The supermultiplier as global matrix: An application to the Eurozone trade imbalances

Ferran Portella-Carbó

Post-Doctoral Research Fellow
South African Research Chair in Industrial Development
University of Johannesburg

Abstract

We investigate the potential of the cooperative Keynesian alternative to the current austerity in the Eurozone periphery. In particular, we examine whether reflationary measures in core-Eurozone countries could lift exports and income in peripheral countries as to rebalance their external accounts and induce a recovery. We focus on the Spanish case and emphasise Spain's interlinkages with the German economy, but we also examine the broader context; that is, the relation between peripheral and core countries in the Eurozone.

To this aim, we employ a set of accounting multipliers derived from a supermultiplier model that accounts for interindustrial and interregional relations in a global setting. The computations rely on global input-output tables and national accounts that cover the years from 1995 to 2011.

We conclude that scepticism about the effectiveness of the standard cooperative Keynesian alternative is in order. Demand management alone cannot rebalance the Eurozone and lift the periphery from its dismal economic situation because structural differences are too profound.

Work in progress, version 06/10/2016, please do not cite.

… if nations can learn to provide themselves with full employment by their domestic policy […] [t]here would still be room for the international division of labour and for international lending in appropriate conditions. But there would no longer be a pressing motive why one country need force its wares on another or repulse the offerings of its neighbours, not because this was necessary to enable it to pay for what it wished to purchase, but with the express object of upsetting he equilibrium of payments so as to develop a balance of trade in its own favour. (Keynes, 1936, pp. 382-383)

1. Introduction

In this article we investigate the potential of the internationalist, cooperative Keynesian alternative to the current austerity in the Eurozone periphery. In particular, we examine whether reflationary measures in core-Eurozone countries could lift exports and income in peripheral countries as to rebalance their external accounts and induce a recovery. We focus on the Spanish case and emphasise Spain's interlinkages with the German economy, but we also examine the broader context; that is, the relation between peripheral and core countries in the Eurozone. The motivation of such investigation is the following.

1.1. Motivation: the external constraint and fiscal policy

Mass unemployment, widespread poverty, rampant inequality, disrupted life cycles, suicide spikes, and emigration are among the economic problems of our time in Spain.[1] Rather than alleviate them, neoliberal austerity and regulations have impoverished the living standard of the majority of the labour class.[2] Against this state of affairs, most alternative policy agendas propose a return to growth via some sort Keynesian fiscal policies.

However, Keynesian reflationary policies are problematic insofar as they worsen the Net International Investment Position (NIIP). Recent data suggest an extremely pro-cycle bias: The NIIP shot up from 30% of GDP at the launch of the euro to 78% in 2007 – mainly because of a comparatively faster growth of domestic demand fuelled by what would become private over-indebtedness (Dejuán and Febrero, 2010; Pérez Caldentey

[1] After eight years since the start of the crisis, Spain has not yet regained the GDP level of 2008. The unemployment rate shot up from 8.6% in 2007 to 26% in 2012; in 2016, it still borders on 23%. Almost 30% of Spaniards in 2014 were either in or at risk of poverty or social exclusion (Spanish National Statistical Institute, 2015a). Spain has led the increase in inequality in the OECD since the beginning of the crisis (OECD, 2013). As a manifestation of disrupted life cycles, since 2007 the average age of the parents at childbirth has sharply increased and the number of births has fallen (Spanish National Statistical Institute, 2015b). The rise in suicides is clearly related to the economic crisis, and it is particularly acute among working-age men (Bernal et al, 2013).

[2] These regulations have been implemented systematically since May 2010, and from that time, the average annual income of households has declined, material deprivation has increased (Spanish National Statistical Institute, 2015a), and health indicators have worsened (Legido-Quigley et al, 2013).

and Vernengo, 2015; Storm and Naastepad, 2016), while *changes* in competitiveness played a minor role (Portella-Carbó, 2015; Storm and Naastepad, 2015; Schröder, 2015)—, and it has stabilised at approximately 94% since 2009 –due to the reduction of the trade deficit resulting from the contraction of domestic demand (EU Commission, 2015, pp. 10-24).

Let us be clear about the nature of such constraint on fiscal policy. A worsening NIIP does not necessarily entail a balance-of-payments crisis defined as the impossibility to defend the exchange rate, which forces a contractive adjustment.[3] Because the debt is denominated in euros, the ECB has the capacity to provide the necessary liquidity to the financial and government sector of any country in the Eurozone and, thereby, avoid the breakup of the European Monetary Union (see Godley and Lavoie, 2007). Indeed, the EMU has proved apt at doing so (Loublier, 2015). Relatedly, the finance of current account deficits is assured in the payments systems TARGET2, which operates in a similar manner, but with less restrictions, than the International Clearing Union devised by Keynes (Cesaratto, 2013; Lavoie, 2015).

A worsening NIIP accompanied with increasing public debt does not necessarily entail a public debt crisis either. The socialisation of private debt and the effects on public finances of the economic crisis and austerity fed public debt, which increased from 35.5% to almost 100% of GDP between 2007 and 2015. However, as the speculative attacks on Spanish public debt in 2012 made apparent, the ECB has the capacity to avoid a public debt crisis of any Eurozone state.

The issue is that the provision of the necessary liquidity is *de facto* conditional on the reversal of current account positions in indebted countries (i.e. the liquidation of foreign debt) through deflationary, neoliberal policies.[4] In short, while private over-indebtedness is at the origin of the imbalances and the crisis, and the public debt crisis was a consequence of the depression and its mismanagement, the external constraint is

[3] For example, according to Krugman (1979, p. 311), "when the government is no longer able to defend a fixed parity because of the constraints in its actions, there is a "crisis" in the balance of payments".

[4] As Cesaratto (2015a, p. 9) 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 (European semester, Six pack, Two pack, Fiscal compact etc.)". See also Gross (2013). Spain was under a "Macroeconomic Imbalance Procedure" of the European Commission (2015) and in 2016 it has been threatened with an 'excessive deficit procedure'.

de facto enforced by the EMU institutions, thereby preventing 'Keynesianism in one country'.[5]

Instead, these institutions promote a sort of the "competitive austerity" described by Gregory Albo (1994) that replaced the capitalist employment policy centred on Keynesianism. Allegedly, it would reconcile the sustainability international payments with domestic economic and employment growth, but it actually contributed, as argued by the same author, "to ratchet down the living standards of workers in *both* the North and the South" (p. 148). This time is not different (EuroMemo Group 2016, Storm and Naastepad, 2015).

This state of affairs motivates the standard, internationalist Keynesian policy proposal that surplus countries must lead the recovery. While expansionary policies in deficit countries are deterred, fiscal policy in surplus countries is 'underutilized' because expansionary policies would not, in principle, endanger the sustainability of their financial balances, but promote and allow for the reflation of the periphery.

1.2. Objective: effectiveness of the cooperative Keynesian alternative

Our objective is to examine the potential of the cooperative Keynesian alternative. Besides issues of political feasibility, we doubt, like Simonazzi, Ginzburg and Nocella (2013, p. 655) among others do, "that reflationary measures in Germany will suffice to bring about an increase in exports and income in the peripheral countries large enough to redress the disequilibria and start a sustainable recovery".

Previously, we intend to demonstrate that balancing trade in peripheral countries is extremely difficult to achieve, if not impossible, for each peripheral government individually via fiscal policy. Then, we aim to quantify the trade balance and income consequences in Spain and the Eurozone periphery as a whole of an increase in government expenditure in Germany and the core Eurozone. Complementarily, we compute the domestic income dependence on own and foreign sources of demand for

[5] The external constraint has repeatedly operated in Spain at least since the developments leading to the Stabilisation Plan of 1959 (Portella-Carbo, 2016). See also Alonso (1999), Alonso and Garcimartín (1998), Garcimartín, Rivas and Martínez (2010) and Leon-Ledesma (1999). Contrary to conventional opinion, the structure and governance of the euro has not eliminated the possibility of problems in external accounts (Barba and de Vivo, 2013; Bordo and James, 2014; Cesaratto, 2015a, 2015b; Lavoie, 2015; Pérez Caldentey and Vernengo, 2015). Indeed, current account imbalances and the deflationary bias they entail in a monetary union without a democratic political union aiming at reducing the productive and income inequalities between countries were to be expected, as presciently argued by, for example, Kaldor (1971) and Godley (1992).

Spain, Germany and the core and periphery of the Eurozone, and examine their evolution from 1995 to 2011 (the years covered by our database). [Finally, we aim to emphasise the role of structural changes in driving the trade balance and the need to narrow the gap in productive capabilities between the periphery and the core. We do so by examining to which extent can domestic autonomous expenditures increase given a certain increase in foreign autonomous demands if the trade balance is to remain constant for the years 1995 to 2011].[6]

1.3. Approach

The problem of how to internationally coordinate an economic reflation that also promotes the sustainability of foreign payments is far from new. To tackle it, multiplier analyses are prominent in the Keynesian tradition since Harrod's (1933) seminal concept of the foreign trade multiplier. We build, in particular, on Metzler's (1950) generalization of the foreign multiplier to the global multiregional case, which accounts for income and balance of trade interdependencies among countries. Goodwin (1980) would similarly frame these linkages through a "world matrix multiplier" and emphasise the possibilities of an internationally coordinated reflation. Our empirical exercise could indeed be interpreted as an implementation of Goodwin's world matrix multiplier.

In addition, following Kaldor (1970), we link Harrod's foreign multiplier to the Hicksian supermultiplier. Kaldor (1970, p. 342) posited that "the 'autonomous component of demand' is the demand emanating from *outside* the region", so that "the growth of exports, via the 'accelerator', will govern the rate of growth of industrial capacity, as well as the rate of growth of consumption" (i.e., the growth of exports governs the evolution of induced demands via the Hicksian supermultiplier). However, in our global framework exports cannot be autonomous sources of demand. Thus, in our setting, the foreign (super)multiplier informs us of the extent to which foreign autonomous demands drive domestic income.[7]

[6] We write this objective in square brackets because, at the time of submitting this paper to the conference organisers, we have not yet completed the section in which we address it.

[7] Therefore, we interpret the relationship between Harrod's foreign trade multiplier and Hick's supermutiplier differently than McCombie (1985, 1993), for whom the supermultiplier reflects both the increase in output through the standard foreign trade multiplier and that increase derived from the expansion of other autonomous expenditure *permitted* (rather than automatically caused) by the relaxation of the balance of payments constraint.

Importantly, we incorporate trade in intermediate products in the analysis –thereby overcoming an acknowledged limitation of Metzler's 1950 and Goodwin's 1980 approach. This is an ineludible characteristic of current international trade: intermediate products represented 55% of world's non-fuel exports in 2011 (WTO, 2013, p. 183). Thus, empirical applications of "international trade and macroeconomic models, which are typically cast in value-added terms", should not equate gross trade flows with value-added flows –as Johnson (2014, p. 199), for example, has recently brought to the fore. This is so because international trade statistics, which are measured in gross terms, 'double count' the value of intermediate goods that cross borders more than once (Koopman, Wang and Wei, 2014). The magnitude of such statistical mirage is significant: $5 trillion of the $19 trillion in 2010 world exports were double-counted (UNCTAD 2013, p.4).

We incorporate intermediate trade in the analysis by merging a Keynesian supermultiplier model (Bortis, 2011; Dejuán, 2005; Serrano, 1995) with Leontief's input-output analysis extended to the global multiregional case. The reason is that global multiregional input-output analysis can accurately capture the consequences of trade in intermediate products on output, income, employment and the balance of trade (e.g. Timmer et al., 2013; Timmer et al., 2014; Tukker and Dietzenbacher, 2013). Similarly, because structural characteristics of the domestic and global productive system are accounted for, imports can be rightly modelled as functions of the different final expenditures, each with its own product composition and import content, rather than simple functions of aggregate domestic activity. In this regard, we follow there the suggestion by Kennedy and Thirlwall 1979 and Giovanneti and Siniscalco's 1986 modelling approach to imports. Thus, we could say that Goodwin's 1980 world trade multipliers are enriched with the multisectorial detail of Goodwin's 1949 matrix multiplier.

Our empirical exercises are thus grounded in the principle of effective demand instrumented in a supermultiplier that accounts for interindustrial and interregional relations in a global setting. It is an extension and application of Metzler and Goodwin's multiplier analyses of global income and trade interdependencies, and the global multiregional and multisectorial generalisation of the supermultiplier relation and the foreign trade multiplier – a further development of Kennedy and Thirlwall's 1976 "Input-Output formulation of the foreign trade multiplier". The model is presented in

accounting framework to be readily applied with Global Input-Output Tables and National Accounts by estimating accounting multipliers, which are based on average expenditure propensities instead of marginal propensities (Pyatt and Round, 1979).

2. The Supermultiplier as Global Matrix

We build a model for a n-country world $(p = 1, 2, \dots, n)$, with σ industries $(i, j = 1,2, \dots, \sigma)$ in each country that cater to domestic and foreign demand for σ products via single production with circulating and fixed capital, heterogeneous labour and without non-competitive imports.[8] In the empirical analysis we have 40 countries and the 'Rest of the World' (n = 41), and 35 industries and products (σ = 35) covering the period from 1995 to 2011.

2.1. The expenditure identity and behaviour of induced expenditures

We begin with the main expenditure identity, which states that the total gross production in country p of industry i's output $(x^p{}_i)$ is used as circulating capital (u) in all or some of the σ industries and/or as a final product (f) in the country and/or abroad. Final expenditures are divided into consumption of households (c) and the public sector (g) and gross fixed capital formation (h). [9]

$$\mathbf{x} \equiv \mathbf{U} \cdot \mathbf{e} + \mathbf{F} \cdot \mathbf{e} \equiv \mathbf{U} \cdot \mathbf{e} + (\mathbf{C} + \mathbf{G} + \mathbf{H}) \cdot \mathbf{e} \qquad (1)$$

The requirements of domestic and foreign circulating capital per unit of each industry's gross output are given by the global sourcing matrix $[\mathbf{A}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$, which is defined as follows: $\mathbf{A} \coloneqq \mathbf{U} \cdot \hat{\mathbf{x}}^{-\mathbf{1}}$. In turn, **U** can be expressed as the product of the circulating capitals used in each industry regardless of their country of origin ($\mathbf{U}^{\mathrm{Tp}}$) and the

[8] This assumption is imposed by the available GMRIO tables because they provide no data on non-competitive imports.

[9] Matrices are indicated with bold-faced capital letters; vectors are columns by definition and are indicated with bold-faced lower-case letters, and italicised lower-case letters denote scalars. A prime (') indicates transposition and a hat (^) signifies diagonalisation. Moreover, the first superscript indicates the country of origin and the second gives the country of destination. Similarly, the first subscript indicates the industry of origin and the second gives the industry of destination. When there is only one superscript, it denotes the country of origin regardless of the country of destination; when there is only one subscript, it denotes the industry of origin regardless of the industry of destination. **I** stands for the identity matrix and **e** represents the summation vector of the appropriate dimension. When we wish to make explicit the dimensions of a matrix, we write its symbol in squared brackets, and then, we give the dimension using subscripts ($[\text{symbol}]_{\text{rows x columns}}$). Similarly, when the matrix is a diagnolised column vector, we write its symbol in between angle brackets.

domestic and foreign shares of these inputs ($\boldsymbol{\Theta}$): $\mathbf{U} = \boldsymbol{\Theta} \otimes \mathbf{U^{Tp}}$, where the symbol $\otimes$ denotes elementwise multiplication. Thus, by defining $\mathbf{A^{Tp}} := \mathbf{U^{Tp}} \cdot \hat{\mathbf{x}}^{-1}$, the demand of intermediate products can be written as follows:

$$\mathbf{U} = \boldsymbol{\Theta} \otimes \mathbf{A^{Tp}} \cdot \hat{\mathbf{x}} \qquad (3)$$

Household consumption behaves according to a standard Keynesian consumption function. Thus, the induced component of household consumption (*ci*) depends on households' disposable income and their propensity to consume. The manner in which such consumption expenditures are distributed among the output of the σ industries is recorded in matrix $[\mathbf{Cib}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}}$, while $[\boldsymbol{\Phi}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$ indicates the country were the product is sourced from –in other words, $\boldsymbol{\Phi}$ indicates market shares.[10] The other component of household consumption is to a great extent autonomous with respect to current incomes and production ($\bar{c}$). Thus, we write:

$$\mathbf{C} = \bar{\mathbf{C}} + \mathbf{Ci}$$

$$\mathbf{Ci} = \boldsymbol{\Phi} \cdot \mathbf{Cib} \cdot \widehat{\mathbf{cp}} \cdot \widehat{\mathbf{y_d}}$$

Household disposable income is obtained by first aggregating multisectorial value added data ($[\mathbf{va}]_{\mathrm{n}\cdot\sigma\times 1}$) to obtain the Gross Domestic Income (y) in each country, which is then distributed to households according to the proportions d --which can be derived from National Accounts.

$\widehat{\mathbf{y_d}} = \hat{\mathbf{d}} \cdot \hat{\mathbf{y}} = \hat{\mathbf{d}} \cdot \mathbf{E} \cdot \widehat{\mathbf{va}} \cdot \mathbf{E'}$, where $[\mathbf{E}]_{\mathrm{n}\times\mathrm{n}\cdot\sigma}$ is composed of ones and zeros as to aggregate the industries.[11] In sum, induced consumption can be written as:

$$\mathbf{Ci} = \boldsymbol{\Phi} \cdot \mathbf{Cib} \cdot \widehat{\mathbf{cp}} \cdot \hat{\mathbf{d}} \cdot \mathbf{E} \cdot \widehat{\mathbf{va}} \cdot \mathbf{E'} \qquad (4)$$

Regarding gross fixed capital formation, we divide it into that part carried out by private businesses (*hi*) and the reaming institutions ($\bar{h}$), i.e. mainly household residential investment and government investment. While the later can be assumed to be largely autonomous from current incomes and production, private business investment evolves according to the accelerator principle:

$$\mathbf{Hi} = \boldsymbol{\Gamma} \cdot \mathbf{Ib} \cdot \widehat{\mathbf{k\imath}} \cdot \hat{\mathbf{r}} \cdot \hat{\mathbf{x}} \cdot \mathbf{E'} \qquad (5)$$

[10] Ideally, we should specify how **Cib** and **Φ** depend on relative prices and income. However, because the empirical exercise will be grounded in fixed-price accounting multipliers, i.e. assume constant prices and unitary elasticities of income, here we simply treat the **Cib** and **Φ** as observed parameters.

[11] For example, for the $n = 3$ and $\sigma = 2$ case, $\mathbf{E} = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 1 \end{bmatrix}$.

In words, given the gross fixed capital intensity per unit of output ($\langle \mathbf{ki} \rangle_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma} \coloneqq \langle \mathbf{k} \rangle_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma} \cdot \langle \mathbf{x} \rangle^{-1}{}_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$, where k_i^p stands for gross fixed capital installed in industry i located in country p), business gross investment adjusts to the expected growth of gross output necessary to satisfy the final demand of its products ($\langle \mathbf{r} \rangle_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$). The sectorial origin of the products devoted to such investments is given by $[\mathbf{Ib}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$, while $[\mathbf{\Gamma}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$ denotes indicates the proportion of each product sourced from each country.

The remaining demands are autonomous, namely government consumption (g), households' autonomous consumption ($\bar{c}$) and private investment in dwellings and public investment ($\bar{h}$). Finally, we decompose $[\mathbf{G}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}}$ into the total domestic public demand for each final product ($[\mathbf{G^{Tp}}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}}$) and the share of these demands satisfied with final products from each country ($[\mathbf{\Omega}]_{\mathrm{n}\cdot\sigma\times\mathrm{n}\cdot\sigma}$). That is:

$$\mathbf{G} = \mathbf{\Omega} \cdot \mathbf{G^{Tp}} \quad (6)$$

We proceed analogously with the other matrices denoting autonomous demands:

$$\bar{\mathbf{C}} = \mathbf{\Psi} \cdot \bar{\mathbf{C}}^{\mathbf{Tp}} \quad (7)$$

$$\bar{\mathbf{H}} = \mathbf{\Upsilon} \cdot \bar{\mathbf{H}}^{\mathbf{Tc}} \quad (8)$$

2.2. Global Multiregional Input–Output supermultipliers

Using equations 1 to 8 and defining value added as $\widehat{\mathbf{va}} \equiv \left(\mathbf{I} - \widehat{\mathbf{e}'\mathbf{A}}\right) \cdot \hat{\mathbf{x}}$, the value added vector can be written as follows, provided that the inverse exists:

$$\mathbf{va} = \left(\mathbf{I} - \widehat{\mathbf{e}'\mathbf{A}}\right) \cdot \left(\mathbf{I} - \mathbf{\Theta}\otimes\mathbf{A^{Tp}} - \mathbf{\Phi} \cdot \mathbf{Cib} \cdot \widehat{\mathbf{cp}} \cdot \hat{\mathbf{d}} \cdot \mathbf{E} \cdot \left(\mathbf{I} - \widehat{\mathbf{e}'\mathbf{A}}\right) - \mathbf{\Gamma} \cdot \mathbf{Ib} \cdot \widehat{\mathbf{k\imath}} \cdot \hat{\mathbf{r}}\right)^{-1} \cdot (\mathbf{\Omega} \cdot \mathbf{G^{Tp}} + \mathbf{\Psi} \cdot \bar{\mathbf{C}}^{\mathbf{Tp}} + \mathbf{\Upsilon} \cdot \bar{\mathbf{H}}^{\mathbf{Tp}}) \cdot \mathbf{e}, \quad (9)$$

which we can rewrite as

$$\mathbf{va} = \mathbf{SM_g} \cdot \mathbf{g^{Tp}} + \mathbf{SM_{\bar{c}}} \cdot \bar{\mathbf{c}}^{\mathbf{Tp}} + \mathbf{SM_{\bar{h}}} \cdot \bar{\mathbf{h}}^{\mathbf{Tp}} \quad (10)$$[12]

[12] where

$$\mathbf{SM_g} = \left(\mathbf{I} - \widehat{\mathbf{1}'\mathbf{A}}\right) \cdot \left(\mathbf{I} - \mathbf{\Theta}\otimes\mathbf{A^{Tp}} - \mathbf{\Phi} \cdot \mathbf{Cib} \cdot \widehat{\mathbf{cp}} \cdot \hat{\mathbf{d}} \cdot \mathbf{E} \cdot \left(\mathbf{I} - \widehat{\mathbf{e}'\mathbf{A}}\right) - \mathbf{\Gamma} \cdot \mathbf{Ib} \cdot \widehat{\mathbf{k\imath}} \cdot \hat{\mathbf{r}}\right)^{-1} \cdot \mathbf{\Omega}$$

$$\mathbf{SM_{\bar{c}}} = \left(\mathbf{I} - \widehat{\mathbf{1}'\mathbf{A}}\right) \cdot \left(\mathbf{I} - \mathbf{\Theta}\otimes\mathbf{A^{Tp}} - \mathbf{\Phi} \cdot \mathbf{Cib} \cdot \widehat{\mathbf{cp}} \cdot \hat{\mathbf{d}} \cdot \mathbf{E} \cdot \left(\mathbf{I} - \widehat{\mathbf{e}'\mathbf{A}}\right) - \mathbf{\Gamma} \cdot \mathbf{Ib} \cdot \widehat{\mathbf{k\imath}} \cdot \hat{\mathbf{r}}\right)^{-1} \cdot \mathbf{\Psi}$$

$$\mathbf{SM_{\bar{h}}} = \left(\mathbf{I} - \widehat{\mathbf{1}'\mathbf{A}}\right) \cdot \left(\mathbf{I} - \mathbf{\Theta}\otimes\mathbf{A^{Tp}} - \mathbf{\Phi} \cdot \mathbf{Cib} \cdot \widehat{\mathbf{cp}} \cdot \hat{\mathbf{d}} \cdot \mathbf{E} \cdot \left(\mathbf{I} - \widehat{\mathbf{e}'\mathbf{A}}\right) - \mathbf{\Gamma} \cdot \mathbf{Ib} \cdot \widehat{\mathbf{k\imath}} \cdot \hat{\mathbf{r}}\right)^{-1} \cdot \mathbf{\Upsilon}$$

In words, we have expressed the value added in each industry of each country as a function of domestic and foreign autonomous demands and their respective 'global multiregional input-output supermultiplier'. Each supermultiplier is an $n \cdot \sigma \times n \cdot \sigma$ matrix that simultaneously depends on the domestic and foreign (1) technical conditions of production ($\mathbf{A^{Tp}}$, $\mathbf{Ib} \cdot \widehat{\mathbf{k\imath}}$); (2) income distribution, as summarised by $\mathbf{d}$;[13] (3) households average propensities to consume ($\mathbf{cp}$); (4) households' consumption patterns ($\mathbf{Cib}$); (5) expectations on the necessary gross output growth to meet demand ($\mathbf{r}$); and (6) the geographical sourcing structure of intermediate products ($\mathbf{\Theta}$), households' consumption goods ($\mathbf{\Phi}$) and private firms' investment goods ($\mathbf{\Gamma}$), which also denote market shares. In addition, each supermultiplier depends on the geographical sourcing structure of the final products catering to the autonomous demands to which is linked. For example, the supermultiplier of government consumption $\mathbf{SM_G}$ also depends on $\mathbf{\Omega}$.

Thus, our global multiregional input-output supermultipliers differ from the standard income multiplier in several respects –besides accounting for accelerator effects. Some differences are akin to those highlighted by Giovanneti and Sinisicalco (1986) because they also model imports as a function of the different components of expenditure, each with its own import content. First, at every round of the multiplier process, the inverse accounts for the particular import content of the induced expenditures and not the aggregate marginal propensity to import with respect to income. Second, our multipliers also take into account that just a fraction of an autonomous injection brings about an increase in income, because of the different direct import leakages. This implies that there is not just one income multiplier, but one specific for each autonomous component. Similarly, each autonomous component affects imports differently.

Other differences are unique and derive from framing our model in a global multiregional input-output setting. The most important ones are that our multipliers account for the interrelations between countries. For example, the demand of one country may trigger the production of exports in a second country, which in turn may require inputs from a third country, and so on. In addition, such exports of the second country may induce greater consumption and investment, which in turn may activate the production exports in the third country, and so on.

---

[13] Actually income distribution is also implicit in the monetary input–output coefficients (see Steedman, 2000).

2.3 Aggregated GMRIO Supermultipliers

Departing from Equation 10, we aggregate the supermultipliers along the sectorial dimension to reflect national aggregates in the following manner:

$$\mathbf{y} = \mathbf{E} \cdot \mathbf{va} = \underbrace{\mathbf{E} \cdot \mathbf{SM_g} \cdot \mathbf{B_g}}_{\mathbf{ASM_g}} \cdot \mathbf{g_T^{Tp}} + \underbrace{\mathbf{E} \cdot \mathbf{SM_{\bar{c}}} \cdot \mathbf{B_{\bar{c}}}}_{\mathbf{ASM_{\bar{c}}}} \cdot \mathbf{\bar{c}_T^{Tp}} + \underbrace{\mathbf{E} \cdot \mathbf{SM_{\bar{h}}} \cdot \mathbf{B_{\bar{h}}}}_{\mathbf{ASM_{\bar{h}}}} \cdot \mathbf{\bar{h}_T^{Tp}}$$

Where $\left[\mathbf{B_q}\right]_{\mathrm{n}\cdot\sigma\times\mathrm{n}}$ denotes the commodity composition of total domestic autonomous expenditure $\left[\mathbf{q_T^{Tp}}\right]_{\mathrm{n}\times 1}$, where $q = g, \bar{c}, \bar{h}$. Thus, $\mathbf{q^{Tp}} = \mathbf{B_q} \cdot \mathbf{q_T^{Tp}}$. **ASM** stands for Aggregated Super-Multiplier of dimension $n \times \mathrm{n}$. Thus, the Aggregated Super-Multiplier will change with variations in the commodity composition of autonomous demand. In sum, we can write the global GDP vector as follows:

$$\mathbf{y} = \mathbf{ASM_g} \cdot \mathbf{g_T^{Tp}} + \mathbf{ASM_{\bar{c}}} \cdot \mathbf{\bar{c}_T^{Tp}} + \mathbf{ASM_{\bar{H}}} \cdot \mathbf{\bar{h}_T^{Tp}} \qquad (11)$$

Equivalently, the GDP of country *s* is:

$$y^s = \sum_{p=1}^{n} asm_g^{s\,p} \cdot g_t^{tp} + \sum_{p=1}^{n} asm_{\bar{c}}^{s\,p} \cdot \bar{c}_t^{t\,p} + \sum_{p=1}^{n} asm_{\bar{h}}^{s\,p} \cdot \bar{h}_t^{t\,p}$$

The *domestic* aggregate supermultiplier of the autonomous component q from the viewpoint of country *s* is $asm_q^{s\,s}$, while $asm_q^{s\,-s}$ are aggregate foreign trade multipliers. These foreign multipliers are all in relation to truly foreign autonomous demands from a global standpoint, not to exports as they were originally conceptualised (Harrod, 1933) and in Kaldor's (1970) extension.

They are also more comprehensive than Kennedy and Thirlwall's "Input-Output formulation of the foreign trade multiplier" (1976). Like theirs, they account for the fact that the items of autonomous expenditure may have different import coefficients. Moreover, however, it also takes into account that these expenditures also have an acceleration effect upon investment in addition to induce greater household consumption and the interrelations between countries mentioned in the previous sections.

We can further aggregate Equation 11 as to obtain a unique supermultiplier of a total autonomous demand vector. To this aim, we first define the total autonomous demand vector $\mathbf{z_T^{Tp}}$ and the following proportions:

$$\mathbf{z_T^{Tp}} \coloneqq \mathbf{g_T^{Tp}} + \mathbf{\bar{c}_T^{Tp}} + \mathbf{\bar{h}_T^{Tp}} \qquad (12)$$

$\mathbf{q_g} \coloneqq \mathbf{q_T^{Tp}} \oslash \mathbf{z_T^{Tp}}$, where $q = g, \bar{c}, \bar{h}$

The symbol $\oslash$ denotes elementwise division. Thus, $\mathbf{q_T^{Tp}} = \widehat{\mathbf{q_g}} \cdot \mathbf{z_T^{Tp}}$. Combining equations 11 and 12 we obtain:

$$\mathbf{y} = \mathbf{ASM} \cdot \mathbf{z_T^{Tp}} \qquad (13)$$

where

$$\mathbf{ASM} = \mathbf{ASM_G} \cdot \widehat{\mathbf{p_g}} + \mathbf{ASM_{\bar{c}}} \cdot \widehat{\mathbf{p_{\bar{c}}}} + \mathbf{ASM_{\bar{H}}} \cdot \widehat{\mathbf{p_{\bar{h}}}}$$

In words, the **ASM** is a weighted average of the supermultiplier of each autonomous demand component, which, therefore, will change whenever autonomous demand components do not evolve in tandem.

So far we have derived *(n-1)·q* foreign supermultipliers for each country, but one of our objectives is to compute *the* foreign supermultiplier. In other words, we need to compute the weighted average of all foreign supermultipliers. To this aim, we define the total foreign autonomous demand $z_{\mathrm{T}}^{\mathrm{Tf}}$ and the total domestic autonomous demand $z_{\mathrm{T}}^{\mathrm{Td}}$. From the viewpoint of country *s*, we have that $z_{\mathrm{T}}^{\mathrm{Tf}} \coloneqq \sum_{\boldsymbol{p \neq s}} z_{\mathrm{T}}^{\mathrm{T}p}$, and total domestic autonomous demand $z_{\mathrm{T}}^{\mathrm{Td}} = z_{\mathrm{T}}^{\mathrm{Ts}}$. Next, we define the weight of each aggregated foreign autonomous demand in the total foreign autonomous demands: $\mathrm{w}^{-\mathrm{s}} \coloneqq \frac{z_{\mathrm{T}}^{\mathrm{T-s}}}{z_{\mathrm{T}}^{\mathrm{Tf}}}$

We can now write the GDP of country *s* as follows:

$$y^s = asm^{s\,s} \cdot z_{\mathrm{T}}^{\mathrm{Ts}} + asm^{s\,f} \cdot z_{\mathrm{T}}^{\mathrm{Tf}} \qquad (14)$$

where, $asm^{s\,s}$ is the total aggregated domestic supermultiplier, and $asm^{sf} = \sum_{\boldsymbol{p \neq s}} \mathrm{asm}^{s\,p} \cdot w^p$ is the total aggregated foreign supermultiplier, both from the viewpoint of country *s*.

2.4. Deriving the conditions for balanced trade from the supermultiplier relation

Given the level of autonomous demands abroad, country *s* can seemingly reach the full-employment income level simply by acting on domestic autonomous demands: for example, through public expenditure programmes. While in a purely demand-constrained economy such a policy is sustainable under fairly weak conditions (Lavoie, 2014, pp. 343—346), it may not be sustainable in a balance-of-payments-constrained economy (Godley and Rowthorn, 1994). If that is the case in country *s* (as it is in Spain

nowadays), it is important to investigate to what extent can public institutions expand effective demand without fostering foreign indebtedness.

To this aim, we search for the level of government consumption in country *s* that is consistent with balanced trade in the same country. [14] In other words, we aim to determine which level of government consumption in country *s* equates domestic income with domestic expenditures. Translated into matrix algebra, the constraint is the following:

$$\mathbf{1^{s\prime}} \cdot \mathbf{y}^{\mathrm{tb}s} = \mathbf{1^{s\prime}} \cdot (\mathbf{f^{Tp\prime}})' \quad (15)$$

where $\mathbf{1^s}$ is a vector of length *n* that contains the number *1* in the *s*-th element and zeros in the remaining entries, and the superscript '$\mathrm{tb}s$' denotes 'which balances trade in country *s*'.

Expressed as function of the supermultipliers and autonomous demands, the final domestic demand is

$$\mathbf{f^{Tp\prime}} \equiv \mathbf{e}' \cdot (\mathbf{Ci} + \mathbf{H} + \bar{\mathbf{C}} + \bar{\mathbf{H}} + \mathbf{G}) = \mathbf{cp}' \cdot \hat{\mathbf{d}} \cdot$$
$$\left(\mathbf{ASM_g} \cdot \mathbf{g}_T^{\mathbf{Tp}} + \widehat{\mathbf{ASM}_{\bar{\mathbf{c}}}} \cdot \bar{\mathbf{c}}_T^{\mathbf{Tp}} + \mathbf{ASM}_{\bar{\mathbf{h}}} \cdot \bar{\mathbf{h}}_T^{\mathbf{Tp}}\right) + \mathbf{ki}' \cdot \hat{\mathbf{r}} \cdot$$
$$\left(\mathbf{SM_g} \cdot \mathbf{g^{Tp}} + \widehat{\mathbf{SM}_{\bar{\mathbf{c}}}} \cdot \bar{\mathbf{c}}^{\mathbf{Tp}} + \mathbf{SM}_{\bar{\mathbf{h}}} \cdot \bar{\mathbf{h}}^{\mathbf{Tp}}\right) \cdot \left(\mathbf{I} - \widehat{\mathbf{e}'\boldsymbol{A}}\right)^{-1} \cdot \mathbf{E}' + \bar{\mathbf{c}}_{\mathbf{T}}^{\mathbf{Tp}\prime} + \bar{\mathbf{h}}_T^{\mathbf{Tp}\prime} + \mathbf{g}_T^{\mathbf{Tp}\prime} \quad (16)$$

By inserting Equations 11 and 16 into 15, we obtain:

$$\mathbf{1^{s\prime}} \cdot \left(\mathbf{ASM_g} \cdot \mathbf{g}_T^{\mathbf{Tp}} + \mathbf{ASM}_{\bar{\mathbf{c}}} \cdot \bar{\mathbf{c}}_T^{\mathbf{Tp}} + \mathbf{ASM}_{\bar{\mathbf{h}}} \cdot \bar{\mathbf{h}}_T^{\mathbf{Tp}}\right)$$
$$= \mathbf{1^{s\prime}}$$
$$\cdot \left(\bar{\mathbf{c}}_{\mathbf{T}}^{\mathbf{Tp}} + \bar{\mathbf{h}}_T^{\mathbf{Tp}} + \mathbf{g}_T^{\mathbf{tbs}} + \left(\mathbf{ASM_g} \cdot \mathbf{g}_T^{\mathbf{Tp}} + \widehat{\mathbf{ASM}_{\bar{\mathbf{c}}}} \cdot \bar{\mathbf{c}}_T^{\mathbf{Tp}} + \mathbf{ASM}_{\bar{\mathbf{h}}} \cdot \bar{\mathbf{h}}_T^{\mathbf{Tp}}\right) \cdot \hat{\mathbf{d}}\right.$$
$$\left. \cdot \mathbf{cp} + \mathbf{E} \cdot \left(\mathbf{I} - \widehat{\mathbf{e}'\boldsymbol{A}}\right)^{-1} \cdot \left(\mathbf{SM_g} \cdot \mathbf{g^{Tp}} + \widehat{\mathbf{SM}_{\bar{\mathbf{c}}}} \cdot \bar{\mathbf{c}}^{\mathbf{Tp}} + \mathbf{SM}_{\bar{\mathbf{h}}} \cdot \bar{\mathbf{h}}^{\mathbf{Tp}}\right) \cdot \hat{\mathbf{r}} \cdot \mathbf{ki}\right)$$

Solving for the government consumption in country *s* that balances trade in this country we obtain:

[14] This condition is equivalent to that from which the canonical Thirlwall Law is derived, namely the equality between imports and exports (McCombie and Thirlwall, 1994). Ideally, however, we would impose a more precise condition of the sustainability of external accounts: the net inflows in the financial account should at least cover the trade balance plus the servicing of external debt. Along these lines, see Bhering and Serrano (2014) for a discussion of the relation between Thirlwall's Law, the external constraint with foreign indebtedness and the supermultiplier.

$$
\begin{aligned}
g_T^{Ts^{tbs}} = \Bigg[& \sum_{p=1}^{n} \Bigg(asmg^{sp} \cdot g_T^{Tp} \\
& - \sum_{i=1}^{\sigma} \Bigg(\Bigg(\sum_{j=1}^{\sigma} smg_{ij}^{sp} \cdot b_{G_j}{}^{p} \cdot g_T^{Tp} \Bigg) \cdot \Bigg(d^s \cdot cp^s + \frac{1}{v_i^s} \cdot r_i^s \cdot k_i^s \Bigg) \Bigg) \Bigg) \\
& + \sum_{p=1}^{n} \Bigg(asm\bar{c}^{sp} \cdot \bar{c}_T^{Tp} \\
& - \sum_{i=1}^{\sigma} \Bigg(\Bigg(\sum_{j=1}^{\sigma} sm\bar{c}_{ij}^{sp} \cdot b_{\bar{c}_j}{}^{p} \cdot \bar{c}_T^{Tp} \Bigg) \cdot \Bigg(d^s \cdot cp^s + \frac{1}{v_i^s} \cdot r_i^s \cdot k_i^s \Bigg) \Bigg) \Bigg) \\
& + \sum_{p=1}^{n} \Bigg(asm\bar{h}^{sp} \cdot \bar{h}_T^{Tp} \\
& - \sum_{i=1}^{\sigma} \Bigg(\Bigg(\sum_{j=1}^{\sigma} sm\bar{h}_{ij}^{sp} \cdot b_{\bar{h}_j}{}^{p} \cdot \bar{h}_T^{Tp} \Bigg) \cdot \Bigg(d^s \cdot cp^s + \frac{1}{v_i^s} \cdot r_i^s \cdot k_i^s \Bigg) \Bigg) \Bigg) \\
& + \Bigg(-\bar{c}_T^{Ts} + asm\bar{c}^{ss} \cdot \bar{c}_T^{Ts} \\
& - \sum_{i=1}^{\sigma} \Bigg(\Bigg(\sum_{j=1}^{\sigma} sm\bar{c}_{ij}^{ss} \cdot b_{\bar{c}_j}{}^{s} \cdot \bar{c}_T^{Ts} \Bigg) \cdot \Bigg(d^s \cdot cp^s + \frac{1}{v_i^s} \cdot r_i^s \cdot k_i^s \Bigg) \Bigg) \Bigg) \\
& + \Bigg(-\bar{h}_T^{Ts} + asm\bar{h}^{ss} \cdot \bar{h}_T^{Ts} \\
& - \sum_{i=1}^{\sigma} \Bigg(\Bigg(\sum_{j=1}^{\sigma} sm\bar{h}_{ij}^{ss} \cdot b_{\bar{h}_j}{}^{s} \cdot \bar{h}_T^{Ts} \Bigg) \cdot \Bigg(d^s \cdot cp^s + \frac{1}{v_i^s} \cdot r_i^s \cdot k_i^s \Bigg) \Bigg) \Bigg) \Bigg] \\
& \cdot \frac{1}{1 - asmg^{ss} + \sum_{i=1}^{\sigma} \Bigg(\Big(\sum_{j=1}^{\sigma} smg_{ij}^{ss} \cdot b_{G_j}{}^{s} \Big) \cdot \Big(d^s \cdot cp^s + \frac{1}{v_i^s} \cdot r_i^s \cdot k_i^s \Big) \Bigg)}
\end{aligned}
$$

$; s \neq p$ (17)

We examine the economic meaning of the $g_T^{Ts^{tbs}}$ equation by interpreting its parts.

a) The denominator

$$\underbrace{\underbrace{\underbrace{\underbrace{1}_{\substack{\text{Effect of each}\\ g_T^{Ts}\text{ unit}\\ \text{on the domestic}\\ \text{income if}\\ g_T^{Ts}\text{ was satisfied}\\ \text{solely with}\\ \text{domestic production}\\ \text{and if } g_T^{Ts}\\ \text{did not induce}\\ \text{multiplier-cum-}\\ \text{acceletor}\\ \text{effects}}} - \underbrace{asmg^{ss}}_{\substack{\text{total effect}\\ \text{of each } g_T^{Ts}\\ \text{unit on}\\ \text{the domestic}\\ \text{income,}\\ \text{including}\\ \text{multiplier}\\ \text{and accelerator}\\ \text{effects in an}\\ \text{open economy}}}}_{\substack{\text{Direct imports to meet each } g_T^{Ts}\text{ unit}\\ \text{minus the multiplier-accelerator}\\ \text{effect in open economies}}} + \underbrace{\sum_{i=1}^{\sigma}\left(\left(\sum_{j=1}^{\sigma} smg_{ij}^{ss}\cdot b_{G_j}{}^{s}\right)\cdot\left(d^s\cdot cp^s+\frac{1}{v_i^s}\cdot r_i^s\cdot k_i^s\right)\right)}_{\substack{\text{Effect of each } g_T^{Ts}\text{ unit on the domestic economy due to}\\ \text{multiplier-cum-accelerator processes in}\\ \text{an open economy plus}\\ \text{the value of imports associated with such induced}\\ \text{domestic consumtion and investment}}}}_{\text{direct and induced imports generated by each } g_T^{Ts}\text{ unit (propensity to import of } g_T^{Ts}\equiv m^s{}_{g_T^{Ts}})}$$

2. The numerator

$$\sum_{p=1}^{n}\left(\frac{\underbrace{asmg^{sp}\cdot g_T^{Tp}}_{\substack{\text{total effect of foreign governments consumption on the domestic economy (Value added exports [VAX≡exports−imports contained in exports]+ their multiplier−accelerator effects in an open economy)}}}-\underbrace{\sum_{i=1}^{\sigma}\left(\left(\sum_{j=1}^{\sigma}smg_{ij}^{sp}\cdot b_{G_j}^{\ p}\cdot g_T^{Tp}\right)\cdot\left(d^s\cdot cp^s+\frac{1}{v_i^s}\cdot r_i^s\cdot k_i^s\right)\right)}_{\substack{\text{Effect of foreign government consumption on the domestic economy due to multiplier−cum−accelerator processes plus the value of imports associated with such induced domestic consumtion and investment}}}}{\underbrace{\substack{\text{Value added exports generated by foreign governments consumption } (vax^{sp}{}_{g_T^{Tp}}\cdot g_T^{Tp}) \text{ minus imports associated with induced demands from value added exports}\\ vax^{sp}{}_{g_T^{Tp}}\cdot g_T^{Tp}-vax^{sp}{}_{g_T^{Tp}}\cdot g_T^{Tp}\cdot m^s{}_{vax\left(g_T^{Tp}\right)}=vax^{sp}{}_{g_T^{Tp}}\cdot g_T^{Tp}\cdot\left(1-m^s{}_{vax\left(g_T^{Tp}\right)}\right)}}_{}}\right)$$

The components of the numerator that refer to $\bar{c}_T^{Tp}$ and $\bar{h}_T^{Tp}$ can be interpreted analogously.

$$\underbrace{\underbrace{\underbrace{-\bar{c}_T^{Ts}}_{(-)Effect\ of\ \bar{c}_T^{Ts}\ on\ the\ domestic\ economy\ if\ the\ propensity\ to\ import\ were\ nil\ and\ if\ \bar{c}_T^{Ts}\ did\ not\ generate\ multiplier-accelerator\ effects} + \underbrace{asm\bar{c}^{ss}\cdot\bar{c}_T^{Ts}}_{total\ effect\ of\ \bar{c}_T^{Ts}\ on\ the\ dom.economy,\ including\ multiplier-accelerator\ effects\ in\ an\ open\ economy}}_{(-)Direct\ imports\ to\ meet\ \bar{c}_T^{Ts}\ plus\ effect\ of\ \bar{c}_T^{Ts}\ on\ the\ domestic\ economy\ due\ to\ multiplier-cum-accelerator\ processes\ in\ an\ open\ economy} - \underbrace{\sum_{i=1}^{\sigma}\left(\left(\sum_{j=1}^{\sigma} sm\bar{c}_{ij}^{ss}\cdot b_{\bar{c}_j}^{s}\cdot\bar{c}_T^{Ts}\right)\cdot\left(d^s\cdot cp^s+\frac{1}{v_i^s}\cdot r_i^s\cdot k_i^s\right)\right)}_{(-)Effect\ of\ \bar{c}_T^{Ts}\ on\ the\ domestic\ economy\ due\ to\ multiplier-cum-accelerator\ processes\ in\ an\ open\ economy\ plus\ the\ value\ of\ imports\ associated\ with\ such\ induced\ domestic\ consumtion\ and\ investment}}_{(-)total\ value\ of direct\ and\ induced\ imports\ generated\ by\ \bar{c}_T^{Ts}=(-)m^s{}_{\bar{c}_T^{Ts}}\cdot\bar{c}_T^{Ts}}$$

Analogously for the component of the numerator that refers to $\bar{h}_T^{Ts}$.

In sum, the condition that guarantees a level of government consumption in country *s* compatible with balanced trade can rewritten as:

$$g_T^{Ts\,tbs} = \frac{1}{m_{g_T^{Ts}}}\cdot\left(\sum_{p=1}^{n}\left(vax^{sp}{}_{g_T^{Tp}}\cdot\left(1-m^s{}_{vax\left(g_T^{Tp}\right)}\right)\cdot g_T^{Tp} + vax^{sp}{}_{\bar{c}_T^{Tp}}\cdot\left(1-m^s{}_{vax\left(\bar{c}_T^{Tp}\right)}\right)\cdot\bar{c}_T^{Tp} + vax^{sp}{}_{\bar{h}_T^{Tp}}\cdot\left(1-m^s{}_{vax\left(\bar{h}_T^{Tp}\right)}\right)\cdot\bar{h}_T^{Tp}\right) - \left(m^s{}_{\bar{c}_T^{Ts}}\cdot\bar{c}_T^{Ts} + m^s\cdot\bar{h}_T^{Ts}\right)\right),\quad ; s\neq p \qquad (17')$$

The equation states that the government consumption expenditure in a country that balances trade must equal the inverse of the propensity to import of domestic government consumption times the net exports induced by foreign autonomous demands minus the imports activated by the remaining domestic autonomous demands.

Inserting equation 17' into equation 11 we can compute the balance-of-payments equilibrium income level for country *s*.

3. Discussion of results

The World Input—Output Database (WIOD) is our source for the World Input—Output Tables (WIOTs) at basic prices. These cover 40 countries (all 27 European Union countries and 13 other major economies) and the 'Rest of the World' at a 35 industry level of disaggregation for the years from 1995 to 2011 (see Dietzenbacher et al., 2013; Timmer et al. 2015).[15] Complementary data come from official national accounts and balance of payments statistics.

Computations have been carried out at the lowest possible level of aggregation to then aggregate results according to the question at hand. This is the right procedure because matrix inversion is a non-linear operation; therefore, first aggregating and then inverting would give inaccurate results. Along these lines, we generally aggregate results as to obtain a 15-region world composed of the following countries and regions:

Code	**Countries**
DEU	Germany
FRA	France
C-EZ	Core Eurozone: Germany, France, Austria, Finland, Belgium and The Netherlands
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

Before proceeding with the presentation and discussion of the results, some caveats are in order. First, we assume a fixed-price scenario, i.e. increases in demand are meet with increases in production but not prices by recourse to unused labour and capacity. Consequently, prices cannot influence factors such as competitiveness and thereby market shares. Second, we compute accounting multipliers, which are based on average expenditure propensities instead of marginal propensities and thus imply unitary

[15] The database is accessible at www.wiod.org We rely on the latest updates: the November 2013 release of WIOTs and the complementary Socio Economic Accounts released on July 2014.

expenditure elasticities (Pyatt and Round, 1979). Thus, the commodity composition of demand and international market shares remain constant as income varies. Third, the GDP and balance of payments figures obtained from the WIOD are not fully consistent with official statistics (Jones, Wang and Xin 2014), despite WIOTs are based on official data from national statistical institutes (and international organisation such as the OECD, the UN National Accounts, UN COMTRADE and IMF trade statistics), and follow the System of National Accounts.[16] Forth, 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).

3.1. Uncoordinated fiscal policy for balancing foreign trade

As stated in the introduction, fiscal contraction in peripheral countries and in Spain in particular has been a tool to rebalance external accounts. Here we confirm that such a task is extremely difficult to achieve for each country individually and that it comes at an unbearable cost in GDP terms.

We simulate which level of a government's final consumption expenditure balances trade in the country under an adverse, uncooperative scenario: only government expenditure in the country induces the adjustment, while the rest of autonomous demands in the country and abroad remain stagnant. In other words, we compute Equation 17. In Table 1, we report the required variation in government consumption and the corresponding change in GDP.

For Southern EZ-countries, the required fall in government consumption is daunting. Indeed, it is outright impossible for Portugal and Greece, whose government expenditure should go below zero. Spain and Italy would have to cut government consumption by 46% and 22%, inducing a tremendous depression as GDP falls by 15 and 7%, respectively.

[16] While GDP figures "fluctuate around the Unite Nations National Accounts benchmark values by small margins (the differences are around or less than +/-1% for the 70% of the covered economies)" and final demand values show even smaller differences, the differences for trade values are much higher: imports in the WIOD are constantly lower than in official statistics, and much of the same applies to exports. Similarly, WIOD figures for exports and imports in goods and services are "largely lower than those derived from Balance of Payments data" (Jones, Wang and Xin 2014, pp. 4-5; 9). These inconsistencies, to our knowledge, are not mentioned in the empirical publications grounded in the WIOD.

Table 1: Percentage change in government consumption required to balance trade and its consequence for own GDP, 2011 base-year.

	%Δ in government final consumption expenditure	%Δ in GDP
DEU	167	41.1
FRA	-38	-13.1
AUT	48	11.1
FIN	12	14.1
BEL	53	14.1
NLD	125	38.8
ESP	-46	-14.5
ITA	-22	-6.7
PRT	-127	-41.8
GRC	-195	-71.1

Conversely, Core-Eurozone governments would have to raise their consumption expenditure to implausible levels. Germany and the Netherlands would have to more than double it, and Austria and The Netherlands boost it by some 50% and Finland by 12%. France, the only core-EZ country with a trade deficit, would have to cut government consumption and thereby depress GDP to an order of magnitude comparable to that of Spain.

3.2. Impact on Spain (the Southern EZ) of a fiscal expansion in Germany (the core-EZ)

Thus, forcing the deficit countries to balance trade via fiscal policy in an uncoordinated manner is extremely difficult or impossible and always distressing, while Core-Eurozone countries (but France) have ample margin to raise public consumption without causing a trade deficit. Hence the logic of the 'surplus countries must lead the recovery' proposal. To examine its potential effectiveness, we perform the following exercise.

We hypothesise a 10% increase in government final consumption expenditure in Germany in relation to its 2011 level –the last year covered by the WIOD.[17] Complementary, we hypothesise a coordinated expansion of the same magnitude among governments in Core-EZ countries, i.e. each government in the core-Eurozone increases consumption expenditure by 10%. The aim is to examine the income and trade balance

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

consequences of such expansion for the same country/region and the other countries and regions. These are summarised in Table 2.

Table 2: GDP and balance of trade consequences of a 10% increase in government consumption in Germany and the Core-Eurozone, 2011 base-year.

	Germany		Core-EZ		
	% Δ GDP	Pp Δ BoT	% Δ GDP	Pp Δ BoT	BoT %GDP in 2011
DEU	2.47	-0.71	2.70	-0.60	8.56
FRA	0.08	0.05	3.56	-0.38	-2.08
C-EZ	1.13	-0.23	3.10	-0.58	4.55
ESP	0.08	0.04	0.26	0.12	-2.88
ITA	0.09	0.04	0.23	0.11	-1.16
PRT	0.07	0.04	0.22	0.11	-9.44
GRC	0.04	0.02	0.08	0.04	-14.41
S-EZ	0.08	0.04	0.23	0.11	-3.16
EZ-12	0.77	-0.12	2.11	-0.31	2.50
C&E-EU	0.18	0.08	0.39	0.17	1.04
RoEU-27	0.11	0.05	0.28	0.14	1.32
USA	0.04	0.01	0.10	0.04	-3.68
CHN	0.07	0.02	0.16	0.06	3.99
RoW	0.07	0.02	0.18	0.05	-0.35
T. FGN	0.19	0.00	0.52	0.00	0.00

A 10% in German government consumption raises German GDP by almost 2.5% without having a major impact on the balance of trade (BoT): the trade surplus only falls by 0.7 percentage points (pp) from a level of more than 8% of GDP. The core Eurozone as whole, of which Germany is the biggest member, does not undergo reversal of its trade surplus either, just a modest fall of 0.23pp while GDP rises by 1.13%.

Of course, the German expansion has favourable consequences for the income and trade balance of the indebted Southern Eurozone. Our estimates, however, show that it is far from enough to rebalance and kick-start these economies: it only lifts the GDP of the region by 0.08% and reduces the trade deficit by 0.04 pp. Exactly the same effects apply to Spain, whereas Greece is the S-EZ country that benefits the least with a mere GDP increase of 0.04% and trade deficit reduction of 0.02pp.

Interestingly, the repercussions are more significant for the Central and Eastern EU region, which profits from a rise in GDP and the BoT of almost 0.2% and 0.1 pp. This is a manifestation of the tremendous eastward expansion of German industry, which has integrated C&E-EU countries into German supply chains (Simonazzi, Ginzburg, Nocella, 2013). In absolute terms, however, the linkages are still stronger with the S-EZ

than with the C&E-EU (in the later GDP increases by $2,360.8 million and the trade balance by $1,069.9, while in the S-EZ these magnitudes are, respectively, $3,286.8 and $1,484.7 million).

Similarly, the Rest of the EU-27 enjoys a higher GDP growth and improvement in the trade balance than the Southern-EU region –which is also true in absolute terms (GDP and the trade balance increase in the RoEU-27 by $3,446.8 and $1,7468.8 million). Finally, non-European countries such as China and the US also benefits more than the S-EZ in absolute values (China's GDP and the trade balance increase by $4,979.2 and $2,001.1million, while the figures for the US are 5,756.6 and 2,026.9 million), but not as much in relative terms because of their much bigger GDP.

All of these consequences are amplified if Germany is not alone in pursuing expansionary policies but accompanied by the rest of the Core-Eurozone countries. In this scenario, Germany's GDP increases 0.22pp more than in the previous one, while the trade balance decrease is equal to 0.6 instead of 0.71pp. The Core-Eurozone's GDP rises almost three times more than if only Germany expands, but still the area presents a large surplus, which only falls by some 0.6pp.

For the Southern Eurozone countries, the cooperative expansion triples the GDP increase and trade deficit reduction following a fiscal expansion in Germany only. Still, such coordinated reflation is not enough to rebalance and kick-start Southern Eurozone economies: it raises the GDP by 0.23% and reduces the trade deficit by 0.11pp. Slightly higher figures apply to Spain (0.26% and 0.12pp), while Greece would again be the least benefited by far (0.08% and 0.04pp). Again, the repercussions are more significant for the Central and Eastern EU region and the Rest of the EU, and in absolute terms also for the USA and China.

In short, scepticism about the effectiveness of the cooperative Keynesian strategy is justified.

3.3. Domestic income dependence on own and foreign sources of demand

The modest impact of a fiscal expansion in Germany on the Spanish GDP and trade balance was to be expected given the relative dependence of domestic income on own and foreign autonomous demand in Germany and Spain. These are summarised in Table 3.

Table 3: Percentage of domestic income in Spain and Germany generated by own and foreign autonomous demands, several years.

	Spain					Germany				
	1995	2001	2007	2009	2011	1995	2001	2007	2009	2011
ESP	70.5	64.9	68.6	72.8	67.5	1.1	1.7	2.5	1.9	1.6
FRA	4.3	4.6	3.9	3.4	3.8	2.8	3.3	3.7	3.4	3.5
DEU	4.3	4.2	2.8	2.6	2.8	70.5	60.4	52.0	57.0	53.6
RoC-EZ	2.0	2.0	1.7	1.6	1.7	3.6	3.6	3.9	3.9	3.6
RoS-EZ	3.9	4.9	4.5	3.9	4.1	2.6	3.6	4.1	3.5	3.2
C&E-EU	0.5	1.0	1.2	1.0	1.2	1.1	1.8	2.9	2.4	2.4
RoEU-27	2.8	4.1	3.7	2.5	2.8	3.5	4.6	5.6	4.2	4.2
USA	3.1	5.0	3.8	3.5	4.4	4.1	8.0	7.8	5.9	6.5
CHN	0.4	1.0	1.4	0.9	1.6	0.5	1.3	2.2	3.0	4.3
RoW	8.1	8.3	8.5	7.7	10.2	10.3	11.7	15.4	14.8	17.1

In 2011, the base-year of our previous simulations, around two thirds of Spanish GDP were generated by own autonomous sources of demand, whereas only 2.8% depended on German sources. Not surprisingly, then, a German fiscal expansion has not much traction on Spanish GDP. Furthermore, this capacity has weakened since at least 1995, when 4.3% of Spanish GDP relied on Germany despite the overall higher dependence on own sources (70.5% of GDP). This 'de-coupling' from Germany took place, significantly, after the introduction of the Euro.

We have seen that the impact of a coordinated expansion in the core-EZ on Spain triples that of a fiscal expansion in Germany only. This is consistent with the fact that the autonomous demands from the core-EZ as a whole account for three times more of the income generated in Spain than Germany alone, namely 8.4%. And again, this reliance has decreased since the introduction of the euro in 2002: in 2001 the corresponding proportion was 10.8%.

From the German viewpoint, in contrast, the reliance on Spanish demand increased rapidly from 1995 up to the peak of the financial bubble in 2007, from 1.1 to 2.5%. This is not exclusive of Spain, because Germany depended more and more on foreign demand to an outstanding degree: In 1995 the percentage of domestic income generated

by own demand in Germany and Spain was exactly the same (70.5%); but by 2007, because of the stagnant demand in Germany while most of its trading partners grew at rates well above 2% and the international fragmentation of production, the percentage felt by almost 20 points to 52%. In other words, in 12 years Germany transited from having own-reliance ratios common in big economies to those usual in small open economies (e.g. the values in 2007 for France, Italy, Great Britain, Japan and the US are 72, 65, 65, 69 and 81%; while those for Austria, Belgium and the Netherlands are 50, 45 and 50%). Among big economies, only China's aggressive mercantilist growth strategy resulted in such a high dependency on foreign economies (48%). But the fastest increases in the German reliance on foreign demands occurred vis-à-vis the Central and Eastern EU region (from 1.1 to 2.9%) and China (from 0.5 to 2.2%), evidencing the German shift towards the Central and Eastern EU and China despite of the Euro.

Much of the same applies to the Southern-EZ in relation to the core-EZ, as it can be seen in Table 4. In 2011, only 7.4% of GDP in the S-EZ relied on autonomous demand from the core-EZ, and the linkages have weakened since 1995, when the proportion was 10.5%. Some 60% of this decline is explained by the reduced dependence on Germany. Again, most of the fall occurred after the introduction of the euro.

Table 4: Percentage of domestic income in the southern and core Eurozone generated by own and foreign autonomous demands, several years.

	Southern-EZ					core-EZ				
	1995	2001	2007	2009	2011	1995	2001	2007	2009	2011
ESP	22.6	21.4	25.7	27.3	25.1	1.2	1.8	2.2	1.8	1.6
FRA	3.6	3.6	3.3	2.9	3	23.9	24.4	26.4	27.5	26.4
DEU	4.8	4	2.8	2.6	2.8	37.5	30.1	24.6	26.3	25.2
RoC-EZ	2.1	1.8	1.7	1.6	1.6	14.6	14.2	14.9	15.7	15
RoS-EZ	48.9	47.9	45.3	47.6	45.7	2.8	3.5	3.7	3.1	2.9
C&E-EU	0.7	1.2	1.5	1.2	1.3	0.9	1.5	2.2	1.9	1.8
RoEU-27	2.8	3.6	3.6	2.4	2.5	3.7	4.9	5.1	4	3.9
USA	4.2	6.2	4.8	3.7	4.3	4.5	7.7	6.4	5	5.5
CHN	0.5	1	1.3	1.3	2.1	0.5	1.1	1.7	2.3	3.4
RoW	9.8	9.4	10.1	9.4	11.6	10.3	10.8	12.7	12.4	14.3

Interestingly, the dependence on own demand in the S-EZ remained roughly constant at around 71% between 1995 and 2007. Thus, while the Southern region depended as much as it used to on foreign demand, its origin shifted from the low-growth core-EZ to

especially C&E EU, the RoEU-27 and China. This shift appears to continue to 2011, but not with respect to other 'Western' economies, since these suffered a deep crisis, but with China and the Rest of the World.

Conversely, during up-swing from 1995 to 2007, the core Eurozone relied less and less on own-sources of demand (-10pp) while more and more on that from S-EZ (2pp). Since the crisis the core Eurozone has been capable of substituting its reliance on foreign European demands (-3pp) for non-European foreign demand (+3.3pp).

In sum, the Southern Eurozone GDP, and the Spanish in particular, has to a significant extend 'de-coupled' from autonomous demands from the core, while the Core-Eurozone, especially Germany, has increasingly relied on foreign sources of demand, including that from Spain and the S-EZ, but most notably with the Central and Eastern EU, China and the Rest of the World.

3.4. Structural changes and structural differences between countries as drivers of the trade balance

In this section we aim to emphasise the role of structural changes in driving the trade balance and the need to narrow the gap in productive capabilities between the periphery and the core. We do so by examining to which extent can domestic autonomous expenditures increase given a certain increase in foreign autonomous demands if the trade balance is to remain constant for the years 1995 to 2011.

[to be completed]

4. Conclusions

We argued that the European Monetary Union institutions de facto enforce the external constraint on Spanish fiscal policy and the reversal of current account positions via neoliberal austerity and regulations. In this context, the standard internationalist Keynesian policy proposal that surplus Eurozone countries must lead the economic recovery gains currency: it would benefit surplus countries without endangering the sustainability of their financial balances while fostering and allowing for the reflation of the periphery and the correction of their trade deficits. The objective of this paper was precisely to examine the potential of such alternative.

To this aim, we built a supermultiplier model that takes into account interindustrial and interregional interlinkages in a global framework. In other words, we expressed the value added in each industry of each country as function of domestic and foreign autonomous demands and their respective 'global multiregional input-output supermultiplier'. The latter is a 'global' matrix that simultaneously depends on the domestic and foreign technical conditions of production, income distribution, households' consumption patterns and propensities to consume, growth expectations, and the geographical sourcing structure of intermediate products, household's consumption goods and private firms' investment goods, in addition to the geographical sourcing structure of the final products catering to each autonomous component of demand. These matrices contain comprehensive foreign trade (super)multipliers and domestic supermultipliers, which are then employed to address our research question.

Moreover, we derived the level of government consumption in a country that is consistent with balanced trade in the same country: it must equal the inverse of the propensity to import of domestic government consumption times the net exports induced by foreign autonomous demands minus the imports activated by other autonomous demands.

We applied the model with recourse to Global Input-Output Tables and National Accounts by computing accounting multipliers in a fixed-price scenario. Simulations were based on the global economic structure in the year 2011, which is the last covered by our database.

We confirmed that it is extremely difficult, if not impossible, for each peripheral country individually to balance trade accounts via fiscal policy. Furthermore, the costs in GDP terms are unbearable. If only government consumption expenditure bears the

burden of adjustment, Spain, for example, would have to cut it by almost half, causing a fall in GDP of 15%.

Thus, forcing deficit countries to adjust in an uncoordinated manner is far from optimal. The logic of 'surplus countries must lead the recovery' is surely sounder. Unfortunately, however, we showed that a German fiscal expansion is clearly insufficient to induce significant economic growth and rebalance trade in Spain and the Southern Eurozone: a 10% increase in German government consumption only raises the GDP of Spain and the Southern Eurozone by 0.08% and reduces the trade deficit by 0.04pp of GDP. The same German expansion has more traction on the GDP and trade balance of other non-Eurozone regions such as the C&E-EU and the RoEU-27, and in absolute magnitudes also on the US and China.

The consequences are amplified if Germany is not alone in pursuing expansionary policies but accompanied by the rest of the core Eurozone countries. For the Southern Eurozone, the coordinated expansion triples the benefits following a fiscal expansion in Germany only. Still, it is not enough to rebalance and kick-start Southern Eurozone economies. Again, the repercussions are more significant for the Central and Eastern EU region and the Rest of the EU, and in absolute terms also for the USA and China.

Such meagre effects were to be expected given the relative dependence of domestic income on own and foreign autonomous demands. In 2011, the base-year of our simulations, around two thirds of Spanish GDP were generated by own autonomous sources of demand, while only 2.8% depended on German sources. Furthermore, the German traction on Spanish GDP has weakened since at least 1995, especially since the introduction of the Euro. The dependence on the Core Eurozone as a whole is three times higher than on Germany alone, namely 8.4%. Thus, it is not surprising that the coordinated reflation is also three times more potent. Again, this dependence has decreased since the introduction of the euro in 2002.

From the German viewpoint, in contrast, the reliance on Spanish demand increased rapidly from 1995 up to the peak of the financial bubble in 2007: from 1.1 to 2.5%. This is not exclusive of Spain, because while in 1995 the percentage of domestic income generated by own demand in Germany and Spain was exactly the same (70.5%), by 2007 the percentage felt to one usual in small open economies (52%). But the fastest increases in the German reliance on foreign demands occurred vis-à-vis the Central and

Eastern EU region (from 1.1 to 2.9%) and China (from 0.5 to 2.2%), evidencing the German shift towards the Central and Eastern EU and China despite of the Euro.

Much of the same applies to the Southern-EZ in relation to the core-EZ. Therefore, the Southern Eurozone GDP, and the Spanish in particular, has to a significant extent 'de-coupled' from autonomous demands from the core, whereas the Core-Eurozone, and especially Germany, has increasingly relied on foreign sources of demand, including that from Spain and the S-EZ, but most notably from the Central and Eastern EU, China and the Rest of the World.

We conclude that scepticism about the effectiveness of the standard internationalist Keynesian alternative is in order. Demand management alone cannot rebalance the Eurozone and lift the periphery from its dismal economic situation because structural differences are too profound. Therefore, if the EMU is to survive and promote economic progress, we can only devise a broad policy line: current account deficits in the periphery must be allowed for –as it happens in any federal state— while a coordinated reflation is implemented alongside forceful industrial policies aimed at promoting the convergence in productive capacities and thereby lifting the external constraint. Then, Eurozone nations could provide themselves with full employment by their domestic policy.

References

Albo, G. (1994). 'Competitive Austerity' and the Impasse of Capitalist Employment Policy. *The Socialist Register*, 30, pp. 144-170.

Alonso J. A. (1999) Growth and the external constraint: lessons from the Spanish case. *Applied Economics,* 31, 245—253.

Alonso J. A. and C. Garcimartín (1998) A new approach to balance of payments constraint: some empirical evidence. *Journal of Post Keynesian Economics,* 21, 259—282.

Barba, A. and G. De Vivo (2013) Flawed currency areas and viable currency areas -external imbalances and public finance in the time of the euro. *Contributions to Political Economy,* 32, 73–96.

Bhering, G. and F. Serrano (2014). A Restrição Externa e a "Lei de Thirlwall" com Endividamento Externo. Available at https://www.anpec.org.br/encontro/2014/submissao/files_I/i7-f9b77672a893388f3fbc8168c574b6b2.pdf

Bordo, M. and H. James (2014) The European Crisis in the Context of the History of Previous Financial Crises. *Journal of Macroeconomics*, 39, 275—284.

Bortis, H. (2011) Notes on Sraffa and Keynes. In: R. Ciccone, C. Gehrke, and G. Mongiovi (eds.) *Sraffa and Modern Economics*, Vol. II. New York, Routledge, Ch. 9, 97-111.

Cesaratto, S. (2013) The implications of TARGET2 in the European balance of payment crisis and beyond. *European Journal of Economics and Economic Policies: Intervention*, 10, 359—382.

Cesaratto, S. (2015a) Balance of Payments or Monetary Sovereignty? In Search of the EMU's Original Sin. Comments on Marc Lavoie's "The Eurozone: Similarities to and Differences from Keynes's Plan". *International Journal of Political Economy,* 44, 142—156.

Cesaratto, S. (2015b). Alternative Interpretations of a Stateless Currency Crisis. Asymmetries Working Papers Series 15/08.

Dejuán, Ó. (2005) Paths of Accumulation and Growth: Towards a Keynesian Long-period Theory of Output. *Review of Political Economy*, 17, 231-252.

Dejuán, Ó. and E. Febrero (2010) Échec d'un modèle de croissance tirée par l'endettement des ménages. *Économie Appliquée,* LXIII, 63—78.

Dietzenbacher, E., B. Los, R. Stehrer, M. Timmer and G. de Vries (2013) The construction of World Input—Output Tables in the WIOD Project. *Economic Systems Research*, 25, 71—98.

EuroMemo Group (2016). Euromemorandum 2016. Addressing Europe's Multiple Crises: An agenda for economic transformation, solidarity and democracy. Available at http://www.euromemo.eu/euromemorandum/euromemorandum_2016/index.html.

European Commission (2015) Macroeconomic imbalances. Country Report – Spain 2015. *European Economy*, Occasional Papers 216.

European Commission (2015) Country Report Spain 2015. Including an In-Depth Review on the prevention and correction of macroeconomic imbalances. Commission staff working document, SWD(2015) 28 final.

Garbellini, N., E. Marelli, and A.L. Wirkierman (2014) Domestic Demand and Global Production in the Eurozone: A Multi-regional Input–Output Assessment of the Global Crisis. *International Review of Applied Economics,* 28, 336–364.

Garcimartín, C., L. A. Rivas and P. G. Martínez (2010) On the role of relative prices and capital flows in balance of payments constrained growth: the experience of Portugal and Spain in the euro area. *Journal of Post Keynesian Economics,* 33, 281—306.

Giovannetti, G. and D. Siniscalco (1986) Structural change, foreign trade and income multipliers in the Italian economy. *Quarterly review. Banca Nazionale del Lavoro*, 158, 319-335.

Godley, W. (1992) Maastricht and All That. *London Review of Books,* 14(19), 3—4.

Godley, W. and M. Lavoie (2007) A simple model of three economies with two currencies: the eurozone and the USA. *Cambridge Journal of Economics*, 31, 1—23.

Godley, W. and B. Rowthorn (1994) Appendinx: the Dynamics of Public Sector Deficits and Debt. In J. Michie and J. G. Smith (eds.) *Unemployment in Europe*. London, Academic Press.

Goodwin, R.M. 1949. The multiplier as matrix. *Economic Journal* 59, 537–55.

Goodwin, R. M. (1980) World Trade Multipliers . *Journal of Post Keynesian Economics*, 2, 319-344.

Gros, D. 2013. Foreign debt versus domestic debt in the euro area, *Oxford Review of Economic Policy,* vol. 2, no. 3, 502-517.

Harrod, R. (1933) *International Economics.* Cambridge, Cambridge University Press.

Johnson, R.C. (2014) Five Facts about Value-Added Exports and Implications for Macroeconomics and Trade Research. *Journal of Economic Perspectives*, 28, 119-142.

Jones, L., Z. Wang, L. Xin, C. Degain (2014) The Similarities and Differences among Three Major Inter-Country Input-Output Databases and their Implications for Trade in Value-Added Estimates. Office of Economics Working Paper, U.S. International Trade Commission, No. 2014-12B.

Kaldor, N. (1970) The Case for Regional Policies. *Scottish Journal of Political Economy*, 17, 337-348.

Kaldor, N. 1971. The Dynamic Effects of the Common Market, *New Statesman,* 12 March (reprinted in Kaldor, N., *Further Essays on Applied Economics,* vol. 6, London, Duckworth, 1978, 187-220).

Keynes, J.M. (1936) *The General Theory of Employment, Interest and Money*, London, The Macmillan Press. In: The Collected Writings of John Maynard Keynes, vol. VII, London, The Macmillan Press, 1973.

Koopman, R., Z. Wang and S.J. Wei (2014) Tracing Value-Added and Double Counting in Gross Exports. American Economic Review, 104, 459-494.

Krugman, P. (1979) A Model of Balance-of-Payments Crises. *Journal of Money, Credit and Banking*, 11, 311—325.

Lavoie, M. (2014) *Post-Keynesian Economics, New Foundations*. Cheltenham: Edward Elgar.

Lavoie, M. (2015) The Eurozone: Similarities to and Differences from Keynes's Plan. *International Journal of Political Economy*, 44, 3—17.

Legido-Quigley H., O. Laura, D. la Parra, C. Alvarez-Dardet, J. M. Martin-Moreno M. McKee et al. (2013) Will austerity cuts dismantle the Spanish healthcare system? *The British Medical Journal*, 346, f2363.

Leon-Ledesma, M. (1999) An application of Thirlwall' Law to the Spanish economy. *Journal of Post Keynesian Economics,* 21, 431—439.

Loublier, A. (2015) Recent developments in cross-border capital flows in the euro area. *Quarterly Report on the Euro Area*, 14, 7—18.

Lopez Bernal, J.A., A. Gasparrini, C. M. Artundo, M. McKee (2013) The effect of the late 2000s financial crisis on suicides in Spain: an interrupted time-series analysis. *The European Journal of Public Health*, 23, 732-736.

McCombie, J. S. L. (1985) Economic Growth, the Harrod Foreign Trade Multiplier and the Hicks Super-Multiplier. *Applied Economics,* 17, 55–72.

McCombie, J. S. L. (1993) Economic Growth, Trade Interlinkages and the Balance of Payments Constraint. *Journal of Post Keynesian Economics,* 15, 471–505.

McCombie, J. S. L. and A. P. Thirlwall (2004) *Essays on Balance of Payments Constrained Growth.* London, Routledge.

Metzler, L.A. (1950) A multiple region theory of income and trade. *Econometrica,* 18, 329–54.

OECD (2013) Crisis Squeezes Income and Puts Pressure on Inequality and Poverty – New results from the OECD Income Distribution Database. Available at: www.oecd.org/social/inequality.htm.

Pérez Caldentey, E. and M. Vernengo (2015). Integration, Spurious Convergence, and Financial Fragility: A Post-Keynesian Interpretation of the Spanish Crisis. Levy Economics Institute, Working Paper 847,

Portella-Carbo, F. (2015) Effects of international trade on domestic employment: an application of a global multiregional input–output supermultiplier model (1995–2011). *Economic Systems Research*, 28, 95-117.

Portella-Carbo, F. (2015) Mass Unemployment in Spain (1959-2014): Productive and Commercial Problems of a Peripheral Economy in Global Capitalism. Unpublished Doctoral Thesis. Available at: http://dugi-doc.udg.edu/handle/10256/12237

Pyatt, G. and J.I. Round (1979) Accounting and Fixed Price Multipliers in a Social Accounting Matrix Framework. *Economic Journal,* 89, 850–873.

Schröder, E. (2015). Eurozone Imbalances: Measuring the Contribution of Expenditure Switching and Expenditure Volumes 1990-2013. The New School for Social Research, Department of Economics, Working Paper 08/2015.

Serrano, F. (1995) Long Period Effective Demand and the Sraffian Supermultiplier. *Contributions to Political Economy*, 14, 67-90.

Simonazzi, A., A. Ginzburg and G. Nocella (2013) Economic relations between Germany and southern Europe. *Cambridge Journal of Economics*, 37, 653—675.

Storm, S. and C.W.M. Naastepad (2016) Myths, Mix-ups, and Mishandlings. Understanding the Eurozone Crisis. *International Journal of Political Economy,* 45: 46–71

Spanish Statistical Office (2015a) Living Conditions Survey 2014, available at: http://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176807&menu=ultiDatos&idp=1254735976608.

Spanish Statistical Office (2015b) Vital Statistics, available at: http://www.ine.es/jaxi/menu.do?type=pcaxis&path=/t20/e304/&file=inebase.

Steedman, I. (2000) Income distribution, foreign trade and the value-added vector. *Economic Systems Research, 12, 221-230.*

Storm, S. and C.W.M. Naastepad (2015) Europe's Hunger Games: Income Distribution, Cost Competitiveness and Crisis. *Cambridge Journal of Economics,* 39, 959—986.

Timmer, M. P., E. Dietzenbacher, B. Los, R. Stehrer and G. J. de Vries (2015) An Illustrated User Guide to the World Input–Output Database: the Case of Global Automotive Production. *Review of International Economics*, 23, 575—605.

Timmer, M.P., A.A. Erumban, B. Los, R. Stehrer and G.J. de Vries (2014) Slicing Up Global Value Chains. *Journal of Economic Perspectives*, 28, 99—118.

Timmer, M.P., B. Los, R. Stehrer and G.J. de Vries (2013) Fragmentation, incomes and jobs: an analysis of European competitiveness. *Economic Policy*, 28, 613—661.

Tukker, A. and E. Dietzenbacher (2013) Global Multiregional Input-Output Frameworks: An Introduction and Outlook. *Economic Systems Research*, 25, 1—19.

UNCTAD (2013) Global Value Chains and Development. Investment and Value Added Trade in the global Economy. UNCTAD/DIAE/2013/1.

World Trade Organisation (2013) International Trade Statistics 2013. Available at https://www.wto.org/english/res_e/statis_e/its2013_e/its2013_e.pdf