

WHY THE CONVENTIONAL TEST OF THIRLWALL'S LAW IS *STILL* NOT A
“NEAR-TAUTOLOGY”: A REJOINDER TO PROFESSOR BLECKER

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Why the Conventional Test of Thirlwall's Law is *Still* not a “Near-Tautology”: a Rejoinder to Professor Blecker

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Blecker (2021) repeats an argument, first put forward by McCombie (1981) and also summarised by Blecker (2016), that the traditional test of Thirlwall's law is merely estimating what Blecker terms a “near-tautology”. This is based on an analysis concerning the arithmetical calculation of the import and export income elasticities of demand, and the circumstances under which these will equal their statistical estimates. The arithmetically calculated income elasticities are the growth of imports divided by the growth of domestic income and the growth of exports divided by the growth of world income, respectively. Blecker's argument is that if the statistical estimates of the two income elasticities of demand equal their respective arithmetically calculated values, and are used in the testing of the law, this represents a “near-tautology”. This rejoinder demonstrates that Blecker's argument concerning the “near-tautology” is a misinterpretation of the nature of the traditional testing of Thirlwall's law. It is shown that Blecker et al.'s (2013) alternative model, which is used to test the balance-of-payments constrained model for Mexico, and is claimed to avoid the “near-tautology” problem, is subject to a serious misspecification of the import demand function. As such, it does not represent an improvement over the traditional model of Thirlwall's law, but, ironically, gives approximately the same empirical result.

Keywords: Thirlwall's law, balance-of-payments constrained growth, “near-tautology”, import and export demand functions.

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1. INTRODUCTION

Thirlwall's law, first formulated in Thirlwall (1979), is the beginning of the testing of what has come to be known as the balance-of-payments constrained growth model and is now over forty years old. It has its basis in Harrod's (1933) foreign trade multiplier, and, more generally, in the Hicks (1950) super-multiplier. The simplest hypothesis that is tested is whether or not the balance-of-payments growth rate, y_B , calculated as $y_B = \frac{\hat{\varepsilon}}{\hat{\pi}} w$, closely approximates to the actual long-run growth rate, namely, y . The parameter $\hat{\varepsilon}$ is the estimated income elasticity of demand for exports and $\hat{\pi}$ is the estimated income elasticity of demand for imports. These estimates are taken from regression analyses of standard export and import demand functions, using a variety of statistical methods that have been developed over the years. The variable w is the growth of the incomes of a country's trading partners, weighted by the country's share of its exports to those markets. It is often proxied by the growth of world income. A variant of Thirlwall's law is the "weak" version, namely, $y_B = \frac{x}{\hat{\pi}}$, which assumes that the growth of exports is determined by $\hat{\varepsilon}w$, where x is the long-run growth of exports (Perraton, 2003). This assumption seems plausible in the light of studies that have estimated the export demand function, but ideally this should be explicitly confirmed in any test of the law. The law has been generally not refuted by a large number of studies that have tested the law. See, for example, the articles cited in Thirlwall (2012, Table 1.2: 39-40).

Immediately after the publication of the Thirlwall's (1979) initial paper, there was an interchange between McCombie (1981) and Thirlwall (1981) about whether or not Thirlwall's law is merely reflecting an identity. McCombie's point was that the income elasticities of demand for exports and imports can be *arithmetically* calculated (not *statistically* estimated) as $\varepsilon^* \equiv \frac{x}{w}$ and $\pi^* \equiv \frac{m}{y}$, where m is the long-run growth of imports and the superscript * denotes an arithmetically calculated parameter.

Consequently, if x is equal to m it follows that $y_B \equiv \frac{\varepsilon^*}{\pi^*} w$, for purely definitional reasons. Nevertheless, while one can arithmetically calculate any income elasticity, or indeed any price elasticity, the export and import demand functions are behavioural equations. These

are estimated using regression analysis and the values of the import and export income elasticities are statistically estimated, and not arithmetically calculated. There was subsequent agreement between McCombie and Thirlwall that there is no theoretical reason why the estimated income elasticities should equal their arithmetically calculated values (McCombie, 2012, 2019).

However, Blecker (2016, 2021) resurrects this old argument and, contrary to McCombie and Thirlwall, finds the original criticism convincing. In the light of this, he interprets the traditional testing of Thirlwall's law as sometimes being a "near-tautology" or, equivalently, a "near-identity". This he defines as occurring when two conditions are satisfied. First, the estimations of the import and export demand functions must find that the growth of relative prices are statistically insignificant and/or are a negligible factor in determining the growth of trade flows. Secondly, the estimates of the income elasticities must be close to their arithmetically calculated values and, presumably, statistically significant. This occurs when the regressions of the demand functions are equivalent to a bivariate regression with an intercept equal to zero (and is not just statistically insignificant). It should be noted that the first condition does not necessarily imply the second and it is also possible for both the income elasticities of demand for imports and exports and the relative price terms to be statistically insignificant. This statistically, *inter alia*, refutes the law (McCombie, 2019). This raises the question as to how the estimation of a model that can be refuted can be described as a "near-tautology". Blecker provides an example of the standard testing of Thirlwall's law which is not refuted for the US over the period 1963-2016 and which he consequently terms a "near-tautology".

Nevertheless, in spite of this supposed "near-tautology" result, with the implication that it invalidates the traditional testing of the law, according to Blecker (2021), all is not lost. He shows that a simple re-specification of the import demand function can ensure that the putative "near-tautology" argument no longer applies to the testing of Thirlwall's law. This alternative specification is due to Ibarra (2011), and is used in Blecker *et al.*, (2013) and Ibarra *et al.*, (2016) and discussed in Blecker (2021). The import demand function now includes the growth of manufacturing exports as a regressor. Blecker uses a disaggregate form of the import demand function, where the regressand is intermediate, rather than total, imports, but, as will be seen, this makes little difference to the argument.

Because the estimates of the intermediate import elasticity of demand and, hence, the total elasticity, no longer equal their arithmetically calculated values, the estimation results are deemed by Blecker not to be due to a “near-tautology”. Consequently, according to this viewpoint, this approach provides one, if not the, correct method of testing the balance-of-payments constrained growth model, unaffected by the putative “near-tautology”. The re-specified model is estimated using data for Mexico. However, it is shown below that this revision of Thirlwall’s law, *per se*, involves theoretically misspecified import (and export) demand functions. Moreover, notwithstanding this, ironically this approach often gives approximately the same statistical result as the traditional specification of Thirlwall’s law.

If the estimated income elasticities are close to their arithmetically calculated values, this will generally not refute Thirlwall’s law, providing that the statistical estimates are statistically significant. But there is no theoretical reason why the data *must* necessarily give this result. It is difficult to see why this is a “near-tautology”, as the model is capable of refutation. This rejoinder outlines this argument in greater detail.

2. BLECKER’S “NEAR-TAUTOLOGY” CRITIQUE OF THE TRADITIONAL TESTING OF THIRLWALL’S LAW

It is useful, for clarity, to begin with a brief recapitulation of the traditional model of Thirlwall’s law (1979), and its testing, before considering what will be termed Blecker’s critique.¹ The discussion abstracts from any discussion of the exact estimation methods used and confines itself to the basic form of the law. Important subsequent developments, such as the multi-sector Thirlwall’s law (Araujo *et al.*, 2007) and the explicit modelling of the supply side, including the endogenous natural rate of growth (León-Ledesma *et al.*, 2002) are not considered here. We are simply concerned with the traditional

¹ As already mentioned, this is similar to McCombie’s (1981) original criticism of the law, to which he no longer subscribes (McCombie 2012). Recent studies that uncritically accept this argument include Clavijo and Ros (2015). As Blecker (2016, 2021), particularly, has given it prominence, it is referred to here as simply Blecker’s critique.

specification and estimation of Thirlwall's law and show that it cannot be considered to be a "near-tautology".

The model (in growth-rate form) is based on the standard import and export demand functions, or the "workhorse" models that have been used since the 1940s (Mann *et al.*, 2007: 249). The import demand function is given by:

$$m_t = c_1 + \pi y_t + \psi(p_{f,t} + e_t - p_{d,t}) \quad (1)$$

where p_f , e and p_d are the growth rate of the price of imports in foreign currency, the rate of change of the exchange rate measured in the domestic price of foreign currency and the rate of change of the price of exports in domestic currency. $\psi (< 0)$ is the price elasticity of demand for imports.

The demand for exports is given by:

$$x_t = c_2 + \varepsilon w_t + \eta(p_{d,t} - e_t - p_{f,t}) \quad (2)$$

where $\eta (< 0)$ is the price elasticity of demand for exports.

The balance-of-payments equilibrium condition, when imports and exports grow at the same rate and the current account is in balance, is given by:

$$p_{d,t} + x_t = p_{f,t} + e_t + m_t \quad (3)$$

Substituting equations (1) and (2) into (3) gives the balance-of-payments constrained growth rate (y_B) in the traditional form, abstracting from the constant terms:

$$y_B = \frac{\varepsilon}{\pi} w + \frac{(1+\eta+\psi)(p_d - p_f - e)}{\pi} \quad (4)$$

If either the price elasticities of demand sum to minus unity (the Marshall-Lerner condition is just met) or relative prices show no significant rate of growth, then equation (4) reduces to Thirlwall's law:

$$y_B = \frac{\varepsilon}{\pi} w \quad (5)$$

As noted above, this may also be expressed as the "weak" version of the law, which assumes $x = \varepsilon w$, as:

$$y_B = \frac{x}{\pi} \quad (6)$$

However, the subsequent discussion between Thirlwall and McCombie came to the conclusion that the law did not reflect an identity (or even a “near-identity”). This is because both the import and export demand functions are behavioural equations and not identities. McCombie (2012: 54) agreed that “As Thirlwall (1981) pointed out in his reply [to McCombie, 1981], the law is not indicative of circular reasoning, but shows that the rate of change of relative prices and the growth of capital flows ‘have been relatively unimportant in allowing growth to deviate from this rule’ ”.

There are, hence, a number of possible outcomes of the estimation of these import and export demand functions, with differing implications for the results of the testing of Thirlwall’s law.

First, if the estimates of the coefficients of *all* the variables in the import and export demand functions are statistically insignificant, this is sufficient to reject Thirlwall’s law. See the simulation results of McCombie (2019) that illustrate this.

Secondly, if the coefficients of the income elasticities are again not statistically significant, but the relative price terms are statistically significant and largely determine the growth of trade flows, Thirlwall’s law is refuted. The neoclassical model (such as the global monetarist approach to the balance-of-payments) is confirmed, or, strictly speaking, not refuted.

Thirdly, if one of the estimated income elasticities is not statistically different from its calculated value, but the other is statistically insignificant, then Thirlwall’s law is again refuted. In the case of the weak version of Thirlwall’s law, used by Ibarra, (2011) and Blecker *et al.*, (2013), this possibility is only applicable to the income elasticity of demand for imports.

Fourthly, if the estimated income elasticities of demand for exports and imports are statistically significant and their ratio takes a value such that y_B equals y , this implies that the growth of relative prices have little effect in ensuring that the balance of payments is in equilibrium. Thirlwall’s law is not refuted.

To these outcomes must be added the cases where the estimated income elasticities are statistically significant, but of values such that Thirlwall’s law is still rejected. All these above possible outcomes theoretically can occur, even if the growth of exports and

imports are roughly equal in the long run. Thus, the finding that $y_B = \frac{\varepsilon}{\pi} w$ is close to the actual growth rate and $\hat{\varepsilon} \approx \varepsilon^*$ and $\hat{\pi} \approx \pi^*$ is an *empirical* result. The law has been extended to incorporate the case where there is a sustainable faster growth of imports than exports (Thirlwall *et al.*, 1982). The conditions under which this difference in growth rates is sustainable has been extensively discussed in the literature. See, for example, Catão *et al.*, (2014).

Blecker (2021), nevertheless, contends that the “near-identity” argument undermines the traditional testing of Thirlwall’s law. He summarises the putative identity critique of Thirlwall’s law, to which he does not raise any objections or qualifications, as follows:

- (i) “One key part of the near-tautology argument is the assertion that, in a long-run data sample, the *econometrically estimated* income elasticities $[\hat{\varepsilon}]$ and $[\hat{\pi}]$ are likely to approximate to the income elasticities from the descriptive data” (p.180, emphasis in the original).

The claim of the critics is:

- (ii) “precisely that the *econometrically estimated* income elasticity will (under certain conditions) turn out to be *approximately the same as* $[\bar{m}/\bar{y}]$; hence, these *empirical tests* are alleged to reflect a *near-identity* or *near-tautology*” (p.178, emphasis in the original).

A bar over a variable in the above quotation denotes its average growth rate. The “certain conditions” are the *empirical* results that, first, the estimated intercept term closely approximates to zero, secondly, the rate of change of relative prices has little effect on the growth of trade flows and, thirdly, the rate of growth of imports and exports are roughly equally. Strictly speaking, the last condition is that the level of the balance-of-payments deficit is sustainable in the long run.

Blecker (2016: 276) makes a similar point.

- (iii) These critics have argued that many empirical tests of the law (either version) are testing a virtual tautology that is likely to be satisfied by almost *any* country’s data, *provided only that exports and imports grow at similar rates in the long run*” (emphasis added).

However, considering quotation (iii) above, the fact that exports and imports grow at similar rates is a necessary, but not sufficient condition for Thirlwall's law not to be refuted. Indeed, it must hold for *any* theory of the balance of payments, including the neoclassical approach. Blecker (2021) has emphasised that the "near-tautology" interpretation *only holds under circumstances when the law is not refuted*. Logically, however, if the law, or indeed any theory, can, in principle, be refuted it cannot be a "near-tautology". The problem with Blecker's analysis is that his use of the term "near-tautology" is a contradiction in terms. A tautology is formally a "statement which is necessarily *always* true" and an identity is "an equation that is valid for *all* possible values of the unknown variables involved" (Chambers 21st Century Dictionary, emphasis added).

Consequently, an identity, or a tautology, in mathematics is an equation which is true, no matter what numerical values are chosen. For example, the estimation of the Keynesian aggregate final demand function by regressing the growth of output on the growth rates of private consumption, investment, government expenditure and net exports must *always* give a near perfect fit to the data, with the estimated coefficients equalling the relevant expenditure shares. The fact that the shares may change over time does not prevent the equation being an identity at any particular point in time. A plausible interpretation of the term "near-tautology" is where an estimation of a regression equation will *always* give estimates that are known *a priori*, but with a varying degree of precision as they are statistical estimates. The estimation of some identities are not readily apparent. For example, it has been established that the estimations of aggregate production functions are merely capturing a mathematical transformation of the national accounts accounting identity. This is the equation that output is equal to the total labour compensation and the total gross operating surplus (Felipe and McCombie, 2013).

Blecker, nevertheless, regards the fact that because some estimations of Thirlwall's law find that the statistically estimated income elasticities are close to their arithmetically calculated means, this implies that the overall test of the law is a "near-tautology", with all the adverse connotations that this implies. In other words, it is somehow not a truly testable theory as the results that do not refute the law are in some way determined by an underlying (near) identity.

As Blecker (2021:183) puts it:

The near-tautology critique is *only* relevant in cases where no other variables besides the income growth rates (domestic and foreign) matter to import and export demand in the long run, either because those other variables have statistically insignificant coefficients or because their growth rates have zero means (emphasis in the original).

To assess the reasoning behind this statement, consider the statistical estimates of the income elasticities of demand for imports and exports. These may be determined from equations (1) and (2) expressed in terms of the means of the variables, denoted by a bar over a variable. The estimates of the income elasticities of demand for imports and exports, are given by:

$$\hat{\pi} = -\frac{\hat{c}_1}{\bar{y}} + \frac{\bar{m}}{\bar{y}} - \hat{\psi} \frac{\bar{r}\bar{p}_M}{\bar{y}} \quad (7)$$

and

$$\hat{\varepsilon} = -\frac{\hat{c}_2}{\bar{w}} + \frac{\bar{x}}{\bar{w}} - \hat{\eta} \frac{\bar{r}\bar{p}_X}{\bar{w}} \quad (8)$$

where $\bar{r}\bar{p}_M$ and $\bar{r}\bar{p}_X$ are the mean growth rates of the relative price terms of imports and exports respectively.

Even if the constant terms are zero, it can be seen that the estimate income elasticities are *not* equal to their calculated values unless the mean growth rates of the relative price terms are approximately equal to zero or the price elasticities are statistically insignificant, or both. If this occurs, and the constant term is insignificant, Blecker, from the above quotation, considers that it is a “near-tautology”.²

In other words, if the statistical estimates of the income elasticities give the results that from equation (7) that $\hat{\pi} = \frac{\bar{m}}{\bar{y}}$ and from equation (8) that $\hat{\varepsilon} = \frac{\bar{x}}{\bar{w}}$, the estimation procedure is described as merely capturing a “near-tautology”.

However, Blecker does not consider the case where the estimated elasticities are statistically insignificant, even though they equal their respective means. Consequently, although Thirlwall’s law is refuted, by Blecker’s reasoning it is still a “near-tautology”. A

² Blecker supports this argument with empirical evidence from the US, which is discussed below.

further problem with this terminology is that Thirlwall's law is not necessarily refuted when the price elasticities are statistically significant, provided that their sum is not statistically different from minus unity. This is to say, the Marshall-Lerner condition is just satisfied. This is true even when their means are not approximately zero. By Blecker's definition above this seems not to be a "near-tautology", but ironically becomes one if the price elasticities are statistically insignificant.

Blecker's concept of a putative "near-tautology" is more general than just applying to the import and export demand functions. Consider *any* multivariate regression. If all the variables, except one, are statistically insignificant, and the intercept is equal to zero, the estimation equation is, implicitly according to Blecker's argument, a "near-tautology". This is because the estimated statistically significant coefficient must be equal to the ratio of the means of the relevant variables.

The fact that many econometric studies are found not to reject Thirlwall's law and the estimated income elasticities approximately equal the ratio of the relevant means has no relevance for Blecker's argument, at least as put forward in the quotation (i) above. This, it will be recalled, is the "assertion" that the statistical estimates of the income elasticities "are likely" to approximate to the calculated income elasticities. The reason why the data often do not refute Thirlwall's law is simply because the assumptions accurately model the balance-of-payments adjustment mechanism for many countries. That is to say, it is the growth of income that adjusts and not the rate of change of relative prices to bring the balance of payments into equilibrium. And these assumptions are often not refuted by the statistical estimation, but they are not *necessarily* true.

Blecker (2021: 178) further comments that Thirlwall's law has "low power". In fact, quite the opposite is true. The test of Thirlwall's law is actually stricter than most other statistical hypothesis testing. In a multiple regression, the emphasis is normally only concerned with whether or not the regressors are statistically significant and the goodness of fit. A successful test of Thirlwall's law is more stringent than this, involving two equations. In both the import and export demand equation, one variable, namely the growth of relative price term must be statistically insignificant or the sum of the price elasticities not significantly different from minus unity. It also requires that the estimates of the import and export elasticities are statistically significant and their ratio, when multiplied by the growth of world income, equals the country's actual growth rate. There

is no theoretical reason why the data *must* necessarily give these results. See, for example, the simulation results in McCombie (2019). Here it is shown that, even though relative prices are statistically insignificant and excluded from the regressions of the import and export functions and the average growth rates of imports and exports are equal over the estimation period, Thirlwall's law can be comprehensively refuted.

To summarise, the problem with the terminology of a “near-tautology” is that it misleadingly gives the impression that the non-refutation of Thirlwall's law is some way due to an underlying relationship that is true by definition. But testing of the traditional specification of law is clearly an “empirical question” as Blecker concedes (Blecker, 2021: 184). Blecker's argument effectively involves a “Catch-22” problem. The implication is that Thirlwall's law is not a “near-tautology” when it is refuted by, say, the price elasticities being large and statistically significant, but when it is not refuted it becomes essentially a “near-tautology”.

We next turn to a consideration of the case of the US, which Blecker argues is an example of a “near-tautology”.

4. BLECKER'S TESTING OF THIRLWALL'S LAW FOR THE UNITED STATES. IS IT A “NEAR-TAUTOLOGY”?

As noted above, Blecker gives the case of the US as an example of when he considers the testing of Thirlwall's law is a “near-tautology”. Blecker provides some new estimates of the export and import demand functions for the US over the period 1963-2016 using the ADRL estimation method. He uses these estimates in the traditional test of Thirlwall's law. Blecker calculates that the balance-of-payments equilibrium growth rate is 2.92 per cent per annum, which is close to the actual growth rate. He further considers that this conforms to, and indeed confirms, the “near-tautology” argument, as he finds that the estimated income elasticities of imports (1.90) and exports (1.76) are very close to the arithmetically calculated ratio of the means, i.e., $\hat{\varepsilon} \approx \varepsilon^* \equiv \bar{x}/\bar{w}$ and $\hat{\pi} \approx \pi^* \equiv \bar{m}/\bar{y}$.

As no significant time-trend was initially found, the equations were re-estimated without a constant term, which, as we shall see, will prove to be of some significance with respect to Blecker's argument. In other words, the intercept was constrained to equal zero. The estimates of the price elasticities were statistically significant and summed to 1.37.

Nevertheless, the rate of change of the relative prices has a mean close to zero in both equations.

The crucial, or interesting, question as Blecker (2021: 188, emphasis in the original) puts it, “is *why* the US data so closely conform to the near-tautology argument?” Or, to put it another way, why do the estimated income elasticities of demand for imports and exports so closely approximate to the ratio of their relevant means? The question is purely one of standard econometrics. His answer, made earlier in his paper, is “that the estimated income elasticities will approximate the calculated ones [...] when all the right-hand-side variables in the export and import demand functions, *other than the income variables*, have either insignificant coefficients or (approximately) zero means (with the variables measured in growth rate form)” Blecker (2021: 184, emphasis added).

Blecker’s argument later moves from the condition where the intercept takes a numerical value different from zero (but is not statistically significantly different from zero) to a specification where the intercept is constrained to pass through the origin. These are the results that he reports in his paper.

The answer to Blecker’s question has nothing to do with a “near-tautology”, in the normal usage of the term tautology. The answer can be explained simply in terms of basic (OLS) regression analysis. This is because the regression that gives rise to his results is simply a bivariate Regression Through the Origin (RTO), or a close approximation to one. For ease of exposition, I shall concentrate on the case of the estimation of the import demand function. The introduction of lags in the regression makes no material difference to the argument. Let us consider the estimated regression equation (7) expressed in terms of the means of the various variables as

$$\bar{m} = \hat{c}_3 + \hat{\pi}\bar{y} + \hat{\psi}\overline{rer} \quad (9)$$

The notation is as above, but where rer is now the rate of change of the real exchange rate.³ Empirically, in Blecker's sample, \overline{rer} has little variation and a mean of approximately zero. It should be noted that this does not imply that the coefficient of the term is statistically insignificant. It is just that the variations in the rate of change of relative prices averaged over time is close to zero. This means that the term \overline{rer} is vanishingly small. Hence, the regression is a close approximation to a bivariate RTO, if the constant term is numerically very close to zero, or is constrained to pass through the origin.

A first proposition is that a standard basic econometric result of a bivariate regression with a constant term is that the regression line will *always* pass through the means of the sample, but will not necessarily equal them. In other words, the estimated elasticity (the slope) will not necessarily equal the ratio of the relevant means of the two variables. A second proposition is that the slope (i.e., the elasticity in this case) of a regression will only equal the ratio of the relevant means if the *numerical* value of the intercept is very close to zero. In other words, this will hold only if $\hat{c}_3 = 0$, as we emphasised above. This is *not* necessarily the same as the case where the intercept is not statistically significantly different from zero. It is where the slope is constrained to pass through the origin, or does so when it is not so constrained. But importantly, there is no theoretical reason why the slope coefficient of a RTO should be statistically significant.⁴

The bivariate RTO estimate of the income elasticity of demand is given by

³ Ever since Houthakker and Magee (1969), there have been discussions as the best variables to use to measure international relative prices and a variety of proxies have been used since then.

⁴ RTO is discussed in most econometric textbooks, albeit very briefly. As one introductory econometric textbook puts it, "one serious drawback with regression through the origin is that if the intercept [...] in the population is different from zero, then the estimators of the slope parameters will be biased. This bias can be severe in some cases" (Woolridge, 2003: 84).

$\hat{\pi} = \frac{\Sigma m_t y_t}{\Sigma y_t^2}$, compared with $\hat{\pi} = \frac{\Sigma(m_t - \bar{m})(y_t - \bar{y})}{\Sigma(y_t - \bar{y})^2}$ when there is an intercept. The slope coefficient of the bivariate RTO is, consequently, theoretically given by $\hat{\pi} = \frac{\bar{m}}{\bar{y}}$.

Blecker's argument is that there are a large number of cases that estimate import and export demand functions where the *estimated* income elasticities will nearly always equal the ratio of calculated mean values. This, as we have seen, in the basis of what Blecker terms the "near-tautology" argument.

If other variables that are included in a regression and are statistically significant and/or do not have a zero mean, then even if the intercept is zero, the estimated coefficients will not equal the ratio of the relevant means. The outcome is more ambiguous in this case and the use of a RTO may not make any significant difference to the estimates of the regressors compared with the case when the intercept is included (Eisenhauer, 2003). (See Blecker 2021: 153-154 for similar conclusions.)

Blecker (2021: 184) poses the question as to whether the view of McCombie and Thirlwall which he states is "that there is no reason to expect econometrically estimated elasticities to approximate the calculated ones, regardless of relative price (RERs) effects are significant or whether relative prices (RERs) are stationary in the long run", is correct rather than the view set out by Blecker above. The former is precisely what McCombie's (2019) simulation results of the testing of Thirlwall's law show, as noted above. There is no reason to expect the close correspondence between the estimated elasticities and the arithmetically calculated ones to occur *unless* a bivariate RTO is the appropriate estimation procedure (or equivalently the unrestricted estimate of the intercept is numerically exactly, or very near, zero). In this sense, there is little disagreement over this econometric point.

Blecker (2021: 184) further states, that "McCombie (2019) is absolutely correct in one respect: this is an empirical question." But if it is an empirical question, and there is no disagreement about this, as Thirlwall's law can be refuted, including the case where the relative price effects are statistically insignificant and exports grow as the same rate as imports, it is difficult to see how it can be in any meaningful sense a "near-tautology".

In fact, Blecker’s regression estimates provide convincing evidence that relative prices play a quantitatively small role in the determination of US trade flows. The implication is that the US is at, or near, its maximum sustainable current account deficit and hence, near or at its balance-of-payments constrained growth rate. Concern about this dates back to Godley *et al.*, (1994), if not before. See, also, for example, Edwards (2005) and Gagnon (2017, a & b), *inter alios*, for a consideration of this issue.

What is surprising is that given these results, Blecker did not estimate the Blecker-Ibarra (2013) re-specification of Thirlwall’s law, which he claims does not suffer from the “near-tautology” problem. In fact, it will be shown below that this model is theoretically problematical and, ironically, comes to much the same conclusion as the standard model.

4. THIRLWALL’S LAW, A MIS-SPECIFICATION ERROR AND THE CASE OF MEXICO.

Given the problems supposedly involved in the traditional test of Thirlwall’s law, Blecker cites the studies of Blecker *et al.*, (2013) and Ibarra *et al.*, (2016) as approaches that do not suffer from this problem. These studies both estimate, using data for Mexico, a different specification of the law. Blecker argues this approach avoids the putative problem of it being a “near-tautology”. Even if the traditional specification of the law is not a “near-tautology”, as shown above, it is still possible that this revised version of Thirlwall’s law is to be preferred to the original. This proves not to be the case.

Blecker *et al.*,(2013) make two changes to the standard balance-of-payments constrained growth model. The first, due to the specific structure of Mexico’s exports, is that the balance-of-payments identity in terms of long-run growth rates is given by:

$$(1 - \mu)(x_{NM} + p_{NM}) + \mu(x_{MF} + p_{MF}) = (m_{TOT} + p_f + e) \quad (10)$$

where it is assumed that exports and imports grow at the same rate and the current account is in balance. p_{NM} is the growth rate of the price of non-manufacturing exports, which is assumed to be distinct from that of manufacturing exports, namely, p_{MF} . The parameter $(1 - \mu)$ is the average share of non-manufactured exports and μ is the average share of manufacturing exports in total exports. The growth of total exports x_{TOT} is, consequently, the weighted average of the growth of non-manufacturing exports, x_{NM} , and the growth of manufacturing exports, x_{MF} . In Ibarra (2011) and Blecker *et al.*, (2013), the

growth of manufacturing exports is also assumed to be exogenous, but in Ibarra *et al.*, (2016), it is also taken to be determined by εw , where w is the growth of the GDP of the US. This is because the US is Mexico's largest export market (taking about 80% of Mexico's total exports).

The total import demand equation is disaggregated into one for intermediate (or induced) imports and one for final demand (or direct) imports. Intermediate imports are those that are used as inputs into the domestically produced goods and services. Final imports are those that are consumed directly in the home country. It is assumed that there are no final imports induced by exports, which is plausible as they would be simply "re-exports".

The second, and more important difference is that, in contradistinction to the traditional Thirlwall's law, the growth of manufacturing exports is included as a regressor in the intermediate import demand function. In discussing Blecker *et al's* (2013) model, for expositional ease, it will be again assumed that relative prices have no effect on the growth of imports and exports.

The two import demand functions in growth-rate form are, consequently, given by the following equations:

$$m_{FD,t} = c_4 + \pi_{FD}y_t \quad (11)$$

and by:

$$m_{INT,t} = c_5 + \tilde{\pi}_{INT}y_t + \alpha x_{MF,t} \quad (12)$$

The subscripts FD and INT denote final demand and intermediate imports respectively. The tilde over π in equation (12) is used to denote the fact that the theoretical interpretation of the intermediate import income elasticity of demand, as well as its estimated value, differs from the traditional specification of the intermediate import demand function. The latter does not include x_{MF} as a separate regressor. It should be noted that x_{MF} is the growth of the constant-price sales of exports. This is to say, exports are valued as comprising *both* their domestic value added *and* the value of intermediate imports used in their production. It can be seen from equation (12) that this gives rise to a high degree of correlation between m_{INT} and x_{MF} for purely definitional reasons.

As the focus of attention is on the aggregate, or total, income elasticity of demand for imports, this may be calculated from the estimates from equations (11) and (12) as $\tilde{\pi}_{TOT} = \tau\tilde{\pi}_{INT} + (1 - \tau)\pi_{FD}$, as do Ibarra *et al.*, (2016: 37, equation (10)). τ is the average share of intermediate imports in total imports and $(1-\tau)$ is the share of final demand imports in total imports.

Alternatively, and without any great loss of generality, equations (11) and (12) may be summed, weighted by $(1 - \tau)$ and τ respectively, to give the total import demand function as:

$$m_{TOT,t} = c_6 + \tilde{\pi}_{TOT}y_t + \tau\alpha x_{MF,t} \quad (13)$$

Equation (13) may be directly estimated to obtain an estimate of $\tilde{\pi}_{TOT}$. Both procedures should give very similar of values for the estimates of $\tilde{\pi}_{TOT}$.

The “weak version” of Thirlwall’s law derived by Blecker *et al.*, (2013) is, consequently, now given by:

$$y_B = \frac{(1-\mu)x_{NM} + \mu x_{MF} - \tau\alpha x_{MF}}{\tau\tilde{\pi}_{INT} + (1-\tau)\pi_{FD}} = \frac{(1-\mu)x_{NM} + (\mu - \tau\alpha)x_{MF}}{\tilde{\pi}_{TOT}} \quad (14)$$

Blecker and Ibarra argue that these specifications avoid the “near-tautology” problem. To see this argument, expressing equation (12) in terms of the means of the regression variables and rearranging gives:

$$\hat{\pi}_{INT} = -\frac{\hat{c}_5}{\bar{y}} + \frac{\bar{m}_{INT}}{\bar{y}} - \frac{\hat{\alpha}x_{MF}}{\bar{y}} \quad (15)$$

This is a simplified version of Blecker’s equation (12) (Blecker, 2021:192), but it serves to make the main point.

It can be simply seen that, from standard regression analysis, the estimate given by $\tilde{\pi}_{INT}$ can only be equal to the ratio of the average growth rates given by $\frac{\bar{m}_{INT}}{\bar{y}}$ if the first and third terms on the right-hand side of equation (15) are equal to zero. In other words, as has been shown, from standard regression theory for this to be a “near-tautology” according Blecker’s interpretation, equations (11), (12) and (13) need to be a bivariate RTO, or a near approximation to one. This proves not to be the case as the coefficient α

turns out to be statistically significant and takes a value of around 0.5 and, hence, the coefficient of \bar{x}_{MF} (i.e., $\hat{\alpha}$) is statistically significant. As \bar{x}_{MF}/\bar{y} is not equal to zero, the last term in equation (15) is not approximately equal to zero. Blecker sets great store by this result, as he implicitly interprets it as demonstrating that this test of Thirlwall's law is not now a "near-tautology".

It also follows that the estimate of the aggregate income elasticity of demand $\tilde{\pi}_{TOT}$ cannot equal its arithmetically calculated value (i.e., \bar{m}_{TOT}/\bar{y}), even if this happens to be the case for the estimate of π_{FD} (i.e., it equals \bar{m}_{FD}/\bar{y}), provided that the constant takes a value near zero. This is simply because the total, or aggregate, elasticity is the weighted average of the values of π_{FD} and $\tilde{\pi}_{INT}$. Alternatively, from equation (13), we have the equivalent result that

$$\hat{\pi}_{TOT} = -\frac{\hat{c}_6}{\bar{y}} + \frac{\bar{m}_{TOT}}{\bar{y}} - \frac{\tau\hat{\alpha}\bar{x}_{MF}}{\bar{y}} \quad (16)$$

So the crucial question is: what is the rationale for the specifications of equations (12) and (13) and is it convincing? Ibarra (2011: 359) justifies the specifications as follows:

The high import-intensity of manufactured exports matters for the interpretation of the BPCG [balance-of-payments constrained growth] model – particularly when the composition of GDP is changing towards these goods. Under export-led growth, exports grow faster than does GDP,⁵ thus increasing their share in output. But given the high import-intensity of exports, so do intermediate imports. Trade liberalization, by encouraging export growth, may accelerate the change in GDP composition. ... Thus, what the regressions detect as an *increase* in the income-elasticity of intermediate imports may reflect the change in the GDP composition towards *manufactured* goods. (Emphasis added.)

It should be noted that manufactured goods are also produced for the home market. If Ibarra's argument is compelling, why is the growth of *total* manufacturing, with its also high induced growth of intermediate imports, as Ibarra suggests, not the appropriate variable rather than just the growth of manufacturing exports? Investment also has a

⁵ This is generally the case, but it is not a condition for either export-led growth and/or growth to be constrained by the balance of payments. Clearly, the growth of exports (and imports) cannot exceed the growth of GDP indefinitely.

higher than average intermediate and final demand import content, so why not include either, or both, these two variables in intermediate and/or final import demand function?

The last two variables could also be included in the aggregate import function, equation (13), as they both determine the growth of final-demand imports, as well as intermediate imports. It is, of course, the sum of both of these categories of imports, not just intermediate imports, that are determinants of the aggregate income elasticity of demand for imports.

In fact, these questions turn out to be not particularly relevant. The whole point of estimating, say, the total income elasticity of demand for imports is that its value should reflect of the total contribution of the weighted income elasticities of the different components of GDP as measured by, e.g., total final expenditure, but in terms of domestic output. To see this, we may define the growth of total final expenditure as follows:

$$y_t \equiv \vartheta_{PC_t} p_{C_t} + \vartheta_{I_t} i_t + \vartheta_{G_t} g_t + \vartheta_{x_{VA,t}} x_{VA,t} \quad (17)$$

where p_c , i , g and x_{VA} are the growth rates of expenditure on personal consumption, investment, government expenditure and exports, all measured in *value-added* terms.⁶ (The subscript VA on x is used to differentiate the variable from the value of exports, x , that includes intermediate imports.) The ϑ 's are the value-added shares of the various components of final expenditure in GDP and vary with time.

It follows that the growth of intermediate imports that is given by:

⁶ In the national income accounts, one definition of GDP, namely, total final expenditure, is $Y \equiv PC' + I' + G' + X - M$. The variables PC' , I' , G' , and X are personal consumption, investment, government expenditure and exports measured *inclusive* of imports. Total imports, M , which, of course, make no direct contribution to GDP is usually deducted as a single (accounting) aggregate, namely M , from Y . Equation (17) deducts the relevant value of imports separately from each category of expenditure. GDP, by this definition, measures the domestic expenditure on consumption, investment and government expenditure in terms of value added plus the foreign expenditure on the country's value-added exports. Empirically, these calculations of value-added need the use of data from an international input-output matrix, which is readily available.

$$m_{INT,t} = c_7 + \pi_{INT} \mathcal{Y}_t \quad (18)$$

may also be expressed as:

$$m_{INT,t} = c_7 + \pi_{INT} [\vartheta_{PC,t} p c_{i,t} + \vartheta_{I,t} i_t + \vartheta_{G,t} g_t + \vartheta_{x_{VA,t}} x_{VA,t}] \quad (19)$$

It can be seen that the effect of the growth of total value-added exports in inducing the growth of imports is already included in the growth of total final expenditure. The fact that it is total value-added exports, rather than manufacturing exports, does not materially affect the argument. The weighted growth of value-added exports in equation (19) can be dichotomised into the growth of manufacturing and non-manufacturing exports, each weighted by their share in value added. The growth of the latter is also likely to determine the growth of intermediate imports, although its effect is likely to be smaller than that of the growth of manufacturing exports. Hence, for expositional ease, the case of the growth of total exports will be considered.

We may more generally express the intermediate income elasticity of demand for imports as in terms of its individual components as:

$$m_{INT,t} = c_8 + \pi_{INT,PC}(p c_t) + \pi_{INT,I}(i_t) + \pi_{INT,G}(g_t) + \pi_{INT,X_{VA}}(x_{VA,t}) \quad (20)$$

where the π_{INT} 's are the intermediate import elasticities of the various components of total final expenditure. Equation (20) allows the individual import elasticities of the each of the components of final expenditure to be estimated separately.

It follows that:

$$\hat{\pi}_{INT} = \sum_j \hat{\pi}_{INT,j} \vartheta_j \quad (21)$$

where $j = PC, I, G$ and X_{VA} and ϑ_j is the average value-added share in total value added over the estimation period under consideration. In other words, the intermediate import elasticity is sum of the income elasticities of the individual components of total final expenditure, each weighted by their average shares in total output. It is also possible to specify a similar equation for the total, or aggregate, import demand function.

From equations (20) and (21), it can be seen that the intermediate income elasticity of demand for imports (and also the total import elasticity) can be higher for one of two reasons, or a combination of both of them. The first is that the aggregate value of π_{INT} will be higher, the larger is the share in GDP of the components of demand with an above average individual intermediate-import elasticity of demand. To put this another way, say, if two countries have identical income elasticities of imports for the various expenditure components, the country with a larger value-added share of an expenditure component associated with a higher income elasticity of demand will have the larger aggregate elasticity of demand for intermediate imports. This is the “composition effect”. Secondly, the aggregate elasticity of demand for imports will be higher if, for example, some of the income elasticities of demand for imports of the individual components of final expenditure are larger (i.e., the various π_{INT} ’s), but, say, the expenditure shares are the same. This is the “import elasticity effect”.

Both effects are important in jointly determining the change in the intermediate income elasticity of demand over time, or differences between countries at a given point in time. Suppose that the growth of exports has a high and increasing intermediate import content and a faster growth rate than that of total income and so, consequently, experiences an increasing share in GDP. The effect of these on the aggregate intermediate import elasticity of demand is automatically captured by the impact of the values of $\pi_{INT, X_{VA}}$ and $x_{VA,t}$ in equation (20). Equivalently, it is given directly by changes in the value of expression $\pi_{INT, X_{VA}} \vartheta_{x_{VA}}$ derived from equation (21). Furthermore, the same analysis is equally applicable to the determination of the total income elasticity of demand, which is the usual elasticity used in the case of Thirlwall’s law.⁷

⁷ Felipe *et al.*, (2021) use the equation $\pi_{TOT,t} = \sum_j \pi_{j,t} \vartheta_{j,t}$ to calculate how China’s aggregate total income elasticity of demand of imports changed annually over the period 1991-2016. The annual values of the various import elasticities are calculated using the World Input-Output Database and are weighted by their annual shares in GDP. This procedure allows the calculated value of the total import income elasticity of demand to change annually. It is found that this closely tracks the annual value of the aggregate import elasticity of demand that is estimated using a time-varying coefficients regression procedure that allows the import elasticity to also vary over time. The total elasticity of the demand for China’s imports is found to have fallen markedly since 2007. China’s

It is not clear why Ibarra (2011) considers changes in the intermediate import elasticity of demand due to the composition effect in, say, equation (21) in some way subjects the estimate of the income elasticity to bias, which consequently needs to be corrected. Ibarra *et al.*, (2016: 510) state that “the appearance of a rise in the income elasticity of demand for final imports in previous studies was largely picking up the increasing share of manufactured exports in GDP and the intensive use of intermediate imports in the production of those exports”.

But this is precisely how an increase in the aggregate import elasticity *should* be determined, as the above analysis shows. The value of the aggregate income elasticity of demand for imports, whether it be of intermediate imports, final demand imports, or total imports, is a function of the shares of the various components of expenditure and will change as these alter. It is also a function of the individual import elasticity of demand for the various components of demand measured in terms of value-added. The overall impact of these changes over time will be captured by the changes in the aggregate import elasticity of demand as evidenced by, say, by the use of dummy variables, rolling regressions (Pacheco-López, 2005), or time-varying coefficients regressions (Felipe *et al.*, 2020). The estimates of the aggregate total or intermediate income elasticity of demand are not “biased” by these changes in the weights or the individual import elasticities, including those of exports.

The conclusion to be drawn that there is no justification for adjusting the “compositional effect” of the intermediate-import elasticity of demand by including the growth of the total value of manufacturing exports separately in the regression of the intermediate-import demand function. As this is the case, the question arises is how the inclusion of x_{MF} and its coefficient α in equation (12) is to be interpreted. Ibarra (2011: 360) correctly argues that α “does not measure directly the elasticity of imports in the manufacturing export sector”. This is, as has been shown, implicitly captured by the value of $\pi_{INT, XVA}$ in equation (20). It is reflected in the aggregate estimate of π_{INT} , as well as in the value of the total import elasticity, namely, π_{TOT} . However, surprisingly, Blecker (2021, Table 4:

estimated balance-of-payments equilibrium growth rate is also found to be close to its actual growth rate.

191) actually labels the term α as the “manufactured export elasticity of intermediate imports”. While mathematically it could be described as an elasticity, from an economic point of view, it is not the intermediate import elasticity of demand with respect to manufacturing exports which, as has been seen, is captured as part of the income elasticity with respect to GDP (as in equations (19), (20) and (21)).

Blecker (2021: 189) cites Blecker and Ibarra (2013, p.42) that “the coefficient on [manufactured export growth] measures the effect of an increase in manufactured exports *holding GDP constant*, which implies a shift in the composition of total output toward the export sector. Thus, the positive coefficient on exports means that export production is more intensive in intermediate imports than the rest of the economy...” (emphasis added). But holding GDP (growth) constant means that the growth rate of value-added exports is also held constant. In fact, as we have seen, the effect of the growth of manufactured (value-added) exports on the growth of imports is explicitly included in the import demand function through the growth of GDP. Moreover the shift in composition of output towards exports is already captured, for example, by changes in $\vartheta_{x_{VA,t}}$ over time in equation (19).⁸

The inclusion of x_{MF} in the regression given by equation (12) is consequently best regarded as that of a theoretically irrelevant variable, as it has no role in determining the unbiased estimate of both the total and intermediate income elasticity of demand for imports.

For Mexico, the average share of intermediate imports in total imports is about 76% and the share of manufacturing exports in total exports is 85% over the period 1993-2017.⁹

⁸ To include the growth of (value-added) exports as a separate regressor into the intermediate import demand function, the correct specification to be estimated is $m_{INT,t} = c_9 + \pi_{INT,Y^*} y_t^* + \pi_{INT,VA} x_{VA,t}$. The variable y^* is the growth of Y^* , which is the level of GDP minus that of value-added exports, (as value-added exports in this equation are already included as a separate regressor). This contrasts with the misspecified equation (12). It follows that $\pi_{INT} = \pi_{INT,Y^*} \delta + \pi_{INT,VA}(1 - \delta)$, where δ and $(1 - \delta)$ are equal to $(PC+I + G)/Y$ and X/Y respectively. But there is not any great advantage in estimating this equation compared with, say, equations (18) or (19).

⁹ All the data are from the Bank of Mexico.

These values have not shown any secular change over this period. The growth of total exports and total imports are very close – both grew at 6.2 per cent per annum over the period 1993-2017. This implies not only that there was a strong correlation between m_{INT} and x_{MF} , but that they also grew approximately at the same rate.¹⁰

Consequently, given that the correct specification is $m_{INT,t} = c_4 + \pi_{INT}y_t$, it is not surprising that the inclusion of the “irrelevant” variable x_{MF} is statistically significant and biases the estimate of the intermediate import elasticity of demand downwards – but the reason is purely statistical and has nothing to do with a correct underlying theory.

As it is plausible to assume that $m_{INT} \approx x_{MF}$, using this relationship in equation (12), namely,

$$m_{INT,t} = c_4 + \tilde{\pi}_{INT}y_t + \alpha x_{MF,t}$$

gives an approximation of the unbiased estimate of the intermediate import elasticity of demand for Mexico as $\pi_{INT} = \frac{\tilde{\pi}_{INT}}{1-\alpha}$. It will be recalled that $\tilde{\pi}_{INT}$ denotes the biased estimate of the income elasticity. Any difference between m_{INT} and x_{MF} will simply affect the degree of bias.^{11,12}

This is confirmed by the various empirical estimates of Ibarra and Blecker. For example, the estimates from Ibarra (2011, Table 3, equation (1)) of $\tilde{\pi}_{INT}$ and α are 1.14 and 0.45

¹⁰ Recall that exports here are not measured as value-added but include the value of intermediate imports.

¹¹ Alternatively, the same result may be obtained as follows. The inclusion of x_{MF} in equation (12) may be regarded as a theoretically irrelevant, but statistically significant, variable. It follows that the relationship between the unbiased and biased estimated of the income elasticity of demand is given by $\pi = \tilde{\pi} + \alpha\beta$ where β is the slope coefficient of the “auxiliary” regression of x_{MF} on y . Given that $x_{MF} \approx m_{INT}$, it follows that $\beta \approx \pi$ and $\pi = \frac{\tilde{\pi}}{1-\alpha}$.

¹² The fact that there may be a long-run difference in the growth of manufactured exports and intermediate imports, say, $x_{MF} = \rho m_{INT}$ does not make any major difference to the theoretical argument. The unbiased estimate of the import elasticity of demand is now given by $\pi_{INT} = \frac{\tilde{\pi}_{INT}}{1-\rho\alpha}$. However, the Blecker-Ibarra estimate of y_B will now differ somewhat from the derived value from the correctly specified Thirlwall’s law.

respectively. The above method of correcting the estimate import elasticity of demand for the degree of bias, gives an unbiased value of π_{INT} of 2.07. The comparable Ibarra's estimate of π_{INT} when x_{MF} is correctly not included in the regression equation is 2.23 (Ibarra, 2011, Table 4, equation (1)).¹³

Similarly, if we use the (averaged) estimates from Blecker (2021, Table 4, 191) for 1975-2012, it is found that $\tilde{\pi}_{INT}$ equals 0.70 and $(1 - \alpha)$ is 0.33. This means that an approximation of the unbiased elasticity of intermediate imports is around 2.1, compared with the directly estimated elasticity of final imports of around 2.3.

Why does the misspecified Blecker-Ibarra model give a balance-of-payments equilibrium growth rate close to the actual growth rate? Using the Blecker-Ibarra specification of the import demand function, the aggregate import demand function is given by equation (13). With the assumptions once again of no growth in relative prices and balance-of-payments equilibrium, this is equal to the growth of exports giving:

$$m_{TOT} = \tau\tilde{\pi}_{INT}y + \tau\alpha x_{MF} + (1 - \tau)\pi_{FD}y = x_{TOT} \quad (22)$$

where, it will be recalled, τ and $(1 - \tau)$ are the shares of intermediate and final demand imports in total imports.

As $\tilde{\pi}_{INT} = \pi_{INT}(1 - \alpha)$, it follows that:

$$m_{TOT} = \tau\pi_{INT}y - \tau\alpha\pi_{INT}y + (1 - \tau)\pi_{FD}y = x_{TOT} - \tau\alpha x_{MF} \quad (23)$$

Given that $m_{INT} = \pi_{INT}y \approx x_{MF}$, so that $\tau\alpha\pi_{INT}y \approx \tau\alpha x_{MF}$, equation (23) becomes:

$$m_{TOT} = \pi_{TOT}y = x_{TOT} \quad (24)$$

This gives the correct specification of Thirlwall's law as the traditional equation, namely,

¹³ The finding that there is a significant dummy slope variable in, say, the import demand function does not significantly affect the argument. This just implies that the weak version of Thirlwall's law should be tested using data (and the differing estimated import elasticities) separately both before and after the date of the introduction of the dummy variable.

$$y_B = \frac{x_{TOT}}{\pi_{TOT}} = \frac{\varepsilon w}{\pi_{TOT}}. \quad (25)$$

Thus, ironically, in spite of the specification error, the Blecker-Ibarra model reduces to the traditional Thirlwall model. This is because the misspecification bias in the import demand function is more or less offset by the resulting error in the contribution of export growth. It should be emphasised that this provides *no* support for the Blecker-Ibarra model, as its theoretical specification of the intermediate import demand function is problematical.¹⁴ The latter is the key flaw in the Blecker-Ibarra model.

Suppose that the aggregate import demand function is used, as in the case of Blecker's example of the US as a "near-tautology" discussed above. However, this is similarly misspecified by including the growth of total exports as a regressor such that:

$$m_{TOT} = \tilde{\pi}_{TOT} y + \gamma x_{TOT} \quad (26)$$

Consequently, as $x_{TOT} = m_{TOT}$ and $\tilde{\pi}_{TOT} = \pi_{TOT}(1 - \gamma)$, this model likewise derives as above, equivalently, the traditional Thirlwall's law given by equation (25). As noted above, Blecker does not estimate his supposed non "near-tautological" specification for the US. But it is highly likely, for the reasons given above, that its estimation would lead to the same value of y_B as that given by the traditional Thirlwall's law.

CONCLUDING COMMENTS

Professor Blecker (2016, 2021) considers the conundrum as to whether or not Thirlwall's law is merely reflecting an underlying identity, where the estimated import and export income elasticities equal their arithmetically calculated values. McCombie and Thirlwall agreed over forty years ago that it was not an identity, given that the estimates of the elasticities are from the standard import and export demand functions. These are behavioural equations, which also include a relative price term. It is, consequently, theoretically possible for Thirlwall's law to be empirically refuted. Nevertheless, Blecker

¹⁴ The export demand function of Mexico is, by definition, part of the import demand functions of those countries to which Mexico exports. In this case, it is largely the US. Consequently, according to the Ibarra specification, Mexico's export demand function, as it is part of the US's import demand function, should also be a function of the exports of the US, when the "strong version" of Thirlwall's law is estimated. However, in view of the above critique, this is not of any importance.

terms the traditional econometric testing of Thirlwall's law a "near-tautology", if the estimated elasticities equal their arithmetically calculated values. In other words, the inference is that the estimation of *any* regression model using a bivariate Regression Through the Origin is considered by Blecker to be that of a "near-identity". If other variables are statistically significant, so the estimation of the import and export elasticities are not by a RTO, then this does not constitute a "near-tautology". The term "near-tautology" is, in the sense used here, a contradiction in terms and carries with it the connotation that the econometric results are somehow pre-determined by an underlying identity.

But as Blecker states, it is an empirical matter and the traditional specification of Thirlwall's law can be refuted. It is shown that the term "near-tautology" has no relevance for the testing of Thirlwall's law. It is not just a question of semantics, as Blecker argues that this in some way invalidates the traditional testing of Thirlwall's law. Paradoxically, according to Blecker, the law can be statistically refuted, but it is a "near tautology" if the empirical results of the traditional model give $y_B = y$.

Blecker and Ibarra suggest an alternative specification of Thirlwall's law, even though the traditional Thirlwall's law is not a "near-tautology". This specifies the growth of the expenditure of manufacturing export sales as an additional regressor in the intermediate import demand function. However, the effect of the growth of the value-added of exports on the growth of intermediate imports is already included in the growth of GDP. Hence, a high import content of value-added manufactured, and indeed total, exports will be captured by the intermediate, and total, income elasticity of demand for imports.

It is shown that problems with the Blecker-Ibarra specification mean that it is this, rather than the traditional, estimate of the intermediate and hence total import elasticity of demand that is biased. Consequently, there is no need to revisit the numerous estimates of the "workhorse" import and export demand functions that have been undertaken in the last sixty years, or so, on the grounds that they are misspecified. Neither are the numerous estimates of Thirlwall's law that have been undertaken flawed.

The fact that, in the case of Mexico, the balance-of-payments growth rates derived from the Blecker-Ibarra specification of the model are often reasonably close to the actual

growth rate is explicable in terms of the degree of bias of the intermediate (and hence total) income elasticity being offset, in the derivation of the traditional Thirlwall's law.

Consequently, this alternative approach of Blecker and Ibarra cannot be regarded as preferable to the traditional specification of Thirlwall's law. While there have been important extensions to the basic Thirlwall's law subsequent to 1979, its traditional specification and estimation remains a parsimonious and valid core of the balance-of-payments constrained growth model.

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