



## WORKING PAPER SERIES

**International financial flows, domestic banks, and the economic development of the periphery: Italy, 1861-1913**

*Paolo Di Martino, Barbara Pistoletti  
and Alberto Rinaldi*

Working Paper 126

December 2016

[www.recent.unimore.it](http://www.recent.unimore.it)

RECent: c/o Dipartimento di Economia Politica, Viale Berengario 51, I-41100 Modena, ITALY  
Phone +39 059 2056856, Fax +39 059 2056947, E-mail: RECent@unimore.it

**Paolo Di Martino\*, Barbara Pistoresi\*\* and Alberto Rinaldi\*\***

## **INTERNATIONAL FINANCIAL FLOWS, DOMESTIC BANKS, AND THE ECONOMIC DEVELOPMENT OF THE PERIPHERY: ITALY, 1861-1913**

Affiliations and addresses of the authors:

**\* Birmingham Business School,  
University House,  
Edgbaston Road,  
B15 2TT,  
Birmingham, UK**

**\*\*Dipartimento di Economia “Marco Biagi” and ReCent,  
Università di Modena e Reggio Emilia,  
Viale Berengario 51,  
41100 Modena, Italy**

### **Abstract**

This paper analyses the impact of different sources of financing (foreign capital, migrants' remittances, and domestic banks intermediation) on economic development in Italy between 1861 and WWI. Existing literature has analysed the role of these channels of financial intermediation separately, while this paper for the first time considers them in conjunction. Using IRF from a Cholesky identification structure of a VAR model and relying on an original dataset that combines the most recent series of several financial and economic aggregates, this paper shows that both international capital and domestic saving had a significant impact on investment, while remittances did not. Foreign capital was invested directly, but also via domestic banks, in particular the "German-style" universal banks. Finally, foreign and domestic capital had different attitudes towards the types of investment (construction vs. plant, machinery and transport equipment) and industries they financed. Combined together, these results shed a new light on the process of economic development of Italy and, more generally, of peripheral economies in the age of the international gold standard.

**Keywords:** Foreign capital, domestic banks, remittances, investment, Italy, IRF, Cholesky identification

**JEL classification:** F24, G15, G21, N23, N43

## 1. Introduction\*

The role of international capital flows in fostering the economic development of peripheral countries represents a key aspect of the literature on the functioning of the classical gold standard (1870-1913).<sup>1</sup> The traditional view on this matter argues that Britain helped the growth of the world economy (including the periphery) by reinvesting abroad the financial resources derived by her constant surpluses in the balance of payment (Kindleberger 1986). This availability of funds benefited peripheral countries either directly via British investment, or indirectly because the integration and competition among international financial markets led to generalised pressure on interest rates on loans. A parallel stream of literature, mostly due to Bordo and his associates (Bordo and Kydland 1995; Bordo and Rockoff 1996), argued that for individual countries the access to such financial bonanza depended on them complying to rules of the gold standard: specifically, gold convertibility operated as a constraint to public expenditure, making governments credible to the eyes of international investors.<sup>2</sup>

Recently, the literature on international capital flows has been enriched by a new perspective, one on the role of remittances. Esteves and Khoudour-Castéras (2009 and 2011) showed a significant macro impact of remittances on financial development in peripheral countries; in fact, in their estimates this was consistently larger than the impact of international capital flows from “core” economies. The implication that follows from these results is that for these countries the ability of domestic institutions to channel remittances into productive investment represented a key factor in fostering economic growth, possibly even more relevant than the capacity of individual economies to access international financial markets. In other words, these new results pave the way for a re-assessment of the functioning of domestic credit institutions in the periphery.

In fact, this topic has been traditionally the subject of a vast literature. For instance, already in the early 1960s, Gerschenkron (1962) provided an analysis that linked countries’ stages of development to the features of their financial systems. Specifically, Gerschenkron identified the development of domestic financial institutions – especially universal banks that provide both commercial banking functions (short-term credit, deposit taking, payments clearing, bill

---

\* A preliminary draft of this paper was presented at the *Economic History Society* Annual Conference 2016 (Cambridge, 1-3 April 2016) and the 6<sup>th</sup> *EH/Tune* (Tuscany University Network in Economic History) workshop (Siena 27<sup>th</sup>-28<sup>th</sup> October 2016). We are indebted to the participants to these seminars for comments and criticisms; in particular, we wish to thank Carlo Ciccarelli, Leandro Conte, Rui Esteves, Giovanni Federico, and Michelangelo Vasta. Usual caveat applies.

<sup>1</sup> For a summary, see Eichengreen (1998, chapter 2).

<sup>2</sup> A much less optimist view, provided in the 1970s by De Cecco (1975), argued that, in fact, individual countries benefited or not from the inclusion in the gold standard system according to their geo-political power, rather than their financial credibility.

discounting) and investment banking services (underwriting and trading in securities) – as *the cause* of the economic take-off in “moderately backward” economies such as Germany, Austria, and Italy. Over the years, this approach has been revisited or openly criticised (Fohlin 2012), but the somehow surprising aspect is that this field of literature has hardly put in relation to the one on international capital flows and the one on remittances.

The lack of systematic links among the three streams of literature described above makes hard to fully address some key questions about the functioning of the international economy during the classical gold standard. For instance, to what extent did peripheral countries depend, for their economic development, on foreign capital inflows, remittances, or domestic savings? Did Italian domestic banks help channelling foreign capital to investment, or did international investment take place via alternative channels? Did domestic and international sources of funding go towards different sectors, e.g. labour- vs capital- and technology- intensive industries?

The aim of this paper is to provide some answers to these questions by investigating the impact of different sources of international and domestic financing on the economy of Italy from political unification in 1861 to the eve of WWI. We believe that there are a number of reasons why Italy is a good case-study to address such questions. Italy was, firstly, an exemplary case of latecomer semi-peripheral country joining (and abandoning) the gold standard, and its vicissitudes can be seen as a good proxy for the whole set of these countries.<sup>3</sup> Italy was also a country of migrants, where remittances have claimed to have represented a very substantial share of the country’s financial liquidity. Finally, scholars in Italy have long debated the relative role of international and domestic credit intermediation (and their impact on economic development), but the two channels have never fully discussed together.

This paper is structured as follows: Section 2 summarises some debates on the role of various sources of financing on Italy’s economic growth and sets up some hypotheses to be tested; Section 3 presents the sources and data we have used in our analysis, and illustrates the evolution of Italy’s capital flows; Section 4 describes the econometric framework; Section 5 presents and discusses the results; finally, Section 6 concludes.

## 2. A view from Italy

Studies focussing on banking and financial aspects figure prominently in the economic history of Italy from Unification to WWI. Chronologically, the pioneer of this research strand is

---

<sup>3</sup> Italy followed a bimetallic standard from unification in 1861 until 1866, when convertibility was suspended in the wake of the war against Austria. Italy joined the gold standard in 1883, but specie payment was suspended in 1893. Mint parity was achieved again in 1903 and maintained until the outbreak of the First World War, but convertibility of bank notes into specie was not re-introduced, e.g., Italy “shadowed” the gold standard (Tattara 2003; Morys 2006).

Gerschenkron (1962) who provided the first proper narrative of Italian economic development centred around financial factors rather than real ones. In his view, backward economies such as Italy could develop and “catch-up” with more advanced countries only thanks to “substitution factors” able to ignite the potential rapid growth implicit in the state of economic backwardness. In the Italian case, the substitution factor was identified in specific financial institutions, German-style universal banks that were set up in the mid-1890s in the wake of the collapse of the previous French-style *credit mobilier*-type commercial banks. In Gerschenkron’s view, German-style universal banks were able to channel both domestic and international savings (these banks had structural links with the German financial market) into the fast-growing technologically-advanced and capital-intensive sectors of the second industrial revolution. Hence – Gerschenkron claimed – the phase of fast growth since the turn of the century (Italy’s “big spurt” in the jargon of the time) was due to new financial institutions and their operations.

A few decades later, Gerschenkron’s analysis was supported by an econometric study (Warglien 1987). This research showed that commercial banks were the engine of financial support to modern sectors and that fluctuations in investment in capital goods depended on variations in commercial banks lending.

The claim that commercial banks (and in particular universal banks) had to be considered as *the* factor behind the development of the Italian economy up to WWI acquired in the Italian historiography the status of a commonplace.

Overtime, however, a number of deep criticisms to this view emerged, in particular along three main lines: firstly, an erroneous view of the actual functioning of universal banks, leading to overestimate their relevance and impact on the economy; secondly, the parallel underestimation of the role played by other domestic financial institutions; thirdly, the possibility that Italian development was led by international rather than domestic financial flows.

Banking historians such as Confalonieri (1974-76, 1982) and Hertner (1984) firstly claimed that Italian universal banks were not the novelty that Gerschenkron had argued. Their view was that domestic financial institutions did matter, in general, for the process of economic development in Italy, but universal banks were hardly different from the banks that existed before them. The credit institutions destroyed by the 1890s crisis, in fact, channelled international (mainly French) financial resources into Italian productive investment in a way similar to what decades later universal banks did with German capital. Logically, the implication of this argument was that if universal banks were not very different from their predecessors, it was very hard to attribute them a much stronger power and influence over the Italian economic development.

This argument was further perfected by Fohlin (1998, 1999). This author showed that universal banks tended to fund large and well-established companies instead of promising, but risky, small firms, which needed venture capital. She also claimed that firms linked to the universal banks performed similarly – in terms of growth of financial capital, fixed assets and revenues – to those that were not.<sup>4</sup> The general conclusion was that universal banks played a limited role in fostering the investment of Italian firms during a critical phase of industrialization, dismissing Gerschenkron's tale.

A parallel line of research, still from banking history, further contributed to undermine Gerschenkron's view by showing the structural contribution to Italian industrial growth provided by local savings institutions and cooperative banks. While Gerschenkron believed in the stereotype of savings institutions and cooperative banks only or mainly investing in safe public bonds or similarly state-guaranteed securities, scholars such as Carnevali and Conti showed how these banks - that overall collected about half of total Italian savings - became progressively more active in the financing of trade and light industry, especially at local level (Carnevali 2005; Conti 2007). A recent work by Vasta, Drago, Ricciuti and Rinaldi (2016) has shown, by using network analysis and quantitative methodologies, that large universal banks were not the only relevant actors that supported Italian industrialization; in fact, in several areas of the country (especially Lombardy and some other regions of the North), small local banks had established strong ties with industrial firms already by 1913.

The strongest attack to Gerschenkron's view, however, rather than from banking history, came from macroeconomic studies. In a number of articles, and thanks to original reconstructions of historical series of GDP and industrial output, Fenoaltea challenged the very idea of a “big spurt” in the Italian economy identified by Gerschenkron on the basis of his own statistical series. According to Fenoaltea, instead, Italy was characterised by a steady process of long-term economic growth with medium-term cyclical fluctuations around the trend due to the cyclical character of the construction industry. Further, and this represents a second structural criticism to Gerschenkron – swings in Italian construction and in other activities were driven by exogenous fluctuations in British capital exports with little role given to domestic savings (Fenoaltea 1988; 2003). In a more recent formulation, Fenoaltea (2011) maintained that exogenous capital inflows prompted not just the construction cycle, but a more general investment cycle in Italy; construction and industrial investment were part of the same cycle and no more than the Italian component of a world-wide cycle in capital formation common to peripheral countries as a whole.

---

<sup>4</sup> This result is confirmed by Battilani (1995) who analyzed the balance-sheets of a sample of Italian cotton firms in the 1920s.

The completely exogenous nature of foreign capital inflows in Fenoaltea's analysis not only reversed Gerschenkron's view on Italian industrialization, but also challenges a vast body of literature linking financial flows from the core to the periphery to the formal adherence of the latter to the gold standard. Indeed, Italy provides an interesting point of view on this matter, as the country formally embraced metallic convertibility in the early 1860s (1861-1866) and later between 1883 and 1893, but not during the years of the most rapid industrial growth (1896-1908).

Finally, Italy was a country of mass-emigration (Gabaccia 2000) and it figures prominently in studies on remittances. Clearly, migrants generated a conspicuous flow of resources able to substantially affect the level of money supply. What is less clear, however, is how this money was channelled into the economy and the impact it had on economic growth.

Overall, the debate analysed above provides a number of claims (often opposite each to the other) to be addressed. They can be summarised as follows:

- a) Did domestic sources of finance dominate international ones, or did the opposite occur?
- b) Did Italian domestic banks help channelling foreign capital to investment, or did international investment take place via alternative channels?
- c) What was the role of emigrants' remittances in funding investment in Italy?
- d) Which types of banks mostly funded industrial investment in Italy? Did commercial banks operate differently from other domestic institutions, such as savings banks and cooperative banks? Was the role of the latter marginal or relevant? What was the role of German-style universal banks?
- e) Did domestic and international sources of funding go towards different sectors, e.g. labour- vs capital- and technology- intensive industries?

### **3. Sources and data**

Before moving to the econometric investigation of the claims described above, we present the sources and data used in our analysis. This study relates various measures of financial flows (a) to key economic aggregates (b); in order to do so, we use – combined together – various individual time series covering the time span 1861-1913.

#### *a. Financial aggregates*

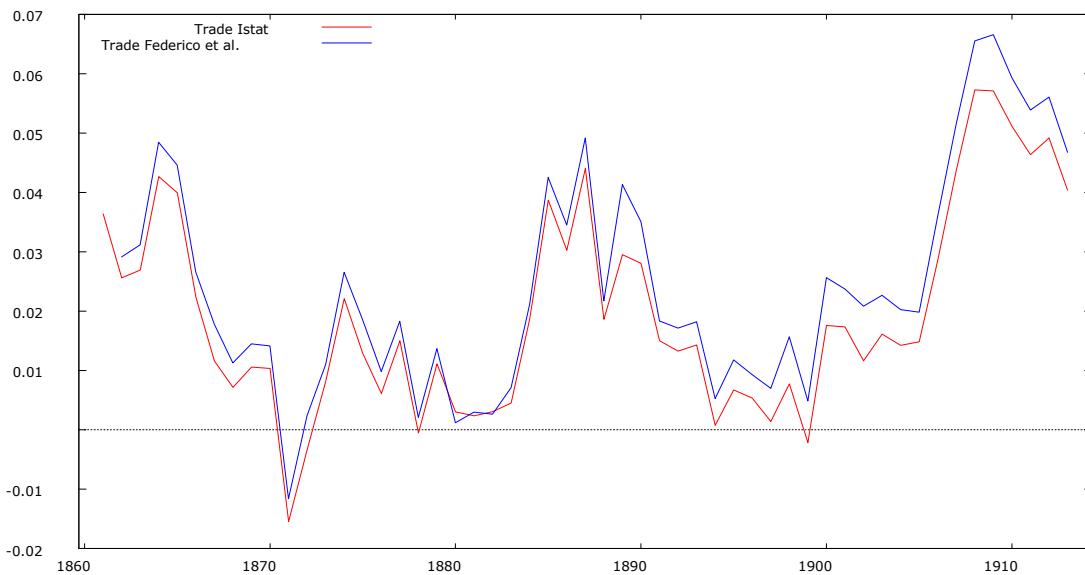
##### *a.1. Foreign capital inflows; remittances*

A full reconstruction of an original series of the aggregate inflows of foreign capital in Italy is at the moment unavailable. In fact, the almost complete lack of information on key elements, for

example the amount of foreign banks' re-discounting of commercial bills owned by Italian banks, makes efforts in this direction almost impossible and estimations very tentative. To circumvent this problem, we instead use the current account (CA) of the balance of payment which, by definition, indicates the amount of financial resources entering (exiting) the country to balance a deficit (surplus) in the balance of payment. Although such a measure does not allow differentiating between different types of flows (short and long-term for instance) or even between "proper" investment and technical adjustment (for instance purchases or alienation of foreign currencies by the central bank), it remains the best available proxy for the variable of interest. In fact, using the CA represents a relevant element of novelty of this paper, as till a few years ago only data on the trade balance were considered sufficiently reliable and the trade balance was used as a proxy for the CA.<sup>5</sup> The picture has changed thanks to the appearance of new and massively improved individual series which, combined together, produce what it is currently the best series for the Italian CA. The latter is calculated as the result of the sum between the trade balance and the invisible balance.

Starting with the trade balance, the old Istat's (1957) series has been almost completely replaced by the recent series by Federico, Natoli, Tattara and Vasta (2011).<sup>6</sup> Figure 1 below plots the old and new series expressed as the deficit of the trade balance as a ratio to GDP.

**Figure 1: Deficit of Italy's trade balance as a ratio to GDP, (1861-1913)**



Sources: see text

<sup>5</sup> For a discussion, see Fenoaltea (2011).

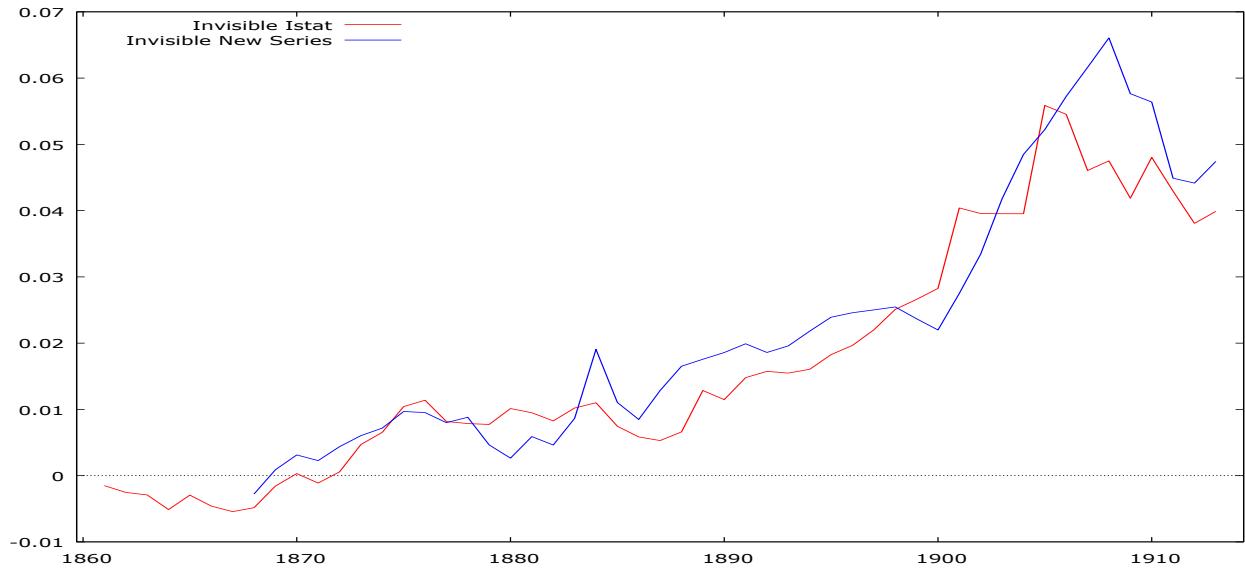
<sup>6</sup> The old series is used only for 1861.

The graph shows how the new data provide an overall more negative picture; the new series confirms that Italy suffered from a structural deficit (apart from 1871) but this deficit was more severe than previously thought, especially during the years of rapid industrialisation at the beginning of the 20<sup>th</sup> century. The implication is that Italy needed a higher amount of financial resources to compensate it, either as a result of the trade on services or in terms of capital inflows from abroad.

To obtain the CA series, the invisible balance must be added to the trade balance. To do that, we produced an estimation of the invisible side of the balance of payment using various individual sub-series: income from interests on investment; remittances; and income from transport and tourism. Originally, these data were only available as part of Istat's (1957) series, which were notoriously weak, especially as far as remittances were concerned. For the years 1861-67, despite its weaknesses we use the same series as anything else is available; it must be noticed, however, that the absolute value of remittances for these years is very low, something that reduces the order of magnitude of possible errors as well. For 1868-1875 we use instead Morys's (2006) series which is based on Istat's data for transport and tourism, but has new estimates of interests paid and of remittances. From 1876 we use the same series but, for remittances only, we use more recent data by Esteves and Khoudour-Castéras's (2009). It is important to stress that both Morys's and Esteves and Khoudour-Castéras's series are not originally produced with primary sources but obtained using an algorithm and available data on number of migrants and average remittances. However, directly-calculated values of remittances exist for 1891 (Biagioli and Picozza 2002) and 1911 (Marolla and Rocca 2002) and these two observations can be used as a robustness check for the available series. In general, data on remittances directly calculated appear to be smaller than the ones obtained via indirect calculation (156 vs. 293 million Lire in 1891; 710 vs. 758 million lire in 1911), although the difference fades away over time.

Figure 2 below plots the pattern of the invisible balance as a ratio to GDP, comparing Istat's series to the one we label the “new series”. In both cases the picture shows how after a brief phase in the 1860s, Italy experiences a constant surplus in the invisible balance as soon as tourism and transport and (later) remittances counterbalance the constant negative sign of the interest paid on foreign investment in Italy. In the new series, however, the surplus tends to be bigger than according to the original Istat's data (with the exception of two short phases in the late 1870s and in the late 1890s). This consideration counterbalances the observation on the extent of the deficit of the trade balance made above.

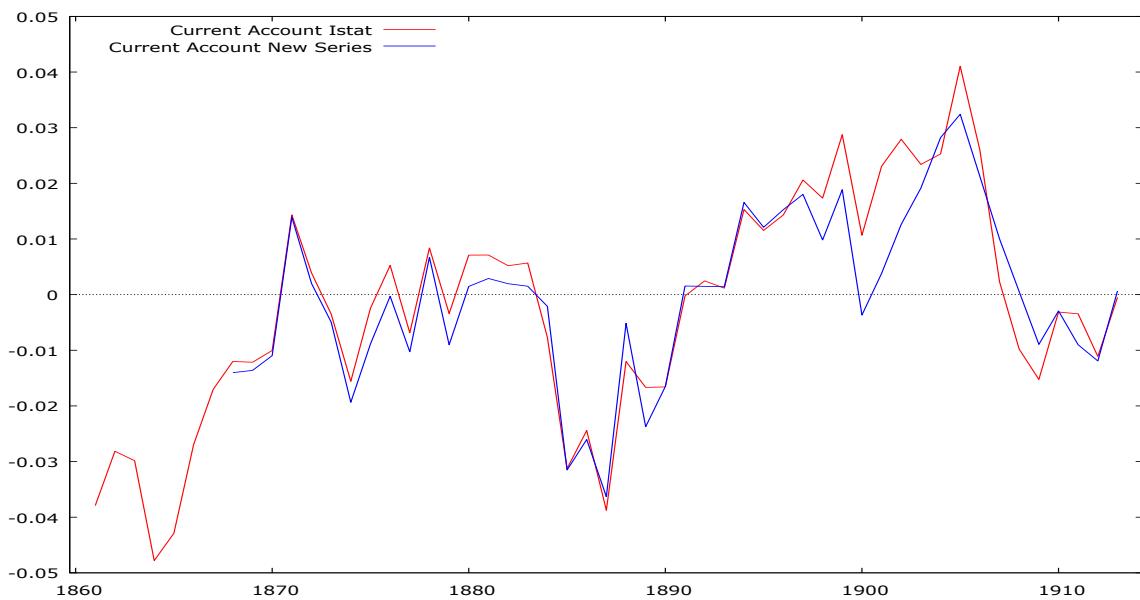
**Figure 2: Italy's invisible balance as a ratio to GDP, (1861-1913)**



Sources: see text

Combining together the series of the trade balance and the one of the invisible balance, we are able to see whether Italy had to import or to export financial resources. Figure 3 below plots the CA balance as a ratio to GDP derived from both Istat's data and the new series described above. Although substantial gaps open between the two series (in particular in the initial years of the 20<sup>th</sup> century), the new data confirm the overall picture of a surplus of the CA balance during the 1860s, and for about two decades from the early 1890s. Conversely, during the period of industrial development of the 1870s, 1880s and 1910s, Italy suffers from a CA deficit. Nonetheless, even when CA was in surplus, Italy was probably never a real net capital exporter, as interest payments abroad always exceeded interest payments from abroad. There were, however, long periods in which capital repatriations (mainly due to remittances) exceeded capital imports (Morys 2006).

**Figure 3. Italy's current account balance as a ratio to GDP, (1861-1913)**



Source: see text

#### a.2. Domestic bank assets

To measure the impact of domestic credit institutions we use total bank assets. For the period 1861-1913 a new series for these data (aggregated in total) has been recently provided by De Bonis and Silvestrini (2014, Tab. 1). Data on bank assets disaggregated by type of banks (i.e., commercial banks, savings banks, and cooperative banks) are instead available only from 1870 (De Mattia 1967, v. 1, t. 2, Tav. 23). To improve this measure we construct a new series that insulates the role of the four largest universal banks: *Banco di Roma*, *Banca Commerciale Italiana*, *Credito Italiano*, *Società Bancaria Italiana*.<sup>7</sup> For this aim, information is drawn from Imita.db, a large database which contains information regarding companies, boards of directors, boards of auditors, and balance sheets of a large sample of Italian joint-stock companies.<sup>8</sup> Because the purchase of houses was mainly finance via mortgages, we use long-term loans of the whole banking system (the best available proxy for mortgages) rather than total bank assets in looking at the impact of various

<sup>7</sup> *Banco di Roma* was founded in 1880, *Banca Commerciale Italiana* in 1894 and *Credito Italiano* in 1895. *Società Bancaria Italiana* was established in 1904 and, because of the crisis of the iron and steel industry in 1911, it merged in 1914 with *Società Italiana di Credito Provinciale*, establishing the *Banca Italiana di Sconto*.

<sup>8</sup> Details on this database are provided in Vasta (2006). Balance sheet data of the four universal banks are available from 1895. The database is available on line: <http://imitadb.unisi.it>

sources of financing on investment in constructions. Data are drawn from De Bonis and Silvestrini (2014, Tab. 1).

### *a.3. Postal savings*

To assess the role of remittances we also use postal savings collected by post offices. This is because in the South of Italy, where the majority of migrants came from, only a fraction of the population used banks, relying instead on alternative channels. Data are from De Bonis, Farabullini, Rocchelli and Salvio (2012, Tab. 4).

## *b. Economic aggregates*

To measure the impact of different sources of financial intermediation on Italy's economic development we use various aggregates. In this case the construction of the series is less problematic than for financial measures, as recent and very reliable reconstructions exist for most variables.

### *b.1. GDP and investment*

Various estimations exist for Italian GDP in this period; to select among them we simply decided to use the most recent series, the one provided by the Italian central bank (Baffigi 2011). We also use the same series for total investment, investment in construction, and investment in plant, machinery and transport equipment (1861-1913), although in this case too previous estimates existed.

### *b.2. Industrial production*

To measure the impact of financial flows on the economy we also use, as an alternative measure, data on industrial production. Specifically, we make use of the data on value added disaggregated by sector (1861-1913) provided by Fenoaltea (2011, Tab. 1.03).

## **4. Econometric framework**

In this section we show the econometric model used to investigate the impact of different sources of international and domestic financing on the economic development of Italy. We start considering a vector autoregression model (VAR) that describes the evolution of a set of variables

of interest, over the same sample period ( $t = 1, \dots, T$ ) as a linear function of only their past values<sup>9</sup>. A  $p$ -th order VAR, denoted **VAR( $p$ )**, is:

$$\mathbf{Y}_t = \mathbf{c} + \phi(\mathbf{L})\mathbf{Y}_{t-1} + \varepsilon_t = \mathbf{c} + \phi_1\mathbf{Y}_{t-1} + \dots + \phi_p\mathbf{Y}_{t-p} + \varepsilon_t \quad (1)$$

where  $\mathbf{Y}$  in our case is a vector of three variables:  $\mathbf{Y}_t = (y_{1,t}, y_{2,t}, y_{3,t})$ ,  $E(\varepsilon_t) = 0$ ,  $E(\varepsilon_{it}^2) = \sigma_i^2$ ,  $i = 1, \dots, n$ ; in general  $E(\varepsilon_{it}, \varepsilon_{jt}) \neq 0$  for  $i \neq j$ . The VAR expresses each variable as a linear function of its own past values, the past values of all other variables being considered and a serially uncorrelated error term. Thus in our case the VAR involves three equations where for example current capital inflows as a function of past values of foreign capital, bank assets and investment and similarly for the bank assets and investment equations. Each equation is estimated by OLS. Information criteria are used to choose the maximum lag  $p$  in the VAR model. To estimate a VAR all variables have to be of the same order of integration. The following cases are distinct:

- All the variables are I(0) (stationary) and a VAR in levels should be estimated;
- All the variables are I(1) (non-stationary). This implies the following cases:
  - The variables are cointegrated: it is possible estimate a VAR in *levels* or equivalently a Vector error correction model (VECM) in which an error correction term (e.g. the long-run equilibrium among the variables) is included.
  - The variables are not cointegrated and they have first to be first differenced. In this case a VAR in first differences should be estimated.

From an economic point of view, if the joint dynamics of a set of variables can be represented by a VAR model, then the structural form is a depiction of the underlying, "structural", economic relationships. Now we introduce the Structural VAR definition and we explain the relationship between reduced form and structural form. A *structural VAR with  $p$  lags* (sometimes abbreviated SVAR) is:

$$\mathbf{A}_0\mathbf{Y}_t = \mathbf{c} + \mathbf{A}(\mathbf{L})\mathbf{Y}_{t-1} + \mathbf{u}_t \quad (2)$$

The matrix  $\mathbf{A}_0$  identifies contemporary structural relationships among the variables, that is suggested by an economic model or theoretical assumptions, while the error terms  $\mathbf{u}_t$  are ***structural***

---

<sup>9</sup> For a review on VAR models, Stock and Watson (2001).

**shocks** with  $E(\mathbf{u}_{it}, \mathbf{u}_{jt}) = 0$  for  $i \neq j$ . The relation between the reduced and structural form disturbances is as follows:

$$\varepsilon_t = A_0^{-1} \mathbf{u}_t$$

A structural VAR may use economic theory to sort out the contemporaneous links among variables requires identifying assumptions that allow correlations to be interpreted causally. It is possible to derive the dynamic response of a specific variable in the system to a specific structural shock over a time period (impulse response function) imposing the simple identification scheme given by:

$$A_0^{-1} = \begin{pmatrix} 1 & 0 & 0 \\ a_{21} & 1 & 0 \\ a_{31} & a_{32} & 1 \end{pmatrix}$$

It is known as Cholesky causal chain (or Cholesky decomposition) and implies that all the structural parameters are identified and hence the related IRF. On this basis in a three variables system we have the following links between the estimated shocks  $\varepsilon$  and the structural shocks  $\mathbf{u}$ :

$$\begin{aligned} \varepsilon_1 &= \mathbf{u}_1 \\ \varepsilon_2 &= a_{21}\mathbf{u}_1 + \mathbf{u}_2 \\ \varepsilon_3 &= a_{31}\mathbf{u}_1 + a_{32}\mathbf{u}_2 + \mathbf{u}_3 \end{aligned} \tag{3}$$

This identification scheme incorporates the following assumptions concerning the variables of interest: the capital inflows shock ( $\mathbf{u}_1$ ) is *contemporary* exogenous to bank assets and investment; the bank assets shocks ( $\mathbf{u}_2$ ) is *contemporary* exogenous to investment.

## 5. Results

In this section we report the estimated impulse response functions (IRF) from a three variables VAR with two lags as suggested by BIC information criterion<sup>10</sup>. The VAR specification is in *levels* because all the variables included are I(1) and cointegrated (see Table A1 and A2 in the Appendix)<sup>11</sup>. The IRF are identified by Cholesky scheme as in Eq.3.

We use eight different proxies for the three financial variables (foreign capital inflows; remittances; bank assets), and six proxies for the two real variables (investment; sectoral industrial output, expressed by sectoral value added). All series are in current prices (million euros) as a ratio

---

<sup>10</sup> The results are available on request.

<sup>11</sup> We obtain similar results from a VECM specification of the system. Results are available on request.

to GDP. The value added series as a ratio to GDP are at constant prices (million euros, 1911). All ratios are in logs. Specifically, the variables used are the following:

Financial variables:

*Foreign Capital inflows*: CA balance / GDP;

*Remittances*: remittances / GDP;

*Bank assets (commercial banks)*: bank assets of commercial banks / GDP;

*Bank assets (savings banks)*: bank assets of savings banks / GDP;

*Bank assets (cooperative banks)*: bank assets of cooperative banks / GDP;

*Bank assets (universal banks only)*: assets of commercial banks minus assets of universal banks / GDP;

*Long-term loans (total)*: long-term loans by all banks / GDP;

*Postal deposits (total)*: postal deposits / GDP.

Real variables

*Investment (total)*: total investment / GDP;

*Investment (pmt)*: investment in plant, machinery and transport equipment / GDP;

*Investment (construction)*: investment in construction / GDP;

*VA (textiles)*: textiles value added / GDP;

*VA (engineering)*: engineering value added / GDP;

*VA (metalmaking)*: metalmaking value added / GDP;

To address the set of questions highlighted in Section 2, we provide various econometric exercises exploring such issues as whether domestic sources of finance dominate international, or the opposite occurred; whether domestic banks helped channelling foreign capital to investment, or international investment took place via alternative channels; the role of emigrants' remittances in funding investment in Italy; which types of banks (commercial banks, savings banks, or cooperative banks) mostly funded industrial investment in Italy; the role of German-style universal banks; and, finally, whether domestic and international sources of funding went towards different sectors, e.g. labour- vs capital- and technology- intensive industries.

### *Exercise 1: Foreign capital, domestic banks, and total investment*

The first exercise provides a general analysis of two basic aspects: the importance of foreign capital relative to national saving as a source of the funding of total investment in Italy, and the role of various types of domestic banks (commercial banks, savings banks,<sup>12</sup> and cooperative banks) in channelling international capital inflows. The rationale of separating by type of banks comes from established wisdom that only commercial banks – the banks that were joint-stock companies according to Italian legislation – might have had links to international investors, while the other institutions were supposed to collect mainly if not exclusively domestic saving. Also, this disaggregation allows testing the hypothesis of a non-negligible role of savings banks, cooperative banks, and commercial banks in supporting investment.

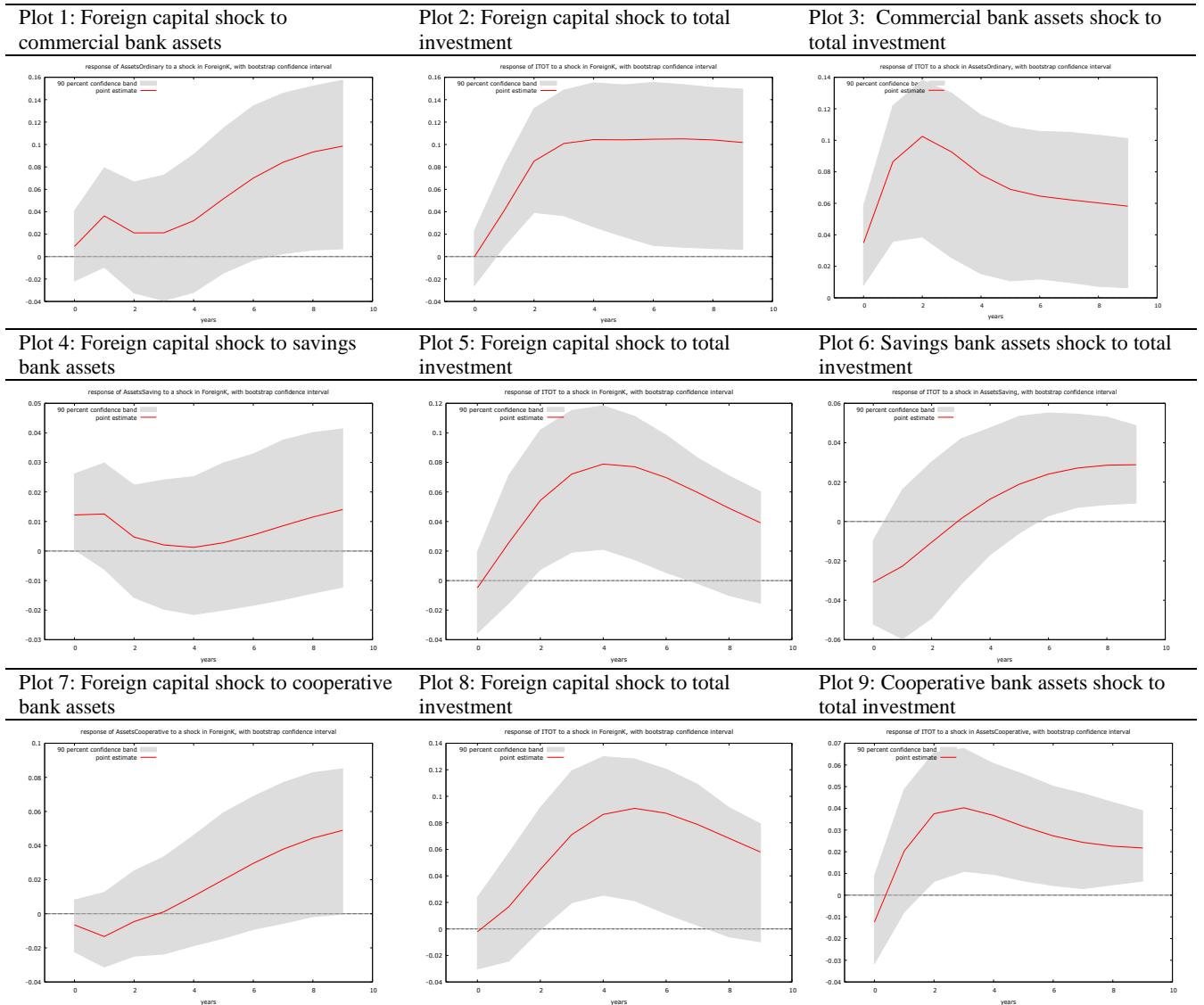
Figure 4 reports the IRF from a VAR(2) containing capital inflows, total bank assets (by type of banks), and total investment. The results are as follows:

- a. Whatever the specification, foreign capital inflows appear to have a positive and statistically-significant direct impact on total investment (plots 2, 5, and 8).
- b. In the long run, foreign capital inflows also have a positive and significant impact on the assets of commercial banks (plot 1), whereas their impact is not statistically significant on the assets of savings (plot 4) and cooperative banks (plot 7).
- c. Total assets of all types of banks (commercial banks, savings banks and cooperative banks) have a positive impact on total investment in the long run; however, the impact is stronger for commercial banks (plot 3 vs. plots 6 and 9).

---

<sup>12</sup> The savings banks were public bodies whose object was to promote the formation of savings and find suitable uses for them. The local authorities presided over the selection of the members of their boards.

**Figure 4: Impulse Responses in the Foreign capital - Bank assets - Investment (total) VAR**



Notes: The solid lines trace the impulse responses while the shadow area the 90% bootstrap confidence bands

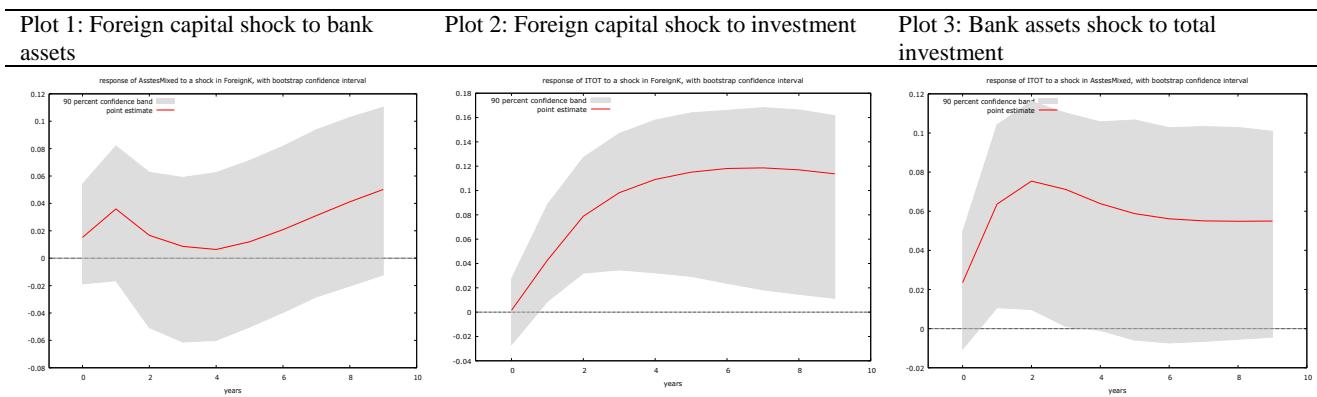
Overall, these results support the established view of a fundamental role of international investment in supporting the economic development of Italy up to WWI. However, they also indicate that foreign capital and domestic banks (or at least a segment of the entire banking system) operated in an integrated market and did not represent two parallel avenues. In other words, domestic institutions did matter in channelling international finance. In fact, domestic institutions were also pivotal in directing domestic savings into investment. Besides the action of commercial banks (which clearly relied on both foreign and domestic funds), savings banks and cooperative banks, which did not appear to intermediate international finance, still played a role in fostering investment by mobilizing domestic saving.

### *Exercise 2: Foreign capital, German-style universal banks, and total investment*

Given the debate on the role of German-style universal banks in fostering investment during the key phase of Italian industrialisation, we analyse how much of the results obtained in Exercise 1 is in fact a reflection of such role. To address this point we repeat Exercise 1 by subtracting from the assets of commercial banks the ones of the four largest universal banks.<sup>13</sup> The results (Figure 5) are the following:

- The indirect effect (i.e., via the domestic banking system) of foreign capital on total investment emerging from Exercise 1 becomes not statistically significant when we consider the assets of commercial banks excluding universal banks. This means that the result we obtained for commercial banks was in reality due mainly to universal banks, that is, foreign capital inflows are channelled to investment not by commercial banks in general but principally by a specific subset of them: universal banks (plot 1).
- The direct effect of foreign capital on total investment noticed in Figure 4 is also confirmed here (plot 2).
- The role of the banking system on total investment is still statistically significant but smaller when universal banks are subtracted from commercial banks. That is, it seems that foreign capital is channelled to investment by universal banks, while the remaining commercial banks play a key role in mobilizing national saving to finance investment (plot 3).

**Figure 5: Impulse Responses in the Foreign capital – Bank assets (commercial minus universal banks) - Investment (total) VAR**



Notes: The solid lines trace the impulse responses while the shadow area the 90% bootstrap confidence bands

<sup>13</sup> We use this procedure because the two largest universal banks were founded in the mid-1890s and therefore the series of their balance sheets are available for fewer than twenty years.

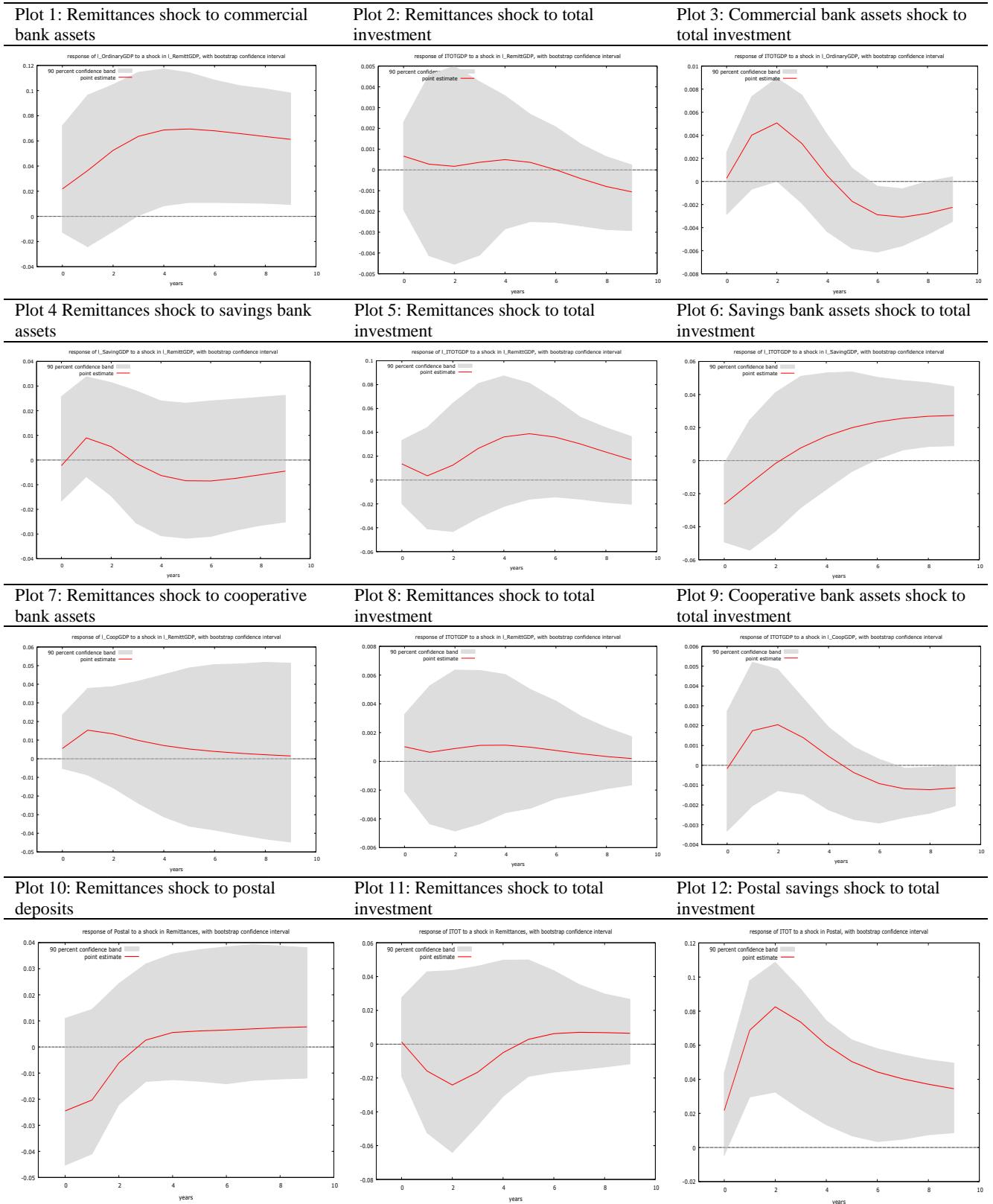
The conclusions from Exercise 2 are, therefore, that universal banks played a crucial role in channelling international finance. Universal banks were thus an element of novelty and their role was, indeed, different from the one played by the other commercial banks. Nonetheless, this exercise also confirms the importance of domestic savings; in fact, it appears that the result of plot 3 in Figure 4 (i.e. a strong impact of commercial banks assets on investment) was only partially due to the re-intermediation of international finance by German-style banks, but also related to other commercial banks investing domestic savings.

### *Exercise 3: Remittances, domestic banks, and total investment*

Results of previous exercises show that capital sent by foreign investors affected total investment in Italy; a question that remains open, however, is how much of this was due to remittances from Italian emigrants abroad. To address this point, we repeat Exercise 1 substituting foreign capital with remittances. In doing this exercise we include not only banks as disaggregated in Exercise 1, but also postal savings collected by post offices. This is because in the South of Italy, where the majority of migrants came from, only a fraction of the population used banks, relying instead on alternative channels. The results (Figure 6) are the following:

- a. Remittances only affect commercial banks' assets (plot 1), but not the ones of the other types of banks, nor postal savings (plots 4, 7, and 10).
- b. There is a positive direct effect of remittances on total investment but this is not statistically significant (plots 2, 5, 8, and 11).
- c. Postal savings had a positive direct impact on investment (plot 12). This indicates that they also – as well as domestic banks – played a relevant role in collecting domestic saving and channelling it to investment.

**Figure 6: Impulse Responses in the Remittances - Bank assets / Postal savings - Total investment VAR**



Notes: The solid lines trace the impulse responses while the shadow area the 90% bootstrap confidence bands

Overall, the exercise run using remittances shows lack of direct contribution of this variable to investment. This does not mean that remittances might not have helped the Italian economy of the time, for instance by increasing consumption or by lifting the need for importing capital during phases of expansion. Also, remittances increased total assets of commercial banks; this was probably a result of the monopoly assigned to the Banco di Napoli in 1901 to transfer remittances from emigrants' destination countries to Italy. Considering the role of commercial banks in fostering investment, we can then conclude that remittances had an indirect role. Finally, the positive impact of total postal deposits on investments confirms again the importance of the mobilization of domestic savings.

#### *Exercise 4: Foreign capital, domestic banks, and sectoral investment*

Having established a role of both foreign and domestic capital on total investment, as well as a much stronger impact of the commercial banks vis-à-vis other types of banks, a further step in our investigation consists in analysing what kind of investment finance was directed to. Specifically, the goal is to capture whether foreign capital financed investment in plant, machinery and transport equipment (PMT) or, rather, investment in construction. We therefore repeat Exercise 1 separating by type of investment and using commercial banks only. Furthermore, because the purchase of houses was mainly finance via mortgages, we use long-term loans of the whole banking system<sup>14</sup> (the best available proxy for mortgages) rather than total assets of commercial banks to investigate the impact of various sources of financing on investment in constructions. Our findings (Figure 7) are:

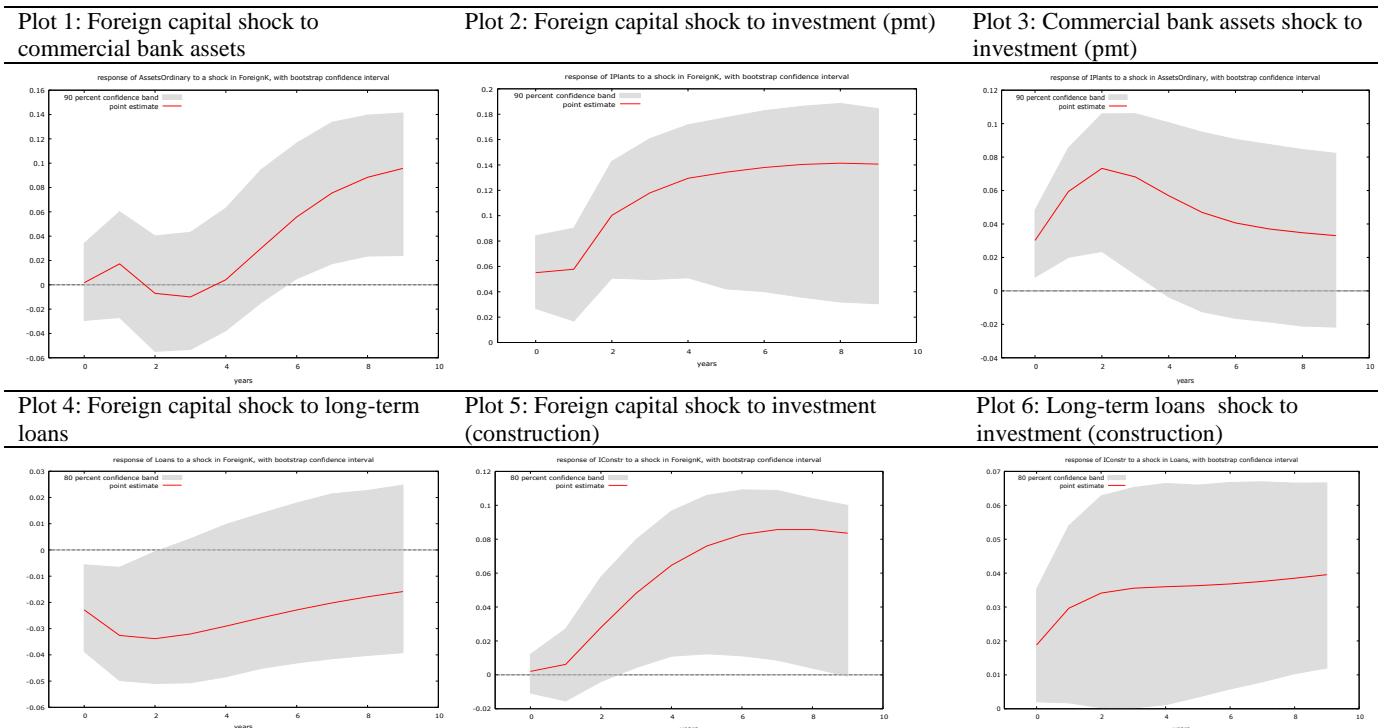
- a. Foreign capital clearly impacts directly on investment in PMT (plot 2) and in the long run, it also prompts commercial bank assets (plot 1).
- b. Commercial bank assets also have a positive effect on investment in PMT in the short and medium run, but this somewhat fades away in the long run (plot 3).
- c. A positive and significant direct effect of foreign capital on investment in construction (plot 5) in the medium- term (four to eight years) and a much weaker indirect effect on long-term banks loans in the short-run (plot 4)
- d. A strong effect of domestic banks long-term loans on investment in construction (plot 6).<sup>15</sup>

---

<sup>14</sup> These data refer to long-term loans extended by all banks (commercial banks, savings banks, and cooperative banks) that operated in Italy.

<sup>15</sup> We repeated this exercise by substituting long-term loans of the whole banking system with total assets of commercial banks (the variable we use in all other exercises) and we found the latter has a positive but not statistically significant effect on investment in constructions. Results are available on request from the authors.

**Figure 7: Impulse Responses in the Foreign capital – Bank assets / Long term loans – Investment (pmt or construction) VAR**



Notes: The solid lines trace the impulse responses while the shadow area the 90% bootstrap confidence bands

Thus, it seems that foreign capital flew principally to investment in PMT, that has a long-term nature and plays a crucial role in fostering productivity and competitiveness. The decisions of international investors boosted investments in industry and infrastructures which relied to a large extent on imports of foreign technology and goods. Instead, foreign capital investment in constructions seems to have a more short- and medium-term nature. Conversely, domestic savings mobilized by long-term loans seems to have played a crucial role in fostering investment in construction.

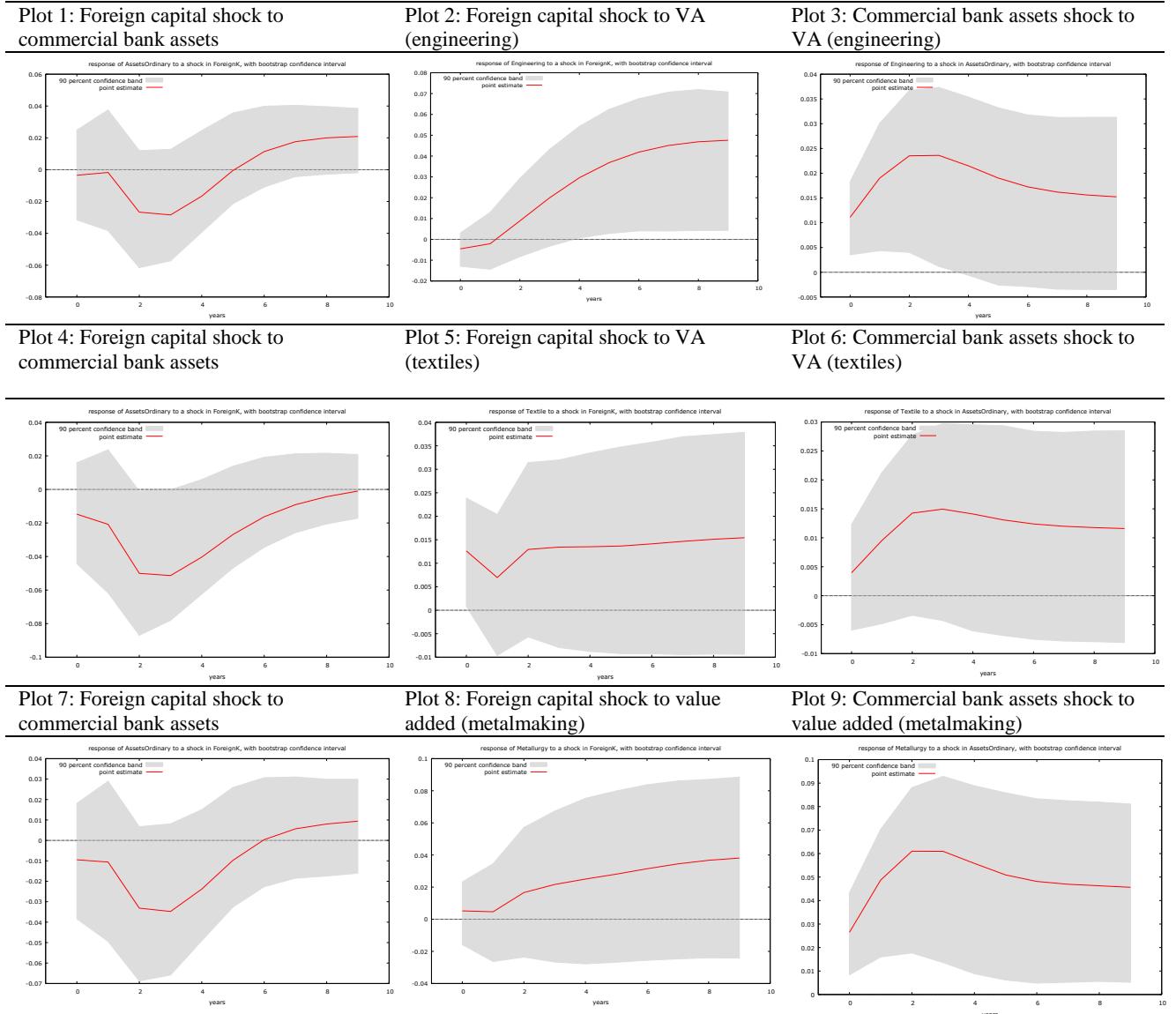
#### *Exercise 5: Foreign capital, domestic banks, and sectoral value added*

The final exercise looks into the avenues for investment by different sources. Relevant questions emerge, for instance whether all types of financing (domestic and international) went into the same industries, or instead different sectors relied on different sources of financing (internal vs. external financing for instance). We address this point by analysing three sectors characterized by different relative intensities of factors of production and technological content: textiles representing

the labour-intensive sectors of the first industrial revolution, metalmaking (including steel) as a proxy of more capital-intensive sectors, and engineering as the main example of the technology-intensive industries of the second industrial revolution. To address this issue, we do not have series of investment disaggregated at the sectoral level, so we must rely on the series of output expressed by sectoral value added. Our main results (Figure 8) are:

- a. Foreign capital had a direct effect on the value added of the engineering industry in the long run (plot 2), but no indirect effect, i.e. foreign capital is not channelled to this sector by banking system (plot 1). This industry was also financed by domestic banks (plot 3)
- b. Foreign capital has neither a direct nor an indirect relevant effect on textiles (plots 4 and 5). For this sector there is also no evidence in favour of a role of national saving either (plot 6).
- c. For metalmaking we find no effect (neither direct nor indirect) of foreign capital (plots 7 and 8, Figure 9) but only evidence in favour of funding through national savings (plot 9).

**Figure 8: Impulse Responses in the Foreign capital - Bank assets - VA in engineering (textile or metalmaking) VAR**



Notes: The solid lines trace the impulse responses while the shadow area the 90% bootstrap confidence bands

Combined together, the results from this exercise allow to draw some general conclusions on the relationship between various industries and financial intermediation. The first one is that textile relied principally (if not exclusively) on internal financing. Engineering, to the contrary, relied on both international investment and domestic capital. The former, however, did not pass via domestic banks, reflecting the preponderant role of greenfield foreign direct investment in technology-intensive industries which could be access without the links or expertise of locally-based financial institutions. This was, for example, the case of electric appliances and machinery, where global leaders started to invest before WWI and soon became dominant players. For instance, in 1903

*Siemens* engaged directly with the Italian market incorporating the *Società Italiana Siemens Schuckert*, a move followed by *Allgemeine Elektricitäts-Gesellschaft* (AEG) one year later, *Accumulatorenfabrik* (AG) in 1907, and *Western Electric* which in 1909 incorporated *Western Electric Italiana* (Colli 2014). Metalmaking was again a different case, relying exclusively on domestic savings. This was likely due the strategic nature of the steel industry in the geopolitics of the time and the role of the state in its financing (De Cecco 2003),<sup>16</sup> also in phases of crises such as 1911 when the Bank of Italy organised the bail-out of the whole sector (Amatori and Colli 1999).

Overall, it appears that industries belonging to different technological regimes were financed by different channels with very little interconnections: traditional labour-intensive sectors were self-financed, capital-intensive sectors of the second industrial revolution relied on domestic commercial banks, while technology-advanced sectors of the second industrial revolution, where Italy's backwardness was more relevant, were mainly boosted by direct international investment, although domestic institutions played a role too.

## 6. Conclusions

This paper analyses the relationship between various sources of financing – foreign capital, domestic savings, and remittances – and economic development in Italy in the age of the international gold standard by using IRF from a Cholesky identification structure of a VAR model. It is also relies on an original dataset that combines the most recent series of several financial and economic aggregates. Because of the features of its economy at that time, Italy represents a good case study which can be exemplary for the whole set of countries positioned at the periphery of the system. Existing literature has investigated the link between financial intermediation and economic development in these countries by focussing on one specific channel, being it international investment, domestic credit intermediation, or remittances. The main novelty of this paper, instead, consists in considering all these aspects together.

Our main results are that in Italy foreign capital had a direct and significant impact on total investment, but at the same time domestic banks played an important role too. The implication is that Italy succeeded, at least to some extent, in escaping from the mood of international investors by building-up domestic institutions able to mobilize and channel non-trivial amount of national savings. This is an important consideration as the literature on international financial flows showed that the rules that peripheral countries had to follow in order to attract international financial flows

---

<sup>16</sup> Thus, in 1884 the procurement necessities of the Navy drove to the establishment of Italy's first modern steelworks in Terni (Bonelli 1975).

were dictated abroad and, anyway, at least a component of such flows remained totally exogenous and probably unstable.

A second result is that the two channels of financing (foreign and domestic) were interrelated. In particular, German-style universal banks played a key role in channelling foreign capital to investment, whereas the other domestic banks funded investment principally by mobilizing national saving. Such interrelation is not surprising to the extent that a sizeable part of foreign investment was directed towards re-discounting of private bills owned by Italian banks, but this result acquires more relevance in the light of the fact that these channels have been analysed separately in previous literature.

A third result is that foreign capital flew principally to investment in PMT, both directly and indirectly, mainly via universal banks. This type of investment has a long-term nature and is crucial to foster productivity and enhance the competitiveness of the economy. Instead, this was less the case for investment in construction, where foreign capital inflows seem to have had a more short- and medium-term nature and domestic savings mobilized by long-term loans played a crucial role in boosting investment.

A fourth result is that remittances did not impact on investment, either directly or indirectly via the banking system. This result, however, does not imply that remittances were not important for the Italian economy, especially after the turn of the century. Remittances probably effected the economy via other channels, for instance consumption and the possibility to generate future domestic saving. Also, remittances reduced the demand for international capital during phases of rapid expansion of the economy via their impact on the balance of payment, contracting interest rates and making investment easier.

Finally, this paper has shown that different industries relied in different proportions on foreign and domestic capital. In particular, the impact of foreign capital inflows was higher for such a technology-intensive industry as engineering. By contrast, metalmalking – a capital-intensive industry that was crucial for the state's geopolitical ambitions – was massively funded by national saving mobilized by domestic banks, while a labour-intensive industry as textiles relied principally on self-funding.

## Bibliography

- Amatori, F., and Colli, A. (1999), *Impresa e industria in Italia dall'Unità a oggi*, Venice: Marsilio.
- Baffigi, A. (2011), *Italian national accounts, 1861-1911*, Quaderni di Storia Economica. Economic History Working Papers No. 18, Rome: Banca d'Italia.
- Battilani, P. (1995), “Il ruolo della strategia finanziaria nella performance dell’industria cotoniera italiana nel periodo fra le due guerre,” *Rivista di storia economica*, n.s., 12, 1, 57-89.
- Biagioli, A., and Picozza, C. (2002), “La bilancia delle partite correnti 1891, 1938, 1951”, in G. Rey (ed.), *I conti economici dell’Italia. III. Il conto risorse e impieghi (1891, 1991, 1938, 1951)*, Rome and Bari: Laterza, pp. 171-213
- Bonelli, F. (1975), *Lo sviluppo di una grande impresa in Italia. La Terni dal 1884 al 1965*, Turin: Einaudi.
- Bordo, M.D., and Kydland, F.E. (1995), “The gold standard as a rule: An essay in exploration,” *Explorations in Economic History* 32, 4, 423-464.
- Bordo, M.D., and Rockoff, H. (1996), “The Gold Standard as a “Good Housekeeping Seal of Approval””, *The Journal of Economic History*, 56, 2, 389-428.
- Carnevali, F. (2005), *Europe’s Advantage: Banks and Small Firms in Britain, France, Germany, and Italy since 1918*, Oxford, Oxford University Press.
- Colli, A. (2014), “Multinationals and Economic Development in Italy during the Twentieth Century”, *Business History Review*, 88, 303-327.
- Confalonieri, A. (1974-76). *Banca ed industria in Italia 1894-1906*, 3 vols. Milan: Banca Commerciale Italiana.
- Confalonieri, A. (1982), *Banca e industria in Italia dalla crisi del 1907 all’agosto 1914*, 2 vols. Milan: Banca Commerciale Italiana.
- Conti, G. (2007), *Creare il credito e arginare i rischi. Il sistema finanziario tra nobiltà e miserie del capitalismo italiano*, Bologna, Il Mulino.
- De Bonis, R., Farabullini, F., Rocchelli, M., and Salvio, A. (2013), *Nuove serie storiche sull’attività delle banche e altre istituzioni finanziarie dal 1861 al 2011: che cosa ci dicono?*, Quaderni di Storia Economica. Economic History Working Papers No. 26, Rome: Banca d’Italia.
- De Bonis, R., and Silvestrini, A. (2014), “The Italian financial cycle: 1861-2011”, *Cliometrica*, 8, 3, 301-334.
- De Cecco, M. (1975), *Money and Empire: The International Gold Standard, 1890-1914*, Totowa: New Jersey: Rowman and Littlefield.

De Cecco, M. (2003), “L’Italia grande potenza: la realtà del mito”, in P. Ciocca and G. Toniolo (eds), *Storia economica d’Italia*, vol. 3: *Industrie, mercati, istituzioni*, t. 2: *I vincoli e le opportunità*, Rome and Bari: Laterza, pp. 3-36.

De Mattia, R. (1967), *I bilanci degli istituti di emissione italiani 1845-1936*, vol. I, tomi I and II, Rome: Staderini.

Doornik, J.A. (1998), “Approximations to the asymptotic distribution of cointegration tests”, *Journal of Economic Surveys*, 12, 573–593.

Eichengreen, B. J. (1998). *Globalizing capital: a history of the international monetary system*. Princeton University Press.

Esteves, R., and Khoudour-Castéras, D. (2009), “A Fantastic Rain of Gold: European Migrants’ Remittances and Balance of Payments Adjustment During the Gold Standard period”, *The Journal of Economic History*, 69, 4, 951-985.

Esteves, R., and Khoudour-Castéras, D. (2011), “Remittances, capital flows and financial development during the mass migration period, 1870–1913”, *European Review of Economic History*, 15, 443–474.

Federico, G., Natoli, S., Tattara, G., and Vasta, M. (2011), *Il commercio estero italiano. 1862-1950*, Rome and Bari: Laterza.

Fenoaltea, S. (1988), “International resource flows and construction movements in the Atlantic economy: The Kuznets cycle in Italy, 1861-1913”, *The Journal of Economic History*, 48, 605-637.

Fenoaltea, S. (2003), “Notes on the rate of industrial growth in Italy, 1861-1913”, *The Journal of Economic History*, 63, 695-735.

Fenoaltea, S. (2005), “The growth of the Italian economy, 1861-1913: Preliminary second-generation estimates”, *European Review of Economic History*, 9, 273-312.

Fenoaltea, S. (2011), *The reinterpretation of Italian economic history: From unification to the Great War*. Cambridge: Cambridge University Press.

Fohlin, C. (1998), “Fiduciari and firm liquidity constraint: the Italian experience with German-style universal banking”, *Explorations in Economic History*, 35, 83-107.

Fohlin, C. (1999), “Capital mobilisation and utilisation in latecomer economies: Germany and Italy compared”, *European Review of Economic History*, 3, 139-174.

Fohlin, C. (2012), *Mobilizing Money. How the World’s Richest Nations Financed Industrial Growth*, New York: Cambridge University Press.

Gabaccia, D.R. (2000), *Italy’s Many Diasporas*, London and New York: Routledge.

Gerschenkron, A. (1962), *Economic Backwardness in Historical Perspective*. Cambridge MA: Cambridge University Press.

Hertner, P. (1984), *Il capitale tedesco in Italia dall'Unità alla prima guerra mondiale: banche miste e sviluppo economico italiano*, Bologna: Il Mulino.

Istat (1957), “Indagine statistica sullo sviluppo del reddito nazionale dell’Italia dal 1861 al 1956”, *Annali di statistica*, serie VIII, vol. 9., Rome: Istat.

Kindleberger, C.P. (1986), *The World in Depression, 1929-1939*, Berkeley: University of California Press.

MacKinnon, J.G. (1996), “Numerical distribution functions for unit root and cointegration tests”, *Journal of Applied Econometrics*, 11, 601-618.

Marolla, M., and Rocca, M. (2002), “La ricostruzione della bilancia internazionale dei servizi e trasferimenti unilaterali dell’anno 1911”, in G. Rey (ed.), *I conti economici dell’Italia. II. Una stima del valore aggiunto per il 1991*, Rome and Bari: Laterza, pp. 171-213

Morys, I.M. (2006), *The classical gold standard in the European periphery: A case study of Austria-Hungary and Italy, 1870-1913*, Unpublished Ph.D. dissertation, London School of Economics and Political Science.

Pistoresi, B., and Rinaldi, A. (2015), “Capital Inflows, Current Accounts and the Investment Cycle in Italy: 1861-1913”, *Research in Economic History*, 31, 241-261.

Stock, J.H., and Watson, M.W. (2001), “Vector Autoregressions”, *Journal of Economic Perspectives*, 15, 4, 101-115.

Tattara, G. (2003), “Paper money but a gold debt. Italy in the gold standard”, *Explorations in Economic History*, 40, 2, 122-142.

Vasta, M. (2006), “Appendix”, in R. Giannetti and M. Vasta (eds), *Evolution of the Italian Enterprises in the 20th Century*, Heidelberg and New York: Physica Verlag (Springer), pp. 269-273.

Vasta, M., Drago, C., Ricciuti, R. and Rinaldi, A. (2016), “Reassessing the bank-industry relationship in Italy, 1913-1936: a counterfactual analysis”, *Cliometrica*, doi: 10.1007/s11698-016-0142-9.

Warglien M. (1987), “Investimento industriale e instabilità finanziaria in Italia, 1878-1913”, *Rivista di storia economica*, n.s., 4, 3, 384-439.

## Appendix

### A. Integration and cointegration analysis

In this Appendix we present the integration and cointegration properties of our data set. We start by testing unit root properties of the series applying standard Dickey Fuller tests. In Table A1 we see that all the series are I(1): the levels are non stationary, while the first differences stationary. In our VAR the series enter in levels so we need to check the cointegration properties of the variables. To this aim we use the usual Johansen's procedure (Trace and Max-Eigenvalue Statistics). Overall, there is substantial evidence on cointegration among the series (see, Table A2).

**Table A1 Integration analysis: results from ADF (OLS) tests**

Variables	Levels		1 <sup>st</sup> Differences		
	ADF (p)	ADF (p)	p-lags	ADF(p)	p-lags
	With constant	With constant and trend		With constant	
Foreign capital	-2.72 (0.08)	-3.10 (0.14)	1	-8.86 (0.00)	0
Bank Assets (total)	-2.30 (0.43)	-4.83 (0.00)	2	-2.45 (0.12)	2
Bank Assets (commercial)	-3.16 (0.03)	-3.90 (0.00)	1	-4.75 (0.00)	1
Bank Assets (commercial – universal )	-2.66 (0.08)	-3.47 (0.045)	1	-4.46 (0.00)	0
Investment (total)	-2.10 (0.24)	-3.66 (0.03)	1\	-5.26 (0.00)	0
Investment (pmt)	-2.40 (0.14)	-2.85 (0.18)	2	-4.85 (0.00)	0
Investment (construction)	-2.42 (0.13)	-2.84 (0.18)	1	-4.24 (0.00)	0
VA (engineering)	-1.04 (0.73)	-2.48 (0.33)	1	-4.74 (0.00)	0
VA (textile)	-0.34 (0.09)	-3.12 (0.11)	0	-7.11 (0.00)	0

Notes: The ADF (OLS) tests are calculated for levels and first differences of the variables. The lag length is selected by BIC.  
 ADF with a constant:  $\Delta Y_t = \alpha + \delta Y_{t-1} + \dots + u_t$ . ADF with constant and trend:  $\Delta Y_t = \alpha + \beta \text{trend} + \delta Y_{t-1} + \dots + u_t$ . Asymptotic pvalues in parenthesis () are from McKinnon (1996). ADF (GLS) and KPSS tests of stationarity are also calculated and conduce to the same results as above. These results are available on request.

**Table A2 Cointegration analysis: results from Johansen estimation, VAR(2).**

Variables		Trace test [p-values]		Max-eigenvalues [p-values]
Foreign capital, Bank assets (total), investment (total)	R=0 R<=1 R<=2	43.304 [0.0006] 17.530 [0.0227] 6.5388 [0.0106]	R= 0 <b>R= 1</b> R= 2	25.774 [0.0085] 10.992 [0.1566] * 6.5388 [0.0106]
Foreign capital, Bank assets (commercial), investment (total)	R=0 <b>R&lt;=1</b> R<=2	27.866 [0.0836] # 4.3731 [0.8664] * 0.68882 [0.4066]	R=0 <b>R=1</b> R=2	23.493 [0.0206] 3.6843 [0.8828]* 0.68882 [0.4066]
Foreign capital, Bank assets (commercial – universal), investment (total)	R=0 R<=1 <b>R&lt;=2</b>	34.319 [0.0132] 15.901 [0.0418] 3.2702 [0.0705] *	<b>R=0</b> R=1 R=2	18.418 [0.1175]* 12.631 [0.0884] 3.2702 [0.0705]
Foreign capital, Bank assets (commercial), investment (pmt)	R=0 <b>R&lt;=1</b> R<=2	40.996 [0.0014] 14.471 [0.0698]# 2.1193 [0.1455] *	R=0 <b>R=1</b> <b>R=2</b>	26.525 [0.0063] 12.352 [0.0978]# 2.1193 [0.1455]*
Foreign capital, Bank assets (commercial), investment (construction)	<b>R=0</b> R<=1 R<=2	24.816 [0.1734] * 10.351 [0.2593] 3.8091 [0.0510]	<b>R=0</b> R=1 R=2	14.465 [0.3415]* 6.5416 [0.5525] 3.8091 [0.0510]
Foreign capital, Bank assets (commercial), VA (engineering)	R=0 <b>R&lt;=1</b> R<=2	40.996 [0.0014] 14.471 [0.0698] # 2.1193 [0.1455] *	R=0 <b>R=1</b> <b>R=2</b>	26.525 [0.0063] 12.352 [0.0978]# 2.1193 [0.1455]*
Foreign capital, Bank assets (commercial banks), VA (textile)	<b>R=0</b> <b>R&lt;=1</b> R<=2	28.263 [0.0755] # 5.9367 [0.7058] * 0.54430 [0.4607]	R=0 <b>R=1</b> R=2	22.327 [0.0316] 5.3924 [0.6945]* 0.54430 [0.4607]

Notes: The Johansen estimation is from a system with an *unrestricted constant* corresponding to deterministic cointegration: the variables are cointegrated sharing common deterministic and stochastic trends. The VAR lag length is selected by BIC. pvalues for the cointegrating rank in [.] are computed by Doornik (1998).\* indicates significance level at 5% while # at 10% by

## RECent Working Papers Series

The 10 most RECent releases are:

- No. 126 INTERNATIONAL FINANCIAL FLOWS, DOMESTIC BANKS, AND THE ECONOMIC DEVELOPMENT OF THE PERIPHERY: ITALY, 1861-1913 (2016)  
P. Di Martino, B. Pistoresi and A. Rinaldi
- No. 125 THE LEGACIES OF SLAVERY IN AND OUT OF AFRICA (2016)  
G. Bertocchi
- No. 124 ORIGINS AND IMPLICATIONS OF FAMILY STRUCTURE ACROSS ITALIAN PROVINCES IN HISTORICAL PERSPECTIVE (2016)  
G. Bertocchi and M. Bozzano
- No. 123 EIGENVALUE RATIO ESTIMATORS FOR THE NUMBER OF DYNAMIC FACTORS (2016)  
M. Cavicchioli, M. Forni, M. Lippi and P. Zaffaroni
- No. 122 DETERMINANTS OF CENTRAL BANK INDEPENDENCE: A RANDOM FOREST APPROACH (2016)  
M. Cavicchioli, A. Papana, A. Papana Dagiasis and B. Pistoresi
- No. 121 THE INTERPLAY OF CULTURAL AVVERSION AND ASSORTATIVITY FOR THE EMERGENCE OF COOPERATION (2016)  
E. Bilancini, L. Boncinelli and J. Wu
- No. 120 DYNAMIC FACTOR MODEL WITH INFINITE DIMENSIONAL FACTOR SPACE: FORECASTING (2016)  
M. Forni, A. Giovannelli, M. Lippi and S. Soccorsi
- No. 119 VAR INFORMATION AND THE EMPIRICAL VALIDATION OF DSGE MODELS (2016)  
M. Forni, L. Gambetti and L. Sala
- No. 118 WORKER FLOWS AND LABOUR MARKET ADJUSTMENT DURING THE GREAT RECESSION: EVIDENCE FROM A LARGE SHOCK (2016)  
H. Lehmann, T. Razzolini and A. Zaiceva
- No. 117 INEFFICIENCY IN CHILDCARE PRODUCTION. EVIDENCE FROM ITALIAN MICRODATA (2016)  
L. Brighi and P. Silvestri

The full list of available working papers, together with their electronic versions, can be found on the RECent website: <http://www.recent.unimore.it/workingpapers.asp>