

# The Italian Crisis within the European Crisis. The Relevance of the Technological Foreign Constraint<sup>1</sup>

**Stefano Lucarelli and Roberto Romano**

Università degli Studi di Bergamo, Italy and CES, Université Paris 1, France and IGCL (Italian General Confederation of Labour)

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## Abstract

The debate on the Italian economic crisis in the Euro zone should address a fundamental issue: what is the origin of the decline in productivity that affected the Italian economic system even before the European crisis begun in 2010? We argue that the effective demand can be revived only by governing the structural economic dynamics. Embracing a theoretical approach that may be called “structuralism” in line with the contributions by Leon (1965), Sylos Labini (1977) and Pasinetti (1993), we will propose to analyze the technological causes that may explain the balance-of-payment constraint affecting year by year the Italian growth. In this perspective we will introduce the notion of technological foreign constraint. We will argue that such a phenomenon, not the increasing public debt, constitutes the shock that deteriorated the Italian labour productivity in the last twenty five years. In the last part of the article we will also present an empirical proof of the previous thesis, by showing the technological dependence of the Italian economic system by the German economic system, through the estimation of the *productivity gap equation*. We propose this equation drawing inspiration from Paolo Sylos Labini (1984, 1993, 2004).

**Keywords:** Euro crisis; Italian decline; productivity gap equation; fiscal austerity; technological foreign constraint

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## 1. Introduction

The Italian debate about the European economic crisis and particularly the Italian crisis, that appears as a crisis within another crisis, is characterized by different readings and different political proposals. In June 2010 three hundred heterodox scholars published an open letter titled “A restrictive policy worsens the crisis, adds fuel to speculation and can bring to the disintegration of the Euro zone. The direction of economic policy needs to be changed to prevent another breakdown on incomes and employment” (also called *Lettera degli economisti*)<sup>2</sup>. In particular, the open letter highlighted the consequences of German neo-mercantilism on the Euro zone stability. Since 2011 several heterodox Italian economists – among others Alberto Bagnai, who became very active in the debate through his successful blog *goofynomics* – endorse the necessity to exit from the Euro zone in order to put Italian economy on the path of recovery and sustainable growth. In order to realize the EU's founding ideals, the EU would unravel the currency union and provide debt reduction for its most distressed economies (Bagnai, 2012).

An alternative way to manage the implosion of the Euro zone has been proposed by Brancaccio (2014). He proposes to build a social bloc around a hypothesis of ‘left’ exit from the Euro: a stop on capital flight; nationalization instead of foreign acquisitions of bank capital; an indexation mechanism of wages and control of some prices of basic goods to manage the changes in income distribution; the idea of a free trade area among the countries of Southern Europe. Other heterodox scholars proposed the constitution of two different monetary areas, the strong Northern European one and the weak Southern European one. However, not all heterodox economists support the exit from the Euro zone. For example, Lunghini (2015)

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<sup>2</sup> The letter was addressed to the Members of Italian Government and Parliament, to the Italian representatives in the European Union Institutions, to the representatives of the political parties and the trade unions, to the Italian representatives in the European Union Institutions and the ESCB, to the President of the Republic. The promoters of the initiative were Bruno Bosco, Emiliano Brancaccio, Roberto Ciccone, Riccardo Realfonzo and Antonella Stirati. See [www.letteradeglieconomisti.it/english.htm](http://www.letteradeglieconomisti.it/english.htm).

argued that the EMU is similar to the Eagles' *Hotel California*: it is programmed to receive but countries can never leave. Biasco (2015) underlined that the possible fragmentation of EMU in different clusters of countries will open a political process made of complex and long secret negotiations which could be extremely costly, both in political and social terms. Another interesting proposal, that has been also advanced by French heterodox economists like Frédéric Lordon, is a new European Clearing Union, that is an application of Keynes' Bretton Woods proposal to regional monetary systems (Amato and Fantacci, 2014). Other authors (Bellofiore and Halevi, 2015; Cavallaro, 2015) stressed that finding a new engine for the Italian effective demand is the real way to exit from the crisis. The stakes are expansionary fiscal policy and investments planning which are able to reinforce the technological and organizational features of the Italian manufacturing sector together with a public demand which is able to change the expectations of the Italian entrepreneurs (Pini and Romano, 2015).

However the debate should address a fundamental issue: what is the origin of the decline in productivity that affected the Italian economic system even before the European crisis begun in 2010? Our thesis is that the effective demand can be revived only by governing the structural economic dynamics (Lucarelli and Romano, 2015). Embracing a theoretical approach that may be called "structuralism" in line with the contributions by Leon (1965), Sylos Labini (1977) and Pasinetti (1993), we will propose to analyze the technological causes that may explain the balance-of-payment constraint affecting the Italian growth. In this perspective we will introduce the notion of technological foreign constraint. We will argue that such a phenomenon, not the increasing public debt, is the shock that deteriorated the Italian labour productivity in the last twenty five years. In the last part of the article we will also present an empirical proof of the previous thesis, by showing the technological dependence of the Italian economic system by the German economic system through the estimation of the *productivity gap equation*. We propose this equation drawing inspiration from Paolo Sylos Labini (1984; 1993; 2004).

## 2. The Italian Decline: a Brief Literature Review

According to a relevant literature, that mostly adopts the standard neoclassical growth framework<sup>3</sup>, the Italian decline since the 1990s depends on a slowdown of its labour productivity. This kind of studies fail to provide a convincing explanation of the sudden stop of labour productivity growth experienced around 1996, after thirty years in which the GDP per hour was growing at the same percentage of the German one (from 100 in the 1970 to 180 around the 1995)<sup>4</sup>.

Saltari and Travaglini (2009) proposed a more helpful approach by interpreting the productivity delay as the result of shifts in labour supply and demand. The interaction between technological and non-technological shocks acts on the labour market equilibrium by affecting productivity and employment. Particularly Italian firms reacted to labour market reforms in the 1990s<sup>5</sup> by reducing capital deepening and hiring low quality labour. Moving away from skilled labour had the main consequence of decreasing the growth rate of technological progress with an undesirable impact on both the growth rate of labour productivity and GDP. What remain to be explained is the origin of the shocks that are considered by these authors.

Several studies argue that the most important shock which affected the Italian economic system is the Italian public debt. It would be the consequence of almost uninterrupted rise beginning in the early 1970s<sup>6</sup>, with fiscal consolidation starting only in the mid-1990s. Following these analyses a succession of primary deficits lay at the origin of debt growth. But scholars who accept this approach do not consider several aspects, such as the effects of the real interest cost of debt and of the GDP growth rate. Such

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<sup>3</sup> The same argument can be found in Ciocca (2012). However, he does not subscribe to a mainstream approach to economic growth.

<sup>4</sup> This kind of literature is reviewed and critically discussed by Saltari and Travaglini (2009) and Bagnai (2015).

<sup>5</sup> The Italian Parliament approved in June 1997 the so called "Pacchetto Treu" (Law No. 196) concerning measures to promote employment, that introduced more flexibility in the Italian labour market by allowing free hiring of individuals on a temporary basis. Bison, Rettore and Schizzerotto (2009) showed that while the reform had a major positive impact on the probability of being hired on a temporary basis at the first employment spell, the proportion of individuals attaining a stable occupation three years after their entrance into the labour market is only slightly lower after the reform than before it.

<sup>6</sup> See also the collection of essays in Giavazzi and Spaventa (1988).

aspects have stringly affected the debt dynamics. These scholars should remember that in 1979 European nations created the European Monetary System (EMS), the antecedent of the euro zone. The EMS called on countries to keep their currencies trading within a fixed range of each other. In 1981, pressed by the Treasury Minister, Beniamino Andreatta, the Bank of Italy raised its discount rate to a peak of 19% and kept it above 10% until 1993. In the same year, another institutional reform contributed to increase the real interest cost of debt: the Bank of Italy "divorced" from the Italian Treasury, and was no longer forced to buy bonds left over from Italy's debt auctions. This process had a dramatic impacts on Italy's public finances<sup>7</sup>.

Also one of the most known Italian economists, who gave relevant contributions to heterodox economics, Augusto Graziani (2001, pp. 184-196) stressed the importance of public debt especially in order to analyze the new economic and social features that affected Italy after the onset of the EMU. However, Graziani agreed that the debt-GDP-ratio is not a correct index in order to measure the sustainability of the public debt. Regarding the origin of the burden of the Italian public debt, he took distance from the mainstream interpretation which considered the absence of control on government's expenditure to be the main cause of the problem. He instead underlined the role of the increasing rates of interest decided, starting from 1981, by the monetary authorities. In his thought the main ratio of this monetary strategy should be found in the attraction of capital flows which are necessary to re-balance the Italian balance of payments<sup>8</sup>.

Secondly, Graziani clearly showed an advantage of the increasing public debt, from which Italian private enterprises benefited: during the 1980s the increasing deficit of the public sector together with the liquidity issuing represented a correspondent financial relief for the non-financial firms. They indeed had the opportunity to reduce their banking loans. At the end of the 1980s the Italian enterprises were characterized by healthy and safe balance sheets. Entrance into EMU has imposed a reversal in Italian own traditional economic policy: before Italy entered the EMS and again when Italy left the EMS (1992-96), the Italian monetary authorities enacted a policy of managed exchange rates, aiming at maintaining the dollar rate stable, while letting the lira depreciate *vis-à-vis* the German mark. In the presence of a unique currency, Italian industry tries to make its exports more competitive through a reduction in costs. Consequently, segments of production began outsourcing to small or middle-size firms located in Italy or in developing countries (Graziani, 2002)<sup>9</sup>.

It should also be considered that a 150-year historical reconstruction suggests that the current high level of public debt is not a unique event in Italian history, as stressed by Bartoletto *et al* (2012): the peak reached in 1894 was almost identical to that of 1994. Italian history suggests that the debt crises may also terminate without resorting to default. Moreover "comparison between the late 19th century and recent decades shows that fiscal authorities were strongly committed to achieving fiscal sustainability in both periods, although during the latter period the effort by government leaders failed because of the worse macroeconomic framework, possibly influenced by more stringent European rules and by a lack of long-term planning at national level" (Bartoletto *et al* 2012, p. 37).

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<sup>7</sup> See Gallino (2015), pp. 144-149. Recently this non-mainstream thesis about Italian public debt has been explained on the Wall Street Journal, see Dalton (2011).

<sup>8</sup> About the Italian exports slowdown see Graziani (2001, p. 209-2015), Nardozzi (2004), Lucarelli, Palma and Romano (2013).

<sup>9</sup> The same cannot be said of Germany. As Graziani (2002, p. 99 ) argued: "When flexible exchange rates were prevailing in Europe (1973-78), and even in the subsequent years after the EMS was enacted, Germany managed to follow a very special foreign exchange policy (Thomasberger, 1993). On the face of it, Germany accepted, more than once, the appreciation of the German mark *vis-à-vis* other European currencies. However, the subsequent appreciations of the mark were lower than the inflation differential. Since Germany had, for many years, a substantial price stability, while other European countries could not avoid a slight but continuous inflation, the result was that the German mark, while being officially appreciated in monetary terms, was in fact devalued in real terms. Germany was thus able to join its technological superiority in production with the advantage of supplying its own products at decreasing relative prices. Owing to a similar strategy, Germany was accused of practising a neo-mercantilist policy (Ciocca, 1981; Hagemann, 1993)". Nowadays, Germany is still able to move along similar lines, see Cesaratto and Stirati (2010).

### 3. It is not a Public Debt Crisis: the Technological Foreign Constraint<sup>10</sup>

#### 3.1 Public Debt, Private Debt and Fiscal Austerity in Europe

The high level of the public spending, mostly funded by the public debt, is one of the arguments used to explain the decline of the Italian economic system. Especially during the 1990s Italian policy makers argued that the growth of the public debt would inhibit private investments and thus GDP growth. Precisely in 1992 Giuliano Amato, the Italian Prime Minister, stressed the need to reduce the public debt in order to avoid the crowding out of the private investment<sup>11</sup>. Therefore, according to policy makers Italian public debt had to be brought under control not only to contain the debt-to-GDP ratio, but also to support private investments. The thesis can be effectively criticized by comparing the Italian trend of investment-to-GDP ratio with other European countries, as we will show in section 3.2.

The austerity policies demanded by the European Union are based on the belief that public spending needs to be cut in order to reduce public debt. This is a mistake, as clearly pointed out by the signatories of the *Manifeste d'économistes atterrés* (*Manifesto of the appalled economists*) published in France by Askenazy, Coutrot, Orléan and Sterdyniak (2010) and the signatories of the *Italian Open Letter* (*Lettera degli economisti* 2010). In the short run, the existence of stable public expenditures restrains the size of recessions; in the long run, public investment and expenditures (education, health, research, infrastructures, etc.) stimulate growth. It is wrong to say that any public deficit further increases public debt, or that any reduction of the public deficit reduces debt. If reducing the deficit weighs down economic activity, this will make debt even larger. As a matter of fact, reducing social income also generates a decrease in tax revenue which brings about a further spread between the interest rate and the GDP growth rate. Particularly in a context where European countries are the main trading partners for the other European countries – the European Union being, as a whole, a rather closed economy. As a consequence, a simultaneous reduction of public spending in all EU countries cannot but generate a worsened recession, and thus a further increase in public debt. The explosion of public debt in Europe is mainly due to the bailout plans of the banking and financial sectors following the crisis occurred in 2007: the average public deficit in the Euro area was only 0.6% of GDP in 2007 (public debt was 66% of GDP) but it became 7% of GDP in 2010 (public debt was 85% of GDP).

As Table 1 shows, from 2007 to 2010 the public debt-to-GDP ratio in Europe seemed correlated with an increasing amount of the private debt-to-GDP ratio. The explosion of the government debt after 2007 was the result of a necessity to save the private sector, in particular the financial sector (see Table 2).

Note how, among European countries, those with the largest public debts are also those in which the rates of family savings are the highest and private debts the lowest. If, indeed, we were to consider the overall situation of debt (public debt + private debt), Ireland, Holland, Denmark and Great Britain would be the most indebted nations. According to this ranking, Italy and Greece would be among the most 'virtuous' countries.

<sup>10</sup> In this paragraph we update the arguments that have been originally presented in Lucarelli and Vercellone (2011) and in Lucarelli, Palma and Romano (2013).

<sup>11</sup> Giuliano Amato's economic policy was supported, from 1992 to 1993, by Luigi Spaventa, who served as the coordinator of the council of experts at the general department of Treasury. In 1993 Spaventa became Minister of Budget, and member of the cabinet of the new Prime Minister, Carlo Azeglio Ciampi.

**Table 1. Debt-GDP ratios in Europe (%)**

Country	Public Debt-GDP			Private Debt-GDP		
	2007	2010	2015	2007	2009	2014
Austria	60.2	60.2	71.9	237.60	253.10	221.80
Belgium	84.1	84.1	96	250.20	297.10	241.90
Denmark	27.5	27.5	42.9	430.00	505.40	464.7
Finland	35.2	35.2	48.4	220.20	286.10	268.80
France	64.2	64.2	82.3	251.50	274.10	298.30
Germany	65.2	65.2	83	208.71	217.00	169.20
Greece	107.4	107.4	145	114.30	130.90	134.60
Ireland	24.8	24.8	92.5	708.10	888.10	748.30
Italy	103.1	103.1	118.6	200.50	221.10	221.50
Holland	45.3	45.3	62.9	588.70	616.40	658.60
Portugal	68.3	68.3	93.3	305.20	373.20	309.90
Spain	36.2	36.2	61.2	310.20	318.00	276.10
Sweden	40.2	40.2	39.4	301.20	360.60	331.7
UK	44.4	44.4	79.6	431.30	462.60	385.60
Euro Area	66.4	66.4	85.4	n.c	n.c	n.c

Sources: Eurostat, Banca d'Italia. Public debt is only the Central Government debt. The private sector includes the debt of financial institutions, non-financial businesses and households. The data about the Public Debt/GDP in the Euro Area are computed on 16 countries (2007 and 2010) and 19 countries (2015). Our elaboration on data Eurostat, Banca d'Italia and World Economic Outlook elaborated by McKinsey (2015, p. 14) for the private debt in the year 2014.

**Table 2. Components of the Private Debt (% GDP)**

Country	Households			Corporate			Financial Sector		
	2007	2009	2014	2007	2009	2014	2007	2009	2014
Austria	53.4	52.3	50.7	82	84.2	89.9	102.2	116.6	81.2
Belgium	46.9	54	57	158.5	163.1	136.1	44.8	80	48.8
Denmark	129.4	147	n.c.	95.7	103.5	n.c.	204.9	254.9	241.9
Finland	52.7	62.4	65.6	97.4	117.8	109.1	70.1	105.9	94.1
France	48.6	50.7	55.8	97.8	104.6	122.4	105.1	118.8	120.1
Germany	63.3	63.1	54.8	68.71	70.7	53.7	76.7	83.2	60.7
Greece	47.5	52.1	63.6	58.9	69.6	62.1	7.9	9.2	8.9
Ireland	98.7	117.9	89.4	112.7	199.3	187.2	496.7	570.9	471.7
Italy	39	42.2	42.8	75.4	82.8	78.6	86.1	96.1	100.1
Holland	118.5	119.8	115.4	92	91	127	378.2	405.6	416.2
Portugal	93.5	99.2	81.9	144.2	168.4	122.5	67.5	105.6	105.5
Spain	83.4	84	72.3	130.6	136.1	109.6	96.2	97.9	94.2
Sweden	69	78.7	n.c.	131.9	147.4	n.c.	100.3	134.5	137.3
UK	100.5	103.2	87.8	108.8	116	73.8	222	243.4	224

Sources: Data Eurostat and Banca d'Italia elaborated by the Italian Ministero dell'Economia e delle Finanze (2011, p. 64) for the years 2007 and 2009; our elaboration on data Eurostat, Banca d'Italia and World Economic Outlook elaborated by McKinsey (2015, p. 14) for the year 2014.

The rise in public debt occurs while public spending, as a proportion of GDP, is stable or declining in EU at least since the early 1990's, also due to the tax competition between European states.

The European Treaties prohibit central banks of the European Union to fund states which must find lenders on financial markets. The European Central Bank is also not entitled to subscribe directly to the public bonds issued by European states as it has been conceived as a body independent from the governments of the member states and thus it does not act as an issuing bank. The ECB may be considered as more akin to a currency board than a central bank, as De Cecco (1999, pp. 9-10) promptly noted:

The ECB Statutes do not give it the mandate to act, if necessary, as a lender of last resort. Supervisory powers will be left to the member banks, over their respective national banking systems. If financial fragility arises as a critical condition for the whole EMU financial market, the absence of positive enabling rules will not totally exclude the ECB from the possibility of acting as a Lender of Last Resort. But supervision by the member banks (or by the national supervisory agencies) ought to uncover cases of banking illiquidity in most of the countries of the EMU, at the same time, and report them to the ECB, of such a diffusion and gravity as to prompt its action as lender of last resort, after an interpretation of its status such as to grant it those powers. Suppose, however, that illiquidity is experienced by just one of the member countries' banks. The national central bank of the country in question, if it has a stock of liquid national debt, can exchange government bonds for the illiquid paper of the banks that are in trouble. What if, however, the illiquid assets of the banks in trouble are of non marketable sort? Were they are marketable, even if at a capital loss, there would be no illiquidity problem. Thus, the very nature of the lender of last resort is denied if national central banks are restricted to exchanging low-grade paper against good marketable paper.<sup>12</sup>

These features of the ECB, based on widespread and yet arguable economic theories, have contributed to the crisis despite the extraordinary measures put in place by the central banker. The political chaos characterising the European Monetary Union has spread the fear of failure to pay interests and has encouraged sales transactions of bonds of European countries in trouble. As a result, interest rates on public debt soared, thus increasing the so-called *spread* with regard to German bonds. In this way, the unsustainability of the Greek, Irish, Spanish, Portuguese and Italian (the so-called PIIGS) public debt is fuelled. The Italian case is exemplary. At the beginning of 2012, Deutsche Bank, one of the five banks that control the market of CDS, began to sell Italian government bonds (BTPs) amounting to E7 billion. As a consequence, the value of BTPs began to decrease, while the spread with respect to German bonds began to increase, rising above 300 points first, and above 600 points by mid-November. In a mere few months, interest rates rose from 3% to 7%, which made the interest costs increase by around E8–9 billion. At the same time, the value of CDS increased almost fivefold, allowing enormous profits in terms of potential capital gains<sup>13</sup>. Facing the increase in interest rates which makes unsustainable the public debt of the PIIGS due to financial speculation, the claim is to reduce public debt by cutting social expenditure, thus leading the European Union to a dreadful recession.

Recent empirical studies (Panizza and Presbitero, 2012) point out that the correlation among high public debt and slow growth does not imply causality: it may be that slow growth causes high debt. The case that public debt has causal effect on economic growth still needs to be made. Nevertheless austerity has been the main prescription across Europe for dealing with the continent's "debt" crisis<sup>14</sup>. Empirical estimates of the impact of fiscal policy greatly vary, and the hypothesis of an expansionary effect of austerity measures does not appear to have a properly-built empirical support<sup>15</sup>. Fiscal austerity in the presence of large public debts seems to have strong implications for redistributing income from taxpayers to the owners of such debt.

<sup>12</sup> See, among others, De Grauwe (2011) and Brancaccio (2012).

<sup>13</sup> To deepen the point see Fumagalli and Lucarelli (2015).

<sup>14</sup> It confirms the "absolute paradox" of economic policy in contemporary capitalism, described among others by Pasinetti (1998 and 2000), Sylos Labini (2004) and Parguez (2007).

<sup>15</sup> See Zezza (2012) for a detailed literature review on this point.

When public debt is financed by financial markets in foreign countries, interest payments on the debt will redistribute income to foreigners, thereby exacerbating the negative impact of austerity on domestic growth and making a lower debt-to-GDP ratio an impossible target (Zeza, 2012, p. 52). How can the European Union solve this puzzle?

As stressed by Pasinetti (2000), there are two distinct ways to reduce to zero the social burden of public debt: the first way is to eliminate the public debt altogether, whatever the level of interest rates may be. The second way is to bring interest rate and growth rate into equality. This last result holds, whatever the level of the stabilised debt-to-GDP ratio may be. It should mean pursuing a reduction of the social burden of the public debt, not through fiscal austerity, but through coordinated efforts to achieve lower interest rates and higher growth rates.

Austerity may be undertaken to demonstrate the government's fiscal discipline to their creditors by bringing revenues closer to expenditures and by facilitating private investments<sup>16</sup>. The cuts in public spending which occurred in Italy are unprecedented in Italian history, but the effects on private investments are not relevant. As we will argue in the next section, the mainstream thesis that public debt and public spending explain the Italian decline demonstrates that there is still a lot work to do in order to understand the investments' black box<sup>17</sup>. The international and specifically European crisis greatly contributed to the deterioration of Italy's economic prospects, but in order to understand the slowdown of Italian productivity it is necessary to analyze the constraints that affect the Italian productive structure<sup>18</sup>.

### **3.2 The puzzle of the productivity**

Undoubtedly the ongoing economic crisis has been exacerbated by the typical vulnerabilities of the institutional system of the European Monetary Union. The bad economic theories on which European monetary and fiscal policies are designed have played a relevant role (Pasinetti, 1998). However, in the Italian scenario, critical aspects are deepened by a production system which is already characterized by serious problems, as shown previously by the proposed literature review. The problems are mainly tied to the increasing inability in developing, within the national productive system, those technological innovations which are necessary in maintaining a relevant position on international markets. From the late 1980s onwards, the increase in private investments has in most cases turned into an increase of foreign imports, which were not accompanied by a recovery in exports sufficient to avoid an increase of trade deficit. Given these conditions of technological delay, the possible pursuit of expansive policies on the demand side would not necessarily turn into a growth opportunity. In other words, the growth of instrumental goods employed by business enterprises can represent a foreign constraint and activate a process of diminishing national income. The quota of investments in machinery over GDP is a variable which continues to assume an important role in the explanation of the growth rate. But beware of proposing a generic increase of investments! In fact qualitative evolution of investment goods has increased its importance, that is to say that the relevance of disembodied technological change has increased. Every change in the composition of instrumental goods – induced for example by technological evolution – has consequences over the productive processes in which they are employed, therefore also over the composition of final consumption goods.

Let's suppose we are in the presence of two economic systems, system A and system B, both characterized, at time  $t_0$ , by zero current account balances: imports are equal to exports. If, at time  $t_1$ , in country A are introduced and spread, due to research and development, instrumental goods that are able to sustain production at lower costs and at the same time to influence the evolution itself of consumption goods, we will have two consequences. First, new consumption goods manufactured in A could replace consumption goods that A was importing from B. Second, the new instrumental goods manufactured in A will

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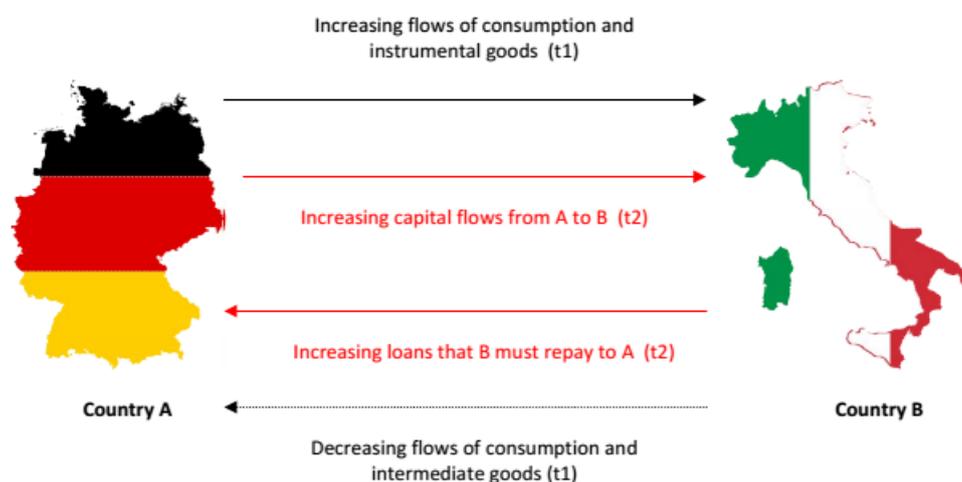
<sup>16</sup> Note the similarities with the theoretical approach to the economic policies adopted by Giuliano Amato and Luigi Spaventa in 1992.

<sup>17</sup> In the following section we will propose a reading of the investments' black box by following the suggestions by Robinson (1956), Leon (1966), Rosenberg (1983) and Sylos Labini (1984 and 1993).

<sup>18</sup> See D'Ippoliti and Roncaglia (2011), Ciocca (2012), Ferrari (2012), Lucarelli, Palma and Romano (2013), Palma and Prezioso (2010).

be demanded by enterprises that are engaged in B to preserve their competitiveness<sup>19</sup>. Lacking an increase of the knowledge developed in B, there will be a worsening of the current account in order to obtain the necessary technologies from A (at time t2); symmetrically, a surplus of the trade balance in A will be recorded. Thus the technological constraint assumes the characteristics of a balance-of-payment constraint. In an economic area where one single currency is used and fiscal and commercial re-balance mechanisms are not contemplated, this dynamics is incorrigible<sup>20</sup>.

**Figure 1. How a technological foreign constraint emerges.**

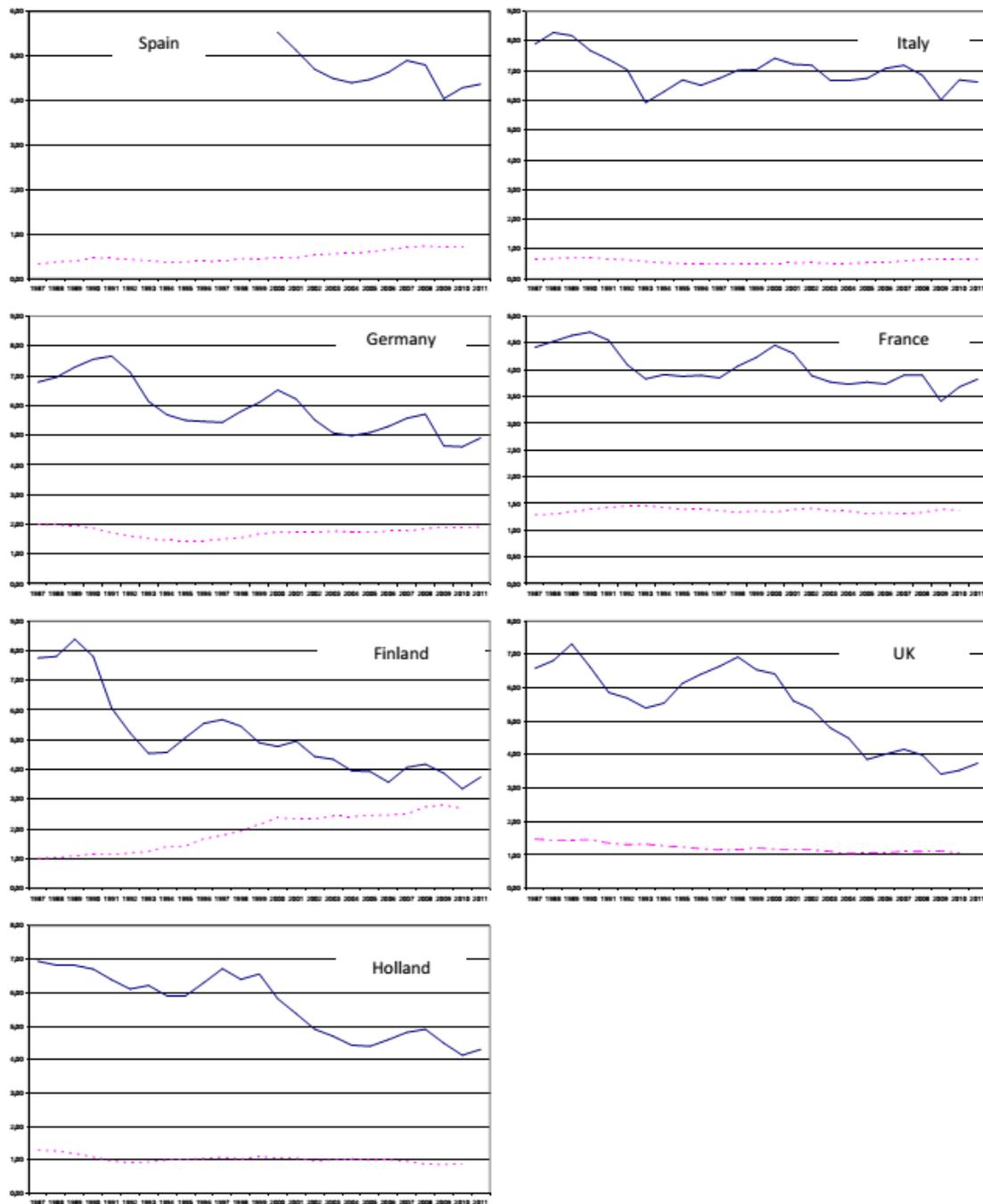


In the period 1987–2012 the main industrialized countries in Europe have taken out the investments in relation to GDP. A growth in the ratio of R&D to GDP has coincided to the above, in particular in the ratio of Business Enterprises Research and Development (BERD) to GDP, indicating a progressive shift of productive specialization on innovation branches characterized by a higher intensity of research. This important transformation is framed in the more general process of development which has concerned the most advanced economies since post-WWII, bringing to the fore the role of scientific research and technological innovation, anticipating a new international division of labour based on the production of high-tech goods. What has entailed the interaction between technical advance and the evolution of the demand for goods and services of higher technological content originated by the growth of per capita incomes? It has outlined the boundaries of a structural dynamics tending to stimulate the redistribution of production from branches which are characterized by a relatively declining demand on others that instead are expanding and are characterized by the presence of new products. Not all the countries show the same trends, but the general frame is one of a reinforcement of expenditure in R&D running parallel to a reduction of the investments in machinery. Just to make some examples, Finland is characterized by a clear-cut reduction of the quota of investments in machinery over the GDP (about 8% in 1987, slightly less than 4% in 2011) and by a concurrent increase of the BERD quota over the GDP (from 1% to about 3% in the same period). Germany maintains a BERD quota level over the GDP slightly lower than 2%, which appears sufficient to guarantee a decreasing trend in the ratio of investments in machinery over the GDP from about 7% to 5% in the period considered). France too is characterized by a reduction of the variable of machinery investments/GDP from 4.5% in 1987 to about 3.5% in 2010) and by a constancy in the BERD/GDP quota slightly inferior to 1.5%. Differently from other countries, Italy is showing a stagnation in the BERD/GDP quota which always remains under 1% and does not tend to increase, accompanied by a growth of the quota of investments in machinery/GDP in the period from 1992 to 2008.

<sup>19</sup> As stressed by Leon (1966, p. 77): "It could be said, when looking at 'research' laboratory, that scientists and technicians may well produce a complex *ensemble* of possible new techniques, rather than only one, among which the entrepreneur can choose. If the entrepreneur is bent only on increasing his profit without caring about the way in which such an increase is obtained, that complex could well include both superior and non-superior techniques. If superior and non-superior techniques are present at the same time, entrepreneurs will normally choose superior ones."

<sup>20</sup> To deepen the point, see Parrinello (2010).

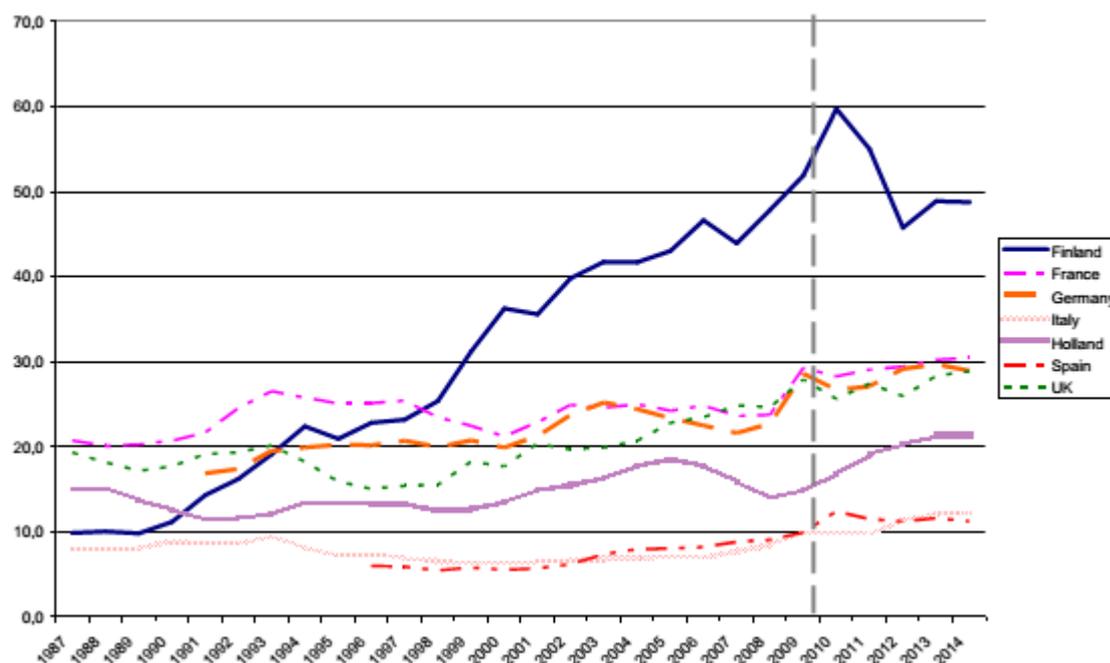
Figure 2. Investment in other machineries and equipment/GDP (continuous lines) and BERD/GDP (dashed lines), 1987–2011.



Source: our elaboration (Lucarelli, Palma and Romano, 2013) on OECD data  
[http://stats.oecd.org/Index.aspx?DataSetCode=MEI\\_REAL](http://stats.oecd.org/Index.aspx?DataSetCode=MEI_REAL)

If we will associate the investments in machineries, equipment and weapon system (henceforth investment in machineries) and the BERD, we will observe to which extent the investment dynamics is correlated to the structural dynamics of the productive system as a function of the level of specialization in branches at high intensity of research. The higher the ratio BERD/investments in machineries, the more the accumulation process proves to be knowledge-intensive, and *vice versa*.

**Figure 3. BERD/Investment in other machineries, equipment and weapon system, 1987-2014.**



Source: our elaboration on OECD data. The data for the BERD in 2014 are estimated by considering the 2013 rate of growth.

Of particular interest is the performance of Finland with a BERD/investments ratio always over 10% that is generally increasing until reaching 60% in 2010, unlike Italy which has a ratio permanently under 10% at least until 2012. Between these two extremes we find all the other examined countries, registering an increase of the above mentioned ratio, particularly Germany. Italy is a borderline case, but representative of the new paradigm: it is the country that has invested more than the others in instrumental goods, but at the same time it is also the one with the worst GDP growth.

The Italian economy stands out for a BERD/investments ratio totally stagnant, bringing the country, on the one hand, to maintain at a high level the quota of instrumental goods required for production and, on the other, making the demand of instrumental goods to be less and less satisfied by domestic production. All this occurs against a productive specialization more and more detached from the technological frontier and therefore insufficient in activating adequate technological expertise. The role of the accumulation model and of its ability at incorporating the processes of technological innovation can't leave out of consideration the level of development in which a given country is situated. In fact, starting from the 1980s, the growth of international commercial exchanges turns out to be fuelled more and more by high-tech productions shifting from a 15% quota at the end of the 1980s to a 30% quota in the 1990s (Ferrari *et al.*, 2002; 2004; and 2007), and it is with regard to these that the competitive ability of advanced economies has been increasingly measured. The tightness of the productive capacity of the different countries in respect to the foreign constraint has therefore defined itself in its capacity to export high-tech products in the markets, taking into consideration that the spread of innovation processes brought contextually also to a greater demand of these goods and to an increase of the respective imports. Differently from what has occurred in the most important

industrialized countries, starting from the 1980s – and more recently in a significant group of Northern European countries – in Italy the increase in the technological intensity of manufacturing imports has not in fact found an adequate counterbalance with the increase of the technological intensity of exports. The commercial deficits of the country in high-tech productions originate therefore from a structural unbalance between technology demand – the latter being coherent with that of other countries of advanced industrialization – and technology supply. The sharpening of these deficits in the long period is nothing but an outcome of the worsening of this unbalance. The reliance of innovative processes on the use of instrumental goods, which are the larger part of high-tech productions, has certainly exacerbated this unbalance.

#### 4. Econometric Analysis

##### 4.1 The Econometric Model

The empirical analysis develops a new version of the Sylos Labini function where labour productivity is influenced by innovation due to the dynamics of some economic variables (Sylos Labini 1984, 1993, 2004; Guarini 2009). The original proposal by Sylos Labini is an equation in which, in dynamic terms, the labour productivity depends positively on market (Smith effect), on the difference between wages and prices of machine (Ricardo effect) and past investments, while it depends negatively on current investments (disturbance effect). Dynamic economies influence labour productivity through, for instance, division of labour and learning by doing, as described by Adam Smith in 1776 in the *Wealth of Nations*, or by Young (1928). The Ricardo effect concerns the dynamic difference between wages and prices of machinery. It is important to quote the following remark by Ricardo: “Machinery and labour are in constant competition, and the former can frequently not be employed until labour rises” (Sylos Labini 1984, p. 168). If relative wages vary, then technological and organizational changes will be stimulated.

The productivity equation introduced in Sylos Labini (1984) is

$$\pi = a + bY + c w/P_{ma} + dI_{(t-n)} - eI$$

where  $I_{(t-n)}$  is the long run effect and  $I$  the short-run effect of investment. More generally the equation incorporates factors that operate both in short and the relatively long run, the latter being represented by the lagged variables; labour productivity  $\pi$  is expressed as a function of total output ( $Y$ ), that refers to the influence of the income growth rate considered an indicator of the market growth rate; the wages-to-prices of machinery ratio ( $w/P_{ma}$ ); and the investment level ( $I$ );  $\pi$ ,  $Y$  and  $w/P_{ma}$  are rate of changes, while  $I$  represents the net addition to the stock of capital and therefore, its variation conforms generally to that change of the rate of change of the capital stock.

Sylos Labini presented in 1993 econometric estimates of the productivity equation concerning the manufacturing sector for different countries. The results for Italy and Germany are the following ones (Sylos Labini 1993, Appendix II)<sup>21</sup>:

##### Italy (1960-85)

$$\pi = 0.53 Y + 0.30 w/P_{ma-t} + 0.08 I_{-n} - 0.06 I \quad R^2=0.84$$

(6.63) (1.70) (2.70) (2.43) DW=1.98

##### Germany (1968-88)

$$\pi = 0.29 Y - 0.66 w/P_{ma-3} \quad R^2=0.84$$

(3.25) (6.01) DW=1.98

<sup>21</sup> The estimations were produced by Paolo Sylos Labini in collaboration with Mirella Damiani, currently at the University of Perugia.

It is meaningful that the Ricardo effect is positively correlated with labour productivity in the Italian case, while it is negatively correlated with the labour productivity in the German case during the 1968-1988. Sylos Labini did not provide an explanation of such unexpected result.

We propose a new equation in which the dependent variable is the difference between the German labour productivity and the Italian one, and the dependent variables are the ones proposed by Sylos Labini.

$$\pi_{Ger} - \pi_{Ita} = a + b_1 Y_{Ger} - b_2 Y_{Ita} + c_1 W/P_{ma(t-n)Ger} - c_2 W/P_{ma(t-n)Ita} + d_1 I_{(t-n)Ger} - d_2 I_{(t-n)Ita}$$

We propose to call the above *formula* the *Sylos Labini productivity gap equation*.

The study regards Germany and Italy in the period 1995-2015 and draws on OECD quarterly data (from the first four months of 1995, to the second four months of 2015). The economic variables estimated are the following: the difference between the German rate of growth of the labour productivity and the Italian one, both defined as the GDP- to-total labour units ratio ( $\pi_{Ger} - \pi_{Ita}$ ); the growth rate of value added for Germany (Smith G) and for Italy (Smith I); the growth of rate of relative labour cost, defined as the difference between wages and the prices of the investment goods, for Germany (Ricardo G) and for Italy (Ricardo I); the level of investment in Germany (Inv G) and in Italy (Inv I); a dummy variable that is 1 from 2007 to 2014 (the years of the great recession and the European crisis) and 0 elsewhere (*dummy*<sub>2007-14</sub>).

#### 4.2 Qualitative Analysis

A descriptive analysis of variables linked to technological capability is useful to understand the position of Italy *vis-à-vis* the European core countries and especially Germany. Barbiellini Amadei et al. (2011) show that, for a relevant part of Italian history, investment in foreign machinery represented for Italy the main channel for the introduction of new technologies. Particularly in the second half of the 20th century the purchases by Italian firms of disembodied foreign technological knowledge – as registered by the Technology Balance of Payments – appears to be particularly relevant. Up to early 1990s, Italy's effort to purchase technology abroad stands out among OECD countries. More recently, however – at least in the last two decades – the dismal productivity growth seems directly associated with innovation activity under-performance more dependent than in the previous phases on the poor level of R&D efforts, particularly of the BERD, as argued in the previous paragraphs of this contribution.

The top import origin of Italy is Germany, that represents 15% in 2013<sup>22</sup>. We may expect that, given the fiscal austerity and the absence of public investments, technological or organizational changes affecting the Italian private sector will lead to an increasing demand of instrumental goods towards the Italian main trade partner characterized by a high technological specialization. As shown, among others, by Belitz *et al.* (2009), Germany boasts the world's highest share of value-added output attributable to (R&D) intensive goods and knowledge intensive services. At the same time, the country possesses an extremely broad range of economic sectors that rely on R&D intensive goods and knowledge intensive services. German firms have strong competitive advantages in numerous industries, including vehicle manufacturing, chemicals, machine building, measurement and medical technologies, as well as business oriented services.

#### 4.3 The Results

We estimated the Sylos Labini productivity gap equation by considering five different OLS models (see Table 3). Model 1 uses in the regression all the economic variables previously explained without lags. Model 2 introduced a lag in the Ricardo effects. Model 3 introduces two lags in the Ricardo effects and does not use the investments variables. Model 4 introduces two lags in the investments and does not use lags in the Ricardo effects. Model 5 introduces two lags both in Ricardo effects and in investments.

Empirical estimations show that the increasing gap between German and Italian productivities may be explained by the economic variables introduced by Sylos Labini. In fact, the coefficients that represent the

<sup>22</sup> See <http://atlas.media.mit.edu/en/profile/country/ita/>

Smith effect and the Ricardo effect are always significant in the five models we estimated. As we expected the Italian Smith effect is negatively correlated with the increase in the gap of productivity between Germany and Italy. To the contrary, the German Smith effect is positively correlated with the increase of the dependent variable. The investments variables are not significant. The dummy variable shows, as we expected, that after 2007 and especially after the 2010, the crisis reduced the gap of productivity between the two countries.

The meaning of the Ricardo effect, that describes technological and organizational changes stimulated by wages, needs attention. We should expect, by following the Sylos Labini analysis, that for each country the increase of Ricardo effect explains an increase in the labour productivity<sup>23</sup>. Model 3 and Model 5 show that in the Italian case this is not precisely verified: the lagged Ricardo effects in Italy increases the labour productivity gap between the two countries. In the last two decades, when Italian Ricardo effect increases, then the gap between German productivity and Italian productivity increases. We interpret this result as a confirmation of the technological foreign constraint that affects Italy and advantages Germany, as we argued in the previous sections. The technological and organizational changes in the Italian enterprises lead to an increase in the investment goods that Italy imports from Germany. Then the first consequence is a stimulus for the German labour productivity. The advantage for the Italian labour productivity will be obtained in the future, but will not be sufficient to fill the gap.

**Table 3 Regressions of the Sylos Labini productivity gap equation**

	$\pi$ Germany – $\pi$ Italy				
	Mod. 1	Mod. 2	Mod. 3	Mod. 4	Mod. 5
k	-0.158	-0.182	0.149 **	-0.485	-1.131
<b>Smith G</b>	0.902 ***	0.879 ***	0.862 ***	0.941 ***	0.908 ***
<b>Smith I</b>	-0.953 ***	-0.976 ***	-1.006 ***	-0.950 ***	-0.949 ***
<b>Inv. G</b>	2.4017e-07	2.760e-07		-2.5654e-05	-2.4977e-05
Inv. G (-1)				1.7468e-06	9.677e-07
Inv. G (-2)				2.7572e-05	3.209e-05 *
<b>Inv. I</b>	4.3858e-06	4.272e-06		4.0857e-05	3.5359e-06
Inv. I (-1)				-6.4193e-05	-5.0504e-05
Inv. I (-2)				2.6882e-05	5.2419e-05
<b>Ricardo G</b>	0.298 **	0.328 ***	0.347 ***	0.376 ***	0.3998 ***
Ricardo G (-1)		0.206 *	0.214 **		0.2632 **
Ricardo G (-2)			-0.102		-0.0742785
<b>Ricardo I</b>	-0.0794 *	-0.0635	-0.085 **	-0.1013 **	-0.09729 **
Ricardo I (-1)		0.0747 *	0.107 **		0.1133 **
Ricardo I (-2)			0.114 ***		0.1307 ***
<b>dummy 2007/14</b>	-0.611 ***	-0.675 ***	-0.631 ***	-0.668 ***	-0.8785 ***
<b>Adj. R<sup>2</sup></b>	0.709888	0.711413	0.749534	0.701379	0.758375
<b>DW</b>	1.925565	2.063199	1.896521	2.018562	1.954245

*p-value* < 0.01 \*\*\*; *p-value* < 0.05 \*\*; *p-value* < 0.1 \*

Our estimations show that the sum of the coefficients of the Italian lagged Ricardo effects, that explain the increase in the labour productivity gap, is higher than the coefficient of the Italian non-lagged Ricardo effect, that *vice versa* explains a decrease in the labour productivity gap.<sup>24</sup>

This result is consistent with the argument put forward by Cesaratto and Stirati (2010) in order to demonstrate that after the onset of the euro, Germany engaged in a neo-mercantilist model of development, that is a policy of competitive internal devaluation by depressing its real wage growth<sup>25</sup>. It is also consistent with the results obtained by Bagnai (2015): 1. the Italian decline can be explained by a progressive tightening of the balance-of-payments constraint and 2. the sudden slowdown of labour productivity in the

<sup>23</sup> The case of Germany for the 1968-1988 period, in which the coefficient of the Ricardo effect – as estimated by Sylos Labini – was negative, represents an unexpected result.

<sup>24</sup> Robustness tests were applied via heteroskedasticity-corrected estimations. Results are in line with our argument that technological and organizational changes in the Italian enterprises lead to an increase in the labour productivity gap between Italy and Germany. See the Appendix (Table A3).

<sup>25</sup> See also Sabbatini and Zollino (2010).

1990s corresponds to a major shock on Italy's external constraint that came from the core Eurozone countries.

### 5. Conclusion

Over the past 25 years, GDP grew in all countries, but the difference in growth rates reflects a non-homogeneous productive structure. GDP is a synthetic indicator of different variables, but the combination of the different inputs tends to hide the singularity of productive specialization. Investments still have a special role as they represent the most dynamic component of the effective demand, but in certain circumstances their increase may be counterproductive: increasing investments in order to support growth is not enough<sup>26</sup>. Scientific knowledge is necessary in order to plan the innovations by the public and the private sectors<sup>27</sup>. The programming of both knowledge and know-how implies a shift in technological paradigms that presupposes an industrial policy which is able to govern the structural economic dynamics. As underlined by Ciriaci and Palma (2016), while in Germany, knowledge-intensive business services act as a support to the development of the manufacturing sector with quite widespread diffusion across the entire industrial structure, the presence of a thoroughly innovative manufacturing sector for national competitiveness is what is still missing in Italy, where a relatively higher effort is made towards low and medium/low-tech subsystems. Precisely for these reasons, Italy does not need the structural reforms suggested by the August 2011 Letter to Italian Prime Minister, signed by Trichet and Draghi, that are thought for a country which remains heavily dependent on foreign technologies.

Trichet and Draghi presented the following measures as essential for the Italian economy:

- a) We see a need for significant measures to enhance potential growth. A few recent decisions taken by the Government move in this direction; other measures are under discussion with social partners. However, more needs to be done and it is crucial to go forward decisively. Key challenges are to increase competition, particularly in services to improve the quality of public services and to design regulatory and fiscal systems better suited to support firms' competitiveness and efficiency of the labour market.
- b) A comprehensive, far-reaching and credible reform strategy, including the full liberalisation of local public services and of professional services is needed. This should apply particularly to the provision of local services through large scale privatizations.
- c) There is also a need to further reform the collective wage bargaining system allowing firm-level agreements to tailor wages and working conditions to firms' specific needs and increasing their relevance with respect to other layers of negotiations. The June 28 agreement between the main trade unions and the industrial businesses associations moves in this direction.
- d) A thorough review of the rules regulating the hiring and dismissal of employees should be adopted in conjunction with the establishment of an unemployment insurance system and a set of active labour market policies capable of easing the reallocation of resources towards the more competitive firms and sectors. (Draghi and Trichet, 2011).

To the contrary, the necessary reforms should be designed to govern the cumulative movements of the macro-economic magnitudes (such as GDP, total consumption, total investment, overall employment, etc.) and the changes in their composition, that is, the dynamics of their structure (Pasinetti, 1993). In short, acting on the economic structure should assume some form of industrial planning<sup>28</sup>. As Augusto Graziani claimed (1997), it is difficult for a country like Italy, until it is characterized by a weak industrial structure, to face the

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<sup>26</sup> Lucarelli, Palma e Romano (2013).

<sup>27</sup> Ferrari (2014), pp. 53-54. See also Ferrari *et al.* (2002; 2004; and 2007).

<sup>28</sup> We are referring to the Italian political debate on "reforms within the structure" during the 1960s. In that period, the Italian terminology "riforme di struttura" meant something totally different from what today are called "structural reforms". Particularly we are referring to the analyses of Riccardo Lombardi and Paolo Sylos Labini. In their contributions the term "structure" means "capitalist structure". About Lombardi see Bartocci (2014), about Sylos Labini political interventions in the 1960s, see Roncaglia (2015).

competition of technologically advanced countries in an optimal currency area. Graziani concluded that, given the absence of the industrial policy, the compression of labor costs would be probably the easier strategy to face the new context.

Economic and social development, in the Schumpeterian, qualitative sense (Schumpeter, 1935), is in fact based on the structural changes, that are mostly related to the ability to 'generate' knowledge. Income growth and diversification of consumption have consolidated and expanded the need for goods and services with higher technological content, consequently they have fueled the growth of high-tech component in domestic consumption and international trade: the high technology, within the manufacturing international trade, rose from 10% (in 1985) to 30% (in 2008)<sup>29</sup>. The relevant variable is the technological intensity of investments, not the investment itself. The growth of research and development, specifically the ratio BERD / GDP, has reduced the need for increasing instrumental goods. Some might argue that the crisis of 2007 has affected investments. In fact, the crisis has only accelerated a consolidated phenomenon: the market has been in charge of selecting productive investment than conservative ones, by supporting companies that have a significant technological intensity. Without considering the serious economic policy mistakes that characterize the EMU, that we reviewed in the previous sections, European countries are facing a new techno-economic paradigm which makes planning economic policies more difficult than it was in the years of the Golden Age (1944–1973). The indiscriminate support of the effective demand may not be sufficient response to the crisis.

Considering the particular nature of the Italian crisis, characterized by the burden of the technological foreign constraint, a request for indiscriminate support of investments would be counterproductive: given the development path on which Italy stands, it would contribute to the increase of the Italian technological gap, as our estimations seem to confirm. On the contrary the point is understanding the structural dynamics of the system and re-programming the productive structure of the country. It is necessary to consider of what is actually produced, how to do it and for whom, urging a modification of the productive specialization towards branches characterized by a higher intensity of research and development. Only the production of innovative goods which are capable to address a technological change apt to go beyond national boundaries can reduce the gap of the country in a durable manner. This is what an industrial policy should mean<sup>30</sup>.

## APPENDIX

**Table A1 A synthetic statistics of all variables of the regressions, using the quarterly observations 1995:1 - 2015:2**

Variable	Mean	Std. Dev.	Minimum	Maximum
$\pi$ Germany - $\pi$ Italy	0.176829	0.774963	-2.10000	1.80000
Smith G	0.321951	0.849113	-4.50000	2.00000
Ricardo G	0.231707	0.456470	-1.00000	1.30000
Inv G	121752.	12545.9	104253.	150763.
Smith I	0.130488	0.726855	-2.90000	1.60000
Ricardo I	0.136585	1.16646	-4.30000	3.80000
Inv I	69622.3	12031.7	45627.0	88041.0

<sup>29</sup> Data are taken from Palma e Prezioso (2010).

<sup>30</sup> See Leon (2014).

**Table A2 Correlation coefficients, using the observations 1995:1 - 2015:2; 5% critical value (two-tailed) = 0.2172 for n = 82**

<b>Smith G</b>	<b>Ricardo G</b>	<b>Inv G</b>	<b>Smith I</b>	<b>Ricardo I</b>	<b>Inv I</b>	<b><math>\pi</math> Germany - <math>\pi</math> Italy</b>	
1.0000	0.2985	0.0687	0.6142	-0.0286	-0.0218	0.5396	<i>Smith G</i>
	1.0000	0.2720	0.1764	-0.0481	0.0131	0.2279	<i>Ricardo G</i>
		1.0000	-0.2803	-0.1349	0.3075	0.1073	<i>Inv G</i>
			1.0000	0.1270	-0.2801	-0.1250	<i>Smith I</i>
				1.0000	-0.0593	-0.2386	<i>Ricardo I</i>
					1.0000	0.1534	<i>Inv I</i>
						1.0000	<i><math>\pi</math> Germany - <math>\pi</math> Italy</i>

**Table A3 Regressions of the Sylos Labini productivity gap equation, heteroskedasticity-corrected**

	<b><math>\pi</math> Germany - <math>\pi</math> Italy</b>				
	Mod. 1	Mod. 2	Mod. 3	Mod. 4	Mod. 5
<b>k</b>	-0.495	-0.142	0.155**	-0.552	-0.9301
<b>Smith G</b>	0.935 ***	0.9394 ***	0.894 ***	0.9468 ***	0.949 ***
<b>Smith I</b>	-0.9881 ***	-0.9889 ***	-1.014 ***	-0.9791 ***	-0.9104 ***
<b>Inv. G</b>	1.79564e-07	-3.00779e-07		-2.5043e-05	-3.14707e-05
Inv. G (-1)				1.59819e-06	1.2654e-06
Inv. G (-2)				1.43643e-05	3.6635e-05 *
<b>Inv. I</b>	7.43211e-06**	4.1766e-06		5.88749e-05	4.63802e-06
Inv. I (-1)				-8.4242e-05*	-8.5546e-05*
Inv. I (-2)				2.66927e-05	8.592e-05***
<b>Ricardo G</b>	0.0595	0.219 *	0.369 ***	0.416 ***	0.27543 **
Ricardo G (-1)		0.4002 ***	0.2194 ***		0.4606 ***
Ricardo G (-2)			-0.131		-0.06149
<b>Ricardo I</b>	-0.0749 *	-0.02688	-0.091 *	-0.0896 **	-0.184318 **
Ricardo I (-1)		0.0542	0.101 ***		0.06064
Ricardo I (-2)			0.0861 **		0.11353 ***
<b>dummy 2007/14</b>	-0.664 ***	-0.627 ***	-0.624 ***	-0.678 ***	-0.883 ***
<b>Adj. R<sup>2</sup></b>	0.795075	0.729594	0.783252	0.910134	0.847585
<b>DW</b>	1.639015	1.943436	1.919661	2.068956	1.866449

*p-value* < 0.01 \*\*\*; *p-value* < 0.05 \*\*; *p-value* < 0.1 \*

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**Author contact:** [stefano.lucarelli@unibocconi.it](mailto:stefano.lucarelli@unibocconi.it) and [roberto.romano@cgil.lombardia.it](mailto:roberto.romano@cgil.lombardia.it)

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