

# Demand and Distribution in Integrated Economies

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## **Abstract**

Open economy issues using income-expenditure models are usually discussed from a small open economy viewpoint. Closing the system by considering the two country case has important implications for the effects of trade openness, devaluation, and domestic redistribution and, therefore, important implications for the effects of economic policy designed for combating the ongoing economic crisis.

*Keywords:* Open Economy, Adding-Up Constraints, International Macroeconomics, Devaluation, Growth, Distribution

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# 1 Introduction

Five years ago the onset of the Great Recession ground growth in the world economy to a halt. In its course light has been shone on the structural deficiencies of the current economic order. Yet, analytical tools have only been used sparsely to understand them. In this paper, I combine two small open economy models in which demand is deficient—and therefore the limiting constraint—to form a closed system. This set-up allows the study of how different sources of demand in the form of consumption, investment, and government expenditure, affect not only the domestic economy directly, but also indirectly through important, positive feed-back effects. A sound understanding of these interlinkages is important for a consistent analysis of economic policies designed for combating the current, ongoing European debt crisis and international economic policies more generally.

Theoretical treatment of open-economy issues in Kalecki-Keynes models almost exclusively focuses the small open economy case. Movements in prices and quantities in the economy are assumed to have no effect on the rest of the world (Blecker, 1989, 1999, 2002; Taylor, 2004a, 2004b; Krugman and Taylor, 1978). The concerns of this body of work are the relations between openness to trade and the degree of competition, between growth and changes in the exchange rate (such as contractionary devaluation), and between growth and distribution. Blecker (2010) provides the most recent, comprehensive summary on the topic. Taking into account the repercussions of a closed two-country system, in which the sources and uses of all funds are accounted for, alters some of the findings of partial equilibrium analysis. Such a general equilibrium analysis has been undertaken before (Godley, 1999a; Godley and Lavoie, 2007; von Arnim, 2009, 2010), but these studies derived their results using numerical simulation methods. Making assumptions about parameter values can lead to a loss of generality which is shown to be the case in certain instances.

Considering positive feed-back effects of increased domestic import demand ameliorates some of the bleak results about international trade and the effectiveness of domestic stimulus policies. Integrating an economy to regional or world trade can lead to the increase of income in all countries, but also to the opposite. The overall outcome depends on the structural characteristics of the domestic and foreign economies, giving international coordination of economic policy as explored in Hein (2011) great importance. The results of this paper also extend to the large literature on uneven

development (Dutt, 1989, 1990, 1996; Kaldor, 1970; Taylor, 1981, 1983).

The key to understanding most results presented below is the fact that linking the two economies through trade extends distributional conflict. With profit shares fixed, workers of both economies compete over available output. The real exchange rate determines which way the playing field lists. After determining price levels and the real exchange rate, the effects of trade on output are explored. While conventional wisdom expects the output response to higher propensities to import to be negative, the positive feed-backs from increased foreign income might even increase home's output. Such win-win situations can also result from a devaluation of the real exchange rate. Finally, the output effects of internal redistribution are derived. Most empirical studies found that openness to trade shifts demand regimes in the profit-led direction. This finding is, however, only valid under certain circumstances. In others, increasing the wage share in one country can increase output and income of all classes in both countries; thereby, the large body of literature on demand regimes in closed economies is seamlessly extended to the open-economy context.

While focusing on the short term dynamics and ignoring the balance of payment constraint, the results on the international effects of domestic redistribution and on the benefits of international demand coordination contribute to the existing explanations of regional growth divergences. The model used here is very similar to the one of McCombie (1993) in that tradition, but relaxes the assumption constant terms of trade. Dutt (2002) also uses a two-country setting and endogenizes the real exchange rate, but assumes the Marshall-Lerner condition to hold. As is shown below, this condition can fail for at least one country if the overall system is closed.

## 2 Model

The general equilibrium analysis is based on two economies each of which is characterized by the standard short-run Kalecki-Keynes model. The variant below is similar to the one of Taylor (2004, ch.7) and Godley and Lavoie (2007, ch.6), since all imports enter the economy through the business sector. Business combines import and labor inputs to produce the final good.

The equations below set out the model. Foreign variables are denoted by a bar over them. Equations (1) through (7) characterize the home economy with each primed counterpart stating the foreign analogue. Both economies

are identical in their functional (linear) forms. Equation (1) states that the price of the final good is set by a mark-up on variable cost components. Import demand is a linear function in the exchange rate,  $e$ , and the price of the foreign good in foreign currency,  $\bar{P}$ . This linear function implies that home's import elasticity equals 1. Note that including the cost of imports in total cost of output in (9) implies that the value of output  $PX$  is greater than GDP. The analysis is carried out in real terms, scaled to capital stock. Output scaled to capital stock,  $u$  (2), is determined by domestic and foreign sources of demand. In (7) macroeconomic equilibrium requires that aggregate injections equal aggregate leakage. In the closed economy, this occurs if saving, (3), equals investment, (4). With trade, the difference between exports  $\epsilon$ , (6), and imports  $\eta$ , (5), provides an additional source of demand injections. For simplicity, capital and labor are assumed to be immobile across countries; investment is only influenced by domestic variables, such as profitability and economic activity. International competition and competitiveness only enter through their indirect effects on income. Aggregate saving, (3), is determined by the behavior of capitalists and workers, where the latter's share in income is  $1 - \pi - a\rho$  (using (1) to derive (11)).

The novel aspect of this model is to consider algebraically the effects of closing the accounts by adding structure to the rest of the world. This structure allows to extend the usual partial equilibrium analysis to a general one. In the context of this model, the adding-up constraints dictate that the volume of home's imports has to equal foreign exports and vice versa. Each country's export demand is determined by the other's import demand. Since the analysis is in real terms scaled to capital stock, foreign variables have to be rescaled by  $\kappa = \bar{K}/K$  and the real exchange rate,  $\rho = eP/\bar{P}$ . In (6) and (6') this implies  $\epsilon = \rho \kappa \bar{\eta}$  and  $\bar{\epsilon} = \eta/(\rho \kappa)$ . Equations (8) through (11) are definitions or identities: (8) defines the real exchange rate, (9) decomposes income by recipient group, (10) establishes the relationship between the profit share and the mark-up, and (11) restates (9) in terms of distributional conflict within and between countries.

Clearly, there are many important aspects of international economics that are left out of this model. It focuses on the short run and the real side of the world economy. Domestic and international financial aspects such as interest rates and asset stocks and flows are left out. Such extensions would most importantly determine the nominal exchange rate which is assumed given in this set-up.

$$P = \frac{1}{1-\pi}(wb + e\bar{P}a) \quad (1) \quad \bar{P} = \frac{1}{1-\bar{\pi}}(\bar{w}\bar{b} + \frac{1}{e}P\bar{a}) \quad (1')$$

$$u = PX/PK \quad (2) \quad \bar{u} = \bar{P}\bar{X}/\bar{P}\bar{K} \quad (2')$$

$$g^s = [s_\pi\pi + s_w(1-\pi-a\rho)]u \quad (3) \quad \bar{g}^s = [\bar{s}_\pi\bar{\pi} + \bar{s}_w(1-\bar{\pi}-\frac{\bar{a}}{\rho})\bar{u}] \quad (3')$$

$$g^i = g^i[\pi, u] \quad (4) \quad \bar{g}^i = \bar{g}^i[\bar{\pi}, \bar{u}] \quad (4')$$

$$\eta = M/PK = a\rho u \quad (5) \quad \bar{\eta} = \bar{M}/\bar{P}\bar{K} = \frac{\bar{a}}{\rho}\bar{u} \quad (5')$$

$$\epsilon = E/PK = \rho\kappa\bar{\eta} = \bar{a}\kappa\bar{u} \quad (6) \quad \bar{\epsilon} = \bar{E}/\bar{P}\bar{K} = \frac{\bar{\eta}}{\rho\kappa} = \frac{a}{\kappa}u \quad (6')$$

$$\dot{u} = (\epsilon - \eta) + (g^i - g^s) \quad (7) \quad \dot{\bar{u}} = (\bar{\epsilon} - \bar{\eta}) + (\bar{g}^i - \bar{g}^s) \quad (7')$$

$$\rho = \frac{e\bar{P}}{P} \quad (8)$$

$$PX = wbX + \pi PX + e\bar{P}aX \quad (9)$$

$$\pi = \frac{rPK}{PX} = \frac{\tau}{1+\tau} \text{ with } P = (1+\tau)(wb + e\bar{P}a) \quad (10)$$

$$1 = \psi + \pi + a\rho = \bar{\psi} + \bar{\pi} + \frac{\bar{a}}{\rho} \quad (11)$$

In the open economy, the real exchange rate,  $\rho$ , adjusts to scale the home economy to the rest of the world. As pointed out by Taylor (2004, p.254), allowing for foreign trade introduces foreign as a new claimant in the distributional conflict over income in (11). In the current framework, the profit share,  $\pi$ , is fixed; the wage shares,  $\psi$  and  $\bar{\psi}$ , have to accommodate any movement in the real exchange rate. Rearranging (11) gives

$$\frac{(1-\pi-\psi)}{a} = \rho = \frac{\bar{a}}{(1-\bar{\pi}-\bar{\psi})} \quad (12)$$

For given levels of output and profit shares, the workers of one country can only expand their income share at the cost of the workers of the other country. Similar arguments are well-known from discussions of wage-profit frontiers in closed economies and were put forward by Marxist economists in their discussion of imperialism.<sup>1</sup>

<sup>1</sup>See Blecker (1989, p.407) for a reference to the primary and Blecker (1999) for a

### 3 International Competition and the Mark-Up

Given the importance of the real exchange rate—the terms of trade—in the analysis of open economy issues, it makes sense to derive closed-form solutions for domestic and foreign price levels before investigating the effects of redistribution and a devaluation on output.

Solving the linear system of equations gives

$$P = \frac{1}{1 - \pi}(wb + e\bar{a}\bar{P}) = \frac{1}{\left(1 - \frac{a\bar{a}}{(1-\pi)(1-\bar{\pi})}\right)} \frac{1}{(1 - \pi)}(wb + e\bar{a}\frac{\bar{w}\bar{b}}{1 - \bar{\pi}}). \quad (13)$$

Prices depend on variable cost, which—when considering the whole world as a closed system—only depend labor inputs.<sup>2</sup> For home’s business, variable cost breaks down into home’s labor input and the marked-up foreign labor input. The general equilibrium feed-back also introduces an additional multiplier term  $\left(1 - \frac{a\bar{a}}{(1-\pi)(1-\bar{\pi})}\right)^{-1}$  which increases the price level. As in the closed economy, prices are anchored by historically determined nominal wages.

Blecker (1989, 2002) criticizes the rigidity of the usual mark-up rule for its inability to capture the effects of international competition on home’s pricing decision and in turn adopts an international closure instead with foreign determinants driving the profit share and mark-up. The formulation chosen here overcomes this criticism. Home’s business responds to changes in foreign parameters. An increase in foreign’s profit share and/or wage increases prices abroad and to a lesser extent at home, so that the real exchange rate depreciates (rises) and home’s competitiveness increases. Conversely, an increase in the domestic profit share decreases  $\rho$ ,  $d\rho/d\pi < 0$ .

Differentiating definition (11) and using the closed form solution of  $\rho$  implied by (13), we find that  $d\psi/d\pi = -1 - a d\rho/d\pi < -1$ . At the same time  $d\bar{\psi}/d\pi = \bar{a}/\rho^2 d\rho/d\pi < 0$ . Opening up the economy to trade alleviates internal distributional conflict and exports part of it to the economy’s trade partners. These shifts in distribution are underlying many of the effects of devaluation and distribution derived below.

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reference to the secondary literature.

<sup>2</sup>Given the linearity of the price system, this pricing rule easily extends to a multi-country setting.

## 4 Output Determination

So far claimants to income divided a given pie among them. We can now turn to the case in which income is determined endogenously. Aggregate income is determined by total injections minus leakages; (7) shows that there are two sources of demand, home and foreign. Equations (7) and (7') form a system of differential equations which can be analyzed using standard dynamical methods. Before applying these, it makes sense to investigate how equilibrium comes about.

Let  $Q$  stand for domestic demand components and  $-D$  for the trade surplus which captures foreign demand. Macro balance in (7) requires  $Q - D = \{g^i - [s_\pi\pi + s_w(1 - \pi - a\rho)]u\} - \{a\rho u - \bar{a}\kappa\bar{u}\} = 0$ . For macro equilibrium, domestic and foreign sources have to offset each other; foreign demand leakages manifested in a trade deficit have to be compensated by excess domestic demand injections. In terms of sectoral financing needs (Barbosa-Filho et al, 2008), domestic net borrowing has to equal the trade deficit  $D[u, \bar{u}] = -a\rho u + \bar{a}\kappa\bar{u} = Q[u]$ . Given structural parameters, the closedness of the system ( $D = -\rho\kappa\bar{D}$ ) introduces a second equilibrium condition: home and foreign income levels adjust to balance overall world demand or  $Q[u] + \rho\kappa\bar{Q}[\bar{u}] = 0$ . This is a restatement of the condition that net borrowing of the whole system has to equal zero. Figure 1 illustrates how equilibrium is obtained using these two conditions. The first quadrant (in the north-east) represents domestic net borrowing given an output level. In the second quadrant the foreign output level which yields the amount of foreign net lending necessary to accommodate home's demand is determined. The fourth quadrant (in the south-east) derives the export level necessary for any level of  $u$  to be an equilibrium. In the third quadrant this is then mapped into the foreign utilization rate necessary to generate this foreign demand for home's export. In equilibrium home's income levels pins down two congruent levels of foreign income.

[Figure 1 about here]

Comparative statics are more easily carried out using closed-form solutions. To derive them applying standard methods of dynamical system analysis, we have to make the first-order approximating assumption that the investment function is multiplicative in  $u$ ;  $g^i[\pi, u] = g[\pi] + g_u u$ .

Using (7), the small open economy's output would be determined by the level of exogenous injections (home investment and exports) and the

multiplier.

$$u = \frac{1}{(-\mu)}(g[\pi] + \bar{a} \kappa \bar{u}) \quad (14)$$

The stability of the system is warranted by the Keynesian stability conditions  $\mu = g_u - [s_\pi \pi + s_w(1 - \pi - a\rho)] - a\rho < 0$  and  $\bar{\mu} = \bar{g}_u - [\bar{s}_\pi \bar{\pi} + \bar{s}_w(1 - \bar{\pi} - \bar{a}/\rho)] - \bar{a}/\rho < 0$ .

Taking into account that exports are not exogenously given, but influenced by the structure of the home economy, this condition changes. In the aggregate, the only sources of exogenous injections are domestic and foreign investment. The multiplier increases, since it now captures the feed-back loop of exogenous spending through both economies.

$$u^* = \frac{1}{(-\mu) - \frac{a\bar{a}}{(-\bar{\mu})}}(g[\pi] + \frac{\bar{a} \kappa}{(-\bar{\mu})}\bar{g}[\bar{\pi}]) \quad (15)$$

The home economy benefits from a reduction in foreign's propensities to save directly through higher demand for domestic exports and indirectly through an increase in the multiplier. The second effect is neglected in standard analysis.<sup>3</sup>

The phase diagram is another way to graphically represent equilibrium. It is drawn in figure 2 with constant levels of the domestic trade deficit as deficit contours (McCombie 1993; Blecker, 1999). Balanced trade rest on the contour running through the origin, the domestic trade deficit increases the higher  $u$  and the lower  $\bar{u}$  (the further in the South-East).

[Figure 2 about here]

Representing the equilibrium using the isoclines (7) and (7'), we can investigate the effects of trade on capacity utilization. Focusing on the domestic economy and the  $\dot{u}$ -isocline (14), an increase in the import propensity,  $a$ , increases the multiplier (the line's slope). The x-intercept (the point where the isocline intersects with the x-axis and  $\bar{u} = 0$ ) shifts inward. For any given level of  $\bar{u}$ , increasing the import propensity consistently decreases capacity utilization since it leads to higher leakages. The  $\dot{\bar{u}}$ -isocline also shifts upward. This second effect captures the fact that increased foreign income also grants the domestic economy access to a higher foreign demand for domestic exports. Considering only the first effect necessarily leads to a decrease

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<sup>3</sup>The change in the multiplier also makes the stability condition more restrictive. For positive output it is now necessary that  $\mu < \frac{a\bar{a}}{\bar{\mu}} < 0$ .



in output, with strong feed-back loops due to a low foreign propensities to save and a higher foreign import share, however, domestic output can even increase in the wake of a rising import coefficient. Figure 3 illustrates both possibilities. Partial equilibrium analysis and, to the best of my knowledge, all numerical general equilibrium analysis have not considered this case (e.g. Lavoie and Godley only found the (conventional) contractionary effect in their numerical simulations; Godley and Lavoie, 2007, p.182).

[Figure 3 about here]

This graphical representation also allows the determination of output in the absence of trade. Plotting the isoclines with each economy's own import demand equal to zero, autarky output is the point where exports are also zero. Graphically this is equivalent to the intersection of the isocline with the respective axis (such that the trading partner's income is zero). As demonstrated above, opening to trade can lead to an increase or a decrease in income for either country (as demonstrated in figure 2). Again, there are two ways in which an economy can benefit from trade: directly through injection of additional investment demand and indirectly through lowering leakage.<sup>4</sup> If the two effects are distributed among the countries, there are gains from trade for both economies. In such a scenario, autonomous investment would be low in one, but saving propensities high in the other economy. Opening up to trade would grant the former access to higher injections through higher investment demand and the latter access to lower saving-induced leakage. The prospects are not necessarily as bad as described by the Marxian literature mentioned above. The opening up of the Asian economies in recent economic history provide examples of economies with relatively high saving propensities and high investment demand. However, such a scenario does not have to hold and engaging in world trade can as well harm either or both economies.

## 5 Effects of Devaluation

The effects of devaluation on capacity utilization have long been discussed by international and development economists. In this model the effects of a

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<sup>4</sup>An appendix presenting the details is available from the author upon request.

(real) devaluation (an increase in  $\rho$ ) is as ambiguous as the effects of increases in trade.<sup>5</sup> While the effects of devaluation are mostly framed in terms of the current account, I focus on its effects on output. A devaluation might decrease or increase either economy's output. The conditions under which either economies output increase can be derived algebraically by differentiating equations (15) and its analogue with respect to  $\rho$ . After some substituting, one obtains the following expressions:

$$\begin{aligned} \frac{du}{d\rho} &= \frac{1}{-\mu} \left[ \underbrace{\bar{a}\kappa \frac{\partial \bar{u}}{\partial \rho}}_{d(-D)/d\rho} - au + \underbrace{as_w u}_{dQ/d\rho} \right] \\ &= \frac{1}{(-\mu) - \frac{a\bar{a}}{(-\bar{\mu})}} \left[ -a(1 - s_w)u + \frac{\bar{a}\kappa}{(-\bar{\mu})} \frac{\bar{a}}{\rho^2} (1 - \bar{s}_w)\bar{u} \right] \end{aligned} \quad (16)$$

The first line decomposes the effect of a devaluation into the domestic and foreign demand components. The equilibrium effect of  $\rho$  on the current account consists of the change in exports which depends on the effect of the devaluation on foreign output and of the decrease in imports.<sup>6</sup> The effect of a devaluation also affects internal demand. It tilts distribution in favor of foreign. With the profit share fixed, the wage share decreases and this reduces leakage in the form of worker's saving. The overall effect can take either sign.

In the macroeconomic analysis of devaluation, one usually invokes the "Marshall-Lerner" (ML) conditions. These ensure that a devaluation leads to an improvement in the current account:  $dD/d\rho < 0$ . In the present model, ML also ensure that any devaluation is expansionary for the home economy. The ML assumption, however, in addition implies that the devaluation (ie foreign appreciation) expands foreign output such that  $\partial \bar{u}/\partial \rho > 0$ . Equation (17) states the effect of a depreciation of home's currency on foreign output.

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<sup>5</sup>Typically, one considers the effect of a nominal devaluation ( $de$ ). Since here the nominal exchange rate only enters through the real exchange rate and  $de/d\rho > 0$ , the analysis is carried out in real terms. Unless stated otherwise, devaluation means real devaluation.

<sup>6</sup>By linearity we assumed an import elasticity of 1, giving  $au$ .

$$\begin{aligned}
\frac{d\bar{u}}{d\rho} &= \frac{1}{-\bar{\mu}} \left[ \underbrace{\frac{a}{\kappa} \frac{\partial u}{\partial \rho} + \frac{\bar{a}}{\rho^2} \bar{u}}_{d(-\bar{D})/d\rho} - \underbrace{\frac{\bar{a}}{\rho^2} s_w \bar{u}}_{d\bar{Z}/d\rho} \right] \\
&= \frac{1}{(-\bar{\mu}) - \frac{a\bar{a}}{(-\bar{\mu})}} \left[ \frac{\bar{a}}{\rho^2} (1 - \bar{s}_w) \bar{u} - \frac{a}{(-\bar{\mu})\kappa} a(1 - s_w)u \right]
\end{aligned} \tag{17}$$

The foreign ML conditions imply  $d(-\bar{D})/d\rho < 0$ . The imposition of home's ML conditions require  $\partial u/\partial \rho > 0$  which implies  $d(-\bar{D})/d\rho > 0$ . In a closed system, the "Marshall-Lerner" conditions necessarily have to fail for at least one economy. This fact becomes obvious when considering the system as a whole, but is usually not appreciated, especially by policy economists when administering their export-led cure. Blecker and Razmi (2008) provide the empirical evidence on this fallacy of composition.

Another way to decompose the effects of a devaluation is into its effect on domestic and foreign income groups. Devaluation decreases the domestic labor share by  $-a$  and increases the foreign one by  $\bar{a}/\rho^2$ . This shift determines the changes in aggregate demand. The second line of equation (16) captures the implications of such redistribution on overall domestic capacity utilization. A reduction in the domestic wage share decreases demand from workers by  $(1 - s_w)u$ , while an increase in the foreign wage share provides  $(1 - \bar{s}_w)\bar{u}$ . Following equation (15), such foreign demand injections have to be scaled by  $\bar{a}\kappa/(-\bar{\mu})$  before becoming available to home's economy.

Giving up the ML conditions for either economy broadens the range of possible outcomes. Aggregate income generally increases if income is redistributed from frugal groups toward low-savers. Equations (16) and (17) show that devaluation raises each country's output if domestic workers save significantly more than their foreign counterparts. While there might be a conflict between workers over available income, redistribution can increase the income of both. Conventional analysis usually neglects this possibility.

## 6 Effects of Redistribution

The idea that redistribution between income groups can increase the income of all is not new. It is usually presented as a trade-off between wage- and profit-earners in a closed-economy framework. The seminal papers on this

subject are Dutt (1984), Taylor (1985), Bhaduri and Marglin (1990). The empirical investigations based on these contributions (Bowles and Boyer, 1995; Gordon, 1995; Naastepad, 2006; Naastepad and Storm, 2007; Ederer and Stockhammer, 2007; Stockhammer, Önanan and Ederer, 2009; Hein and Vogel, 2008) often had to accommodate the fact that real economies are always linked to the world economy to a certain extent. Most studies find that small open economies (like the Netherlands or Austria) are more likely to be profit-led than large, relatively closed ones (like the US or the Euro area as a whole); as Gordon (1995) puts it: "[...] the estimated coefficients from the net-export equation are instrumental in determining the final sign of the utilization function" (p. 361). Based on these findings, the view emerged that increasing the openness of an economy pushes it necessarily toward a profit-led demand regime. However, given the findings that the mark-up rate changes the real exchange rate and that the output effects of such changes have ambiguous sign, trade openness could very well push demand regimes in any direction.

In a closed economy, redistribution to profits increases output if the investment response is strong and the difference in the saving rates of wage- and profit-earners is small. In equation (18) below these conditions manifest in the first two terms. In an open economy an increase in the mark-up additionally leads to a loss in competitiveness as captured in the third term and the appreciation of the real exchange rate,  $\partial\rho/\partial\pi < 0$ . In the previous section we concluded that such a shift in the exchange rate leads to a redistribution way from domestic toward foreign workers. Depending on how such an appreciation affects output, aggregate demand rises or falls.

$$\begin{aligned} \frac{du}{d\pi} &= \frac{1}{(-\mu) - \frac{a\bar{a}}{(-\bar{\mu})}} \left[ g[\pi]' - (s_\pi - s_w)u + \left[ \frac{\bar{a}\kappa}{(-\bar{\mu})} \frac{\bar{a}}{\rho^2} (1 - \bar{s}_w)\bar{u} - a(1 - s_w)u \right] \frac{\partial\rho}{\partial\pi} \right] \\ &= \frac{1}{(-\mu) - \frac{a\bar{a}}{(-\bar{\mu})}} [g[\pi]' - (s_\pi - s_w)u] + \frac{du}{d\rho} \frac{d\rho}{d\pi} \end{aligned} \quad (18)$$

Trade openness pushes an economy toward profit-led demand if the appreciation has a positive effect on output, ie if  $du/d\rho < 0$ . If a depreciation increases output, the (closed) economy's demand regime becomes more wage-led. Again, keeping track of the repercussions of adding-up constraints reveals unanticipated outcomes.

## 7 Discussion

Most analytical work using income-expenditure models to investigate international economic issues limits itself to the special case of a small open economy. This assumption has been relaxed in recent years by research efforts based on (large-scale) numerical models. This paper fills the gap between the two by analytically investigating the implications of adding-up constraints in a two-country model. Even in such a small set-up, moving to a general equilibrium analysis has surprising results. Considering the output effects of trade, devaluation, and redistributive policies, the bottom line is that "anything goes".

The key to understanding this wide range of possible outcomes is the fact that introducing foreign trade in a model extends distributional conflict. Foreign income groups enter as claimants to income in the form of the trade deficit. With profit shares fixed, the domestic and foreign workers' income adjust to allow for equilibrium. For a given level of output, this idea is correct. The paradox of thrift implies that shifting income from high- to low-saving groups increases output. In the international context presented above, the combination of economies with high investment demand on the one side and low-saving populace on the other, can increase the income of all.

Similar considerations apply to the investigation of devaluation. Devaluation can increase or decrease the output of either economy. One sufficient condition for output to increase in both countries is that the differential between workers' saving rates is (sufficiently) large. The general equilibrium focus unveils that such a scenario is an expansionary devaluation at home, but simultaneously an expansionary appreciation abroad. The Marshall-Lerner conditions ensure that a trade deficit falls in the wake of devaluation. In this model the domestic economy's Marshall-Lerner conditions also imply output expansion in both economies. Clearly this is in violation of the foreign economy's Marshall-Lerner conditions. There are not enough degrees of freedom for such conditions to hold for all economies. This simple observation follows from the closedness of the system as a whole.

Most literature on the internal redistribution between wages and profits in open economies concluded that increasing openness pushes the economy in the profit-led direction. This finding is based on the fact that exports provide a demand source which is independent of workers' consumption. When taking into account the feed-back effects of exports on the home economy,

openness to trade can tilt the economy's demand regime in either direction. As before, the outcome depends on the structural parameters of the domestic and foreign economy.

The analysis of the paper is limited to the short run and the real side of the economy. The investigation of growth rates and their determinants in light of possible instabilities or divergent processes is left for future research. Capital and financial stocks and their changes over time are also not considered. This clearly has the disadvantage that many aspects of the international economy and the current world economic architecture cannot be captured. Most importantly financial flows are absent. An extension to the financial side of the economy would have to include the introduction of interest rates and the determination of the nominal exchange rate which in this model is assumed to be fixed. Balance of payment effects are limited to the current account in this model. Any trade deficit is assumed to be financed by sufficient positions on the capital account. Balance of payment considerations as presented in Minsky (1983) and Taylor (2010) would also be important in the light of the adding-up consistency emphasized in this paper.

The model developed here is applicable to situations in which economies are integrated and the exchange rate is fixed; financial flows are not relevant. This is clearly the case for the Northern and Southern countries in the Euro zone and, to a limited extent, for the current economic relations between China and the US. The analytical results lie bare the effects of economic integration on the effectiveness of demand management in one country on its own level of income and growth and that of its trading partners. It therefore provides a consistent basis for evaluating policies designed for combating the current, ongoing debt crises and international economic policies more generally.

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# A Figures

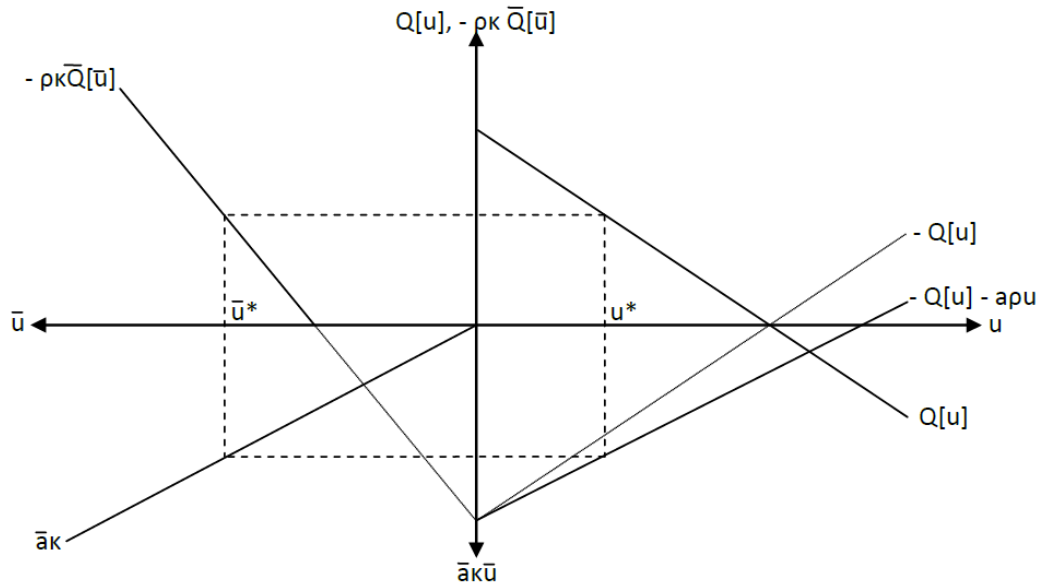


Figure 1: Output determination using injections and leakages of domestic and foreign demand

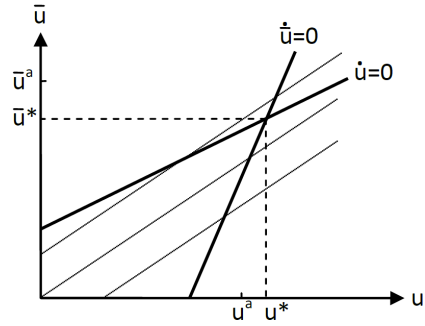


Figure 2: Phase diagram of the  $\dot{u}$ - and  $\ddot{u}$ -isoclines. Dotted lines represent current account contours with balanced trade running through the origin. Autarky output levels are denoted by the superscript  $a$ . Openness to trade can either increase or decrease output.

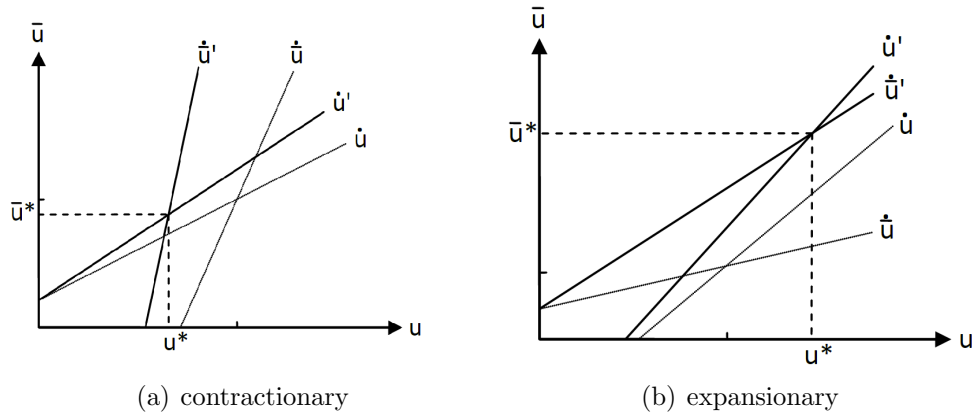


Figure 3: Increasing the import propensity of the domestic economy can have (a) contractionary or (b) effects