Explaining Italy's economic growth: a balance-of-payments approach with internal and external imbalances and non-neutral relative prices.

Abstract

Thirlwall's Law (Thirlwall, 1979) considers that growth can be constrained by the balance-of-payments when the current account is in permanent deficit. The Law focuses on external imbalances as impediments to growth and does not consider the case where internal imbalances emerging from budget deficits or public debt can also constrain growth. The recent European public debt crisis of peripheral countries (including Italy) shows that when internal imbalances are out of control they can constrain growth and domestic demand in a severe way. Recently, Soukiazis *et al.* (2013) developed a model–henceforth the SCA model - that takes into account both internal and external imbalances and where relative prices are not neutral in the pace of economic growth. The SCA model proved to be accurate in explaining economic growth in Portugal. The aim of the present paper is to apply the SCA model to Italy and check its precision for explaining the growth path in this country. Italy is an interesting case study of a larger economy with a lack of growth in the last decade facing serious internal imbalances caused by high deficit and public debt. Our empirical analysis shows that Italy grew at a slower rate than its potential capacity due to supply constraints. Policies designed at increasing external competitiveness and lowering the costs of financing the economy are shown to be effective strategies to achieve higher growth.

1. Introduction

Thirlwall (1979) developed a simple model that determines an economy's long-run growth rate consistent with the balance-of-payments equilibrium, by establishing the simple rule that actual growth can be predicted by the ratio of exports growth to the income elasticity of demand for imports[1]. According to Thirlwall's Law, no country can grow faster than its balance-of-payments equilibrium growth rate. The exception occurs when a country can continuously finance external deficits through capital inflows; however this is not a sustainable solution in the long-run perspective. Therefore, when the balance-of-payments disequilibrium on the current account cannot be permanently financed by available foreign resources, it works out as a serious obstacle to promote higher growth. As a consequence, growth is constrained by external demand and it is income and not relative prices that adjust to bring the economy back to equilibrium.

There is a vast literature on checking the validity of Thirlwall's Law and criticisms about its basic assumptions, namely those related to constant relative prices in the long-run and an initially balanced current account. McCombie (1989), Moreno-Brid (1998-99), McCombie and Thirlwall (1994) and recently Blecker (2009) are valuable contributions on the discussion and basic implications of the Law.

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[1] Thirlwall's Law is given by $\dot{y} = \dfrac{\dot{x}}{\pi}$ or alternatively by $\dot{y} = \dfrac{\varepsilon \dot{y}*}{\pi}$, where $\dot{y}$ is the growth of domestic income, $\dot{x}$ is the growth of real exports, π is the income elasticity of the demand for imports, ε the income elasticity of the demand for exports, and $\dot{y}*$ the growth of foreign income. The underlying hypotheses are that relative prices are constant and the balance-of-payments on the current account is in equilibrium or has a constant imbalance in absolute term (it should be noticed, however, that owing to economic growth, the ratio of any constant imbalance to GDP will vanish in the long-run). For an application of this Law to Portugal see Soukiazis and Antunes (2012).

Although the hypothesis of relative prices constancy has been criticized widely in the empirical literature,[2] in most studies relative prices are shown to be statistically insignificant and even when they are significant the price elasticities are very low when compared to the income elasticities, thus indicating that imports and exports are less sensitive to price than to income changes. Moreover, Blecker (2009) stressed that in longer time periods it is more likely that relative prices remain constant.

The empirical evidence largely supports the idea that it is income that adjusts to equilibrate external imbalances, meaning that growth is actually constrained by the balance-of-payments. In addition, increasing capital inflows relax the balance-of-payments constraint only temporarily; in fact, they do not permit a country to grow at the export-led cumulative growth rate in the long-term.

Although Thirlwall's model has been extended to include capital flows and foreign debt, the role of public imbalances as an additional constraint on growth has not been accounted for. The recent experience of public debt crises in some peripheral European countries (including Italy) is the motivation to deal with this issue. In fact, the use of an expansionary fiscal policy to expand growth and reduce unemployment does not always achieve the desirable goals. When budget deficits are financed by monetary expansion or by public borrowing, the adoption of such an expansionary policy could contribute to increase public debt and interest rates, thus crowding out private investment, raising inflation and jeopardizing medium-term growth (Pelagidis and Desli, 2004).

The discussion about the attractiveness of budget deficits is not plain and depends on how government borrowing is being used (*i.e*, to finance government consumption or investment in infrastructure), the sustainability of such a deficit and how it is financed.

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[2] See, at this respect, McGregor and Swales (1985; 1991); Alonso and Garcimartín (1998-99) and López and Cruz (2000).

Moreover, the hesitation of many policy makers – especially in Europe – to rely more aggressively on fiscal policy contraction to keep their public finances relatively balanced may lead to the maintenance of a vicious cycle between slow growth and high public deficit[3]. Less economic growth associated with higher unemployment levels result in lower tax revenues and higher social benefits paid by the government, which in turn aggravate the public deficit. Indeed this is the situation we are recently assisting in two peripheral countries, Greece and Portugal, as a result of the implementation of the austerity measures under the supervision of the so-called "troika".

Our paper aims at contributing to this debate by using an alternative growth model, in line with Thirlwall's Law, that takes into account not only external, but also internal imbalances caused by budget deficits and public debt. We also assume that relative prices can play a significant role on economic growth. Our model shows that the growth of domestic income is explained essentially by trade competitiveness and external demand. Fiscal tightening rules and higher costs of financing the economy can affect economic growth negatively. The theoretical model is tested for the Italian economy, which has been recently facing difficulties with financing its public debt. The country was forced to adopt austerity measures, which are expected to have negative repercussions on growth in the following years.

Following the previous considerations, and in order to fulfil the proposed goals, the paper is organized as follows: in section 2 we present the theoretical growth model that takes into account internal and external imbalances and assumes that relative prices are not neutral. In section 3 we apply the model to the Italian economy in order to assess the main determinants of growth. A scenario analysis is presented in section 4 focusing on the variables that could foster growth. The last section summarizes the main findings.

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[3] For different points of view on this policy see Alesina and Perotti(1996) and Perotti (2011)

2. The extended growth model with internal and external imbalances and non-neutral relative prices.

The growth model recently developed by Soukiazis *et al.* (2013) determines the reduced form of income growth which, among other things, depends on internal and external imbalances and where relative prices play a non-neutral role. This approach, although in line with the balance-of-payments constrained growth hypothesis, displays three particular differences: (i) it considers not only external imbalances (captured through current account deficits) but also internal imbalances emerging from public deficit and debt; (ii) it separates the import contents of the components of domestic income; and (iii) relative prices[4] are introduced explicitly into the growth model.

The growth model involves the following equations:

The Import Demand Function

We use the components of domestic income to explain import flows, unlike the conventional specification that considers real aggregate domestic income as the main determinant of the demand for imports. Moreover, we assume that relative prices play a significant role and that in the long-run they can affect economic growth. According to these assumptions, the import demand equation is specified as follows, with all variables expressed in growth rates[5]:

$$\dot{m} = \pi_c \dot{c} + \pi_g \dot{g} + \pi_x \dot{x} + \pi_k i\dot{n}v + \delta_m (\dot{p}^* + \dot{e} - \dot{p}) \qquad \textbf{(1)}$$

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[4] The hypothesis that relative prices remain constant in the long-term is debatable, despite its use in some studies, justified by simplification of exposition. There are studies showing that relative prices are important in international trade to explain a substantial part of growth, but this occurs especially in developing countries. As an example for a European country, Garcimartín *et al.* (2010-2011) argue that the slowdown of the Portuguese economic growth was due to the overvaluation of the domestic currency (loss of price competitiveness) when the country joined the Euro zone.

[5] The time index *t* is not attached to the variables for the sake of simplification.

In this equation, the growth in demand for imports $\dot{m}$ depends on the growth rates of private consumption $\dot{c}$, government expenditures $\dot{g}$, exports $\dot{x}$, and investment $\dot{inv}$, respectively. Additionally, the growth of imports depends on the growth of foreign and domestic prices, $\dot{p}*$ and $\dot{p}$ respectively, and the variation of the exchange rate $\dot{e}$ over time.[6] In the same equation, π represents the elasticity of imports with respect to each of the components of demand. These elasticities are all expected to be positive since all components of demand have import content. In addition, the relative price elasticity of demand for imports is expected to have a negative sign, $\delta_m < 0$. A devaluation of the domestic currency is expected to reduce the demand for imports turning them more expensive in domestic market.

The Export Demand Function

The growth of foreign income and the growth of relative prices are conventionally the main determinants explaining the growth of exports. The export demand function is given as:

$$\dot{x} = \varepsilon_x \dot{y}* + \delta_x (\dot{p}* + \dot{e} - \dot{p}) \qquad (2)$$

where $\dot{x}$ is the growth of real exports, $\dot{y}*$ the growth of real foreign income, and $\dot{p}*$, $\dot{p}$ and $\dot{e}$ are defined as before. It is explicitly assumed that exports competitiveness is based on non-price and price competitiveness captured by the income and price elasticities of the demand for exports, respectively. Specifically, $\varepsilon_x > 0$ is the income elasticity of demand for exports capturing the non-price characteristics of the exported

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[6] Exchange rate (*e*) is defined as the price of foreign currency in terms of domestic currency units. Therefore when *e* increases it shows a currency depreciation of domestic currency.

goods associated with quality, design, reliability, variety, etc.[7] In the same equation, δ_x >0 is the relative price elasticity of export demand, with an expected positive sign. A devaluation of the domestic currency is expected to increase the demand for exports turning them more competitive in external markets.

Private Consumption and Investment

The aggregate consumption is mainly a function of total disposable income (including earnings from holding government bonds), is given by:

$$\dot{c} = \varepsilon_c \dot{y}_d \tag{3}$$

where $\dot{c}$ is the growth of consumption, $\dot{y}_d$ is the growth of disposable income and $\varepsilon_c > 0$ is the income elasticity of consumption.

On the other hand, the private investment equation is derived from the accelerator theory,[8] arguing that the growth of gross investment $\dot{inv}$ is a function of the domestic income growth $\dot{y}$ and the change in real interest rate $\dot{r}$, defined as follows:

$$\dot{inv} = \varepsilon_k \dot{y} + \varepsilon_r \dot{r} \tag{4}$$

In this equation, $\varepsilon_k > 0$ is the accelerator effect and $\varepsilon_r < 0$ reflects the impact of the real cost with financing gross investment.

The Government sector

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[7] We assume that the income elasticity of demand for exports captures the quality characteristics of the produced goods. However, we acknowledge that changes in relative prices can also be due to changes in relative quality.

[8] For more details on the original specification of the investment function see Goodwin (1951) and Chenery (1952).

The government budget is considered to be expressed (in nominal terms) by the following identity:

$$G_n + iB_H + i * B_F e = tYP + D \qquad (5)$$

where G_n is nominal government expenditures, B_H is public debt[9] owned by home bond holders, B_F is public debt owned by foreign bond holders, Y is real domestic income, P is the domestic price level, D the public deficit, i and $i*$ are nominal interest rates paid to home and foreign public debt holders, respectively, e the nominal exchange rate, and t is the tax rate on nominal income. According to this expression, we are in the presence of a public deficit when total current expenditures (including interest payments on public debt) exceed the revenues obtained through taxes on domestic money income, i.e, when $G_n + iB_H + i * B_F e > tYP$.

As it is shown in the Equation A.5 from the *Appendix A* in Soukiazis *et al.* (2012), the long-term behaviour of the real government expenditures growth, $\dot{g}$, compatible with the constraint (5), is given by:

$$\dot{g} = \frac{t\dot{y}}{w_G} + (\dot{d} - \dot{p})\frac{w_D}{w_G} - \left[\Delta i + i(\dot{b}_H - \dot{p})\right]\frac{w_{BH}}{w_G} - \left[(e\Delta i * + i * \Delta e) + i * e(\dot{b}_F - \dot{p})\right]\frac{w_{BF}}{w_G} \qquad (6)$$

where $w_D = \dfrac{D}{YP}$ is the budget deficit ratio, $w_G = \dfrac{G}{Y}$ is the government expenditure ratio, $w_{BH} = \dfrac{B_H}{PY}$ and $w_{BF} = \dfrac{B_F}{PY}$ are the shares of public debt owned by home and foreign bond holders (as a percentage of nominal income), respectively, $\dot{d}$ is the growth of budget deficit and $\dot{b}_H$ and $\dot{b}_F$ are the growth rates of the public debt owned by home and foreign bond holders, respectively.

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[9] Public debt is assumed to have origin in the issuing of government bonds to finance public deficit.

The Balance-of-payments condition

Lastly, we present the external equilibrium condition given by the following identity:

$$XP + D_F e - i * B_F e = MP * e \qquad (7)$$

The left hand side of the identity shows the money resources available to finance imports, namely the export revenues plus the amount of public deficit financed by foreigners minus the interest rate payments to foreign bond holders.

As it is shown in Soukiazis *et al.* (2012) (*Appendix B,* Equation (B.6)) the balance-of-payments final relation can be expressed as:

$$\dot{x} + \dot{p} + (1-\xi)\frac{w_D}{w_X}(\dot{p} + \dot{y} - i*) - (1-\xi)\frac{w_B}{w_X}\Delta i* = \frac{w_M}{w_X}\frac{P*e}{P}(\dot{m} + \dot{p}* + \dot{e}) \qquad (8)$$

where $\dot{x}, \dot{m}, \dot{p}, \dot{p}*, \dot{y}$ and $\dot{e}$ are the growth rates of exports, imports, domestic prices, foreign prices, domestic income and nominal exchange rate, respectively. Additionally, w_D, w_B, w_M and w_X are respectively the ratios of budget deficit, public debt, imports and exports on income. Finally, $(1-\xi)$ represents the percentage of public deficit (or debt) financed by external markets.

Domestic income growth

Proceeding as in Soukiazis *et al.* (2012) (*Appendix C*, Equation (C.4)) the growth rate of domestic income is given by:

$$\dot{y} = \frac{A}{B} \text{ , where}$$

$$A = \begin{bmatrix} \left(\varepsilon_x - \frac{w_M}{w_X}\left(\frac{P*e}{P}\right)\pi_x\varepsilon_x\right)\dot{y}* + \left(\delta_x\left(1-\frac{P*e}{P}\frac{w_M}{w_X}\pi_x\right) - \delta_m\frac{w_M}{w_X}\left(\frac{P*e}{P}\right)\right)(\dot{p}*+\dot{e}-\dot{p}) + \\[2mm] +\left(\dot{p} - \frac{P*e}{P}\frac{w_M}{w_X}(\dot{p}*+\dot{e})\right) + (1-\xi)\frac{w_D}{w_X}(\dot{p}-i*) - (1-\xi)\frac{w_B}{w_X}\Delta i* - \\[2mm] -\left(\frac{P*e}{P}\right)\frac{w_M}{w_X}\left\{ \begin{array}{l} \dfrac{(\Delta i - \Delta\dot{p})\xi w_B}{(1-t)+r\xi w_B}(\pi_c\varepsilon_c) + \pi_k\varepsilon_r(\Delta i - \Delta\dot{p}) + \\[2mm] + \pi_g\left[-\Delta i\dfrac{\xi w_B}{w_G} - \Delta i*e(1-\xi)\dfrac{w_B}{w_G}\right] \end{array} \right\} \end{bmatrix}$$

and (9)

$$B = \frac{w_M}{w_X}\left(\frac{P*e}{P}\right)\left\{\pi_c\varepsilon_c + \pi_k\varepsilon_k + \pi_g\left(\frac{t}{w_G} + \frac{w_D}{w_G} - \frac{i\xi w_B}{w_G} - i*e(1-\xi)\frac{w_B}{w_G}\right)\right\} - $$
$$- (1-\xi)\frac{w_D}{w_X}$$

Equation **(9)** highlights that (among other factors) the growth of domestic income is determined by internal and external imbalances, as well as on relative prices. More specifically, the numerator A is decomposed in various terms: the first measures the impact of foreign demand on domestic growth; the second reflects the substitution effect through the change of relative prices; the third is the volume effect of trade; and the next terms measure the impact of internal imbalances on domestic growth. The denominator essentially captures the effect of the disaggregated import elasticities of the components of demand on domestic growth. Equation **(9)** will be used to explain actual growth in Italy.

3. Testing the model for the Italian economy

The first step consists in estimating simultaneously the import demand equation **(1)**, the export demand equation **(2)**, the private consumption **(3)** and investment equations **(4)**, to obtain the elasticities required to compute the reduced form of domestic income growth as defined in equation **(9)**. Annual growth rates are used for the period 1983-2010 to estimate the mentioned four-equation system. The definition of the variables and the data sources are explained in the *Appendix A*. The system equations are estimated by *3SLS (Three-Stage Least Squares)*, as it is more efficient to capture the interrelation between equations and the causal and feedback effects between the core variables of the system. **Table B.1** in the *Appendix B* provides the estimation results from the *3SLS* regression.

The growth of imports, consumption, investment, and exports are the dependent variables of the four-equation system and thus are assumed to be endogenous, as well as the growth of government expenditures, domestic disposable income, domestic product, real exchange rate and real domestic interest rate. All other variables in the system are assumed exogenous, including some lagged variables, as it is explained in **Table B.2**.

Overall, the outcomes are quite satisfactory: all elasticities display their expected signs and in general are statistically significant. The relative price elasticity is statistically significant in the export equation (at the 1% level) and it carries the expected positive sign, whereas in the import demand equation despite being negative it is not statistically significant. The coefficient on the relative price elasticities is low in comparison with the income elasticities, confirming the general finding in the literature that trade is more sensitive to income than to price changes. The most noticeable aspect regarding the import demand function is the high elasticity of consumption, which exceeds unity

(π_c=1.272), indicating that imports in Italy increase more than proportionally in relation to consumption increase. Although the elasticity of imports with respect to exports and investment are also relevant, thus indicating a significant import content in these elements of demand, they are low (π_x=0.439 and π_k=0.462 respectively). The elasticity of imports with respect to government spending (π_g=-0.163) is not statistically significant, revealing an insignificant import content in this element of demand. This may indicate the existence of an import substitution policy of the government expenditure in favour of domestic goods and services.

Table B.1 also shows that investment and exports are income elastic with respect to domestic and foreign income, respectively (ε_k =2.076 and ε_x =2.961). The first outcome confirms the accelerator principle in the investment function, and the latter shows the high sensitivity of exports relatively to external demand (proxied by the OECD income growth average). The impact of real interest rate on investment is negative (ε_r =-1.178), as expected, but it displays no statistical significance. Therefore, the accelerator impact is dominant in the investment equation, showing that investment projects are undertaken only when the perspectives on economic growth are fulfilled. Finally, consumption is income inelastic, as expected (ε_c=0.704), but with a sizeable value.

We also regressed each of the equations individually, by *2SLS* (see **Table B.2** in the *Appendix B*) using the same instruments. By doing that, we are able to perform diagnostic tests to check the robustness of the results. The first is the Sargan statistic, a test of over-identifying restrictions to assess the validity of the instruments used in the regressions; that hypothesis is confirmed for all equations. The second is the Pagan-Hall heteroskedasticity test, showing that the hypothesis of homoskedasticity is never rejected. The third test is the Cumby-Huizinga test for autocorrelation, confirming that

errors are not first-order autocorrelated in every case. Finally, the Normality hypothesis of residuals is also confirmed except for the investment equation (at the 5% significance level).

Table I below displays the values that are further ahead used for computing the growth rates of domestic income in Italy. Some are estimated values taken from **Table B.1** (Appendix B), whereas others are annual averages over the period considered. Three growth rates are computed: $\dot{y}_a$ obtained from equation **(9)** where internal and external imbalances are considered and relative prices are not neutral; $\dot{y}_b$ determined by the SCA model with relative prices being constant, and $\dot{y}_c$ obtained from Thirlwall's original Law, given by $\dot{y} = \dfrac{\varepsilon_x \dot{y}^*}{\pi}$. In the latter case, it was necessary to estimate the import demand function $\dot{m} = \pi\dot{y} + \delta_m(\dot{p}^* + \dot{e} - \dot{p})$ by OLS (with robust standard errors) to obtain the aggregate import elasticity with respect to income growth (π=2.847).

Comparing these different growth rates with the actual average growth in Italy over 1983-2010 ($\dot{y}$=1.493%) the following remarks can be made:

(i)   The growth rate obtained from Thirlwall's Law ($\dot{y}_c$), given by $\dot{y}_c = \dfrac{\varepsilon_x \dot{y}^*}{\pi}$, is 2.785%, which overestimates the actual growth achieved in Italy over the period considered (1.493%). This result should be consistent with the existence of a trade surplus or at least with a balanced trade. But looking at the figures of the share of exports ($w_X = 0.235$) and imports ($w_M = 0.226$) on income, their similarity is evident, thus showing that Italy is close to a balanced economy with respect to external trade. In fact, the ratio of the two shares (

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$w_X / w_M = 1.04$) is close to one for the whole period[10]. The main conclusion from this comparison is that Thirlwall's Law over-predicts actual growth in Italy, showing that the country has the potential to grow faster than it actually did.

Table I. Computation of the growth rates of domestic income in Italy, 1983-2010.

ε_x	π_x	ε_c	π_c	ε_k	π_k	π_g	ε_r	δ_m
2.961	0.439	0.704	1.272	2.076	0.462	-0.163	-0.177	-0.210
δ_x	t	r	$\dot{p}$	$\dot{y}*$	w_D	w_G	w_B	ξ_D
0.467	0.429	0.040	0.047	0.027	0.068	0.424	1.033	0.580
ξ_B	w_M	w_X	i	$i*$	Δi	$\Delta i*$	e	$\dot{e}$
0.580	0.226	0.235	0.087	0.057	-0.006	-0.002	0.93	0.01
$(\frac{p*e}{p})$	$\dot{p}*+\dot{e}-\dot{p}$	$(\Delta i - \Delta\dot{p})$	$\dot{p}*$	$(\dot{p}-i*)$				
1.02	-0.002	-0.001	0.031	-0.010				
$\dot{y}_a$	$\dot{y}_b$	$\dot{y}_c$	$\dot{y}$					
3.393	2.205	2.785	1.493					
Internal and external imbalances and relative prices not neutral	Internal and external imbalances and relative prices neutral, SCA model	Thirlwall's Law $\dot{y} = \frac{\varepsilon_x \dot{y}*}{\pi}$	Actual growth					

Notes: $\varepsilon_x, \pi_x, \varepsilon_c, \pi_c, \varepsilon_k, \pi_k, \pi_g, \varepsilon_r, \delta_m$ and δ_x are taken from Table B.1 (see Appendix B).

$r, t, w_D, w_G, w_B, w_M, w_X, i, i*, e, \dot{p}$ and $\dot{y}*$ are annual averages over the period 1983-2010.

ξ_D and $\xi_B = 0.58$ is assumed constant over the whole period.

(ii)   The growth rate computed by the SCA model with neutral relative prices ($\dot{y}_b = 2.205$ %), also overestimates actual growth in Italy thus leading us to the same conclusion as before. Our estimates indicate that Italy has grown slower than the rate consistent with the balance-of-payments equilibrium ($\dot{y} < \dot{y}_b < \dot{y}_c$) and this can be taken as evidence that this country faces supply constraints that restrain the economy from growing faster[11]. In other words, Italy's potential growth[12] (without harming the balance-of-payments position) is higher than that actually achieved and the explanation for this slower growth rate can be found on the

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[10] The average current account as a percentage of GDP is -0.46% for the whole period.

[11] Some previous studies agree on the supply constrained growth, such as Thirlwall (1979; 1982) for the period 1953-1976, McCombie (1985) for 1973-1980, Pattichis (2001) for 1960-1997, and more recently, Daveri and Jona-Lasinio (2005) from 1970 to 2004, as well as Bagnai (2008) for the period 1960-2006.

[12] The definition of potential growth is different than that implying full capacity utilization of factors of production. In this paper, by potential growth we mean the growth achieved without incurring in balance-of-payments deficits.

existence of supply constraints[13] that keep the country from growing faster. As a matter of fact, once an economy becomes supply-constrained, demand growth no longer plays a role on the rate of output growth.

(iii)   The growth rates computed using Equation (9), thus taking into account the internal and external imbalances and no neutral relative prices, provide the same outcomes as the former cases. In fact, the predicted growth rate $\dot{y}_a = 3.393$ % is much higher than the actual rate $\dot{y} = 1.493$, indicating again that the country is under supply or capacity constraints. This computed growth rate is also slightly higher than the rate obtained assuming internal and external equilibrium. Therefore, both our extended SCA model - with or without (internal and external) equilibrium – and Thirwall's Law all agree that Italy has the potential to grow faster (without creating balance-of-payments problems), whenever the supply constraints are removed.

4. A scenario analysis

In this section, some scenarios are designed in order to detect the most appropriate policies that could help Italy to grow faster. This reasoning is performed under the framework of the SCA model with internal and external imbalances – Equation (9) - for the global period:

(i) Fiscal policy towards a reduction in income taxation: If the rate of taxed income reduces from $t = 43\%$ to 35% (everything else constant) the predicted growth given by our model is $\dot{y}_a = 3.32\%$, lower than that found in **Table I** ($\dot{y}_a = 3.39\%$). Therefore, a more friendly taxation policy alone is apparently not capable to stimulate faster growth.

(ii) Fiscal discipline, by imposing a public deficit of $w_D = 3\%$ and a debt of $w_B = 60\%$ (as percentages of GDP), thus matching the goals of the Stability and Growth Pact in

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[13] The supply restrictions can rely on the lack of production organization, low productivity, labour market rigidities, financial constraints, high bureaucracy, inefficient legislation, state interference, among others. In fact, total factor productivity growth in Italy is declining over time, with average values of 1.7% in 1986-1990, 1.2% in 1991-1995, 0.8% in 1996-2000, 0.3% in 2001-2005, and -0.5% in 2006-2010.

the Eurozone. When these goals are considered in the SCA model, the predicted growth

rate for Italy reduces from $\dot{y}_a$ =3.393% (**Table I**) to 3.109%, showing that the economy

does not grow significantly faster due to public budget discipline *per se.*

(iii)   Interest rate policy: A monetary policy attempting to reduce domestic interest

rates from 8.7% (the average rate for the whole period) to 5% (implying Δi= -0.037) or

3% (implying Δi= -0,057), induces a faster growth than that shown on **Table I**,

equivalent to $\dot{y}_a$ = 3.87% and $\dot{y}_a$ = 4.18%, respectively. On the other hand, if foreign

interest rates[14] rise from i^*=5.7% (the average for the whole period) to i^*=7% (the rate

that forced peripheral countries like Greece and Portugal to ask for the *"troika"*

intervention), and thus Δi^*=0.013, the predicted growth falls drastically from $\dot{y}_a$ =

3.39% to $\dot{y}_a$ = 1.31%. It is therefore shown that growth in Italy is more sensitive to

changes in interest rates, due to increases in costs with external debt. Therefore,

financing the domestic economy with lower interest rates is a considerable stimulus to

growth. This outcome goes along the recent argument about issuing Eurobonds, which,

if approved, would allow Member countries to finance their economies at a lower cost.

(iv) The novelty in this model is that now we assume that relative prices are not neutral.

Otherwise, if we assume that relative prices are constant in the long-term, that is,

$\dot{p}^* + \dot{e} - \dot{p} = 0$ and   therefore (P*e/P) =1, e=1 and $\dot{e} = 0$, this also implies that

$\dot{p} = \dot{p}^* = 0.031$ (the average foreign inflation rate) according to the definition of our

model. By replacing these values into our model [Equation (9)] the obtained growth rate

is $\dot{y}_a$ =3.368%. Assuming the same conditions but setting the foreign inflation equal to

the domestic inflation rate, $\dot{p} = \dot{p}^* = 0.047$, the obtained domestic growth rate becomes

$\dot{y}_a = 3.55\%$. In both cases the result differs from that found when relative prices are not

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[14] In this study we use long-term interest rates for the German economy as the benchmark for foreign
interest rates.

neutral, $\dot{y}_b$ = 2.205% (**Table I**). Hence, our outcomes show that relative prices play an important role for Italian growth and when they are ignored the model can under-predict the actual growth rate.

(v) It is interesting to check a scenario where there is a change in the average value of the growth of real relative prices (or real exchange rate) for the whole period from $\dot{p}* + \dot{e} - \dot{p} = -0.001$ to 0.01 or 0.02 representing a depreciation of domestic currency. As a result, growth increases to $\dot{y}_a$ = 3.75% or $\dot{y}_a$ = 4.06%, respectively, thus suggesting that a currency devaluation[15] could work as a stimulus to growth, by increasing the country's competiveness in foreign markets.

(vi) Another relevant policy could be to reduce the import sensitivity of exports from π_x = 0.439 to 0.35. According to our model, the result would be an increase in the growth rate from $\dot{y}_a$ = 3.393% to $\dot{y}_a$ = 3.85%. If instead, π_x = 0.30, the growth rate is even higher, $\dot{y}_a$ = 4.09%. Exports having large import content could be an impediment to growth since the exports' multiplier effects on income are crowded out by higher imports. Reducing the import content of exports is the appropriate policy to achieve faster growth in Italy. We have to notice however, that in a globalized world, what is important is not importing too much in order to produce exports, but ensuring that the transformation of imported components into exports contains enough value-added. In international markets, most exports embody a substantial share of imported components, but in terms of gains it is important that the value (price) of exports embodying imported components is sufficiently higher than the value (price) of those imported components.

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[15] However, this is not an option for Italy since the country belongs to the Euro zone and nominal exchange rates are fixed. Even if devaluation was an option, to exert permanent growth effects it should be continuous.

(vii) Growth rates in Italy are also sensitive to import contents of the other components of demand like consumption and investment. Reducing the import sensitivity of consumption from π_c =1.272 to 1.0 and that of investment from π_k =0.462 to 0.40 the predicted growth rate obtained from the SCA model increases from $\dot{y}_a$ =3.393% to $\dot{y}_a$ =4.24% which is a significant improvement. Therefore, policies aiming at reducing the import dependence of the elements of demand (especially in consumption) can be a good strategy for fostering economic growth in Italy.

(viii) Increasing the share of exports by only one percentage point (from 23% to 24%) the obtained growth is $\dot{y}_a$ = 3.57%, or, alternatively, reducing the share of imports by only one percentage point (from 22%% to 21%) the predicted growth is even faster, of about $\dot{y}_a$ = 4.04%. Therefore, apparently the most appropriate way of achieving faster growth in Italy is related to changes in the structure of the import and export shares.

These hypothetical scenarios clearly show that the most effective policy to achieve faster growth in Italy is related to the external sector, either through an effort to obtain a positive net trade or to lower the import content of the components of demand. These findings are in line with the balance-of-payments equilibrium approach supported by Thirlwall's Law. Apart from foreign trade relations, financing the economy at lower interest rates is also advantageous for stimulating faster growth.

5. Concluding remarks

The aim of this study was to develop a more complete growth model in line with Thirlwall's Law that takes into account both internal and external imbalances and assuming that relative prices are not neutral. The important contribution of the extended model is that it distinguishes the import content of aggregate demand and introduces

public deficit and debt ratios as determinants of growth. Additionally, the model controls for relative prices movements and this is the main difference from our previous model (the SCA model). The reduced form of the model shows that growth rates can be obtained in three alternative ways: assuming internal and external imbalances and no neutrality in relative prices; assuming internal and external imbalances but neutral relative prices; and lastly the growth rate predicted by Thirlwall's Law. The growth model is tested for the Italian economy over the period 1983-2010 to check its accuracy for predicting actual growth.

The equations constituting the model are estimated by *3SLS* to control for the endogeneity of the core variables and to obtain consistent estimates. The empirical analysis shows that growth rates obtained by Thirlwall's Law and from our extended model both over predict the average growth rate of the Italian economy over the period 1983-2010. This can be taken as evidence that Italy should grow faster than actually did without harming its balance-of-payments position, and this lack of growth is due to supply or capacity constraints.

The scenarios analysis implemented to identify policies that could foster economic growth suggests that strategies aiming at equilibrating external deficits or changing the structure of imports and exports are the most effective for achieving higher growth. Competitive devaluation also acts as a stimulus to growth but this policy is not feasible in the Euro-zone. Two remarks must be made in this respect. The first is that about half of the total trade in Italy is with non-European partners; therefore, variations of the nominal exchange rate of the Euro against the non-Eurozone partners might have significant effects on the balance-of-payments in Italy and therefore on its growth performance. The second is that, Thirlwall's Law considers real, rather than nominal exchange rate, the former being determined by the inflation rate differentials between a

country and its trade partners. Taking into account that inflation differentials are persistent in Italy, before and after its Euro zone membership, they may affect seriously its external competitiveness in real terms.

Finally, the scenarios analysis also shows that policies designed to achieve better conditions of financing internal imbalances, and reducing the payment costs of public debt are beneficial to growth. To some extent, Italy could benefit from the challenging idea of issuing Eurobonds to finance its public debt in the European market at lower costs. However this initiative is far from being feasible due to lack of political consensus in Europe.

Appendix A : *Description of the variables and data sources*

- $\dot{m}_t$ – annual growth rate of real imports - Imports of goods and services at 2000 prices (national currency; annual percentage change).

- $\dot{c}_t$ – annual growth rate of final private consumption - Private final consumption expenditure at 2000 prices (national currency; annual percentage change).

- $\dot{x}_t$ – annual growth rate of real exports - Exports of goods and services at 2000 prices (national currency; annual percentage change).

- $in\dot{v}_t$ – annual growth rate of investment - Gross fixed capital formation at 2000 prices (national currency; annual percentage change).

- $\dot{y}_t$ – annual growth rate of real GDP - GDP at 2000 market prices (national currency; annual percentage change).

- $\dot{p}_t$ – annual growth rate of price deflator GDP at market prices (national currency; annual percentage change).

- $\dot{p}_t^*$ – annual growth rate of price deflator GDP at market prices, for the EU-12 (national currency; annual percentage change).

- w_G – share of government's expenditure on GDP - Total expenditure; general government minus interest including flows on swaps and FRAs (% of GDP at market prices; excessive deficit procedure).

- w_D – share of government's deficit on GDP - Net lending (-) or net borrowing (+); general government (% of GDP at market prices; excessive deficit procedure).

- w_B – share of government's debt on GDP - General government consolidated gross debt (% of GDP at market prices; excessive deficit procedure).

- w_M - imports of goods and services at current prices (national accounts) - % of GDP at market prices

- w_X- exports of goods and services at current prices (national accounts) - % of GDP at market prices.

- t – share of government's revenues on GDP - Total current revenue; general government (% of GDP at market prices; excessive deficit procedure).

- i – nominal long-term interest rates (%)

- i^* - nominal long-term interest rates (%) for Germany

Data on $\dot{m}_t$, $\dot{c}_t$, $\dot{x}_t$, $in\dot{v}_t$, $\dot{y}_t$, $\dot{p}_t$, $\dot{p}_t^*$, w_G, w_D, w_B, w_M, w_X, t, i and i^* were taken from European Commission (2011).

- $\dot{g}_t$ – annual growth rate of government's expenditure. Computed by the authors from data on "General government expenditure by function (Millions of euro from 1.1.1999/ECU up to 31.12.1998)" (for 1990 on) and "General government expenditure (Millions of euro from 1.1.1999/ECU up to 31.12.1998)" (till 1989), from Eurostat - http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes (extracted on 29th February 2012 and 14th January 2011, respectively) and information on $\dot{p}_t$.

- $\dot{y}*$ - annual growth rate of real foreign income (OECD countries), excluding Italy. Computed by the authors using information about "Gross domestic product, GDP per head, US $, constant prices, constant PPPs, reference year 2005" , from OECD.StatExtracts - http://stats.oecd.org/ (extracted on 15th December 2011)

- $\dot{y}_d$ - annual growth rate of real disposable income. Computed by the authors using information about "Net national disposable income (national currency, constant prices, national base year)", from OECD.StatExtracts - http://stats.oecd.org/ (extracted on 10th March 2012)

- e – nominal effective exchange rate - price of domestic currency in terms of foreign currency - index (2010=100) narrow indices (27 countries). Computed by the authors using monthly data, from the Bank for International Settlements(BIS)- http://www.bis.org/statistics/eer/index.htm (extracted on 18th May 2012)

- $(P*e/P)$- real effective exchange rate index (2010=100), narrow indices (27 countries). Computed by the authors using monthly data, from the Bank for International Settlements(BIS)- http://www.bis.org/statistics/eer/index.htm (extracted on 18th May 2012)

Appendix B

Table B.1. The 3SLS estimation of the structural growth model: Italy 1983-2010.

	Coefficient	Std Error	t-stat	p-value	R^2	F-stat	p-value
Imports growth							
constant	0.829	0.836	0.99	0.324			
$\dot{c}_t$	1.272	0.455	2.8	0.006***			
$\dot{g}_t$	-0.163	0.114	-1.43	0.156	0.8404	28.03	0.000
$\dot{x}_t$	0.439	0.13	3.39	0.001***			
inv_t	0.462	0.231	2	0.049**			
$(\dot{p}_t * + \dot{e}_t - \dot{p}_t)$	-0.21	0.193	-1.09	0.279			
Consumption growth							
constant	0.589	0.232	2.54	0.013**	0.6626	58.66	0.000
$\dot{y}_{d,t}$	0.704	0.092	7.66	0.000***			
Investment growtl							
constant	-1.662	0.555	-2.99	0.003***			
$\dot{y}_t$	2.076	0.24	8.64	0.000***	0.7373	39.55	0.000
$\dot{r}_t$	-0.177	0.308	-0.57	0.568			
Exports growth							
constant	-4.327	1.068	-4.05	0.000***			
$\dot{y}_t *$	2.961	0.339	8.72	0.000***	0.7528	45.91	0.000
$(\dot{p}_t * + \dot{e}_t - \dot{p}_t)$	0.467	0.109	4.28	0.000***			

Table B.2. The 2SLS estimation of each equation of the structural model, Italy 1983-2010.

	Coefficient	Std Error	t-stat	p-value	Sargan test	Heteroskedasticity test	AR(1) test	Normality test
Imports growth								
constant	0.841	0.952	0.88	0.387	$\chi^2_{20}=27.334$	$\chi^2_{25}=17.048$	$\chi^2_1=0.899$	$\chi^2_2=5.58$
$\dot{c}_t$	1.378	0.523	2.63	0.015**	p-value=0.1261	p-value=0.8800	p-value=0.3429	p-value=0.062
$\dot{g}_t$	-0.195	0.131	-1.49	0.152				
$\dot{x}_t$	0.438	0.149	2.94	0.008***				
$\dot{inv}_t$	0.469	0.266	1.76	0.092*				
$(\dot{p}_t*+\dot{e}_t-\dot{p}_t)$	-0.261	0.222	-1.18	0.253				
Consumption growth								
constant	0.591	0.243	2.43	0.023**	$\chi^2_{24}=26.830$	$\chi^2_{25}=22.682$	$\chi^2_1=0.194$	$\chi^2_2=2.08$
$\dot{y}_{d,t}$	0.703	0.099	7.12	0.000***	p-value=0.3124	p-value=0.5961	0.6594	p-value=0.354
Investment growth								
constant	-1.691	0.589	-2.87	0.008***	$\chi^2_{23}=26.941$	$\chi^2_{25}=21.660$	$\chi^2_1=3.690$	$\chi^2_2=12.72$
$\dot{y}_t$	2.099	0.256	8.21	0.000***	p-value=0.2585	p-value=0.6553	p-value=0.055	p-value=0.002
$\dot{r}_t$	-0.124	0.336	-0.37	0.716				
Exports growth								
constant	-4.333	1.158	-3.74	0.001***	$\chi^2_{23}=26.429$	$\chi^2_{25}=21.815$	$\chi^2_1=0.020$	$\chi^2_2=1.02$
$\dot{y}_t*$	2.967	0.372	7.98	0.000***	p-value=0.2810	p-value=0.6464	p-value=0.8863	p-value=0.600
$(\dot{p}_t*+\dot{e}_t-\dot{p}_t)$	0.511	0.124	4.13	0.000***				

Notes to the tables:

Endogenous variables: $\dot{m}_t, \dot{c}_t, \dot{inv}_t, \dot{x}_t, \dot{g}_t, \dot{y}_t, \dot{y}_{d,t}, \dot{r}_t, (\dot{p}_t*+\dot{e}_t-\dot{p}_t)$

Exogenous variables: $t_t, t_{t-1}, i_t, i_{t-1}, \dot{r}_{t-1}, \dot{r}_{t-2}, \dot{p}_t, \dot{p}*_{t-1}, \dot{p}*_{t-2}, w_{B,t}, w_{B,t-1}, w_{D,t}, w_{D,t-1}, w_{G,t}, w_{G,t-1}, \dot{c}_{t-1}, \dot{c}_{t-2}, \dot{g}_{t-1}, \dot{x}_{t-1}, \dot{x}_{t-2}, \dot{inv}_{t-1},$ $\dot{inv}_{t-2}, \dot{y}*_t, i_t*, (\dot{p}*_{t-1}+\dot{e}_{t-1}-\dot{p}_{t-1})$

*, **, *** Coefficient significant at the 10%, 5% and 1% level, respectively.

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