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# The slowing of growth in France: an interpretation based on Thirlwall's law

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## Abstract:

In this paper, we evaluate the French balance-of-payments constrained growth rate and we compare it with the effective growth rate. Empirically, we show that France is experiencing, simultaneously to its European integration, a substantial increase in the income elasticity of demand for imports and a collapse in the growth rate of its exports. Within the balance-of-payments constrained growth approach, this twofold negative effect is a major obstacle to true economic recovery and full employment.

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**JEL classification:** C22, F41, F43

## 1. Introduction

Forty years ago now, Thirlwall (1979) wrote a path-breaking article explaining the differences among international growth rates by a demand-oriented approach. By contrast, neoclassical growth theories continued to turn out supply-side explanations based on aggregate production functions. Following the logic of Harrod's foreign trade multiplier (Harrod, 1933), Thirlwall emphasizes the role of exports as the ultimate brake on activity but in a dynamic framework. He claims that growth rates differ across countries or regions because growth in demand differs. In the long run, exports are the only component of aggregate demand that remains exogenous, and accordingly they become the driving force that constrains the economy. It is therefore the existence of demand constraints that explains differences in growth rates. In an open economy, differences in countries' macroeconomic performances are thus mostly determined by their respective capacities to export. This means that growth is constrained by the necessity to equilibrate the balance of payments in the long run.

This leaves a fundamental role for exports ahead of any other component of aggregate demand (Thirlwall, 2013, p. 36). First, only earnings from exports can pay for the import content of consumption, investment, government expenditure, and exports themselves. Accordingly, rapid growth of exports has a direct effect on demand but also an indirect effect: by allowing all other factors of demand to grow faster without upsetting the equilibrium of the balance of payments. Second, exports enable capital goods that are not produced domestically to be imported. This access to better technologies is fundamental for developing countries trying to escape the trap of under-development.

Besides, exports are not the sole determinant of growth in Thirlwall's framework. There is a second key element in his model, corresponding to a domestic appetite for imports, i.e. the income elasticity of demand for imports.

Following Thirlwall, in the long run, the maximum sustainable growth rate (also called the balance of payments equilibrium growth rate) is equal to the rate of growth of exports divided by the income elasticity of demand for imports. Accordingly, the current growth rate of a country should be close to its balance of payments equilibrium growth rate and the latter represents a good indicator of the former. This result soon became famous and gave rise to a massive and still very active ongoing empirical literature around what is known today as Thirlwall's law.

The purpose of this paper is to characterize economic growth in France by mobilizing the balance-of-payments constrained growth approach. In a context of European integration (both economic and monetary), we show empirically that France is experiencing a twofold negative effect reinforcing the constraints on increasing GDP. We think that such an issue is of prime importance for France where poor macroeconomic performances are often explained by a lack of competitiveness and/or excessive public debt. Here, we want to stress what constitutes a true paradox for the proponents of European integration who claimed it would bring higher growth and employment: since the acceleration of such integration France has experienced a substantial decline of its balance-of-payments constrained growth rate and of its effective growth rate.

To the best of our knowledge, this is the first time Thirlwall's law has been mobilized to explain the progressive slowdown in France's economic growth rate. In some studies (see for example Bairam, 1988 or Bagnai, 2010), France is included, but there are no studies dedicated to interpret precisely French economic trajectory following Thirlwall's law.

We also extend Thirlwall's law literature by providing a case study on a specific country, following one of the suggestions made by Razmi (2016) in an article pointing at the flaws inherent to the empirical literature of balance-of-payments constrained growth. Moreover, our results derive from the implementation of formal structural break tests based on Andrews (1993). Surprisingly, such an econometric methodology is rarely used in the scope of the balance-of-payments constrained growth approach, though it is remarkably useful to enlighten structural change. In a recent paper celebrating the 40th anniversary of his pathbreaking article, Thirlwall (2019) points at "the need for structural change" for countries trying to boost their growth. But, where Thirlwall (2019) sees structural change as the spreading of technologies across all the sectors of the economy, we want here to stress structural change as the modification of the institutional environment undergone by the French economy: behind the balance-of-payments-constrained growth, there is an institutionally-constrained growth. Finally, we hope that our paper contributes to various strands of the literature, both about Thirlwall's law and political economic analysis of the French economy.

The rest of the paper is organized as follows. Section 2 reviews the literature on Thirlwall's law. Section 3 develops the simple analytics of the basic constrained growth model. Section 4 briefly discusses the econometric strategy. Section 5 presents our main

empirical results. In section 6, we propose a political economy analysis for these results and conclude in section 7.

## 2. Literature review

Since Thirlwall's original study, an impressive number of contributions have emerged in the literature, either for groups of countries or individual countries, but with the common goal of showing that the effective growth rate converges with the balance-of-payments constrained growth rate in the long run.<sup>1</sup> Thirlwall and Hussain (1982) is one of the first attempts to validate Thirlwall's law for a group of developing economies including capital flows. Bairam (1988) is the first to encompass European and North American countries over the period 1970–1985 and to find support for the balance-of-payments constrained growth approach with a parametric test. This result was quickly supplemented by Bairam and Dempster (1991) for 11 Asian countries and Hussain (1999) whose estimations compare the performance of African and Asian countries during the 1970s and 1980s. In the same vein, Perraton (2003), with 34 testable developing countries, finds some support for Thirlwall's law. Using the cointegration method and a structural break test for non-stationary time series, Bagnai (2010) extends Andersen's (1993) results and provides evidence that growth is ultimately balance of payments constrained for a group of OECD economies. Gouvea and Lima (2010), based on a previous work by Araujo and Lima (2007), test the original and a multisectoral version of Thirlwall's law for a sample of Latin American and Asian countries over the period 1962–2006. The authors find that the multisectoral Thirlwall's law holds for all countries. More recently, Bagnai *et al.* (2016) also test a disaggregated version of Thirlwall's model on a panel of 20 Sub-Saharan economies.

Numerous contributions have been made for individual countries. Using a two-stage least squares methodology, Atesoglu (1993, 1994) focuses specifically on the United States and Germany and shows that their balance of payments equilibrium growth rates are a good predictor of their actual growth rate. Other studies deal with large developing countries, with Razmi (2005) and Jeon (2009) testing Thirlwall's law, respectively, on India and China. Empirical studies of small emerging economies have also flourished in the last decade: see for instance, the works of Fugarolas Alvarez-Ude and Matesanz Gómez

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<sup>1</sup> The reader interested in understanding the evolution and the various extensions of Thirlwall's law can refer to Soukiazis and Cerqueira (2012).

(2008) for Argentina, Felipe *et al.* (2010) for Pakistan, Gökçe and Çankal (2013) for Turkey, and Blecker and Ibarra (2013) for Mexico. Finally, an increasing volume of works concerns southern Europe and, particularly, Spain (Alonso, 1999; Léon-Ledesma, 1999), Italy (Soukiazis *et al.*, 2014), Portugal (Soukiazis and Antunes, 2011), and Greece (Soukiazis *et al.*, 2018).

Even though France is part of the studies of Bairam (1988) and Bagnai (2010), no article has been made to extensively analyze French economic performance through the lens of Thirlwall's law. In Bairam (1988), the purpose was to verify the validity of Thirlwall's law in general, but it was not to assess French economic performance. Bagnai (2010) is more relevant to our present study, since it looks at different countries to search for structural breaks in the estimation of the different parameters entering Thirlwall's law. While its purpose is also to empirically validate Thirlwall's law, Bagnai (2010) introduces the quest for structural breaks in the literature over balance-of-payments constrained. If Bagnai (2010) found structural breaks for several countries in his panel, France did not seem to undergo such a break. But, Bagnai (2010)'s data goes only to 2006, and our departure assumption is that the eventual structural break caused by the adoption of the euro was not yet apparent. With now a better historical step back, it could be assumed that a structural break may concern France. That is what we will test in the fifth section of this paper.

Nearly as soon as the original paper of Thirlwall has been published in 1979, several criticisms arose. McCombie (1981) was one of the first ones, and it questioned whether the law was just a tautology or not. More recently, the same line of criticisms appeared in the works of Clavijo and Ros (2015), Razmi (2016) or Blecker (2016). For them, testing the empirical validity of Thirlwall's law is like testing whether the growth rate of exports equals the growth rate of imports in the long run. An early answer came from Thirlwall (1981) and it has been recently recalled by McCombie (2019) who has long ago accepted this response to his 1981 critique: "There is no econometric reason why the estimated coefficients in a regression equation should not all be statistically insignificant. After all, they are derived from behavioral relationships and this is why elasticities are estimated econometrically and not simply calculated arithmetically. As has been shown, the argument that Thirlwall's law is simply a tautology is based on a confusion between a statistically estimated elasticity and an arithmetically calculated one" (McCombie, 2019, p. 433). In our paper, our main purpose is not to test the empirical validity of Thirlwall's

law. Therefore, we let the interested reader refer to Blecker (2016) or McCombie (2019) for a detailed presentation of this issue.

Beyond these empirical debates, Thirlwall's law has also been criticized on the theoretical front (Blecker, 2016). A first criticism concerns the driver for growth in individual countries. Assuming that the income elasticities of exports and imports are stable over long period of time, Thirlwall's law ends to assess that every individual country growth rate is positively correlated to the world growth rate. Razmi (2016) shows that this correlation does not hold for many countries. Testing other variables which could possibly determine national economic growth, Razmi (2016) stresses the fact that accumulation rates play a better role in determining national growth rates than foreign growth. The purpose of our paper is precisely to show that income elasticities for imports and exports are not stable over time and may be subject to structural breaks due to institutional changes (for instances, modifications in international commercial agreements), so that national growth does not depend only upon foreign growth. A second criticism stands for the disregard of the role of exchange rate variation in determining growth. If it is logically consistent not to consider persistent devaluation or reevaluation in the long run, Razmi (2016) also blames Thirlwall's law for underestimating the effect of the *level* of the real exchange rates on growth. More specifically, Razmi (2016) explains that an undervaluation of the exchange rate may foster accumulation, and these two variables are often overlooked in Thirlwall's law literature. In our paper, we try to respect this caveat: when dealing with the interpretation of our results, we will assume that both the overvaluation of the exchange rate and the decrease in accumulation rates may have play a role in shaping income elasticities in France.

A third line of criticism addresses the question of the concrete mechanisms through which the effective growth rate converge to the balance-of-payments constrained growth rate. For Pugno (1998), the canonical Thirlwall's model is silent on this point. He thus proposes an extension of the model where the effective growth rate is directed to the balance-of-payments constraint notably through the interplay of demand management policies, labor market dynamics and mark-up changes. In our paper, the causality between the effective and the balance-of-payments growth rates could be mixed. On the one hand, starting with a trade deficit, the effective growth rate will drop because of the combination of austerity policies by the State and potential delocalization by firms trying to escape the

profit brake embodied by a trade deficit in Kalecki's profit equation<sup>2</sup>. On the other hand, it is also possible that the balance-of-payments constrained growth changes over time because of changes in the effective growth rates. Indeed, a reduction in the effective growth rate may trigger a drop in accumulation rates (accelerator effects), which could lead to a degradation of income elasticities for imports and exports: the decrease in the income elasticity of exports means that domestic production is less appealing to foreign customers, while the increase in the income elasticity of imports implies that domestic customers are more attracted to foreign productions, both effects contributing to a drop in the balance-of-payments-constrained growth rate. Conversely, a government trying to move up its balance-of-payments constrained growth rate could engage in what Setterfield (2011, p. 401) calls "supply-side Keynesianism" while making the income elasticity of exports goes up and the imports one goes down (on this specific point, see also McCombie and Thirlwall, 1999). To do so, it is possible to boost investment as argued above, but also to support specific sectors in the economy: Araujo and Lima (2007) develops a model where different imports and exports have different income elasticities. Then, it becomes possible to increase the aggregate exports' income elasticity while focusing on the industries which benefits from the bigger exports' income elasticity: for example, Gouvea and Lima (2010) or Romero and McCombie (2018) show that the high-tech intensive sectors have a higher income elasticity for exports.

### 3. The theoretical framework

One of the reasons why Thirlwall's law is so resilient is that it relies on a very small number of equations in the canonical model. In his original article, Thirlwall (1979) starts from the following two equations:

$$X = Z^\varepsilon \left(\frac{p^d}{p^f}\right)^\eta \quad (1)$$

$$M = Y^\pi \left(\frac{p^d}{p^f}\right)^\theta \quad (2)$$

with  $\varepsilon, \theta, \pi > 0$  and  $\eta < 0$ . Equations (1) and (2) are export and import demand functions specified in multiplicative terms with constant elasticities.  $X$ ,  $M$ ,  $Z$ , and  $Y$  are exports,

<sup>2</sup> Kalecki's profit equation assesses that the level of macroeconomic profit is equal to the addition of public deficits, trade surplus, investment and capitalists' consumption but minus workers' savings (see, for example, Chapter 7 in Kalecki, 1971). The drop in macroeconomic profit may be an incentive for firms to reduce their national production or to invest and produce more and more abroad... which could increase the initial trade deficits.

imports, foreign income, and domestic income in real terms respectively.  $P^d$  over  $P^f$  is the ratio of domestic prices to foreign prices *expressed in the same currency*.<sup>3</sup> Finally,  $\eta$  and  $\theta$  are the price elasticities and  $\varepsilon$  and  $\pi$  are the income elasticities. Log-linearizing (1) and (2) and differentiating with respect to time gives:

$$x = \varepsilon z + \eta(p^d - p^f) \quad (3)$$

and

$$m = \pi y + \theta(p^d - p^f) \quad (4)$$

where the lower case letters stand for the growth rates of the above variables (for instance,  $x = \dot{X}/X$ ). In a long-run perspective, it is assumed that the current account is in equilibrium. The rationale behind this hypothesis is the following. First, a country may be unable to attract capital from abroad permanently in order to finance a chronic trade deficit. Otherwise, it could lead to a collapse in international confidence, a downgrade in its international credit rating, and a possible currency crisis. Second, a country may be unwilling to run a chronic deficit because of its increasing financial commitments, possibly in a foreign currency, and the negative impact of a potential currency depreciation on these debts. Third, a persistent trade deficit may contribute to the vanishing of the economic base (Haig, 1927) and so lead to a permanent reduction in economic growth. By equalizing (3) and (4) we obtain:

$$\varepsilon z + \eta(p^d - p^f) = \pi y + \theta(p^d - p^f) \quad (5)$$

After some simple manipulations, we find the balance of payments constrained growth rate for the domestic economy:

$$y^* = \frac{(\eta - \theta)(p^d - p^f) + \varepsilon z}{\pi} \quad (6)$$

Assuming that relative prices in international trade are constant over the long run, *i.e.*  $p^d = p^f$ , equation (6) reduces to:<sup>4</sup>

$$y^* = \frac{\varepsilon z}{\pi} \quad (7)$$

and, ultimately, with the help of (3), it becomes:

$$y^* = \frac{x}{\pi} \quad (8)$$

<sup>3</sup> The ratio under study therefore refers to the *real* exchange rate: domestic prices expressed in domestic currency over foreign prices also expressed in domestic currency, which means that the denominator is equal to foreign prices in foreign currency times the *nominal* exchange rate.

<sup>4</sup> Several reasons may be invoked for relative prices remaining constant in the long run. According to Thirlwall (1986, p. 1260), the existence of highly competitive markets is such that a price reduction in a country will be matched by foreign competitors for some goods. For other goods, prices are fixed in oligopolistic markets and competition occurs mainly through product and quality differentiation.

Equations (7) and (8) are known as Thirlwall's law, indicating that the growth rate,  $y$ , should be equal to the balance of payments equilibrium growth rate, which is itself equal to the growth rate of exports divided by the income elasticity of imports. Here, it is necessary to recall that Thirlwall's law is a long-term relationship, which means that equations (7) and (8) hold in the long run but not for each specific country in a given year. Next, this law may sometimes be violated over considerable periods of time for reasons related to capital flows.<sup>5</sup> On the one hand, a specific country may experience a persistent trade deficit with no obligation to devalue its currency or restrain its level of activity, if the country manages to attract unconditional capital inflows. Because of its place in the international monetary system (the dollar privilege), the United States is able to avoid currency crises despite running permanent trade deficits. The frequent crises in emerging countries also help the United States to attract capital inflows fleeing these unstable markets. Conversely, a country may accumulate trade surpluses with no tendency to revalue its currency or to strongly increase its level of activity, if this country decides to recycle its trade surpluses abroad with massive capital outflows. This example is akin to the German case where the aging society helps to build a national consensus as to the necessity of accumulating trade surpluses, partly obtained by the implementation of restrictive demand policies in the 2000s. As a consequence, the effective growth rate is not always equal to the balance-of-payments constrained growth rate. Apart from these specific cases, Thirlwall's law seems quite accurate for most countries. Then, we try to use it for the French economy in the remainder of the paper. Our purpose now is to estimate the export and import functions in order to obtain the income elasticities and assess the balance of payments equilibrium growth rate.

#### 4. Data and estimation strategy

To confirm the validity of Thirlwall's law we first evaluate the export function for the French economy:

$$x_t = \beta + \varepsilon z_t + \eta(p^d - p^f)_{t-1} + \varepsilon_{xt} \quad (9)$$

<sup>5</sup> Though Thirlwall (2011) recognizes that incorporating capital flows may marginally improve the power of the law in some cases, it also explains that "export growth, not capital flows, is by far the most important variable governing growth performance" and that "exports dominate".

with  $\beta$  a constant,  $(p^d - p^f)_{t-1}$  the growth rate in relative prices of exports (defined as the difference between the growth of export and import prices) lagged by one period and  $\varepsilon_{xt}$  an error term. Analogously, we test the following import demand function:

$$m_t = \alpha + \pi y_t + \theta(p^d - p^f)_{t-1} + \varepsilon_{mt} \quad (10)$$

where  $\alpha$  is a constant,  $(p^d - p^f)_{t-1}$  is the growth rate in relative prices of imports (corresponding to the difference between the growth of domestic and import prices) lagged by one period and  $\varepsilon_{mt}$  is an error term. Here, we have chosen to include a lag in the import function. As emphasized by Soukiazis and Antunes (2011), there may be a justification to such a choice: relative price variations cannot have an immediate impact on import growth since international transactions are based on contracts with fixed terms in the short run. By analogy, we assume *a priori* that this logic applies to the export function. Though, from the point of view of statistical significance we will see that, depending on the function, the use of the current/lagged growth in relative prices may yield different results.

Our data comes from the annual macroeconomic database of the European Commission (AMECO) and the World Bank over the period 1961–2017 and growth rates are expressed in log difference. We use the following time series for the import function:  $m_t$  the rate of growth of real imports;  $y_t$  the rate of growth of real GDP and  $p^d$  ( $p^f$ ) the rate of growth of the GDP (import) price deflator. Whereas for the export function  $x_t$  is the rate of growth of real exports and  $z_t$  the rate of growth of foreign real income (approximated by the real GDP of the OECD countries from which French real GDP is subtracted). Here, our proxy is justified by the fact that France's exports towards OECD countries represent a large portion of its total exports (see Appendix 1). Lastly,  $p^d$  is the rate of growth of the export price deflator and  $p^f$  the growth rate of the import price deflator as in the import function.

When dealing with the import and export demand functions we can identify two technical issues. First, the Ordinary Least Squares (OLS) estimate may be biased due to the existence of simultaneity between the dependent variable  $m$  and the independent variable  $y$ . This problem has been a familiar one in the literature about Thirlwall's law as recognized by Atesoglu (1993, 1994). The standard procedure consists in using the Two-Stage Least Squares (2SLS) method to overcome this difficulty and ensure that the estimates remain consistent. It is to note that such an issue does not concern the export function since the capability of French exports to influence OECD real GDP is very unlikely. Second, considering our sample of 56 years, it would be unwise to assume away the

possibility of a structural break over the whole period. Accordingly, we make use of the structural break test of Andrews (1993) with an unknown break date to take such a possibility into account for both functions. Besides, this test is shown to be superior to the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for detecting parameter instability (see Andrews, 1993, p. 826). This implies that Andrews' test could detect a structural break ignored by the CUSUM and CUSUMSQ tests, making OLS and 2SLS estimates vary substantially.

## 5. Empirical results

The first step before running any regression is to check for the stationarity of our time series. The results of the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are encompassed in Appendix 2. Here, we decided the specific form to be tested only after a systematic graphical inspection of each series. Consequently, all series are tested with a trend and a drift with the exception of the growth rate of relative prices for imports and exports that are tested without trend and drift as in Soukiazis and Antunes (2011). All the time series utilized appear to be stationary, i.e.  $I(0)$ , with a trend and a constant, a constant or without trend and drift even at a very low level of significance.

As recalled above, the estimated export equation (9) should not suffer from endogeneity. The direct consequence is that the standard OLS procedure can be applied without risk. The estimated model, labelled OLS I, gives expected results in terms of signs, magnitude and statistical significance (see Table 1). However, the diagnostic tests indicate serious problems due to an important serial correlation and an absence of normality of residuals. Then, we re-estimate the model (labelled OLS II), incorporating a lag on the dependent variable, in order to overcome this difficulty and control again for serial correlation, heteroskedasticity and normality of residuals. From now on, the model passes all the diagnostic tests at the conventional levels (1 and 5%) of statistical significance and the essential independent variable remains highly significant: income elasticity,  $\varepsilon$ , is now around 1.48. Then, in what follows, we decide to keep this second estimation considering its greater statistical robustness.

**Table 1: Estimated export function for the period 1961–2017**

	OLS I	OLS II
<b>Explanatory variables</b>		
Constant	0.003 (0.694)	-0.005 (-0.544)
$z_t$	1.663*** (6.115)	1.485*** (5.538)
$(p^d - p^f)_{t-1}$	0.097 (0.584)	0.266 (1.546)
$x_{t-1}$		0.270** (2.546)
$R^2$	0.452	0.513
Observations	56	56
<b>Diagnostic tests</b>		
Serial correlation	0.034	0.907
Heteroskedasticity	0.724	0.837
Normality	0.041	0.575

Notes: \*\*\* and \*\* denote 1 and 5% levels of significance,  $t$ -statistics for coefficients are in parentheses. The lower part of the table reports the  $p$ -values of Chi-square testing the null hypothesis of no serial correlation of errors (Lagrange multiplier test), the absence of heteroskedasticity (ARCH test) and the normal distribution of residuals (Jarque-Bera test).

Estimating the import function with an OLS procedure gives, once more, expected results when compared with the existing literature.<sup>6</sup> As shown in Table 2, income elasticity,  $\pi = 1.87$ , and relative price elasticity,  $\theta = 0.3$ , are positive and highly significant. The greater value for income elasticity means that, in the long run, adjustments work mainly through quantities rather than prices: growth of French imports react more strongly to changes in the growth rate of income than to changes in the growth rate of relative prices.

<sup>6</sup> In the rest of the paper, we keep the OLS approach only for comparison with the results obtained by the 2SLS methodology.

**Table 2: Estimated import function for the period 1961–2017**

	OLS	2SLS
<b>Explanatory variables</b>		
Constant	0.002 (0.303)	-0.008 (-1.135)
$y_t$	1.871*** (9.023)	2.307*** (9.740)
$(p^d - p^f)_{t-1}$	0.300*** (3.792)	0.292*** (3.392)
$R^2$	0.712	0.730
Observations	56	55
<b>Diagnostic tests</b>		
Serial correlation	0.814	0.393
Heteroskedasticity	0.210	0.449
Normality	0.687	0.303
Sargan's test		0.756
Endogeneity test		0.003
Cragg-Donald $F$ -Statistic		60.792

Notes: \*\*\* and \*\* denote 1 and 5% levels of significance,  $t$ -statistics for coefficients are in parentheses. The lower part of the table reports the  $p$ -values of Chi-square testing the null hypothesis of no serial correlation of errors (Lagrange multiplier test), the absence of heteroskedasticity (ARCH test), the normal distribution of residuals (Jarque-Bera test), the validity of the overidentifying restrictions (Sargan test) and whether  $y_t$  can be treated as exogenous (endogeneity test). Lastly, the Cragg-Donald  $F$ -statistic tests the null hypothesis of the weakness of the chosen instruments. When the  $F$ -statistic is greater than the Stock-Yogo (2005, p. 101) critical value we reject the null of weak instruments. Here, critical value is 13.43 with a maximum 2SLS size distortion of 10%. Note that the  $R^2$  does not have the current interpretation in 2SLS, we indicate its value for convenience only.

The model passes all the diagnostic tests: we find no evidence of serial correlation in the residuals, an absence of heteroskedasticity and normally distributed residuals. Nevertheless, as explained above, OLS coefficients may be biased because of simultaneity issues between the growth rate of GDP and the growth rate of imports. Thus, equation (10) is estimated by using the 2SLS approach to ensure that our estimates remain consistent. For this purpose, we use a constant, the growth rate of real gross fixed capital formation  $inv_t$ ,  $p_{t-1}^f$ , and  $p_{t-2}^f$  as instruments. In this article, we choose not to use the lag of endogenous variable as an instrument. The main reason is it produces completely unrealistic values for the coefficients and weak results in terms of statistical significance

and robustness. Moreover, such a decision does not seem unconventional since it follows the literature as reflected by the works of Atesoglu (1993, 1994), Léon-Ledesma (1999) and Soukiazis and Antunes (2011). Then, our estimations immediately reveal a substantial increase in the income elasticity of the import demand function which, everything else being unchanged, reduces the balance of payments equilibrium growth rate with regard to the OLS specification. In order to assess the strength of this second estimation, we perform several diagnostic tests, including tests specific to the 2SLS method. All the conventional tests are conclusive. First, the Sargan test shows that we cannot reject the validity of the chosen instrumental variables. Second, the endogeneity test confirms our doubts about  $y_t$ , indicating that the variable cannot be considered as exogenous in the import function and strengthening the need to use a 2SLS approach. Third, the Cragg-Donald  $F$ -statistic is greater than the critical value from Stock and Yogo (2005), rejecting the hypothesis of weak instruments. Given the previous results, we use the 2SLS procedure as being more appropriate for estimating income elasticity.

However, we still need to address our second issue and eventually confirm the presence of structural breaks that could noticeably modify the estimated coefficients. To this end, we perform a test proposed by Andrews (1993) to detect the possible presence of a structural break point when the break date is unknown. Table 3 shows that Andrews' test unambiguously rejects the absence of a structural break for the import function. Here, two key elements are to be noted regarding the import function. First, the break dates – for the year 1993 – appear to be the same in both methodologies (OLS and 2SLS). Second, the null hypothesis of no breakpoint is even more strongly rejected when the import function is estimated through the 2SLS procedure. As for the export function, we also have to reject the absence of a structural break. Then, Andrews' statistical procedure finds a break in 1979. At this point, it is also necessary to emphasize that these findings are rather robust to changing conditions; for instance, choosing different trimming percentages (10 or 20%) does not modify the break date established for both dates.

**Table 3: Andrews' structural break test**

Maximum LR $F$ -Statistic	P-value	Break date
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<b>Exports</b>			
OLS II	7.161***	0.000	1979
<b>Imports</b>			
OLS	5.315**	0.021	1993
2SLS	6.227***	0.006	1993

Notes: \*\*\* and \*\* denote 1 and 5% level of significance.  
A standard 15% level of trimming is applied for both tests.

On the export side, the structural break date in 1979 may be explained by three major factors. The first one deals with the oil shock following the Iranian revolution that involved a substantial reduction in world crude oil production, leading to a second inflationary peak. The second one corresponds to the creation of the European Monetary System (EMS) that was, in some sense, a trial run for the Eurozone. The EMS was a monetary arrangement in which countries belonging to the European Economic Community engaged to maintain stable exchange rates, inside a narrow corridor, by preventing fluctuations in the exchange rate of  $\pm 2.25\%$ . Finally, another difference between both sub-periods (1961-1978 and 1979-2017) is the substantial decrease in the growth rate of foreign real income,  $z_t$ .<sup>7</sup>

The structural break date in 1993 corresponds to a new phase in the European construction, namely the official launch of the Single European Market (on December 31 1992) created by the Treaty on European Union (also labelled Maastricht Treaty). For the purpose of our study, amongst the most important changes we find the full removal of custom duties between European member countries, the abolition of non-tariff barriers to trade (quantitative restrictions on imports, unlawful technical trade barriers, etc.), the liberalization of services and the perfect mobility of capital between Member States but also between Member States and other countries. For France, the limitation of national industrial policies has also played a detrimental part, since the defense of 'national champions' was a pillar sustaining exports, but also restraining the access to the domestic market by foreign competitors, thus constraining imports. All these measures have progressively contributed to an unrestricted opening of goods and services markets,

<sup>7</sup> It should be noted that the decrease regarding the growth rate of foreign real income only concerns OECD countries from which China is excluded. Nevertheless, French exports towards China represents less than 5% of its total exports.

favoring the appetite for imports. Moreover, the rigid exchange rate regimes adopted (during the preparations for the Euro and then with the functioning of the Eurozone) since the 1990s have partly neutralized price competition among European countries, since there are no longer exchange rate adjustments. As a consequence, export and import variations depend more on income changes than on price changes. France is just another example of what could arise in a common currency area when there are imbalances in demand dynamics.

**Table 4: Estimated export functions with a structural break in 1979**

	OLS 1961-1978	OLS 1979-2017
<b>Explanatory variables</b>		
Constant	-0.015 (-0.374)	-0.010 (-1.314)
$z_t$	1.439** (2.294)	2.125*** (5.538)
$(p^d - p^f)$	-0.542* (-2.136)	-0.500*** (-2.996)
$x_{t-1}$	0.391 (1.692)	
$R^2$	0.390	0.668
Observations	17	39
<b>Diagnostic tests</b>		
Serial correlation	0.915	0.084
Heteroskedasticity	0.732	0.395
Normality	0.746	0.823

Notes: \*\*\*, \*\* and \* denote 1, 5 and 10% levels of significance,  $t$ -statistics for coefficients are in parentheses. The lower part of the table reports the  $p$ -values of Chi-square testing the null hypothesis of no serial correlation of errors (Lagrange multiplier test), the absence of heteroskedasticity (ARCH test) and the normal distribution of residuals (Jarque-Bera test).

Here, we re-estimate the export demand function (9) by dividing the whole period into two sub-samples in order to take the structural break into account for the year 1979. In Table 4, our econometric strategy consists in selecting the specification that performs better in terms of statistical significance and diagnostic tests. Alternative estimations with poorer results are not reproduced here for reasons of space. Consequently, as in Bairam

(1988) and Atesoglu (1994), we do not retain a lagged value for relative prices of exports since the estimations produce weaker results in terms of significance and robustness. The main result is a strong increase in the level of income elasticity between both sub-periods, the growth rate of exports being more sensitive to a change in the growth rate of foreign real income. Indeed,  $\varepsilon$  is now roughly equal to 2.12 over the period 1979-2017. France undergoes a very difficult situation since its exports become more and more dependent from foreign growth precisely in a period where such foreign growth has strongly declined.

**Table 5: Estimated import functions with a structural break in 1993**

	OLS		2SLS	
	1961-1992	1993-2017	1961-1992	1993-2017
<b>Explanatory variables</b>				
Constant	-0.003 (-0.246)	-0.003 (-0.686)	-0.011 (-0.816)	-0.006 (-1.173)
$y_t$	1.792*** (5.449)	3.059*** (11.449)	2.018*** (5.776)	3.189*** (11.574)
$(p^d - p^f)_{t-1}$	0.329*** (3.433)	0.105 (0.792)	0.299*** (3.057)	0.180 (1.247)
$R^2$	0.726	0.859	0.721	0.856
Observation	31	25	31	25
<b>Diagnostic tests</b>				
Serial correlation	0.317	0.424	0.402	0.767
Heteroskedasticity	0.498	0.107	0.559	0.179
Normality	0.943	0.502	0.869	0.410
Sargan's test			0.708	0.131
Endogeneity test			0.037	0.004
Cragg-Donald $F$ -Statistic			79.453	25.559

Notes: \*\*\* and \*\* denote 1 and 5% levels of significance,  $t$ -statistics for coefficients are in parentheses. The lower part of the table reports the  $p$ -values of Chi-square testing the null hypothesis of no serial correlation of errors (Lagrange multiplier test), the absence of heteroskedasticity (ARCH test), the normal distribution of residuals (Jarque-Bera test), the validity of the overidentifying restrictions (Sargan test) and whether  $y_t$  can be treated as exogenous (endogeneity test). Lastly, the Cragg-Donald  $F$ -statistic tests the null hypothesis of the weakness of the chosen instruments. When the  $F$ -statistic is greater than the Stock-Yogo (2005, p. 101) critical value we reject the null of weak instruments. Here, critical value is 22.30 (for 1961-1992) and 19.45 (for 1993-2017) with a maximum 2SLS size distortion of 10%.

We also re-estimate the import demand function (10) for two sub-samples. For the period 1961-1992, a constant,  $x_t$ ,  $x_{t-1}$ ,  $c_t$  the growth rate of real private consumption and  $(p^d - p^f)_{t-1}$  are used as instruments with respect to the 2SLS procedure while a constant,  $x_t$ ,  $x_{t-1}$ ,  $inv_t$ ,  $c_t$ , and  $p_{t-1}^f$  are utilized for 1993-2017. In addition, our estimates pass all the standard tests for both periods showing a reasonable degree of robustness. There is no evidence of serial correlation and heteroskedasticity. Moreover, residuals seem to be normally distributed. The Sargan test leads us not rejecting the validity of the chosen instruments. The endogeneity test indicates that  $y_t$  cannot be considered as exogenous and the Cragg-Donald  $F$ -statistic shows that the instruments are not weak. These results are summarized in Table 5 and call for several comments.

The major novelty is the substantial increase (more than 58%) in the value of income elasticity of imports between both periods whatever the econometric methodology used. From equations (7) and (8) we see that this increase in  $\pi$  has had a strong negative impact on France's balance of payments equilibrium growth rate. In the context of trade liberalization, such a phenomenon is particularly striking for a developed economy since it mainly affected developing countries as is well established in a series of publications by Santos-Paulino (2002), Thirlwall (2013), Santos-Paulino and Thirlwall (2004), and Thirlwall and Pacheco-López (2008). The authors show that liberalization has made imports more sensitive to income changes, leading to a large increase in the value of income elasticity for the post-liberalization period. Then, our study indicates that trade liberalization is also able to negatively affect a major developed economy like France through imports, especially when the growth rate of exports is diminishing. Next, the coefficient expressing the effect of growth in relative prices remains roughly the same for the period 1961-1992 and is highly significant while it is not statistically significant over the second sub-sample. This implies that adjustments work only through quantity changes during the second period. One explanation could be that, in the second period, some industries no longer exist in France, which means that domestic consumers are no longer able to choose between domestic products or foreign ones on the basis of price competition.

Using the previous estimations, we are now able to compute the growth rates consistent with the balance-of-payments equilibrium (7) including the various sub-periods. On the one hand, Table 6 shows that France has been growing above its equilibrium growth rate

with the exception of 1979-1992. On the other hand, the balance-of-payments equilibrium growth rate is rather close to the actual growth rate with the exception of the first sub-period (1961-1978) that offers more mixed results in comparison with the overall period and the last two sub-periods (1979-1992 and 1993-2017). As a first approximation, we consider our result as reasonably robust. Nevertheless, when it comes to implementing parametric tests in order to validate Thirlwall's law, several authors consider it is preferable to test equation (8). Indeed, as emphasized by Bairam (1997) and recalled by Bagnai (2010) and Soukiazis and Antunes (2011), the export function may be highly unstable and taking a structural change into account may not be enough. Moreover, equation (8) involves only one estimated parameter, instead of the ratio of two estimated parameters, consequently it is less subject to sample variability (Bagnai, 2010, p. 1319).

**Table 6: Evidence for Thirlwall's law**

	$\varepsilon$	$\pi$	$z_t$	$y_t$	$y^*$	$y^* - y_t$
1961-2017	1.485	2.307	3.0	2.7	1.9	-0.7
1961-1978	1.439	2.018	4.4	4.7	3.2	-1.5
1979-1992	2.125	2.018	2.8	2.3	3.0	0.7
1993-2017	2.125	3.189	2.1	1.5	1.3	-0.2

Notes: Authors' calculations based on Tables 4-5, AMECO and World Bank.

Then, the next step consists in testing the validity of Thirlwall's law using (8). Considering that the theory is understood as a long-run relationship it does not make sense to test it year by year. Therefore, we follow a procedure put forward by Atesoglu (1993, 1994) in order to overcome this apparent difficulty. First, we calculate the average growth rate for each variable in overlapping periods from 1961-1970 until 2008-2017. Second, we calculate an average balance of payments equilibrium growth rate for each overlapping 10-year period based on equation (8). To this end, we use the estimated income elasticities obtained with the 2SLS procedure in Table 5 (results are encompassed in Appendix 3). We retain the values of  $\pi$  in the cases of the full sample (third column) and of the two subsequent sub-samples deriving from the structural break in 1993 (fourth and fifth columns). Third, we perform statistical tests between the predicted and the actual growth rate to confirm the empirical validity of the law.

The test consists in estimating the following equation (see, for example, McCombie, 1992; McCombie and Thirlwall, 1994, and Hussain, 1999):

$$y_t = a + by^* + \epsilon_t \quad (11)$$

and verifying the hypothesis  $H_0 : a = 0$  and  $b = 1$ . If we do not reject the null hypothesis, it confirms the statistical relevance of the law, making the balance of payments equilibrium growth rate,  $y^*$ , a good indicator for the current GDP growth rate since  $y_t = y^*$ . We immediately see from Table 7 that the law is validated for the full sample while it is not for the entire period when we take the structural break into account, splitting the sample into two sub-periods and re-estimating equation (11). Indeed, as shown by the  $F$ -Statistic, we do not reject the null when testing for  $a = 0$  and  $b = 1$  for the period 1961-2017. When testing two sub-samples, we do not reject the null that (i) the coefficient on  $y_t$  is equal to unity and (ii) the constant is not statistically different from zero only for the first sub-period 1961-1992 but reject it for the second one 1993-2017. This result seems to be additional evidence reinforcing our decision to search for a structural break over the period. We show *infra* that a different approach generates similar results.

**Table 7: Testing the empirical validity of Thirlwall's law for France**

	1961-2017	1961-1992	1993-2017
<b>Explanatory variables</b>			
$a$	0.035 (0.192)	0.365 (1.151)	0.060*** (3.970)
$y_t$	1.085*** (14.958)	0.965*** (14.114)	0.861*** (8.263)
$R^2$	0.837	0.904	0.748
<b>Test results</b>			
$F$ -Statistic ( $a = 0$ )	0.036 (0.848)	0.011 (0.915)	3.970 (0.000)
$F$ -Statistic ( $b = 1$ )	1.393 (0.244)	2.282 (0.145)	1.770 (0.196)

Notes: \*\*\* and \*\* denote 1 and 5% levels of significance,  $t$ -statistics for coefficients are in parentheses. In the lower part of the table the  $p$ -values are reported in parentheses for the  $F$ -statistic.

We have to be cautious when testing the law with the previous methodology because the regression test may suffer from an important shortcoming. For instance, there may be systematic over-prediction or under-prediction if the balance of payments of the country under consideration runs chronic surpluses or deficits as explained by Thirlwall (1986) and Hussain (1999). To overcome this potential issue, McCombie and Thirlwall (1994) propose an alternative procedure. We calculate the 'balance of payments equilibrium income elasticity of demand for imports' as equal to  $\pi' = x_t/y_t$  coming from each overlapping period and find the average  $\pi'$  for the period considered. We now have two expressions for the growth rate of GDP, that is to say,  $y_t = x_t/\pi'$  and  $y^* = x_t/\hat{\pi}$  where  $\hat{\pi}$  is the estimate of the income elasticity from Table 5. Then, the methodology consists in testing whether  $\hat{\pi}$  and  $\pi'$  are not statistically different. If this condition is met, the equality  $y^* = y_t$  is also ensured. It turns out that the law is validated for 1961–1992, the average value for  $\pi'$  is 1.86 (see Appendix 4) and is not statistically different from  $\hat{\pi} = 2.01$  at any standard confidence level. However, we fail to validate the law for the sub-period 1993–2017,  $\pi' = 2.38$  being statistically different from  $\hat{\pi} = 3.18$  which confirms our previous results. Actually, this rejection is perfectly understandable since France ran chronic and substantial trade deficits over the period 2005–2017 (see Figure 1). The consequence is straightforward from a long run perspective: on average, the actual growth rate has been higher than that compatible with the balance-of-payments equilibrium  $y^* < y_t$ .

**Figure 1: France's trade balance as a percentage of GDP (1993-2017)**



Source: Authors' calculations based on AMECO.

## 6. Interpretations: combining Thirlwall's law to an analysis of political economy so as to understand French economic performance

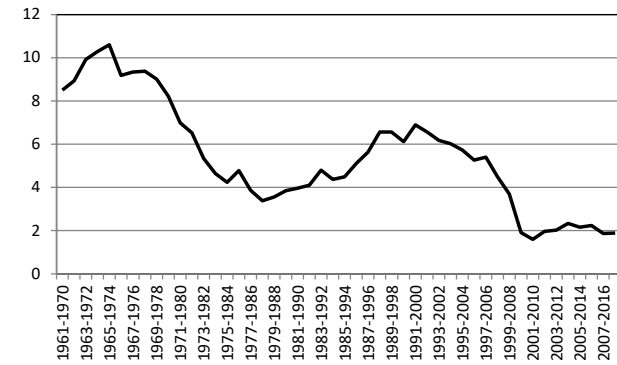
At this point it is necessary to give a detailed analysis of why the balance of payments equilibrium growth rate,  $y^*$ , has been so low and below  $y_t$ . In details, several elements are necessary to understand the evolution of the French economy, but most of them rely on an analysis of political economy. Behind the evolutions of our parameters, there are institutional changes which need to be stressed.

The advantage of the balance-of-payments equilibrium growth rate is that it does not depend mathematically on numerous factors. Whether you choose to refer to equation 7 or 8, we have to consider the evolution of two or three parameters: the income elasticity for exports, the growth rate of foreign income and the income elasticity for imports (equation 7); the growth rate of exports and the income elasticity for imports (equation 8). To understand the reasons why the balance-of-payments equilibrium growth rate has declined, we only have to study these variables. First, the most obvious factor is the substantial increase in the value of the income elasticity of demand for imports between both periods as explained in the previous section. This increase can be related to the new phase in the European construction starting in the early 1990s. The full removal of both tariff and non-tariff barriers to trade between European member countries or the limitation to national industrial policies are essential to understand the increasing appetite for imports.

Second, Figure 2 indicates that, after a period of recovery, the average growth rate of exports starts to fall again. Then, we witness a pronounced fall in  $x_t$  from 1992–2001 and 2001–2010 and stabilization at a very low level (around 2%) over the recent period. Two factors are at the origin of such a decrease. The first is the rise in the real effective exchange rate with respect to the other 28 European economies, as illustrated between 2001 and 2010 (see Figure 3). The continuous appreciation of the domestic currency and, by analogy, the impossibility of it depreciating, when necessary, with regard to other European competitors literally stifled French exports. The second factor can also be attributed to a non-negligible extent to the economic slowdown (including a recession in 2003) in Germany entailed by wage moderation. For example, Le Moigne and Ragot (2015) estimate that if wage rises had been equivalent in Germany with respect to France over the period 1993–2012, the French trade balance would have improved by 1.1 percent of GDP. Here, the main issue is that Germany is France’s leading trading partner, which generated a major contraction of its key market for exports. Consequently, in the context of the European Monetary Union, there is no room for manoeuvre, except the adoption of internal devaluation the results of which, looking *ex-post* at Greece, Spain, or Italy, seem very questionable.<sup>8</sup> To put it in a nutshell, a more flexible exchange rate regime (even a fixed but adjustable exchange regime) could have helped to absorb negative exogenous shocks.

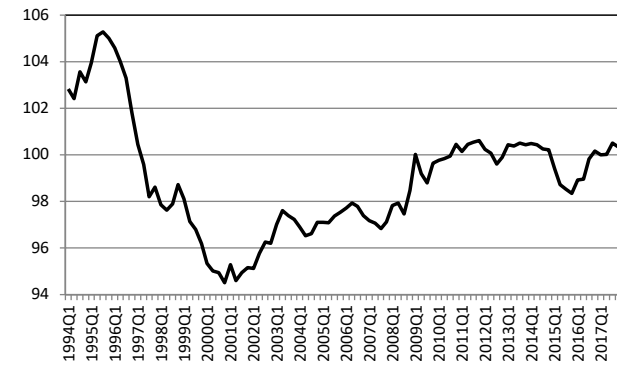
<sup>8</sup> Another (positive) solution would be to implement expansionary fiscal policies in countries running chronic trade surpluses. However, there is no reason to believe that a country will give up its surplus in order to improve the situation of its competitor.

**Figure 2: Average growth rate of real exports for France**



Source: Authors’ calculations based on AMECO.

**Figure 3: Real effective exchange rate (REER) for France**

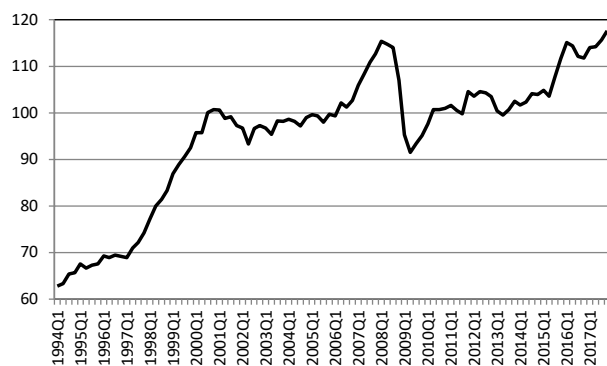


Source: Eurostat, index 2010 = 100, a rise in the index means a loss of competitiveness. REER is based on unit labor cost relative to the 28 EU Member States.

Third, it is worth noticing the existence of several periods of stagnation (2001–2006 and 2010–2014) concerning the level of investment in machinery, equipment, and weapons systems (i.e. the core of industrial manufacturing), as indicated in Figure 4. In our view, the adoption of a fixed exchange rate regime in 1999, progressively deteriorating price competitiveness in the short run and entailing a decrease in external demand, tends to depress investment and to deteriorate non-price competitiveness in the medium and the

long run. Following the Kaldorian analysis of Dixon and Thirlwall (1975), such stagnation in investment in industrial manufacturing leads to stagnation in productivity with a negative impact on exports. Conversely, we unambiguously note that, during the second half of the 1990s, the fall in the real effective exchange rate exerted a strong positive effect on industrial investment. Ultimately, the fall in  $x_t$  could have generated a feedback effect on the level of income elasticity, reinforcing the appetite for imports and maintaining  $\pi$  at a very high level as the industrial capacity is eroding.

**Figure 4: Gross fixed capital formation for France**



Source: Eurostat, chain linked volumes, index 2010 = 100. References are AN.113 + AN.114 machinery and equipment + weapons systems. Seasonally adjusted and corrected for calendar factors.

This twofold negative effect — the rise in  $\pi$  combined with a decrease in  $x_t$  — contributed to the collapse of the French balance of payments equilibrium growth rate to a level lower than the actual growth rate. Besides, even though  $y^*$  remained persistently below  $y_t$ , it still led to the fall in the actual growth rate over the period 1993–2017 (see Figure 5), playing, in some sense, the role of an attractor.<sup>9</sup> Indeed, the fall in the growth rate of exports depresses both the need for investment and the current growth rate. Ultimately, there is a simultaneous decrease in  $y_t$  and  $y^*$ , the remaining gap between  $y^* < y_t$  simply indicates the existence of a trade deficit. It also indicates that France attracted a sufficient amount of international capital to avoid a balance of payments crisis. Perversely, the existence of a trade deficit may also contribute to strengthening this

<sup>9</sup> See Appendix 5 for the gap between the actual growth rate and the predicted growth rates.

vicious circle: obsessed by the question of competitiveness,<sup>10</sup> French governments have successively imposed policies designed to reduce trade deficits through cuts in labor costs (social security contributions) financed by a moderation in public spending which may amplify the slowdown of the actual growth rate; but, in a context of generalized internal devaluation in Europe (Greece, Spain, Portugal, Italy, etc.), French efforts have not been very successful. Instead of causing an increase in exports (and so in  $y^*$ ), these policies may have contributed to a reduction in actual growth ( $y_t$ ). In the most recent years, the remaining gap between  $y^* < y_t$  has been closing not because the French economy has managed to increase its balance of payments constrained growth, but because its actual growth fell.

Beyond the question of the gap between the actual growth rate and the balance-of-payments equilibrium growth rate, we should not forget what should be the main objective of a Keynesian economic policy: full-employment. Are actual and/or balance-of-payments equilibrium growth rates compatible with full-employment? The answer to this question is key to understand whether the French ability to promote full-employment is constrained by the balance of payments. We thus try to construct a full-employment growth rate, but due to lots of theoretical and empirical issues in building such a growth rate, we prefer here to present a growth rate allowing for the closing of the output gap.<sup>11</sup> Concretely, this growth rate is calculated simply by adding the output gap to the actual growth rate. Besides, it is to note that the closing-output gap in Figure 5 approximately shows the growth-full employment nexus. What emerges from a historical comparison between these different growth rates is worth some remarks. If we exclude two sub-periods,<sup>12</sup> the French economy has nearly always been constrained by the balance of payments and the actual growth rates being too low. The space separating the French economy from the closing of the output gap is not so wide, and we may expect only a moderate stimulus to close the gap. Obviously, the space separating the French economy from full-employment is even bigger. But every attempt to boost actual growth so as to reach full employment (or only to close the output gap) would hurt the balance-of-

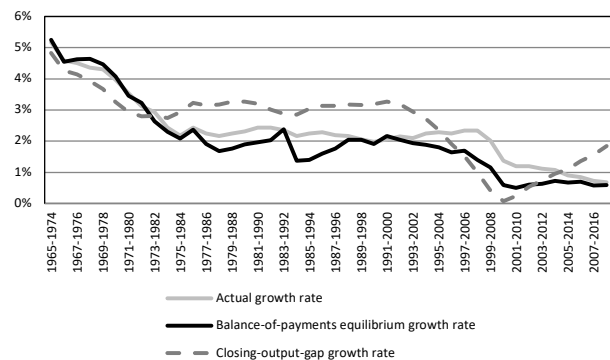
<sup>10</sup> See the Gallois report (November 2012), the “Pacte de Responsabilité” (December 2013) or the transformation of the “Crédit d’Impôt Compétitivité Emploi (CICE)” due in 2019.

<sup>11</sup> We are well aware of the numerous difficulties linked to the measure of the output gap but, for the sake of simplicity, we choose here to refer to the European Commission output gap. See Charles *et al.* (2019) for a discussion of this concept.

<sup>12</sup> Obviously, our comments depend on the measure of the output gap by the European Commission which estimates a positive output gap at the beginning of the 1970s (years of high inflation) and during the 2000s before the 2008 crisis (growth supposed bigger than its potential).

payments constraints, and thus would lead to increasing trade deficits. This configuration should force policy makers to think on solutions to create jobs without growth. A good way to bypass this external constraint to full-employment is obviously to favor reductions in working hours.

**Figure 5: Actual growth rate, balance-of-payments equilibrium growth rate and closing-output-gap growth rate in percentage points and in real terms**



Source: Representation based on Appendix 3 for actual growth rate ( $y_t$ ) and balance-of-payments equilibrium growth rate ( $y^*$ ) and AMECO for closing output-gap growth rate.

The affiliation to the Eurozone and its impossibility to depreciate the domestic currency, in order to correct external disequilibria with regard to other member countries, is particularly complicated to manage. Any attempt to implement expansionary fiscal policies will degenerate into a deteriorated trade balance,<sup>13</sup> leaving fiscal austerity and internal devaluation as the only way out.

## 7. Conclusion

In this paper we have investigated the causes of the French economic slowdown over the long run by empirically assessing its balance of payments equilibrium growth rate according to the works of Thirlwall (1979, 2013) and we have provided fresh empirical results for France. The implementation of a standard structural break test seems to give

<sup>13</sup> The deterioration of the trade balance would be that much greater when the economy has undergone an increase in the income elasticity for the demand of imports, which means that imports would react strongly to an increase in national income.

a strong response for a break date in 1993, allowing us to split our sample into two sub-periods. The fall in the French balance-of-payments constrained growth rate has two main causes after the break date. First, a substantial increase in the income elasticity of demand for imports, which suggests a healthy appetite for imports. The second factor is a collapse in the growth rate of exports and its stabilization, over the recent period, at a very low level.

At this point, France is in a situation already described by McCombie and Thirlwall (1994): its actual growth rate is higher than the balance of payments equilibrium growth rate while it is smaller than the growth rate compatible with full employment. In short, French policymakers face a marked contradiction between the internal objective (fighting unemployment) and the external one (fighting trade deficits). We believe that France's memberships to the European Union and Eurozone in their present forms are the causes of this contradiction. While the Single European Market has promoted an impressive appetite for imports since the 1990s, the Euro has prevented any attempt to limit the trade deficit between member countries (except by implementing an austerity policy) thanks to a depreciation of the domestic currency and has allowed Germany to pursue its wage moderation with disastrous effects on French exports. In terms of solutions, it is to note that our dilemma between fighting unemployment and trade deficits is similar to what has been proposed by Blecker (1998). In order to improve competitiveness, we should consider measures in order to reduce the income elasticity of imports even with quotas if necessary. Another way is to engage in the pursuit of a Green New Deal (Davila-Fernandez and Sardi, 2019). With an incentive to relocate productive activities and the urge to reduce energy consumption, a Green New Deal may be able to reduce our demand for imports, and thus relax our external constraint. A reduction in inequalities may also help the ecological transition in so far as the wealthiest households are responsible for the highest impact on our natural resources. It is also necessary to increase the growth rate of exports which should alert policymakers to the need to rebalance growth in the Eurozone. But growth may not be the solution to all of our problems. For example, the reduction in working hours is a way to bypass the external constraint on growth, while creating jobs.

For future research, we need to consolidate our results so as to improve the understanding of the effect of exchange rate on the accumulation rate, and the interplay with price and non-price competitiveness. The productive structure of the economy

depends crucially on investments, and if the latter is deeply influenced by the exchange rate, we need to better evaluate this point for the Eurozone (Botta, 2014; Storm and Naastepad, 2015).

Moreover, in some respects, the French current context with its contradictory pressures reminds us of a similar situation in which the United Kingdom was involved just after it joined the European Monetary System (the contradiction between internal and external objectives, that is to say fighting unemployment or defending a stable exchange rate). We all know what that has led to: the United Kingdom decided to leave the EMS in 1992.

#### Appendix 1: France' exports towards OECD in terms of its total exports (%)

Year	$X_{FR-OECD} / X_{FR}$
2000	82.7
2005	81.5
2010	75.5
2015	75.2
2018	75.6

Note: Authors' calculations based on Insee (French national institute of statistics and economic studies).

#### Appendix 2: Unit root tests

Variables	ADF	PP	Specification
$m_t$	-7.354***	-7.353***	with trend and drift
$p_t^d - p_t^f(m)$	-7.464***	-7.464***	without trend and drift
$y_t$	-5.269***	-5.269***	with trend and drift
$x_t$	-6.236***	-6.236***	with trend and drift
$p_t^d - p_t^f(x)$	-8.207***	-8.299***	without trend and drift
$z_t$	-5.750***	-5.584***	with trend and drift
$inv_t$	-4.419***	-4.402***	with trend and drift
$c_t$	-4.722***	-4.688***	with trend and drift

Notes: \*\*\*significant at critical 1% level. The number of optimal lags is determined by the Schwartz information criterion for ADF tests. For PP adjusted t-statistic we retain Newey-West bandwidth.

with  $m_t$ : growth rate of real imports,  $p_t^d - p_t^f(m)$ : growth rate of relative prices for imports,  $y_t$ : growth rate of real GDP,  $x_t$ : growth rate of real exports,  $p_t^d - p_t^f(x)$ : growth rate of relative prices for exports,  $z_t$ : growth rate of OECD countries (excluding France),  $inv_t$ : growth rate of real gross fixed capital formation, and  $c_t$ : growth rate of real private consumption.

#### Appendix 3: Actual and predicted average growth rates 1961–2017

	Actual growth		Predicted growth		
	$x_t$	$y_t$	$y^*$ $\pi = 2.307$	$y^*$ $\pi = 2.018$	$y^*$ $\pi = 3.189$
1961-1970	8.50	5.57	3.68	4.21	
1962-1971	8.93	5.60	3.87	4.42	
1963-1972	9.91	5.39	4.29	4.91	
1964-1973	10.29	5.40	4.46	5.10	
1965-1974	10.60	5.17	4.59	5.25	
1966-1975	9.17	4.58	3.97	4.54	
1967-1976	9.34	4.50	4.04	4.62	
1968-1977	9.38	4.36	4.06	4.64	
1969-1978	9.00	4.31	3.90	4.46	
1970-1979	8.22	3.97	3.56	4.07	
1971-1980	7.00	3.54	3.03	3.46	
1972-1981	6.53	3.12	2.83	3.23	
1973-1982	5.34	2.93	2.31	2.64	
1974-1983	4.64	2.44	2.01	2.30	
1975-1984	4.23	2.18	1.83	2.09	
1976-1985	4.78	2.44	2.07	2.37	
1977-1986	3.86	2.25	1.67	1.91	
1978-1987	3.39	2.17	1.47	1.68	
1979-1988	3.56	2.24	1.54	1.76	
1980-1989	3.84	2.31	1.66	1.90	
1981-1990	3.97	2.44	1.72	1.96	
1982-1991	4.10	2.44	1.78	2.03	
1983-1992	4.80	2.35	2.08	2.38	
1984-1993	4.37	2.16	1.89		1.37
1985-1994	4.49	2.24	1.94		1.40
1986-1995	5.11	2.29	2.21		1.60
1987-1996	5.63	2.19	2.44		1.76
1988-1997	6.55	2.17	2.84		2.05
1989-1998	6.56	2.06	2.84		2.05
1990-1999	6.11	1.97	2.65		1.91
1991-2000	6.89	2.06	2.99		2.16
1992-2001	6.56	2.15	2.84		2.05
1993-2002	6.17	2.10	2.67		1.93
1994-2003	6.01	2.25	2.60		1.88
1995-2004	5.74	2.29	2.48		1.80
1996-2005	5.25	2.24	2.27		1.64
1997-2006	5.40	2.34	2.34		1.69
1998-2007	4.49	2.34	1.94		1.40
1999-2008	3.70	2.01	1.60		1.16
2000-2009	1.90	1.37	0.82		0.59
2001-2010	1.60	1.19	0.69		0.50
2002-2011	1.97	1.20	0.85		0.61



2003-2012	2.03	1.11	0.88	0.63
2004-2013	2.33	1.08	1.01	0.73
2005-2014	2.16	0.90	0.93	0.67
2006-2015	2.23	0.85	0.96	0.70
2007-2016	1.87	0.73	0.81	0.58
2008-2017	1.89	0.68	0.82	0.59

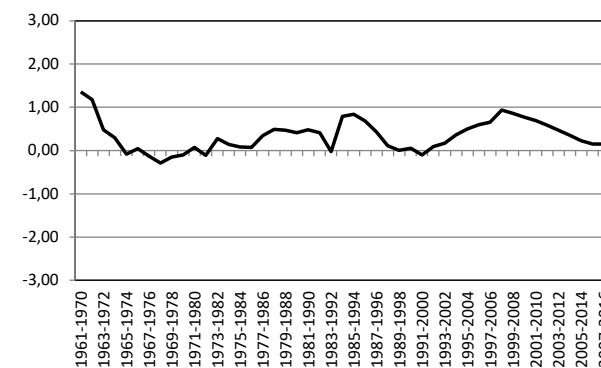
Note: Authors' calculations based on AMECO and estimations from Tables 2 and 5.

#### Appendix 4: Equilibrium income elasticity of demand for imports

	$\pi'$		$\pi'$
1961-1970	1.52	1984-1993	2.01
1962-1971	1.59	1985-1994	1.99
1963-1972	1.83	1986-1995	2.23
1964-1973	1.90	1987-1996	2.56
1965-1974	2.04	1988-1997	3.01
1966-1975	1.99	1989-1998	3.18
1967-1976	2.07	1990-1999	3.10
1968-1977	2.15	1991-2000	3.34
1969-1978	2.08	1992-2001	3.04
1970-1979	2.06	1993-2002	2.93
1971-1980	1.97	1994-2003	2.67
1972-1981	2.09	1995-2004	2.50
1973-1982	1.82	1996-2005	2.33
1974-1983	1.89	1997-2006	2.30
1975-1984	1.94	1998-2007	1.91
1976-1985	1.95	1999-2008	1.83
1977-1986	1.71	2000-2009	1.38
1978-1987	1.56	2001-2010	1.34
1979-1988	1.59	2002-2011	1.63
1980-1989	1.65	2003-2012	1.83
1981-1990	1.62	2004-2013	2.14
1982-1991	1.68	2005-2014	2.38
1983-1992	2.04	2006-2015	2.61
Average	1.86	2007-2016	2.53
		2008-2017	2.76
		Average	2.38

Note: Authors' calculations based on AMECO.

#### Appendix 5: Gap between actual growth rates and predicted growth rates ( $y_t - y_t^*$ )



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