in Germany in 2009 and 2014.[10] The first date corresponds to the worst year of the crisis, and 2014 to the last year covered by the WIOD. Complementarily, we hypothesise a coordinated expansion of the same magnitude among governments in core countries, that is, each government in the region increases consumption expenditure by 10%. The aim is to examine the income and trade balance consequences of such expansions for the same country or region, and for the others. These are summarised in Table 4.

[10] The increase is assumed to be proportional, that is, the government consumption basket remains constant.

Table 4. *Percentage change in GDP and percentage point change in the BoT in proportion to GDP as a result of a 10% increase in government consumption in Germany and the core Eurozone*

	2009					2014				
	Germany		Core Eurozone			Germany		Core Eurozone		
	%Δ GDP	Pp Δ BoT	%Δ GDP	Pp Δ BoT	BoT	%Δ GDP	Pp Δ BoT	%Δ GDP	Pp Δ BoT	BoT
DEU	3.54	–0.83	4.05	–0.69	4.94	3.29	–0.87	3.71	–0.75	6.74
FRA	0.16	0.05	4.91	–0.60	–1.42	0.16	0.05	4.68	–0.65	–1.84
C-EZ	1.63	–0.28	4.42	–0.72	2.72	1.58	–0.30	4.11	–0.78	3.69
ESP	0.16	0.05	0.54	0.16	–1.15	0.17	0.03	0.56	0.11	2.49
ITA	0.18	0.05	0.49	0.14	–0.68	0.19	0.05	0.53	0.13	2.93
PRT	0.14	0.04	0.44	0.12	–8.50	0.15	0.03	0.47	0.10	–2.07
GRC	0.08	0.03	0.20	0.06	–10.68	0.10	0.02	0.24	0.06	–5.25
S-EZ	0.16	0.05	0.48	0.14	–2.06	0.18	0.04	0.52	0.12	2.02
EZ-12	1.11	–0.15	3.02	–0.38	1.41	1.12	–0.19	2.94	–0.49	3.59
C&E-EU	0.37	0.10	0.83	0.23	–1.23	0.37	0.10	0.82	0.22	1.72
RoEU-27	0.19	0.06	0.52	0.17	–0.77	0.15	0.05	0.45	0.14	–0.88
USA	0.08	0.02	0.21	0.05	–2.73	0.07	0.02	0.21	0.05	–3.04
CHN	0.11	0.03	0.29	0.08	4.41	0.08	0.02	0.21	0.07	3.41
RoW	0.11	0.03	0.30	0.08	–2.92	0.09	0.03	0.25	0.07	–4.04
T. FGN	0.32	0.00	0.88	0.00	0.00	0.27	0.00	0.71	0.00	0.00

Source: Own computations based on the WIOD 2016 release. GDP is computed according to Equation S.10 and the BoT as the difference between Equation S.10 and Equation S.15. The balance of trade is expressed in proportion to GDP.

The 2009 stimulus raises German GDP by 3.5% without having a major impact on the trade balance: the surplus only falls by 0.83 pp from a level of almost 5% of GDP. Of course, the C-EZ as a whole does not eliminate its trade surplus either, but just reduces it by 0.28 pp while GDP rises by 1.65%.

As expected, the German stimulus impacts positively on the income and trade balance of the indebted S-EZ. Our estimates, however, show that it is far from enough to significantly induce growth and rebalance trade in these economies: this only lifts the GDP of the region by 0.16% and reduces the deficit by 0.05 pp. Exactly the same results apply to Spain, whereas Greece is the southern Eurozone country that benefits the least, with a GDP increase of a mere 0.08% and a trade deficit reduction of 0.03 pp. These results are again in line with those in Schröder and Picek (2017), as can be seen in Appendix A3.

Interestingly, the spillovers are far more significant for the Central and Eastern EU region (C&E-EU) than for the S-EZ, as the former profits from a rise in GDP and BoT of 0.37% and 0.1 pp, respectively. This is a result of the notable integration of C&E-EU countries into German supply chains. In absolute terms, however, the linkages are still stronger with the S-EZ than with the C&E-EU; in the latter, GDP improves by $4.4 billion and the trade balance by $1.2, while in the S-EZ these magnitudes are $6.9 and $1.9 billion, respectively. Likewise, the Rest of the EU-27 (RoEU-27) enjoys a higher GDP growth and improvement in the trade balance than the S-EZ, although also not in absolute terms (GDP and the trade balance increase in

the RoEU-27 by $5.9 and $1.9 billion, respectively). Finally, even the USA benefits more than the S-EZ in absolute values (US GDP and trade balance increase by $11.3 and $2.3 billion, respectively).

All of these consequences are much amplified if expansionary policies are carried out simultaneously in all C-EZ countries. In this cooperative scenario, Germany's GDP increases 0.51 pp more than in the previous case and, furthermore, its trade balance does not worsen as much (–0.69 pp instead of –0.83). The C-EZ's GDP rises almost three times more, but the area still presents a large surplus (2% of GDP).

For the southern Eurozone region, the cooperative expansion triples the percentage increase in GDP and the trade deficit reduction following a fiscal expansion in Germany only. Nonetheless, such coordinated reflation is still not enough to rebalance and kick-start the S-EZ: it raises the GDP by 0.48% and reduces the trade deficit by 0.14 pp. Slightly higher figures apply to Spain (0.54% and 0.16 pp), while Greece again benefits the least by far (0.20% and 0.06 pp). In this scenario, the repercussions also are more significant for the C&E-EU region and the RoEU-27 and, in absolute terms, also for the USA.

The impact of the hypothesised stimuli in 2014 is qualitatively the same as that in 2009. In other words, the potential of the coordinated expansion in the C-EZ to spur significant growth and improvements in the trade balance of the S-EZ appears as bleak as in 2009. The only significant difference is that the 2014 stimulus also has a greater absolute impact in China than in the S-EZ.[11]

In sum, the cooperative Keynesian strategy is sensible: it has favourable consequences for the GDP of all countries and contributes to rebalance trade. However, this is clearly insufficient because structural interdependencies with the S-EZ are not tight enough and the spillover effects dilute among a large number of countries, especially other European countries, the USA and China.

4.3 Domestic income dependence on own and foreign sources of demand

These conclusions are consistent with the relative dependence of domestic gross value added (GVA) on own and foreign autonomous demand in the S-EZ and C-EZ (see Table 5).[12]

In 2009, the first year of our previous counterfactual exercise, around two-thirds of GVA in the S-EZ is activated by own sources of demand, and only 7.8% by the C-EZ. Furthermore, the C-EZ traction on the S-EZ GVA is much weaker than in the pre-euro years: in 1995, the percentage was 1.5 times higher. Some two-thirds of this decline is explained by the reduced dependence on Germany, which at the time was 'the sick man of Europe'. This 'de-coupling' from the C-EZ takes place, especially, from the introduction of the euro in 1999 to 2009, as Figure 2 (solid line) makes apparent.

[11] When Germany increases government expenditure by 10%, the GDP and trade balance improve by $7.1 and $1.8 billion, respectively, in the S-EZ, while in China these figures are $8.2 and $2.8 billion, respectively. When the C-EZ raises government expenditure by 10%, the GDP and trade balance improve by $20.6 and $5.2 billion, respectively, in the S-EZ, while in China these figures are $21.8 and $7.4 billion, respectively.

[12] Garbellini *et al.* (2014) carry out similar computations, also with WIOD data (see their Table 1 on p. 345). Our results are in line with theirs. However, they report higher values for the proportion of domestic GVA activated by domestic sources of demand because they use a GMRIO model in which household consumption and business investment are exogenous.

Table 5. *Percentage of domestic GVA in the S-EZ and C-EZ generated by own and foreign autonomous demands*

	Southern-EZ					Core-EZ				
	1995	1998	2007	2009	2014	1995	1998	2007	2009	2014
ESP	20.4	18.3	23.4	24.5	19.3	1.5	1.8	2.7	2.1	1.4
FRA	4.1	4.1	3.7	3.4	3.8	21.8	22.3	23.5	24.4	22.3
DEU	5.6	5.0	2.8	2.6	3.2	33.6	29.7	20.2	21.4	21.3
RoC-EZ	2.4	2.2	2.0	1.8	1.9	13.0	12.5	13.7	14.2	12.6
RoS-EZ	42.9	43.7	40.7	43.0	36.8	3.4	3.9	4.1	3.6	2.6
C&E EU	0.9	1.2	1.6	1.4	1.6	1.1	1.6	2.4	2.2	2.1
RoEU-27	3.3	4.0	4.2	3.1	3.6	4.2	5.0	5.4	4.4	4.8
USA	5.6	6.8	5.4	4.0	5.5	6.0	7.5	7.3	5.9	6.6
CHN	0.7	0.8	1.3	1.6	3.2	0.7	0.8	2.1	2.9	4.5
RoW	14.1	13.9	15.0	14.7	21.3	14.7	14.7	18.6	18.9	21.8
Sum	100	100	100	100	100	100	100	100	100	100

Source: Own computations based on Equation S.12. The results for years 1995 and 1998 rely on the WIOD 2013 release; for the years 2007, 2009 and 2014, on the WIOD 2016 release.

In contrast to 'conventional wisdom', such decoupling does not occur mainly because of a lower responsiveness of S-EZ income with respect to C-EZ demand (dashed line), which would allegedly derive from a loss of competitiveness. Indeed, this responsiveness remains more or less stable up to the enlargement of the EU to C&E-EU countries in 2004, when it starts dropping to levels below but close to initial values. Rather, the decoupling derives from the relatively lower C-EZ growth, which entails a lower weight of C-EZ as a source of demand. In other words, the S-EZ capacity to generate income from C-EZ demand weakened slightly, chiefly because of the C-EZ reorganisation of supply chains, but the main driver of the decoupling was the relatively low C-EZ growth. Despite such decoupling, the southern region in 1995 and 2007 depended as much as it used to on foreign demand (37%), because especially the C&E-EU, the RoEU-27 and China filled the gap left by the C-EZ.

Since 2009, we observe some 're-coupling' because of the reversal of the previous tendency, as the C-EZ performs relatively better. However, the downtick from 2013 to 2014 suggests that a return to 'normal' growth rates implies a return to pre-crisis tendencies.

From the C-EZ viewpoint, in contrast, the reliance on S-EZ demand increases significantly from 1995 up to the peak of the financial bubble in 2007—from 4.9% to 6.8% of C-EZ GVA. This is not exclusive to the S-EZ, because the C-EZ relies less and less on own sources of demand (–11 pp), and more and more on that from China (1.4 pp), C&E-EU (1.3) and the RoW (3.9). The causes of this increased reliance on the S-EZ are the opposite of those that explain the falling spillover effects of C-EZ demand upon S-EZ GVA: the C-EZ capacity to generate income from S-EZ demand clearly decreased, but this was more than compensated for by the greater weight of S-EZ as a source of demand due to its relatively faster economic growth. This is apparent in Figure 3. Then, since the financial crisis, the proportion of C-EZ activated by S-EZ demand decreases to levels below the initial ones, mainly due to the poor S-EZ performance, which also entails a more than proportional demand fall in the investment

and technologically sophisticated goods of which the C-EZ is a leading producer, and thereby also of the income spillover per unit of S-EZ demand. For these reasons, and as the uptick in this indicator since 2012 suggests, recovering pre-crisis growth rates entails a recovery in the S-EZ traction on the C-EZ economy.

Finally, it is important to highlight the imbalanced linkages between S-EZ and C-EZ: \$1 of S-EZ autonomous demand typically generates more than \$0.3 in C-EZ, while the other way around, the impact is less than half of \$0.3 (compare the dashed lines in Figures 2 and 3).

In sum, the S-EZ GVA has to a significant extent 'de-coupled' from demands from the core, while the C-EZ has increasingly relied on foreign sources of demand, including that from the S-EZ, but most notably from the C&E-EU, China and the RoW. Furthermore, these trends are largely explained by relative growth differentials. Thus, a return to 'business as usual' seems to entail the deepening of these tendencies; that is, increasingly imbalanced linkages between the core and the periphery, which were only temporarily reversed during the worst years of the crisis.

4.4 Structural interlinkages, relative growth and the trade balance

We now aim to emphasise the importance of structural interdependencies in driving the trade balance and the need to narrow the gap in productive capabilities between

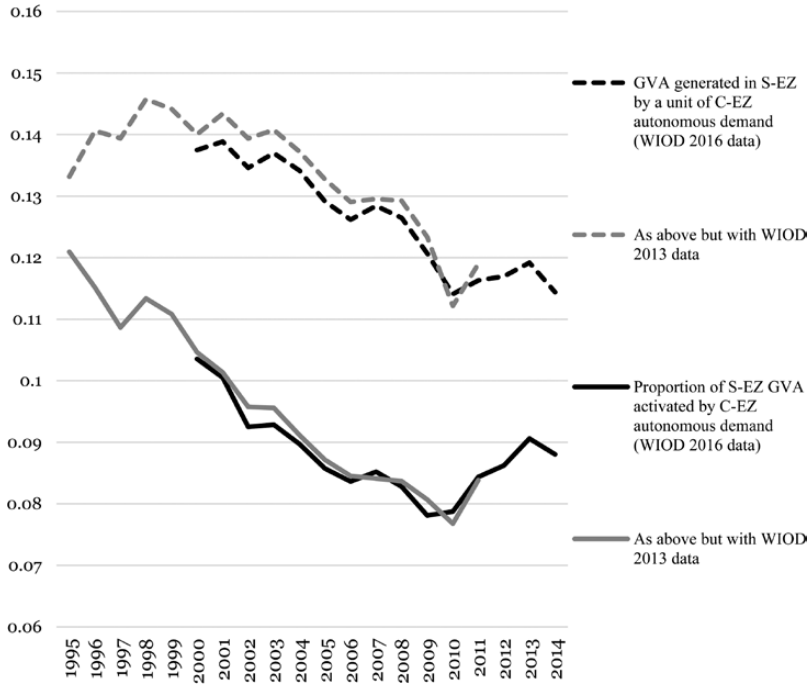

Fig. 2. GVA generated in the S-EZ by a unit of C-EZ autonomous demand (dashed line), and proportion of S-EZ GVA activated by total C-EZ autonomous demand (solid line), 1995–2014.

Source: Own computations based on Equations S.12 and S.13 and the WIOD releases.

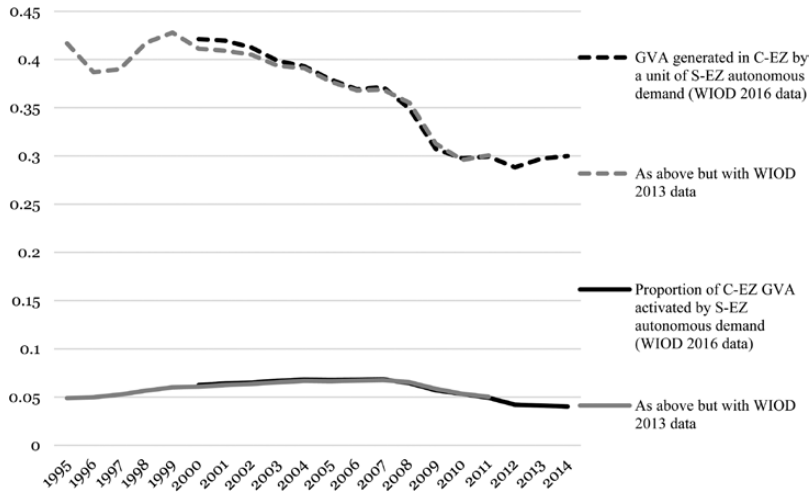

Fig. 3. GVA generated in the C-EZ by a unit of S-EZ autonomous demand (dashed line), and proportion of C-EZ GVA activated by total S-EZ autonomous demand (solid line), 1995–2014.

Source: Own computations based on Equations S.12 and S.13 and the WIOD releases.

the periphery and the core. To this end, we examine to which extent domestic autonomous expenditures can increase in both absolute and proportional terms, given an increase in foreign autonomous demands, if the trade balance is to remain constant. We examine the results for Spain and Germany because these are important members of the S-EZ and C-EZ, respectively (Figure 4).

Unsurprisingly, Spain's autonomous demand must grow at rates well below those of its trading partners if the trade balance is not to worsen. That is, a 1% increase in foreign autonomous demand improves the domestic trade balance and, if the improvement can be 'spent', it allows for a positive but lower than 1% increase in domestic autonomous demand (as shown by the solid line in Figure 4). The same applies to Portugal, Greece and Italy for the years from 2000 to 2012 (unreported results). In stark contrast, autonomous demand in Germany (and the Netherlands, Belgium, Finland until 2010, France until 2003 and Austria since 2002) can rise at much higher rates relative to trade partners without reducing their trade surplus. While these may be well-known facts by now, the magnitude of the problem is nonetheless striking. For example, in 2007, autonomous demand in Spain could increase at *half* of the growth rate of foreign autonomous demand, while Germany could raise such demand at a rate almost *double* that of its trading partners.

Moreover, in Spain during the booming years from 1995 to 2007, such relative growth rates that keep the trade balance constant tended to decrease markedly in an anti-cyclical fashion. However, the capacity to expand domestic autonomous demand *per unit* increase in foreign autonomous demand in 2007 is almost the same as in 1995 (dashed line). Thus, even if such capacity also is highly anti-cyclical (thus showing that changes in the composition of demand due to income elasticities work against the Spanish trade balance), the main driver of the mentioned decreasing relative growth rate is a domestic demand-led growth that diminishes the relative importance of foreign

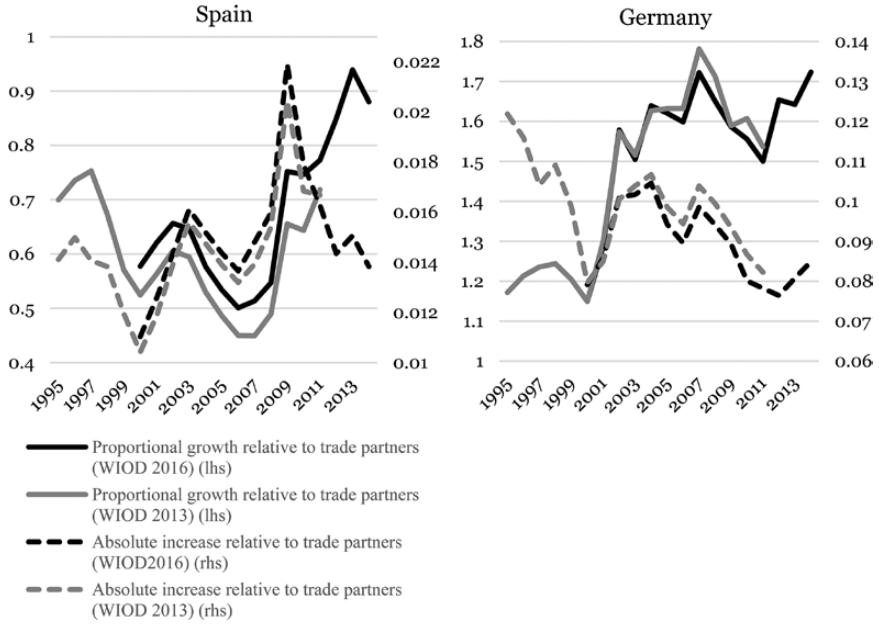

Fig. 4. Increase in domestic autonomous demand relative to the increase in trade partners' autonomous demand, both in absolute and proportional growth terms, that keeps the trade balance unchanged.
Source: Own computations based on Equations S.19 and S.20 and the two WIOD releases.

autonomous demands. In other words, the longer growth relies on increasing domestic demand, the less such increases are consistent with balanced trade.

In contrast, from 2008 to 2009, both the absolute and proportional increase in domestic autonomous demand relative to trade partners rises rapidly, because relative demand for high-income elasticity products fell due to the crisis and the burst of the construction bubble meant that the ratio of foreign to domestic autonomous demands increased. Since then, the capacity to expand domestic autonomous demand *per unit* increase in foreign autonomous demand has tended to recover its low pre-crisis levels, but the huge contraction of domestic demand relative to foreign demand outweighs this effect and thus increases the relative growth rate that keeps the trade balance constant. Nonetheless, this last tendency cannot be sustainable if domestic demand is to contribute to economic growth, as its reversal between 2013 and 2014 already suggests.

In contrast, in Germany from 1995 to 2007, the capacity to expand domestic autonomous demand at rates above the foreign ones without worsening the trade balance improved, even if the room created for domestic autonomous demand by a unit increase in foreign autonomous demands decreased overall. The explanation lies in the relatively low growth rates of German autonomous demand. It is thus the opposite case to the Spanish one. The experience of the period from 2007 to 2014 clearly indicates that the pre-crisis dynamics are back and likely to remain.

This constraint on domestic autonomous demand translates into a constraint on the growth rate of the economy relative to the growth rate of trade partners. Figure 5

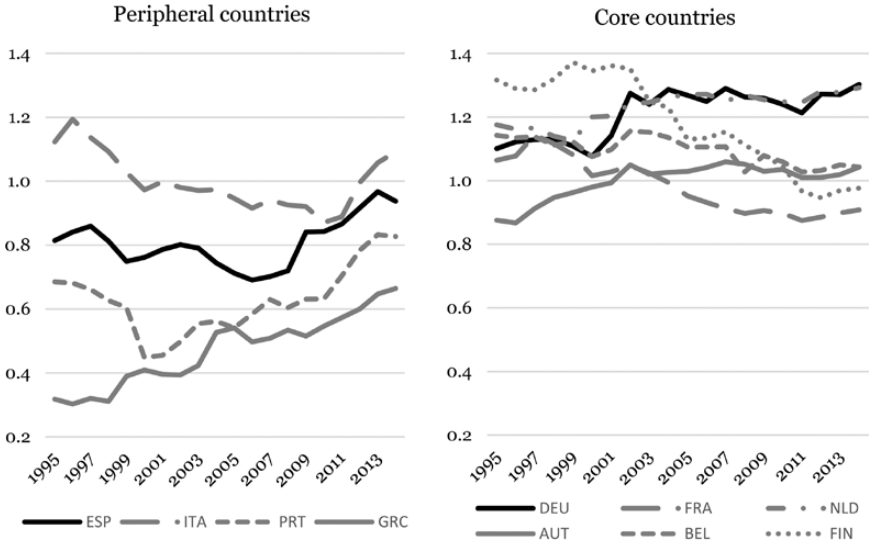

Fig. 5. Maximum GDP growth rate of the country relative to trade partners, consistent with a constant trade balance in the country.
Source: Own computations based on Equations S.13 and S.20 and the two WIOD releases.

shows the relative growth rate of core and peripheral countries that keep their trade balance constant, in clear analogy with Prebisch's (1959, pp. 253–54) famous numerical example.

Peripheral countries' GDP must grow at lower rates than that of their trading partners, except Italy until the adoption of the euro and since 2013. The opposite is true for most core countries, except for Austria until 2001, France since 2004 and Finland since 2011. Again, the differences are stark. For example, in 2014, Germany's GDP growth rate could be 1.30 times higher than that of its trade partners, while that of Spain, Portugal and Greece had to be 0.94, 0.82 and 0.66 times lower, respectively. Previously, the differentials were even higher.[13] In sum, given that Eurozone countries mostly trade among themselves, their convergence in terms of material living standards necessarily entails, given the current productive capabilities and structural interrelations, growing trade imbalances.

5. Conclusions

The European Union de facto enforces the external constraint on S-EZ countries' fiscal policy, despite the European Keynesianism alternative surely being sounder. The objective of this paper was precisely to corroborate that rebalancing trade in the periphery via fiscal austerity is extremely costly, and to examine the potential of the Keynesian alternative.

[13] Nonetheless, Uxó and Álvarez's (2017, p. 1015) results for Spain suggest that a relatively high external deficit (of around 5% of GDP) can still be consistent with a stable Net International Investment Position to GDP ratio, given high (around 6%) nominal GDP growth.

To this end we have built on the prominent Keynesian tradition initiated by Harrod's concept of the foreign trade multiplier; followed Kaldor's suggestion to link it to the Hicksian supermultiplier; and integrated it with Leontief's model along the lines of the work of Metzler (1950) and Goodwin (1980). In other words, we have built a supermultiplier model that accounts for interindustrial and interregional linkages in a global framework. From the model we have derived income and trade spillovers between countries, the level of government consumption consistent with balanced trade, and the maximum growth rate of domestic autonomous demand and GDP relative to trade partners, consistent with an unchanged trade balance.

We applied the model with recourse to the latest releases of the Global Input-Output Tables and National Accounts by computing accounting multipliers. We confirm that it was extremely recessive, if not impossible, for each peripheral country individually to balance trade via fiscal policy, while core Eurozone countries have ample margin to raise public expenditure without generating a trade deficit. The logic of 'surplus countries must lead the recovery' therefore seems to be vindicated. Unfortunately, however, we show that both a German and a coordinated fiscal expansion among C-EZ countries are clearly insufficient to induce significant economic growth and rebalance trade in Spain and the S-EZ.

In addition, the S-EZ GDP has to a significant extent 'de-coupled' from the core since the introduction of the euro, while the C-EZ has increasingly relied on foreign sources of demand, including from the S-EZ but most notably from the C&E-EU, China and the RoW. These trends are explained mainly by relative growth differentials. Thus, the return to 'business as usual' that we are witnessing entails the return to increasing imbalanced linkages between the core and the periphery.

Finally, there are tremendous differences in the capacity of peripheral and core governments to stimulate the domestic economy if the trade balance is not to worsen. For example, in 2007, domestic autonomous demand in Spain could increase at half of the growth rate of foreign autonomous demand, while Germany could raise such demand at a rate almost double that of its trading partners. This implies that S-EZ countries' GDP must grow at a rate well below that of their trading partners, whereas the opposite is true for most C-EZ countries. For example, Germany's growth rate in 2014 could be 1.3 times higher that of its trade partners, whereas Greece's growth rate had to be 0.66 times lower.

We conclude that scepticism about the effectiveness of the standard European Keynesianism alternative is in order. Demand management alone, unless an inconceivably large cooperative fiscal expansion among the C-EZ countries is implemented, cannot guarantee significant GDP growth rates in the periphery and equilibrated trade balances. What is more, given the current productive capabilities and structural relations, income convergence between the periphery and the core of the Eurozone *necessarily* entails growing trade imbalances. In other words, bold and sustained European Keynesianism could promote growth both in the core and periphery, as well as equilibrated trade relations, but at the expense of income convergence.

Therefore, *if* the EMU is to survive and promote growth and income convergence between the core and the periphery, we can only devise a broad policy line: current account deficits in the periphery must be compensated for through public deficits, which must be backed explicitly by fiscal transfers and/or monetary intervention by the central bank—as it happens in any federal state—while a coordinated reflation is implemented alongside forceful industrial policies aimed at promoting convergence in

productive capacities and balanced interlinkages. Only then will income convergence not be choked by the external constraint, which moreover could be gradually lifted with policies favouring the productive catch-up of the periphery. Thus, a growth dividend of fiscal transfers and monetary union would benefit the whole EMU, instead of the 'recessionary dividend' of the current neoliberal set-up. The opposition to European Keynesianism, redistribution, monetary intervention by the ECB and old-fashioned industrial policies is thus unfortunate. However, as Kalecki (1943, p. 325) observed, 'obstinate ignorance is usually a manifestation of underlying political motives'. In this case, to our mind, the opposition reflects a will to further advance the neoliberal agenda both in the core and the periphery. Ultimately, it is all about Political Economy.

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Appendix A1

We often divide the world into the following countries and regions:

Code	Countries
DEU	Germany
FRA	France
C-EZ	Core Eurozone: Germany, France, Austria (AUT), Finland (FIN), Belgium (BEL) and The Netherlands (NLD)
ESP	Spain
ITA	Italy
PRT	Portugal
GRC	Greece
S-EZ	Southern Eurozone: Spain, Italy, Portugal and Greece
EZ-12	Eurozone-12: C-EZ, S-EZ, Ireland and Luxemburg
C&E-EU	Central and eastern countries of the European Union: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia
RoEU-27	Rest of the EU-27: Cyprus, Denmark, Great Britain, Malta and Sweden
USA	The United States of America
CHN	China
RoW	Rest of the World: Australia, Brazil, Canada, Indonesia, India, Japan, Korea, Mexico, Russia, Turkey, Taiwan and all the countries that the WIOTs label RoW.
T. FGN	Total foreign countries: all countries except the one under analysis

The C-EZ includes the Eurozone countries with a trade surplus (DEU, FRA, AUT, BEL, NLD and FIN, even if this last country tends to have deficits since 2011) and France. The S-EZ encompasses the southern Eurozone countries that typically present a trade deficit, and Italy (whose trade balance deteriorated sharply and has also been severely hit by the crisis). We do not include Ireland in the Eurozone periphery group and Luxemburg in the core because of their peculiar economic characteristics.

Appendix A2

The flows in WIOD's GMRIO tables are in basic prices and on the basis of the 'territory principle'. In order to compute GDP and the trade balance according to standard measures and principles, we must express flows in purchasers' prices and on the basis of the 'residency principle'. In other words, we must account for 'Taxes less subsidies on products' and 'International transport margins' to express flows in purchasers' prices, and for 'direct purchases abroad by residents' and 'purchases on the domestic territory by non-residents' to apply the residency principle.

The computations of counterfactual evolutions of GDP and the trade balance assume that taxes less subsidies on intermediate products maintain their actual proportion to value added at basic prices; taxes less subsidies and international transport margins on final products evolve according to their actual proportion to final domestic demand at basic prices and based on the territory principle. The values for direct purchases

abroad by residents and purchases on the domestic territory by non-residents are left unchanged and thus considered to be autonomous. We do so because, for example, the surge in tourism in Spain has clearly more to do with the perceived insecurity in the north of Africa than with the recovery of foreign incomes.

The precise computations can be found in the MATLAB codes, which are available upon request.

Appendix A3: Comparison of some of our results with those of selected studies

Our accounting multipliers are consistent with the multipliers reviewed in Gechert's (2015) meta-regression analysis, but systematically larger than the averages reported in it, which is consistent with the recent upward revisions by leading marginalist scholars (Blanchard and Leigh, 2013; Fatás and Summers, 2016). The following tables also show that our results and multipliers are broadly in line with those in the literature.

Table 6. *Comparison of some of our results with those of selected studies*

	1% of GDP increase in Germany's final demand raises GDP by ...%		1% of GDP increase in Germany's final demand changes the trade balance in % of GDP by ... pp		$1bn increase in government expenditure raises GDP by... $bn	
	GMRIO-SM model (for 2009)	Schröder and Picek (2017, p. 8) (for 2009)	GMRIO-SM model (for 2009)	Schröder and Picek (2017, p. 8) (for 2009)	GMRIO model (for 2014)	United Nations Global Policy Model (version 5.2 c) (Cripps and Izurieta, 2014)
Austria	0.27	0.29	0.07	0.08	1.60	
Belgium	0.19	0.2	0.06	0.07	1.32	
Brazil	0.04		0.01		2.56	1.62
Canada	0.04		0.01		1.69	1.53
China	0.07		0.02		1.85	2.22
Czech Rep.	0.31		0.09		1.32	
Finland	0.11	0.12	0.04	0.04	1.62	
France	0.10	0.11	0.03	0.04	1.82	1.61
Germany	1.74	1.55	–0.48		1.72	1.64
Greece	0.04	0.06	0.01	0.03	2.23	
India	0.04		0.01		2.65	1.92
Indonesia	0.06		0.01		2.15	1.87
Ireland	0.15	0.18	0.04	0.06	1.17	
Italy	0.11	0.13	0.03	0.04	2.09	1.72
Japan	0.04		0.01		2.23	1.82
Luxemburg	0.26		0.05		0.99	
Netherlands	0.19	0.23	0.06	0.09	1.30	
Portugal	0.08	0.11	0.02	0.04	1.98	
Spain	0.09	0.12	0.03	0.04	2.14	
Turkey	0.13		0.02		2.18	1.73
UK	0.10		0.03		1.85	1.55
USA	0.05		0.01		3.07	1.85
Euro Area 12					2.13	

Table 7. *Comparison of multipliers*

	Fatás and Summers's (2016) fiscal multipliers (for 2011)	Domestic GMRIO-SM (for 2005)	Freitas and Dweck's (2013, p. 181) supermultiplier (for 2005)	Domestic GMRIO-SM (for 2013)	Girardi and Pariboni's (2015, pp. 18–19) supermultipliers (for 2013)	Domestic GMRIO-SM (average 2000–2014)	Onaran and Galanis (2014, p. 2509) (period 1960/1970–2007)	Obst, Onaran and Nikolaidi (2017, p. 24) (period 1960–2013)	Stockhammer, Onaran and Ederer (2009) (estimation period 1962–2005)
Austria		1.30		1.26		1.30		2.048	
Belgium		1.11		1.07		1.10		1.153	
Brazil		2.11	2	2.06		2.12			
Canada		1.45		1.45		1.46	1.214		
China		1.60		1.83		1.78	1.228		
Czech Rep.		1.13		1.06		1.13			
Finland		1.24		1.27		1.27		3.357	
France		1.63		1.56	1.55	1.62	1.388	2.988	
Germany		1.54		1.40	1.2	1.49	1.076	2.256	
Greece		1.71		1.84		1.72		5.055	
India		1.86		2.03		2.01	2.18		
Indonesia		1.74		1.94		1.85			
Ireland		0.94		0.87		0.91		1.14	
Italy		1.80		1.78	1.65	1.79	1.73	1.718	
Japan		2.39		2.26		2.39	2.407		
Luxemburg		0.79		0.72		0.79		0.56	
Netherlands		1.10		1.02		1.12		2.76	
Portugal		1.69		1.71		1.70		3.187	
Spain		1.79		1.90	1.5	1.82		4.49	
Turkey		1.97		1.74		1.84	2.208		
UK		1.68		1.56		1.66	1.2	2.238	
USA		2.89		2.96	2.7	2.97	2.08		
Eurozone 12 2		2.10		2.13		2.10	1.59		1.38–2.69