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Italian Firms in History: Size, Technology and Entrepreneurship

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Abstract

The economic performance of a country depends, among other things, on the strategies and structures of its firms. In the framework that is designed by institutions and policies and determined by technology and macroeconomic cycles, entrepreneurs decide how to allocate available resources in order to face off competitors and to hook up with demand cycles.

This paper looks at the evolution of the Italian economy across the last 150 years from a business history perspective. Analyzing Italian firms over the long-term cycles of the global economy and with respect to the different paradigms of the three industrial revolutions, we identify some structural features that explain successes and failures of the Italian economy. In doing this we explicitly connect the micro level of the business enterprise to the macro one of the national business system and explain the comparatively good performance of the Italian economy from the end of the 19th century to the 1970s. Over the last three decades this performance has turned negative, highlighting the role played by the small average size of firms and the failure of institutions to provide incentives for growth.

JEL Codes: N83, N84, P12, O33. O38

Keywords: firm size, technological paradigms, innovation, entrepreneurship

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1. Introduction[1]

The economic performance of a country depends, among other things, on the characteristics of and the strategies adopted by its firms. It is firms and their entrepreneurs that, given the macroeconomic environment, the institutions and the policies, choose how to face competitors and hook up with demand cycles, whether to adopt new technologies and innovate products and processes.

This paper revisits the evolution of the Italian productive system in the last 150 years. Observing Italian firms over the various long-term cycles of the global economy and with respect to the different technological paradigms that have emerged throughout allow us to identify some structural features that may explain successes and failures of the Italian economy. Obviously, in doing so, we do not pretend to offer an exhaustive explanation, but to outline an interpretative framework built around the nature and the choices of firms and entrepreneurs.

When talking about firms, in particular industrial firms as we do, globalization and technology are crucial and, surely in the case of Italy, exogenous factors: they shape the competitive environment, the comparative advantages, the level and the nature of market demand, the productivity (aggregate, sectoral and of firms). They are also strictly inter-twined concepts: on one side, breakthrough technological advancements, especially in transportation and communication, has often given rise to globalization waves; on the other side, intensified international flows of goods, services, labor and capital have been key for the spreading of new technologies worldwide. Useless to say, technology plays a crucial role even when globalization retrenches.

Three "technological revolutions" have to be considered over the history of united Italy. The first one, dating back to the end of the 18th century, is identifiable with a bulk of technological innovations which evolved around the general purpose technology of the steam engine and boosted productivity in industries like textiles, metallurgy, and mining. The new technologies in transportation and communication originated by the first industrial revolution were the premise both for the first globalization wave (from the last decades of the 18th century to 1913), but also for the advent of a second industrial revolution. Developed around the last quarter of the nineteenth century, the second industrial revolution is centered on the application of mass-production techniques (like the assembling line in the mechanical industry) and the diffusion of a general purpose form of energy like electricity: it invested industries like steel, chemicals, pharmaceuticals, refining, food processing. The third technological revolution brings us to the last 3-4 decades: based on physics, it is known as the new information and communication technology (ICT) and led to the emergence and diffusion of semiconductors, computer and software, biotechnologies with significant advances in many technology- and science-intensive industries (aerospace, pharmaceutical,

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etc.). Favored by these technological advancements that have reduced the "size of the world", a second globalization wave has significantly changed the international competitive environment since the 1990s.

In the next section, we set the stage of our analysis by describing the Italian industrial sector through the international cycles and the technological revolutions from 1861 to 2011. Anecdotal evidence and census data make clear that since 1890s Italian firms have been able, though with some delay with respect to the main advanced economies but before many others, to latch to the first two technological revolutions, to take advantage of the first globalization and, in the period between the two world wars, to surf through the autarchic policies and the protectionist attitudes which spread almost everywhere in Europe. In the "golden age" period, the high growth rates of the Italian economy were accompanied by a robust development of the productive system around big privately-owned and State-owned firms. Overall, it is not too far from truth claiming that the Italian industrial sector performed comparatively well from the end of the 19th century until 1970.

These developments have turned negative in the last (and recent) technological revolution and globalization episode. Despite Italy was in the 1960s in the same position as many other advanced nations to grasp the opportunities offered by ICT, this did not happen; indicators of diffusion of ICT in Italy signal a delay in adoption during the 1990s and still a significant distance from the technological frontier. At the same time, and especially since the mid-90s, Italian firms have suffered relatively more than European rivals the increased competitive pressures from low-cost goods and services produced in emerging and developing countries (Brandolini and Bugamelli 2009).

There are obviously many causes – political and economic, macro and microeconomic, domestic and international – behind such a turnaround in Italy's (absolute and relative) economic performance, but if we have to isolate one important structural feature of the Italian productive system this is firm size. The size of a firm is indeed positively correlated with innovation, internationalization, adoption of advanced technologies, ability to face new competitive challenges; through all these channels, larger firms record higher productivity, surely levels, often growth rates.

There are good theoretical reasons for larger firms to be better equipped along those dimensions, ranging from a greater availability of financial resources to a less risk-averse approach, from a greater capacity to attract high-skilled workers to the adoption of more efficient and innovative organizational and managerial practices. In Section 3 we will provide support to these hypotheses using the results of empirical analyses conducted solely on recent data; however, we believe – and anecdotal evidence confirms it – that the profound characteristics that make a firm to be catching up with the technological frontier and successful in the global economy are invariantly the same across modern times.

To accept firm size as a credible explanatory factor of Italy's economic performance since its unification, we need to show that the distribution of firms in terms of their dimension was somehow adequate until the 1970s, but defective later on. This is the object of Section 4.

Firm size is not a given, however. It is instead the endogenous choice of entrepreneurs. This calls for a look at the background, the characteristics, the strategies of those people that have founded and run Italian firms over the last 150 years. In Section 5 we review the stories

of the most relevant entrepreneurs and managers (of both privately- and State-owned enterprises), trying to identify the main features of Italian entrepreneurship. We will linger not only on single well-known individuals, but also on the mass of anonymous small and medium family entrepreneurs that gave rise to the industrial districts and the so called "*quarto capitalismo*".

The last step that we leave to our concluding remarks is to provide answers to the following crucial questions: what are the main causes behind the failure of large firms (private and public) and the large predominance of small and medium enterprises? How much does it have to do with deep-rooted attitudes and the dominant entrepreneurial culture in Italy? What has been the role of the State? Finally, and more importantly, what should policy-makers do now to address these structural weaknesses?

2. Italy between globalization waves and industrial revolutions

1861 –1914

At the eve of its political unification, the Peninsula was already deeply embedded in the international economy. The small States which composed the variegated geographical patchwork of the future Kingdom of Italy were involved, to a different extent and in different ways, in the international flows of trade and investments which were at the basis of the expansionary cycle of the first globalization. The largest, and more dynamic regional-States (the Kingdom of Sardinia, but mostly Piedmont), the Kingdom of Lombardy and the Venetian region – in the North – and the Kingdom of two Sicilies in the South were already in close contact with the fast-growing economies of Central Europe, namely Britain, Belgium, Germany, and France. This involvement had two key features.

First, while Italian states were participating to international markets of goods, no or little integration was at work among the regional economies of the Peninsula (Cafagna 1989). Southern wines, citrus, olive oil, sulfur and other minerals were shipped (mostly by British and French merchants) to British and French ports as raw materials for the domestic manufacturing industry. The North was delivering Piedmont's foodstuffs and wool or enormous quantities of raw silk produced in the hilly pre-alpine area going from Piedmont to Venice in France and Germany, where this "staple" product was sent to factories and transformed into weaved silk (Federico 1994). But very scarce were the flows of the same goods among the Italian regions, mostly due to the poor endowment of internal transportation networks. Secondly, Italy's competitive advantages were basically in agriculture. Peasantry and farming pervaded all the regions, even if with large heterogeneities in terms of productivity, resource endowment, technological dynamism and innovation. The most "industrial" product, that is raw silk, was coming from the countryside, produced by farmers who grew up silk worms to support the household's income.

Before and immediately after its political unification Italy had a clear and defined role in the international division of labor, basically as a provider of agricultural products and raw materials[2]. The pervasiveness of agriculture imprinted not only the way in which Italy entered and was part of the first globalization wave, but also the way in which the first

[2] This was well understood by the ruling class which, especially in the Northern areas, orientated both trade and infrastructural policies so as to improve the efficiency of the communication networks with central and northern Europe and make the Italian countryside closer and closer to the Continental markets.

industrial revolution impacted on the economy of the newborn State. As in the rest of Continental Europe, the first industrial revolution transformed the manufacturing activities already in place, but in Italy this happened with a clear adaption to the national economic conditions.

Until the last two decades of the nineteenth century, manufacturing activities remained in Italy marginal in terms of contribution to GDP and rudimental in their structure, so rudimental that the few exceptions (like the woolen modern plant of Alessandro Rossi in Schio, near Vicenza) were considered as unique wonders to admire. Manufacturing was mainly based upon putting-out and small workshops, while clusters of small plants and mills agglomerated in the bottom of the valleys in search of the cheapest form of energy: water. These manufacturing activities were, often, the follow-up of craft and guild traditions, especially in urban centers as Milan, Turin or Naples or the heritage of artisanal know-how in specialized areas which were going to be labeled, after one century, "industrial districts".

On one hand, the pre-industrial heritage existing in many areas of the country – in which artisanal know-how, domestic production, putting-out networks and mercantile traditions mixed up – was a promising seedbed for the new production techniques, also thanks to the presence of a pervasive apparatus of technical schools and professional institutes. On the other hand, though, it was barely impossible to separate – as in Britain and Germany – the manufacturing activities from agriculture: during this early phase of industrialization the main (in terms of production and employment) manufacturing industries like textiles – basically silk, wool and cotton –, metallurgy, food processing and non-organic chemical fertilizers had strong and strict linkages with agriculture. The countryside was, in fact, both the source of raw materials and labor force as well as the main market for the products of small mills and craft shops[3].

The low degree of competitiveness and technological advancement of domestic challengers, if any, and a promising, even though still uncertain, domestic market made easy and convenient for foreign entrepreneurs to invest in the Peninsula, before and after the Unification. In cotton, already before the unification, Swiss entrepreneurs were establishing factories both in the North (Lombardy) and in the South (near Naples), enjoying a cheap and disciplined labor force. In mechanics and metallurgy German, French and British initiatives could be found in the main cities, where public procurement offered good opportunities. Foreign capital, and with it expertise, technology and know-how, were flowing into the Peninsula thanks to the presence of free-standing companies, mainly Belgian and French, that from their home-country based headquarters invested capitals gathered in the domestic

[3] For example, in the metalworking districts in the pre-alpine regions (Como Lake, Bergamo and Brescia) the prevalent production pattern was based upon the recycling of scrap iron to be transformed into finished wares for agriculture. As a result, the production cycle could be fragmented and carried on in small, specialized production units (Colli, 2002). This was even more diffused in textiles: in Biella (Piedmont) the production of semi-finished and finished woolen fabrics, exported everywhere in Europe, was carried on in-house, by artisans who were also peasants, while some phases of the production process (dyeing, for instance) were increasingly centralized into mechanized plants (Ramella 1983). Cotton was not an exception: domestic production in peasants' houses and putting-out system dominated alongside rare factories which gathered only few dozens of workers. In the Altomilanese (a countryside area north-west Milan) entrepreneurial merchants started to invest into spinning plants, at the same time relying on the domestic efforts of thousands of half-peasants-half-laborers. Entrepreneurial families like Cantoni, Crespi and Dell'Acqua employed officially thousands of laborers, of which only a few dozen under one roof and the rest working at home (Romano 1992).

stock exchanges in mining, or, more frequently, in utilities as waterworks and gas networks, or local transports as tramways or local railways, without exceptions from Lombardy to Sicily (Hertner 1998).

Thus, the first industrial revolution initially had not an impact incisive enough to transform in depth the dominant patterns in the economy of a peripheral country which had been unified on the basis of moral, cultural, ideal and political issues more than that of real economic needs. However, up to the 1880s, a "first coat of industrial paint" has been given (Cafagna 1989), thanks sometimes to the initiatives of the State which had to build quickly some necessary infrastructures as, for instance, an efficient network of railways on a national and not regional scale, or to become more independent from abroad for military products[4]. The technologies, industries and products of the first industrial revolution thus slowly diffused flourishing on the seedbed of local craft and mercantile traditions, until the last decade of the nineteenth century, when something new happened.

The first globalization wave had in fact not only the shape of international trade for Italian agricultural products or the inflow of foreign capital in infrastructures and services. Progressively, the challenges posed by the inflows into European continental markets of cheap products from the Russian large estates and the US mid-west became serious for Italian producers, pushing them to ask for higher trade barriers. The protectionist reaction, extended to manufacturing, provided the basis for more frequent and ambitious entrepreneurial initiatives in traditional and more "modern" industries.

Since the beginning of the 1890s the rate of growth of manufacturing accelerated at a pace never seen before. Some industries – namely mechanics, metallurgy, steam engines, electricity and electro-mechanics – experienced a double digit rate of expansion during the whole period known as the "Giolittian Age", after Italy's Prime Minister Giovanni Giolitti (Zamagni 1978; Toniolo 1988). In this phase some "first movers" established an enduring advantage in some industries of the second industrial revolution through a strategy of investments and growth (Amatori and Colli 1999). Electricity (mainly, in the form of hydroelectricity) and the electro-mechanic industry were already present in a quite sophisticated form since the beginning of the 1890s. But also FIAT's automobiles, Pirelli's rubber, Ansaldo's shipbuilding, and Falck, Piombino and Terni in mass- production of steel[5]. Again, a large part of this modernization was due to the globalization: foreign investments carried with themselves the most advanced technologies[6].

This expansion created a number of bottlenecks and imbalances that could be solved thanks again to the dynamics of the first globalization. To feed this fast modernization process, at an initial stage Italy needed to import technology under the form of machinery and plants from abroad, and energy (mainly coal). This created obviously a growing trade

[4] In metallurgy, military procurement was at the origin of the establishment of the Terni's iron and steel works, the first attempt to modernize steel production (Bonelli, 1975).

[5] The geographical concentration of new "modern" plants in some areas in the North of the country (in 1911 Milan, Turin and Genoa produced 55 per cent of the country's industrial value added) accentuated the economic divide between the Northern and Southern regions.

[6] German and Swiss investments flew into the Peninsula in the electric and electro-mechanic industry, where AEG and Siemens dominated together with the American Westinghouse and the Swiss Brown Boveri; in 1906 Mannesmann started a joint venture with an Italian partner, Orlando, for producing in Dalmine, near Bergamo, steel pipes with a sophisticated technology.

deficit partly counterbalanced by the large amount of remittances from Italian emigrants (Cafagna 1989).

At the eve of the WWI and around fifty years after its unification, Italy could undoubtedly be considered as one of the advanced European nations, and for sure the sole in the Mediterranean to have undertaken a process of industrial modernization. The census data for 1911 confirm that the sectors of the first industrial revolution (foodstuffs and tobacco, textiles, clothing, leather goods, wood and furniture, paper, metallurgy) were absorbing more than three-quarters of manufacturing employees, a larger share of it in textiles and foodstuffs (Table 1). Among the sectors that we include in the second industrial revolution (publishing, energy, chemicals, rubber and plastic, glass, cement and bricks, steel and metallurgy, mechanical instruments, automotives and other transportation equipment), in 1911 a relative higher weight characterized glass, cement and bricks, steel (and metallurgy) and other (than automobiles) forms of transportation equipment.

However, two weaknesses were still limiting Italy's development. The still dominant and pervasive primary sector, characterized by diffused self-production and low income levels, made internal demand limited and slow-growing, thus restraining industrial development[7]. Secondly, in Italy the signs of the second industrial revolution, diffused quickly on the wings of the first globalization in other advanced economies (with US and Germany surpassing Britain), were still quite weak: according to some estimates, in 1911 the total value of steel production was almost equal to that of manufactured silk.

1915 – 1970

Ironically, the event that brought to an end the first globalization was at the same time at the edge of the definitive Italian industrial modernization. WWI very quickly consolidated existing leaders fueling their expansion, and providing new occasions for growth. Three examples are particularly significant. In the hydroelectric industry, the war allowed companies to complete their capital intensive investments very quickly (and at a low cost thanks to the growing inflation), to provide energy working at their full capacity, and to accumulate know-how and competencies in a way typical of a truly "modern" industry. In chemicals the conflict provided Montecatini, a mining company, the resources for an ambitious expansion strategy of downward integration. Revenues and profits from the war allowed Fiat to inaugurate in 1923 the Lingotto, Europe's largest automobile plant endowed with the most advanced techniques. Similar dynamics could be found in other industries in which the technologies of the second industrial revolution could deploy their potential, for instance in artificial fibers where in the 1920s SNIA quickly became a European leader and a member of a powerful international cartel.

As said above, the outbreak of the war coincided with the end of the first globalization wave, a situation which was worsened by the Great Depression followed by autarchic policies and protectionist attitudes which spread almost everywhere in Europe. On the one side, the protection which the Fascist regime granted to domestic companies allowed them to further consolidate on the internal market: Montecatini and Fiat, for instance, could easily maintain their position as undisputed leaders, respectively in fertilizers and automotives. On the other side, though, it revealed itself as a sort of iron cage. Italian companies in the large-

[7] At the beginning of the 1920s, if Italian per capita income was "1", in the United Kingdom or France it was "2" while that of a US citizen was almost four times as much (Fuà 1981).

scale, capital-intensive industries of the second industrial revolution were facing a small and relatively stagnating domestic market, nothing comparable to the continental-size one which US firms could enjoy, or the captive Southern-European one which German companies had at their disposal before the war. Contrary to the pre-WWI period, Italian firms did not benefit from international exposure, now precluded by the worldwide economic depression and autarchic closures.

This situation affected the Italian approach to the second industrial revolution in two ways. First of all, due to the small internal market it was not possible for domestic large firms to fully exploit the benefits of mass production. Second, sticking on the internal market meant also to adapt production and diversification strategies to the existing demand: Montecatini basically maintained the production of fertilizers as its core activity, with limited diversification in advanced chemicals, for which it had necessarily to buy German technology and expertise. Last but not least, entrepreneurial limits affected the full modernization of the iron and steel industry (see section 5), which remained characterized by excess capacity and production overlaps, and above all by the absence of modern plants able to carry on an integrated production process[8].

To sum up, in the interwar period, which is a phase of retrenching globalization, Italy approached almost all the industries of the second industrial revolution. The limits of the internal market in terms of dimension and dynamics, together with the monopolistic attitudes of entrepreneurs shared by the Fascist government, heavily affected the Italian approach to the new technological shift.

A confirmation, if needed, of this explanation is provided by the changes occurred after the Second World War, when many of the above mentioned constraints were removed by a number of new conditions. During the twenty five years immediately following the war, the Italian economy enjoyed extremely high rates of growth, both in GDP and manufacturing output, comparable only to those of the first decade of the Twentieth century. Four element, two endogenous and two exogenous, contributed to boost (but were also the consequences of) what is rightly defined as the "Economic Miracle". Endogenous was the steady rise of internal demand accompanied by the social transformations that were at the basis of the definitive advent of a consumerist society; and endogenous was, since the beginning of the 1950s, the modernization effort of State-owned enterprises in capital intensive industries to provide basic goods and infrastructures as motorways and an efficient telecommunication system. Crucial proved to be, however, two exogenous forces, both connected to the postwar attempts to restore a global economy: the first was the process of European integration, which, together with the above mentioned rise in internal demand, removed the handicap of the small and static domestic market. The second was the flow of international direct investments that filled technological gaps in some industries.

At the beginning of the 1960s the second industrial revolution was in full swing. A large share of manufacturing employment was concentrated in the capital intensive industries like oil refining, automotives, chemicals, rubber, heavy mechanics, cement, steel and shipbuilding. Taking the sectors of the second industrial revolution as a whole, their share over the total number of manufacturing employees moved less than 40 per cent in the

[8] Oil refining, one of the symbols of the second industrial revolution, was totally dominated by US companies, which controlled on-site plants transforming oil imported from the middle-East for a still limited internal demand.

interwar period to 52 per cent in 1961, and almost 60 per cent in 1971. In these sectors a major role was played by big businesses: the aggregate sales of the top-200 companies weighted around one-third of the Italian GDP – a percentage similar to that of US, Germany or Britain (Battilossi 1999). However, significant backwardness persisted in organizational and ownership structures of these large firms (Pavan 1977). On these issues we will come back in sections 4 and 5.

In 1970 the effects of Italy's catching-up were visible under many points of view, ranging from the general modernization of the society to the diffusion of consumption habits and styles proper of an advanced economy. Perhaps the best indicator is provided by the convergence of income levels towards US standards: Italian GDP per capita was the 36.6 per cent of US in 1950, 52.2 in 1960 e 64.6 in 1970, reaching 70 per cent the following decade.

1970 – 2011

Italian per capita income levels, however, started again to diverge from those of US after the 1980s. In 2000 GDP per capita was back at 66 per cent of that of US, in 2010, at 63.8 per cent, was below the 1970 level. In order to explain this sudden reversal, it is worth turning once again at the relationship among technology, globalization and the domestic market.

Since the 1960s, a new technological wave deeply transformed some industries and created new ones. The origins of the third industrial revolution are to be found in new technologies developed during WWII; their progressive maturation led to the emergence of the semiconductor industry, to the mass production of computers and the development of software, to the invention of new materials and the birth of the aerospace industry, to an acceleration in the technological development of pharmaceuticals first and biotechnologies after, and to the exploitation of the potentials of nuclear energy. Basically, the third industrial revolution was based on physics and a close interaction among public and private institutions providing the necessary research infrastructures and human capital. Frequently, it was big, established firms to diversify into these new activities given the necessity of huge investments to develop research in these technology- and science-intensive industries (Amatori and Colli 2011).

The United States benefitted most from the so called new information and communication technologies (ICT): since the mid-1990s output and labor productivity growth in the US have been much higher than in the past and far in excess of that recorded in the main European countries. This acceleration has been ascribed largely to the introduction of ICT (Jorgenson and Stiroh 2000; Oliner and Sichel 2000; OECD 2003; Visco 2004). According to Timmer and van Ark (2005) the channels through which ICT affects productivity and value added are three. Firstly, the rapid progress in the production of ICT generates a sharp acceleration of productivity in the producing sectors whose contribution to aggregate productivity depends on the relevance of ICT producers. Secondly, the progressive reduction in the prices of ICT goods and the improvement in their quality hasten their adoption by firms, and therefore investment in ICT capital sustains labor productivity; moreover, since the use of more sophisticated machinery requires higher-skilled labor, increases in the level of human capital gives a further contribution to productivity growth. Thirdly, ICT stimulates innovation: to exploit the possibilities offered by a general purpose technology like ICT firms are stimulated to adopt more efficient forms of organization, thus improving total factor productivity (David 1990; Basu and Fernald 2008). Triplett and

Bosworth (2004) argue that the first two factors were the main drivers of the extraordinary economic growth of the United States in the late 1990s; the third factor began to produce effects only later and especially in the service sector.

Well, if not optimally, placed in terms of its endowment in capital and scale intensive industries of the second industrial revolution, Italy was, back in the 1960s, in the same position as many advanced nations in order to grasp the opportunities offered by the third technological wave. And, actually, in some industries it seemed so: Italy had both entrepreneurial attitudes (see section 5) and the commitment and resources of large organizations to join the new technological wave. Both private and State-owned enterprises crossed the technological frontier quite early (i.e., at the beginning of the 1960s), for instance in electronics (Olivetti microcomputers) and microelectronics (SGS Ates and Microlambda semiconductors, controlled by the State), in nuclear energy, in telecommunications (Alenia and Telespazio, both State-owned). The network-based nature of the high-tech industries made essential the establishment of joint-ventures in applied research among companies, and this involved both State-owned and private groups as well as foreign multinationals (Bussolati, Malerba and Torrisi 1996).

Only a few of those initiatives survived (e.g., semiconductors), but in a marginal – and protected by military procurement – position. Many (computer production or nuclear energy) had come to an end, while in others no attempts were made at all (notably, in biotechnology and pharmaceuticals, where Italy suffered a chronic dependence from foreign capitals and knowledge).

As a result, the Italian manufacturing industry entered the new globalization wave lacking of capabilities, investments and entrepreneurship in the high-tech industries of the third revolution and sticking on the capital intensive, mass production industries of the second industrial revolution, that however did not go through a full restructuring after the crisis of the 1970s, especially as far as the large section of State-owned enterprises is concerned.

At the beginning of the 1990s, Italy was clearly lagging behind in terms of presence in ICT industries (Rossi 2003), as witnessed by the constant deficits in its technological trade balance. This is clearly visible in Table 1: the share of employees in the manufacturing sectors mostlyffected by ICT (office machinery, electrical devices, radios and televisions, and precision instruments) has, over the past three decades, remained stable around 7 per cent, a very low level in an international comparison. A more accurate sectoral breakdown, that looks within ICT sectors and includes among them also some productions of the chemical and pharmaceutical industry and of air transportation, would reinforce this outcome, showing how Italy concentrated its production efforts in the less technologically advanced areas.

The picture does not improve when we consider the adoption of ICT across the whole economy. According to the estimates by Bugamelli and Pagano (2004), in 1997 Italian manufacturing enterprises trailed US ones in the adoption of ICT by an average of around seven years. This technological gap has been partly bridged during the last decade. In January 2010, the diffusion of “basic” ICT (computers, e-mail and Internet connections) approached saturation levels, with computerized enterprises accounting for over 90 per cent of the total, irrespective of their size or location (Istat 2010). In the meantime, though, the technological frontier has advanced, and despite the increasingly widespread diffusion of

basic ICT, Italy continues to be lagging behind. One example is broadband, whose penetration rate and average actual bandwidth are low in comparative terms (Ciapanna and Sabbatini 2008). Among Italian firms the use of Internet is limited to tasks with a low interactive content, such as access to on-line banking and to services provided on-line by the Public Administration, while the continued low diffusion of e-commerce strongly discourages individual enterprises from using this technology (Banca d'Italia 2010).

Undoubtedly, the strong delay in the diffusion of ICT technologies, that in the next sections we will relate to an industrial structure dominated by small and medium enterprises with too few large firms, have constrained demand for ICT as well as the advantages in developing innovative entrepreneurial activities in the IT sector.

The ICT revolution has anticipated, partly caused, the second globalization wave. With varying degrees of intensity, in the last two decades it has affected product markets, the organization of production, labor and financial markets. The factors contributing to these developments have been the reduction in the barriers to the movements of goods and capital[9] and the political changes and economic reforms in the former Communist countries, China, India and other emerging economies. International trade in goods and services has grown faster than world demand. Between 1987 and 2007, before the trade collapse recorded during the recent international crisis, the ratio of exports to world GDP rose from 18 to 31 per cent (that of goods from 14 to 25 per cent of GDP), mostly due to the emerging and developing countries whose share of world exports of goods rose from 21 to 37 per cent.

The greater worldwide integration of goods markets has profoundly altered the structure of comparative advantages: by a rough estimate, due to the entry into the trade system of a sizable group of countries, such as China, India and the former Communist countries, endowed with an abundant supply of labor but a limited stock of capital, the labor force of the global market economy has been doubled (Freeman 2006). According to factor proportions theory, this should determine greater competition for labor-intensive industries, particularly those using unskilled labor. This is undoubtedly the case of Italy, whose specialization remains exceptionally unbalanced toward traditional sectors like textiles, clothing and footwear (Table 1). As a result of increased competitive pressures from low wage countries and China in particular, these sectors recorded the largest drop in employment (Federico 2010) and firms' prices and profits (Bugamelli, Fabiani and Sette 2011).

The performance of Italian exports has sounded the first alarm bell about the existence of a structural problem in the competitiveness of the production system overall. Since the mid-1990s, the share of Italian exports on the world market for goods has tended to decline, and it did so until 2007. While recognizing that a similar trend was common to all the leading advanced countries, reflecting the entry into world markets of businesses located in the emerging economies, Italy's market share has fallen often more than that of the main European economies, Germany above all. After the 2008-09 international crisis, this negative trend appears to be continuing.

[9] Both in multinational venues (the General Agreement on Tariffs and Trade and, subsequently, the World Trade Organization) and within regional blocs such as the European Union and the North American Free Trade Agreement

Over the past several decades globalization has involved not only the integration of markets but also the reorganization of production on an international basis[10]. This has resulted in a rapid expansion of foreign direct investment (FDI): its stock has grown from 7 per cent of world GDP at the end of 1980s to 29 in 2007[11]. Also in terms of outward FDI Italy is lagging behind the other main European countries: according to Eurostat data, in 2007 the stock of outward FDI amounted to 23 per cent of GDP in Italy, against 35 per cent in Germany, 38.1 per cent in Spain and 52.5 per cent in France.

During the last globalization and technological wave, the backbone of the Italian productive system has been a large mass of small and medium enterprises (SMEs), also for the progressive disappearance of larger firms in strategic sectors. Often organized within industrial districts, where they could exploit agglomeration externalities, these SMEs have guaranteed, back in the 1970s and 1980s, employment, exports and, in more general, a significant dynamism to the Italian economy. Since the mid-1990s, however, they also entered a difficult phase that has coincided with the prolonged, very unsatisfactory growth performance of Italy, the one that still plagues it in 2011.

3. A role for firm size?

In the previous section we have reminded here and there how big businesses have often been the main actors of Italy's industrial development and how the slow growth of the last decades is accompanied with a productive system dominated by small and medium enterprises. Now we want to give more substance to our thesis that firm size affects a country's competitiveness and growth.

Providing evidence in support of these claims along the 150 years of Italy's unification is not possible. The lack of detailed firm-level data for the less recent years to be combined with equally detailed measures of firm- or sector-level performance is an insurmountable obstacle to conduct reliable empirical exercises for the whole period under analysis. However, data referred to the last 20-30 years come to help, especially if we accept, as we do, the hypothesis that the profound characteristics that crucially make a firm to be close to the technological frontier and successful in the global economy are invariantly the same across modern times.

Therefore we first provide a survey of the recent empirical literature that relates firms' characteristics to indicators of performance and conclude that there is a positive correlation between firm size on one side and innovation, internationalization and productivity on the other. Then, we use census data on the Italian manufacturing sector and firm-level data on the main Italian firms, both available since few years before WWI, to argue that changes in the distribution of firm size can contribute to explain successes and failures of the Italian economy in the different international cycles.

[10] Thanks to lower transport and communication costs, many firms have located phases of production in different countries, on the basis of the relative costs of factors (Feenstra 1998). In addition, there has been increasing recourse to cross-border mergers and acquisitions for the purpose of penetrating foreign markets or achieving economies of scale. The internationalization of production permits firms to access new technologies, knowledge or specialized skills and thereby raise their productivity.

[11] In this context, the role of multinational companies has become ever more important: their foreign affiliates are estimated to account for some 10 per cent of world GDP and a third of world exports (Unctad 2007).

3.1 Firm size, innovation and technology adoption

Recent data on R&D, patents and the realization of product and process innovations all consistently signal that Italy lags behind with respect to the other main advanced economies. In 2008, R&D expenditure in Italy amounted to 1.2 per cent of GDP, below the EU average (1.8) and very far from Germany (2.6) and Scandinavian countries; the gap is almost entirely due to the private component that is to the contribution of firms. According to the data of the European Patent Office, in 2001 Italy's share, equal to 7.8 per cent, is smaller than that of the main European countries; the number of patents per capita poses Italy among the countries with a low propensity to patenting (along with Belgium, Greece, Ireland and Portugal)[12].

The lower level of innovative activity in Italy is surely affected by the bias of sector specialization towards traditional low-tech goods. However, this turns out not to be the main driving factor, since the Italian gap is significant also within each productive sector (Bugamelli, Cannari, Lotti and Magri 2011). According to Eurostat's Community Innovation Survey (CIS) data, in 2008 in all main European countries the share of innovative firms increases with firm size: in Italy it goes from 37 per cent among firms with 10-49 employees, to 58 among firms with 50-249 employees, to 74 for larger firms. Along the same line, the share of firms with positive R&D goes from 13.8 per cent among the smaller firms to 50.7 among firms with more than 250 employees[13]. Marini e Menon (2011) show how patenting is, in Italy, highly concentrated in few very large firms: over all the patents filed at the EPO by Italians between 1990 and 2007, almost a quarter is due to the 20 largest applicants, 40 per cent by firms with a turnover larger than 10 millions of euro[14]. At the macro-level it is widely acknowledged that innovation has a direct impact on firms' productivity that in turn affects the rate of growth of a country. Pagano and Schivardi (2003) highlights the role of firm-size as a potential channel: they find that in those countries where average firm size is smaller, after controlling for sectoral differences, the growth rate of labor productivity is lower because of the greater difficulties by smaller firms to pay for the high fixed costs related to innovation and R&D activities[15].

As pointed out in the previous section, Italy has always been lagging behind in the adoption of ICT. According to Bugamelli and Pagano (2004), the delay as of 1997 was not so much due to a production specialization skewed toward more traditional sectors (which

[12] If one considers the propensity to realize any product or process innovation, the Italian delay reduces slightly, but these "extra innovators" appear to realize innovations that are characterized by a shorter innovative leap (Bugamelli, Cannari, Lotti and Magri 2011).

[13] Also the chances that a firm establishes a R&D collaboration with a University or public research entities increases significantly with firm size.

[14] Lotti e Schivardi (2005) find that the likelihood of filing a patent is positively correlated to the size of the firm, but for enterprises with at least one patent the relationship between size and number of patents is U-shaped, with a minimum probability towards the thirtieth percentile of the firms' size distribution, which corresponds to around 48 workers. The patent deficit in Italy, where small-sized enterprises are dominant, is therefore largely ascribable to the extensive margin (i.e., the low number of enterprises that file a patent).

[15] Taking into account the informal R&D activity of innovative SMEs, Hall, Lotti e Mairesse (2009) confirm the positive relationship between firm size and innovation.

tend to invest less in ICT) as much as to the scarcity of qualified workers and the high costs associated with implementation, especially as regards reorganizing business activities (Bresnahan, Brynjolfsson and Hitt 2002; Black and Lynch 2001 and 2004). Fabiani, Schivardi and Trento (2005) came to similar conclusions when they examined firm-level data for 2001, noting that the size of a firm as well as the availability of qualified personnel were determining factors in the decision to adopt ICT. Local presence of big businesses also tended to have a favorable impact on the likelihood of ICT investments, possibly because coordination between firms, favored by the presence of a "big player", can help overcome investment hesitations during a changing phase of the technological paradigm.

Why a productive system based primarily on small and medium sized firms is not able to stay abreast of the uses of ICT has reasons that are varied and interconnected. Given their specificity, these technologies are capable of changing a firm's internal organization. Empirical studies focusing on US (Bresnahan, Brynjolfsson and Hitt 2002; Black and Lynch 2001) and Italy (Bugamelli e Pagano 2004) show how production gains were superior for those firms that adopted ICT and, at the same time, changed their internal organizations, reducing the number of hierarchy levels and moving toward more horizontal structures. This would suggest that the potential for organizational improvements is higher in more organizationally complex firms that, thanks to ICT, can efficiently reduce their scale. Furthermore, reorganization (both internal and external, that is with respect to suppliers and customers) calls for codifying and standardizing business activities, i.e., data and information that can be elaborated by a computer. It is again large sized firms that typically have a high level of standardization to start with. Smaller firms, instead, can still count on the use of "informal" exchanges rather than standardized procedures[16].

Adoption costs also merit some consideration; they include both those related to reorganizing as well as to workforce training. Because new technologies typically leads to a major conversion of workers, those firms with a higher qualified workforce are more likely to adopt them. Often there is a positive correlation between the size of a firm and the quality of its workforce (Bugamelli, Cannari, Lotti and Magri 2011); moreover, when financial markets work imperfectly, small firms encounter greater difficulties in financing the high costs of new technologies' adoption.

3.2 Firm size and globalization

Export flows are an important indicator of an economy's competitiveness, especially for a manufacturing country like Italy. For decades the literature on international trade has focused on the characteristics of countries and industries, developing the concepts of comparative advantage and economies of scale. More recent empirical studies (Bernard and Jensen 1999, 2004a, 2004b) and theoretical works (Melitz 2003; Bernard et al. 2003; Melitz and Ottaviano 2008) have concentrated on firms and their high degree of heterogeneity. Consistently with this new microeconomic approach, it is worthwhile to focus on the characteristics of exporting firms.

[16] On the other hand, one could also claim that ICT and, especially, network technologies, bring about a reduction in transaction costs (both with other firms as well as with clients), thus giving small-sized companies greater opportunities to improve their access to markets. In the Italian case, these benefits could be limited to the diffuse presence of industrial districts, a form of cooperation between businesses that was finalized toward greater interaction between firms.

In the United States and in the main European countries exporting firms are few in relation to the total number of firms in business; they are generally larger, more productive, more profitable and more capital-intensive than non-exporters and pay higher wages[17]. The set of exporting firms is highly heterogeneous, comprising a legion of small exporters and a few "superstars" which alone account for the bulk of national exports (Mayer and Ottaviano 2007).

According to Istat-ICE data on the universe of Italian exporters, in 2006 – a year not affected by the effects of recent financial crisis and international recession – firms exporting goods were about 190,000, 4.2 per cent of all firms and employing about 20 per cent of the total workforce. About 80 per cent of the exporters had fewer than 16 employees, but they accounted for only 16 per cent of total exports compared with 60 per cent for those with 100 or more employees. The propensity to export increases significantly with firm size: the share of exporters rises from 3.5 per cent among firms with fewer than 20 workers to 41 among those with 20-49 workers and exceeds 50 per cent for firms with 50 or more workers. More than 75 per cent of Italian exporting firms sell some products in the EU market, which takes 60 per cent of total exports. By contrast, the percentage that has entered non-EU markets is very low (20 per cent in North America and East Asia). The size distribution of exporting firms by outlet market is more uneven, the farther away the outlet market. Some 75 per cent of exporting firms with fewer than 20 workers and nearly all those with 50 or more workers sell in the EU, while less than 15 per cent of small exporting firms but 60 per cent of those with more than 100 workers reach the dynamic markets of East Asia. Firm size is also positively correlated with the number of foreign markets in which firms sell their products[18].

Bugamelli, Cipollone and Infante (2000) underscore the importance of firm size as a condition for operating on foreign markets. The role of size becomes increasingly important with the degree of sophistication of international activities, starting from exports, the simplest form, to commercial agreements, technical and production agreements and, finally, direct investment[19]. Strong is also the link between internationalization and innovation: companies with production facilities abroad are also more likely to engage in product and process innovation and R&D, have a higher proportion of high-school and university graduates among their staff, and a higher propensity to carry out organizational innovation[20].

Globalization is not only the conquest of foreign markets, but also increased competitive pressures. As reminded in section 2, the growing importance of low wage countries in international trade has had a significant impact on the Italian economy. The analyses conducted on firm-level data from various countries suggest quite clearly that firms in advanced economies can escape those new competitive pressures by increasing their R&D

[17] See, among others, the contribution by Barba Navaretti, Bugamelli, Schivardi, Altomonte, Horgos and Maggioni (2011) that use homogeneous firm-level data on Austria, France, Germany, Hungary, Italy, Spain, and UK.

[18] Overall, 43 per cent of exporting firms sell their products in a single market, 74 per cent in not more than five markets, and only 5 per cent in more than 25 different markets in a given year.

[19] More recent works have shown that not only size but also productivity is greater on average among the firms that adopt more complex and costly forms of internationalization (Castellani and Zanfei 2007; Casaburi, Gattai and Minerva 2008; Benfratello and Razzolini 2008; Federico 2008).

[20] All these results are consistent with the theoretical models with heterogeneous firms according to which FDI involves higher fixed costs than exporting (Helpman, Melitz and Yeaple 2004).

expenditure, improving their products' quality, hiring high-skilled workers (Bernard, Jensen and Schott 2006a; Bloom, Draca and Van Reenen 2010; Buono 2011; Martin and Mejean 2011; Mion and Zhou 2011). All these activities impose the payment of high up-front costs, often precluded to smaller firms. In the case of Italy, non-technological innovations – related to marketing, branding, distribution networks, post-sales assistance – have proved to be important in strengthening firms' competitiveness in the post-euro era (Bugamelli, Schivardi and Zizza 2009). Again, for these innovations to be viable and economically convenient, their costs need to be spread over a large customer base, something easier for larger firms.

3.3 Firm size and productivity

Since larger firms have a higher propensity to R&D and innovation in general, tend to adopt better management practices, hire more likely skilled workers, and have the financial strength to invest in capital and new technologies, it is not surprising that they turn out to be also more efficient. In Figure 1 we plot the value added per hour worked, at constant prices, computed on the Bank of Italy's sample of manufacturing firms with at least 20 employees (Invind). The data, averaged by class size, show that indeed the level of productivity grows with the size of the firm. With some exceptions, often due to the small sample size as in the case of firms with more than 500 employees, the growth rate of productivity has been increasing in firm size: since 2001, which is the first year when firms with 20-49 employees have been included in Invind, to 2007 (before the recent international recession) the cumulated growth of productivity has been less than 1 per cent for the smallest firms (20-49 employees), around 15 per cent for firms with 50-99 and with 200-449 employees, about 8 per cent for the other firms (100-199 and more than 500 employees). The positive relationship between firm size and productivity growth is, even more neatly, confirmed looking at the short expansionary phases in 2005-07.

4. The size distribution of firms

Given the evidence reviewed in the previous section, it comes quite immediate to relate the recent unsatisfactory performance of the Italian economy in terms of productivity, innovation and technology adoption to the size of its firms. In 2007 Italy's average firm size was equal to 4 employees, less than that of not only Germany (13.3) and UK (11.1), but also France (5.8) and Spain (5.3). It is a structural feature that is not driven by the sectoral composition of production: according to a shift-share analysis, the firm size gap between Italy and the EU-15 average is almost exclusively due to the within-sector component (Banca d'Italia 2010). The average size of Italian firms is smaller than that of the other main European competitors in all manufacturing sectors (Table 2). These average figures hide a much skewed firm size distribution: in 2009 out of 4.5 millions of active firms, 95 per cent has less than 10 employees and overall absorbs 47 per cent of total employment (Istat 2011). There are also 3 millions of firms without employees that correspond to 65.2 per cent of the total number of firms. On the other end of the distribution, firms with more than 250 employees are only 3,718, about a third in the manufacturing sector.

The firm size structure of the Italian productive system has been more or less the same in the last 3-4 decades. But how was it before and along through its history as a single united country?

Again data availability constraints our analysis. As already clear from Table 1, the census data are available since 1911 and only for the manufacturing sector. This is not too

much of a loss, though. As argued in section 2, 1911 is a key year to draw a quite reliable picture of the industrialization process that has slowly interested the Italian economy in the first 50 years after its unification. Secondly, the manufacturing industry has been and still is central to technology advancements and globalization waves, thus representing the natural focus of our paper.

Table 3 shows average firm size by manufacturing sector for 10 out of the last 100 years. The figure for the whole sector follows an inversely U-shaped trend: equal to 5.8 employees per firm, average firm size increased, with the only exception of the interwar period, until the beginning of the 1980s and then started declining. This pattern is quite striking in some specific sectors. Textile, a sector that we classified within the first industrial revolution, has an average firm size of more than 50 employees until 1927; it is now at about 9. Even more striking is the expansion after the WWII and the fast reduction since 1980s in some sectors of the second industrial revolution: chemicals, steel, automotives and other forms of transportations. The figure for office machinery confirms the relevant and very large presence of Italian producers until 1971 and then subsequent dramatic collapse.

Thus, while the predominance of small-sized firms has always distinguished Italy's industrial history from that of front-runner nations like the United States, Germany, France and United Kingdom, a look through Italian firms' average firm size across 100 years provide first signals that something has changed, in particular after the 1970-80s.

Again it is useful to focus on the tails of the distribution, in particular on the right tail of the largest firms, i.e., those that, according to our thesis, are more capable (and therefore relevant for a country) to catch up with new technologies and face globalization challenges. To this aim, Table 4 reports the share of manufacturing workers employed in units with more than 500 workers by sector. Coherently with our thesis, very large firms were highly predominant in textiles until WWII (with 40 per cent of sectoral employment), in chemicals, energy, rubber and plastics, steel during the golden age (with about 50 per cent of each sector's total employment), and automotives where the employment share has been stable around 80 per cent from 1937 to 1981. Large firms in office machinery absorbed 90 per cent of all employees during the 1960s. In the last 3-4 decades the weight of large firms decreased in all sectors, reaching 3 per cent in textiles, 7 in rubber and plastics, 45 per cent in office machinery.

In Table 5 sectors are grouped according to our definition of industrial revolutions. In the sectors of the first industrial revolution, the employment share of large firms (> 500 employees) has been stable slightly below 20 per cent until 1951, after which it started a steady decline until reaching 3 per cent in 1996. The same share for the smallest firms (<10 employees), very high since 1911 (46.6 per cent), declined in the post-WWII period reaching 29.4 per cent in 1971: since then it increased again to about one third. Combining these two pieces of evidence, it results quite clearly the growing importance of medium-sized firms. Turning to the sectors of the second industrial revolution, we see the employment share of large firms be steadily around 30 per cent until 1981 and then decrease fast. The growth and collapse of Olivetti depicts the evolution of the employment share of large firms in the third industrial revolution sectors: it went from 23.3 per cent in 1927 to 40 in 1971 and then collapsed to 18.8 in 1996.

Since our thesis evolves around the role of big businesses as driving forces of an economy, it is worth focusing on them using firm-level data on the top 200 Italian

manufacturing firms (Giannetti and Vasta, 2006). These data are available in the database Imita.db[21] for the years 1913, 1921, 1927, 1936, 1952, 1960 and 1971, and have been complemented by us with similar information found on Mediobanca's publication for the years 1981, 1991, and 2001. For any single firm, we know the name, the sector, the geographic location, the value of corporate stock holdings and of total assets.

A first look at the sectoral composition of the top 200 firms confirms the conclusion drawn from census data. At the beginning of the last century Italy had large players operating in the sectors of the first and the second industrial revolution. The importance of the latter kept growing until the end of seventies, while the former one started contracting after the WWI. Among this sample of big businesses, the relevance of firms in the ICT-related sectors has always been limited. In other terms, if we look at largest manufacturing firms Italy resembles today the structure it has at the beginning of the 1980s.

The Imita database does not allow to study the evolution of large firms, since the only quantitative figure –i.e., total assets – is not homogeneous over time. Therefore we have estimated the number of employees[22] so as to compare the data on the top 200 firms with census data[23].

Figure 2 reports the ratio between employment in the top 200 firms and the total employment of census data by the three groups of sectors related to the technological revolutions. For all three groups the reduction in the weight of the largest firms after 1971 is quite visible: in the case of sectors of the third industrial revolution it is again striking the effect of Olivetti's collapse. Overall, the share of employment of top 200 firms decreased from 70 per cent before WWI to 40 in 1991 and 2001.

The reduction of large businesses' importance may also be due to their direct downsizing. In Table 7 we show different points of the size distribution of the top 200 firms. Despite some inevitable measurement error in our estimates of employees, it is quite surprising that, with very few exceptions, for all technological revolution groupings and any point of the distribution the highest number is recorded either in 1971 or in 1981. After those dates, the minimum, the median, the mean and the maximum values all decrease.

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[21] The database *Imita.db* has been created using various statistical sources, especially the publications of Notizie Statistiche which refers to all stock companies. The series, covering the period 1911-72, was started by Credito Italiano and then taken over in the 1920s by Assonime.

[22] To calculate the number of employees at the corporate level we followed these steps. First, from the Notizie Statistiche volumes we gathered the data, when available, for horsepower and the number of employees per firm. Until 1952 Notizie Statistiche regularly furnished data regarding horsepower while rarely giving information regarding the number of employees; the situation gets reversed for the succeeding years. In Mediobanca's publications, instead, the number of employees per firm is almost always provided from 1981 on. In a successive stage, the missing data is inferred using the estimated coefficients that come out by running year-by-year regressions with the available data. The empirical specification was the following:

$$y_i = \alpha + \beta assets_i + \mu_s + \mu_r + \varepsilon_i$$

where ***y*** corresponds to horsepower (up through 1952) or number of employees (following years), assets is the value of total assets at the firm level (information always available in Imita.db), μ_s is a set of dummies based on sectors (based on a classification of Ateco2002) and μ_r is a set of dummies by regions. As regards the third step, for the period between 1911 and 1952 the number of employees was calculated by using sectoral data regarding horsepower per worker available in census data (Table 7), published by G. Federico (2003).

[23] Given the slight misalignments between Census and Imita data (1911 vs 1913; 1936 vs 1937; 1951 vs 1952; 1960 vs 1961), the comparison is a bit imprecise.

As pointed by many commentators (Trento and Warglein 2003), the downsizing of firms in the last decades is a common phenomenon across all advanced countries: it is very likely the outcome of the organizational innovations brought about by the new technologies of information and communication. By allowing a better monitoring of the single phases of a production process, ICT indeed allowed firms to adopt more horizontal management practices within firm and make a stronger recourse to external outsourcing. Both changes favor a reduction in firm size.

Now the point for us becomes to show that the downsizing of Italian firms have been stronger than in the other advanced economies, despite the fact that the initial size distribution of firms was already highly fragmented. Some evidence, though scant, in this direction is provided in Table 6 where, using different sources and trying to take into account differences due to the unit of observation (plants vs firms), we show data on the employment share in plants/firms with more than 100 workers for Italy, France and Germany. Between 1961 and 2001, that share decreased in Italy by 15 percentage points against around 10 in France and Italy; considering the initial level, the reduction in Italy amounted to more than 30 per cent, as double as that recorded in France and Germany.

5. Entrepreneurship

We should use caution and delicacy when discussing entrepreneurship. In fact, entrepreneurship is innovation, decision making at the highest levels, risk, and the ability to take advantage of favorable business conditions. Of course, we are talking about a factor of development which is difficult to separate from the larger context. The renowned economic historian Sir John Habakkuk used to say that great generals are not created during periods of peace as a way of explaining the "lazy" English entrepreneurs of the Victorian era (Amatori 2006).

That being said, what we see in post-unification Italy is the presence of a group of entrepreneurs (though a minority, they were definitely well trained) who were able to take full advantage of the opportunities offered by the biggest economic operator of the nation – the State. This intertwining of patriotism and business dealings is evident in the events that brought Pietro Bastogi to establish, in 1862, "Società Strade Ferrate Meridionali", the country's biggest firm at the time as it was created with the then stratospheric amount of one hundred million lire (Coppini 2003). In the same manner, it could also be seen in the Perrone brothers' project to transform Ansaldo into a group that, starting with minerals, would be capable of manufacturing anything from machinery and warships to automobiles and electrical systems for telecommunications (Webster 1979). Probably the best example of the ties between business and the State is Terni, a sort of public armory that was entrusted to a private entrepreneur, Vincenzo Stefano Breda, who already headed a large company that worked because of public orders – "Società Veneta di Costruzioni"[24].

Along with these examples of government control or political capitalism, there was a vast segment of firms that strove to create sectorial interdependencies that were almost

[24] The link between business and politics is such that, when the State is forced to save the almost bankrupt Terni (which had been brought to this point by some administrative maneuverings of Breda) it then proceeded to nominate the wily businessman as a Senator, meaning that he could only be judged by a special court – the entire Senate brought together as a high court of justice! Italy's ruling class was not able to abandon to its own fate a project like that of Breda but put itself in the same shoes as the newly nominated Senator (Bonelli, 1975).

always self-financed. The business leaders of this section included some of the first great entrepreneurs in the textile (silk, cotton, and wool manufacturers) sector (Federico 1994; Romano 1992; Roverato 1986). Though not refusing State support to gain market control via cartel agreements, these entrepreneurs knew how to keep abreast of the latest developments (technical and organizational) that evolved around the world. Industry sectors and sizes in this vast area of self-financed firms were varied. They ranged from the first attempts of standardized production in foods to similar trials in leather and shoe manufacturing[25]. As pointed in section 1, the vast majority were either small or micro-small businesses related to agriculture or with origins tied to the dismantling of the corporative system (Colli 2002). This is probably the reason for the persistent Italian familism.

With the age of the *Belle Epoque* and the first round of globalization that began in 1896 we start to see clusters of entrepreneurs who have innovation as the foundation of their actions. Giovanni Agnelli was the first to understand that the automobile was not a toy for the wealthy but a product destined for mass consumption and capable of transforming civilization (Castronovo 1971). Alberto and his brother Piero Pirelli undertook the consolidation of the rubber business created by their father years earlier. They transformed Pirelli into a large multinational that, at the beginning of the 1900s, operated in Spain, South America, and even in the very heart of international capitalism – Southampton in Great Britain (Bigazzi 1981). Giorgio Enrico Falck, a technician of Alsatian origins, transformed steel production in Italy by introducing the electric oven, a new way of production that offered greater flexibility. Falck was able to do that without government commissions as he took advantage of urban and industrial development that predominated in northern Italy (Pozzobon 1982).

But, as much as this form of capitalism was innovative and on par with the most significant international competitors of the era, its dimensions were still limited and it was not transformed into a diffused capitalism like what occurred in the United States or Germany (Amatori and Colli 2011). As already pointed out, the internal market's dimension and insularity were the main reasons for the limited development of firms.

International markets helped to some extent. In the years after WWI Italy possessed a number of well-organized and highly competitive multinationals such as Fiat and Montecatini (chemicals); by the mid-Twenties the largest Italian firm was Snia, created by Riccardo Guaino, a tycoon who held a real hegemony on manufacturing artificial fibers on a worldwide basis (AA.VV., 1993). However, Italian firms faced stiff competition in foreign markets[26] and suffered, in the interwar period, from increasing instability in the international economic scenario. Moments of success alternated with unexpected setbacks and ruinous falls. In 1922 Fiat was in a potentially risky situation as it exported 70 per cent of its production. The company decided to focus on reinforcing its political ties in Italy, a move that proved in 1930 when Benito Mussolini exercised his authority to kick Ford out of the country (Castronovo 1971). An even more remarkable example is that of Montecatini. By the end of the Twenties Montecatini was already a colossal protagonist of Italy's economy. From its origins in the mining sector, over time it had undergone a process of vertical

[25] The process of centralizing and decentralizing production then extended to include other goods for consumers and their households.

[26] Breda (locomotives manufacturing) discovered first hand when it was kicked out by its German competitors in markets such as Eastern Europe and the Balkans (Licini 1994).

integration starting in 1920 when it took over the two major producers of the chemical fertilizer industry, "Unione Concimi" and "Colla e Concimi". Two years later Montecatini reached a major step when it bought the patents for the production of nitrogenous fertilizers from Giacomo Fauser of Novara[27]. Since fertilizer production calls for significant investments in hydroelectric plants, an absolute control of the internal market was fundamental. Mussolini took Donegani's side in the battle with the equally strong Federconsorzi (association of Italian farmers), which was openly supported by the powerful Fascist leader, Italo Balbo and in 1931 conceded a prohibitively high duty on nitrogenous fertilizers, a move that allowed Montecatini to remain the only player in the Italian market (Amatori 1990). Still, the support of the regime had its price as it was accompanied by further requests for industrial rescues from the Fascist government, including the takeover of inefficient firms operating in the chemical and mining sectors, the continued usage of obsolete methods which were a burden on large firms. So significant was the impact of these measures that we can attribute to them much of the responsibility for the irreparable crisis of the Sixties (Amatori 1990).

Bargaining with political power was a common practice among Italy's major entrepreneurs. Arturo Bocciardo, leader of Terni, was skilled in working the system and some of the agreements he reached are true masterpieces. After WWI, steel production for war purposes was no longer a good business and it had become a source of steep losses. Therefore, Bocciardo decided to put the company's focus on the production of electricity and, subsequently, on the electrochemical sector. By doing so, Terni became the only Italian manufacturer in competition with Montecatini. Still, the company did not entirely abandon armament steel production. Bocciardo insisted that the "sacrifice" his company was making be rewarded with new tariffs in the electricity industry as well as an important share for Terni of the chemical alliances in effect at the end of the Twenties (Bonelli 1975).

Italian capitalism was not only limited to its ties with the public sector and regulation. In the years preceding the Great Depression, a good-sized segment of Italy's business leaders studied the American model based on high production volumes and, as a consequence, high salaries that lent themselves to greater consumption. Undoubtedly Fiat wanted to "do things the way Ford does" when, in 1923, it inaugurated Lingotto. Emulating Ford was even more apparent in 1936 when Giovanni Agnelli, in his 70s and without a direct heir[28], utilized the profits made during the war in Ethiopia to build the large horizontal factory of Mirafiori (Castronovo 1971). But the limits of the internal market could still be felt. Lingotto's director, Ugo Gobbato, visited Detroit in the Twenties to see Ford's plant in operation. In the report that sent back to Agnelli he noted "their production line is like an Alpine torrent that forcefully runs down the mountain. In comparison, ours is like a pond in the field" (Bigazzi

[27] This seemed like the ideal solution to the age-old problem of procuring a reliable source of nitrogen which previously had been extracted from guano imported from Chile or was created via the complicated Haber-Bosch system, a process so difficult that no one had enjoyed success, even after the defeat of World War I forced the Germans to render details of the process freely. The method created by Giacomo Fauser, instead, was based on air, water and electricity. This put Montecatini in a favorable light with the Fascist regime as the Fauser method stood as a synthesis of ruralism, warmongering (synthetic nitrogen was also utilized in manufacturing explosives) and autarky.

[28] His son Edoardo had been killed in a tragic accident the year before.

1980). In fact, at the time Fiat manufactured 200 automobiles a day while the Ford plant produced 3,000[29].

Has it ever been possible to speak of managerial capitalism in Italy? Or of a system where a diffused ownership allows salaried managers to make high level decisions regarding the allocation of corporate resources?

Theoretically something like this would have been possible in the electric industry that was dominated by large firms with numerous shareholders, companies like Edison, SADE, Sip, and SME. The reality, however, was different and only achieved by a happy few (wealthy families like Agnelli, Pirelli, Feltrinelli, Volpi, Cini, Marchi, etc.) who effectively used mischievous ownership schemes, corporate pyramids, cross shareholdings, and multiple vote shares. In these firms salaried managers operated under a clear mission: they were functionaries whose principal role was to make sure that the affluent families received hefty dividends (Segreto 2005)[30].

With the dawn of the State as entrepreneur, managers start to take on a greater entrepreneurial role. At the moment of its creation in 1933, Istituto di Ricostruzione Industriale (IRI) controlled 40 per cent of the publicly traded companies on the stock exchange. The man behind IRI's creation was Alberto Beneduce, a technocrat who had acquired much experience as a collaborator of Francesco Saverio Nitti, an influential politician of southern Italy. Beneduce's first objective as head of IRI was to break the ties between bank and enterprise which tended to move in tandem; once this had been accomplished, it would be possible to start privatizing the firms that had been made healthy. This second objective was only partially achieved because many of the firms taken over by IRI were in sectors like steel, machinery, shipbuilding and telecommunications rendering them not only difficult to find new buyers but also (and above all) expensive to operate.

Thus Beneduce found himself permanently in charge of industrial concerns and based his actions on precise guidelines. First of all, ownership of the firms would remain in the hands of the State (so as to avoid any type of fire-sale) while the companies were expected to act as publicly-traded concerns under civil law. Secondly, in an era of confused conglomerates, these companies were to adhere to the conceptual framework of industrial sectors. The outcome was a complex architecture with the super-holding IRI at the top overseeing the sectorial finance companies (1934 Finmare; 1936 STET; 1937 Finsider) that, in turn, oversaw the companies in their care. Lastly, Beneduce opted to entrust management of the IRI companies to "qualified hands", the best managers available[31]. The formula adopted by IRI, supported by bonds that were guaranteed by the State, was effectively an

[29] Fordism at Fiat reached its peak in 1932 when the company's managing director, Vittorio Valletta, offered his employees a variation on Ford's plan to encourage automobile ownership among workers. In the United States a Ford plant worker would use approximately one fourth of his annual salary to buy his own Model T. At Fiat, Valletta encouraged his employees to form groups of four to buy a Balilla (then the least expensive model manufactured) which they would use to travel together each day to the factory and then on alternating weekends could take turns to use the automobile with their families (Bairati, 1983).

[30] A merciless commentary on this situation can be found in the inquiries of the economic commission of the Constitutional Assembly (Amatori, Brioschi, 1997). In those same years, Ettore Conti, in his "Taccuino di un borghese" (Notebook of the *bourgeousie*) talks of Italian capitalism's feudal regression in the final years of Fascism (Romeo 1988).

[31] These were individuals like Ugo Bordoni (STET) and Agostino Rocca (Finsider).

ingenious device for overcoming the gap in Italy between the financial needs of industrial development and the capital actually available. For the subsequent transformation into a long lasting and consistent managerial capitalism, however, IRI still had a weak point: ownership was anything but diffuse as the owner was a hard-to-please master – the State – which, once the early years of benign neglect had come to an end, started to show its weight (Amatori 2000).

In the golden years of the international economy that followed the end of WWII, Italy experienced a convergence of top managers from State-owned firms with those from private industry. These were entrepreneurs such as Oscar Sinigaglia, Vittorio Valletta, Enrico Mattei, Adriano Olivetti, and Giuseppe Luraghi. Sinigaglia, for example, brought to fruition a plan for steel that he had been envisioning since 1910; in less than a decade the plan advanced Italy from ninth to 6th place in the international classification of steel producing nations[32]. To those who objected that the plan called for firing thousands of workers, Sinigaglia (who was attentive to social problems) would reply that, by manufacturing quality steel in great quantities, the plan would actually give a powerful boost to the machinery industry and this would be a way to reabsorb those who lost their jobs with the modernization of Italian steel manufacturing.

Common among these entrepreneurs was their ability to play in the major leagues, to believe that the wealth of a nation can be increased so much so that the game did not end with a tied score. Italian firms could then take advantage of economies of scale that exceeded the collusive contractual ties between political powers and competitors (Amatori and Colli 1999). Thus in Fiat Valletta was able to increase production tenfold over the course of a decade (Bairati 1983); Mattei of ENI assembled an extensive methane network in northern Italy and, taking advantage of methane, construct a petrochemical plant in Ravenna that in 1956 was three times larger than the next biggest plant built by Montecatini in Ferrara just six years earlier. By doing so, Mattei's group was able to take over the monopoly of nitrogenous fertilizers (Amatori and Colli 1999). Adriano Olivetti was skilled in growing the firm created by his father into a multinational that ranked among world leaders in the production of office machinery. By 1959 Olivetti was able to take over a large US firm, Underwood, while it pursued expansion in electronics and the production of semiconductors (Bricco 2005). Giuseppe Luraghi transformed Alfa Romeo, which before the war assembled fewer than five hundred automobiles in a year, into a real industrial firm, by introducing new models like the "1900" in 1950 and the Giulietta in 1954. In a four year period between the late 50s and the early 60s, Alfa Romeo manufactured more than two times as many automobiles as it had manufactured in the previous half century. By doing so, the company was able to position itself into a segment of the Italian market that made it the second most important player after Fiat, exceeding the family-owned car manufacturer, Lancia (Amatori 1996).

Up to this point we have only dealt with long-time entrepreneurs. But the so-called "Economic Miracle" also gave birth to new entrepreneurs like those who became important players in the white goods industry: Lino Zanussi, Eden Fumagalli, Giovanni Borghi, and

[32] Sinigaglia's plan involved the construction, thanks to funds from the Marhsall Plan, of a large new full-cycle plant outfitted with the most advanced technology (continuous rolling mills) in Cornigliano, a highly focused specialization in two other full-cycle plants (Piombino and Bagnoli), and the closure of a few obsolete operations.

Aristide Merloni. In fact, Italian industry experienced an overall strengthening with the step up from artisanal shops to factories. Tailors became fashion industrialists, carpenters were transformed into furniture manufacturers, and cobblers became producers of footwear (Amatori and Colli 1999).

Starting from the 1970s this competitive industrial apparatus started to collapse. This was the period in which we see a big wave of family businesses unprepared to efficiently deal with successions (the case of Olivetti in computer manufacturing is a good example). The system as a whole was unable to grab on to the opportunities that accompanied the nationalization of electricity; at the same time a dramatic form of social unrest manifested itself in the factories[33]. The decline of private big business went hand in hand with the dramatic defeat of the big State owned enterprises, in a climate of shocks, both external (energy and monetary) and internal (terrorism).

In this same period the weight of small businesses never diminished and their utility seems to be rediscovered in the turbulent 1970s when everything else appeared to be disintegrating. Small businesses were the vital solution because, in a nation seen as incapable of creating a system, they easily lent themselves to being organized into industrial districts (Colli 2002 and 2011).

In 1991 when Italy's Parliament decided to draft legislation to safeguard industrial districts, a census accounted for 190 of them scattered around the country, offering employment to 2.4 million workers, 40 per cent of the nation's manufacturing work force (Brusco and Paba 1997). Industrial districts are homogenous territories that specialize in manufacturing goods that call for a rather sophisticated division of labor, both horizontal as well as vertical. This specialization extended from goods to include the machinery and intermediate components necessary to produce them. That industrial districts were more diffuse in Northern and Central Italy can be explained in large part with the history of the local territory: the heritage of the guild system, enterprising attitude, a strong work ethic, and a wealth of manual skills found in the sharecropping system at the base of many local economies. These were highly complementary to the refined consumers of the many Italian "capitals" as well as the cosmopolitan entrepreneurial style of merchants (Fuà and Zacchia 1983; Becattini 1998).

The industrial districts were the seedbed of the so-called "Fourth Capitalism" with its mid-size firms that excluded big State owned enterprises, large private corporations, and small companies (Colli 2003). By the beginning of the 21st century, more than 1500 businesses with annual sales between 150 million and 1.5 billion euros were operative in Italy. Most are concentrated in niches, often global; thus we might define them as "pocket multinationals". These are the firms at the heart of the Italian economy today and a clear sign of its metamorphosis (Berta 2004).

Still, these businesses have their limits. On one hand, the industries where they operate are sectors that focus primarily on manufacturing goods for consumers and households, perhaps too far from the technological path-breakers. On the other hand, a family management style that favors ownership over performance.

[33] All this came to an end only at the beginning of the Eighties (Scalfari and Turani 1974; Berta 1998).

It seems plausible that family firms have a higher risk aversion, as a consequence of the stronger correlation between business and family wealth, with negative effects on growth, innovation and internationalization[34]. Family-owned firms have also a low propensity to hire managers not belonging to the same family, even when managerial skills are not available within the family. According to homogeneous firm-level data on 7 European countries (EFIGE data), in Italy 86 per cent of manufacturing firms with at least 10 employees belong to a family, a figure in line with that of France (80), Spain (83) and UK (81), smaller than that of Germany (90). Italy becomes peculiar when one looks at the family-owned firms where the whole management belongs to the same family: these are two-thirds in Italy, against one-fourth in France and Germany and much one-tenth in UK. Firms that are both family-owned and wholly family-managed tend to adopt worse managerial practices, like a very centralized management approach and little use of performance-based remuneration schemes. These "bad" practices are associated with lower productivity and profits (Bloom and Van Reenen, 2007; Bandiera et al., 2008), innovation and R&D propensity (Bugamelli, Cannari, Lotti and Magri 2011). In general, we believe that the negative implications of such management structures, much more diffused among small and medium enterprises, may not be very relevant in periods of stable growth, but become quite limiting when a firm is called to face significant external shocks with the need of engaging in risky activities like innovation and internationalization.

6. Concluding remarks

Since its unification, the Italian productive system has made exceptional progresses. Alone among the Mediterranean countries, Italy had been able to position itself as one of the most industrialized countries very soon, already before WWI. One hundred and fifty years after 1861 Italy is beyond any doubt still one of the richest and developed countries in the world. As said, this is an outstanding success, especially if one thinks to the initial conditions and to the constraints characterizing the domestic market at least until the 1950s.

From the last decade of the 19th century to the end of the 1960s, Italy's economic performance benefited from the actions of some private entrepreneurs that, though often with some delay with respect to the other advanced European economies, have been able to catch up with modern technologies, face international markets, make their firms grow, and, at the end, contribute to the establishment of a competitive industrial sector. Private entrepreneurs have been come abreast, especially after IRI's creation in 1933 and more intensively after

[34] Michelacci and Schivardi (2008) use the share of family firms to proxy diversification opportunities in a country. They find where these opportunities are lower, the sectors characterized by higher "specific" risk (measured by the industry- and firm-specific component of the volatility of annual returns) have lower productivity and investment growth and a lower business birth rate. The large share of family firms in Italy could explain recent poor performance, especially in the sectors more exposed to international competition. Cucculelli (2007) suggests that family firms may be more oriented towards maintaining control in the long run than in strengthening profitability and growth. This could make them less responsive to demand and thus less able to exploit market opportunities. In the period 1995-2004 the sales of family firms were less sensitive than non-family firms to variations in demand for their sector's products, especially if they were financially constrained. Partially in line with these results but with a more precise identification of family firms, Bianco, Golinelli and Parigi (2008) analyze the investment decisions of Italian firms in the period 1996-2007 and find that investment in family firms are relatively more sensitive to uncertainty. This is partly due to a lower wealth diversification of the owners of family firms and a corresponding higher risk aversion, since the effect diminishes as the interest held in the firm decreases.

WWII, of State-owned enterprises that played in capital- and technology- intensive industries a key role in the modernization process of the Italian economy. As already pointed out, these positive developments occurred, in particular until WWII, in spite of the small size and scarce dynamism of a domestic market, still pervaded by consumption levels, styles and needs proper of an agricultural, backward society.

This industrial structure, populated by some big businesses competitive in advanced sectors and a mass of small and medium enterprises, recorded a significant, maybe not from a quantitative but surely from a qualitative point of view, change starting from the 1970s. In particular, it is the failure of big businesses in "core" sectors to have deprived the Italian economic system of the ability to fully exploit the benefits from the new information and communication technologies – both on the production and the adoption side – and to face the new serious challenges posed by the last globalization wave. Example of these failures were the demise of historical firms like Montecatini and Olivetti, the significant reduction of Pirelli and the uncertain future for Fiat (Gallino 2003).

Italy managed to remain among the richest countries thanks to the competitive advantages gained by its many small and medium firms, its industrial districts (and, today, "pocket multinationals"), as described by Michael Porter in his *The Competitive Advantage of Nations*.

During the 1970s and 1980s, these firms have generated employment, sustainable development and, last but not least, a steady growth in foreign trade which allowed the country to counterbalance the heavily negative trade balance in high-tech industries and energy. But, in the last decade or so, they, with their peculiar and outdated organizational structures, with their difficulties in financing innovation and internationalization, appear to have exhausted their propulsive push. Leaving aside the deficiencies in the financial system[35], the vast majority of Italian small firms and industrial districts are traditionally and historically present in craft-based industries, maybe with an high content of style and tacit knowledge, but barely able to develop proprietary, in house technologies in the third industrial revolution sectors. In the same vein, their ability to conquer the fast growing (but risky) Asian markets with their products and services is negligible.

The structural conditions of the Italian manufacturing industry at the beginning of 2000 were astonishingly similar to those at work when Italy entered the first globalization wave. Basically, and with only few relevant exceptions (machinery), the Italian international competitive advantage was located in traditional industries, sometimes characterized by high-value added activities – especially as far as niche productions are concerned – but more often exposed to the competitive challenges brought by developing countries. As a consequence, since the beginning of 2000, the Italian trade balance started to deteriorate; imports of high-tech and high-value added products were not anymore offset by exports in light, traditional or even specialized industries, nor (as it was at the end of the nineteenth century) Italy could enjoy of a huge amount of remittances from emigrants.

What are the main causes behind the failure of big businesses in Italy?

Much has been said about Italy's "failed landing" into a key player in the international economic scenario, unlike a country such as Japan which in many ways resembled Italy

[35] The venture capital industry has still a negligible dimension in Italy (Banca d'Italia, 2009).

(Pirani 1991; Pivato 2011). Undoubtedly, the Italian entrepreneurs that were protagonists during the golden age must accept responsibility for their part in this failed landing when, for example, they did little to govern the social change brought about by their actions both inside as well as outside the factories. Italian business leaders failed to come together to ask for a reform of capitalism that would have brought about modern new regulation like antitrust and measures to protect investors in the stock market as well as encourage institutional investors. It is well known that in this panorama there were exceptions like Adriano Olivetti, who called for workers to participate in company life, as well as a harmonization of corporate needs with those of the surrounding community and a balanced development of various regions of the country (Bricco 2005). But Olivetti shared with other captains of industry of his time a management style where management of the firm was centralized in his hands; upon his unexpected demise, the managers who took over the reins decided to abandon some of the futuristic projects in electronics introduced by Adriano Olivetti. This kind of failure is comparable to what happened with some managers of State-owned enterprises who were incapable of saying no to some of the outlandish requests that they received from political figures more interested in growth, acquisitions and industrial rescues for electoral reasons than anything else (Osti and Ranieri 1983).

Entrepreneurial failures, especially in the high-tech industries, negatively affected the supply-side of the economy, with a loss of competitiveness that, in combination with needed but painful macroeconomic adjustments during the 1990s, ended up depressing the internal demand and triggering a vicious circle.

Obviously, when talking about the need of changing the rules of the game and modernize a country's institutional framework, the State and the policy makers are in the frontline. As repeatedly argued, the relationship between businesses and government was fruitful since the beginning of united Italy and especially after WWII thanks to the formidable bulk of State-owned enterprises in capital- and technology-intensive industries. A situation, however, which had not been replicated in the last decades, when the State proved to be barely able (or unable at all) to create a framework in which the economic activity could take place and the efficiency of large firms, both under the profile of their international competitiveness and of their innovative capabilities in the most advanced industries, could be strengthened. We refer to the persistence of inefficient financial markets, an inexistent market for corporate control, the persistence of monopolistic rents, a low quality and efficiency of public goods, a high level of taxation and administrative and bureaucratic costs on economic activities.

The negative influence of the State on the economy goes beyond the unwillingness or the incapacity to improve the set of rules, to modernize institutions, and to appropriately regulate markets. The governement can directly distort the allocation of resources. Exploiting a unique longitudinal dataset that combines matched employer-employee data with administrative archives on the universe of individuals appointed in local governments over the period 1985-97 in Italy, Cingano and Pinotti (2011a) quantify the private returns and the social costs of political connections. They find that the revenue premium granted to industrial firms that have in their workforce politicians belonging to the party (or coalition of parties) that won the elections amounts to 5.7 per cent on average; interestingly, this is obtained through increases in domestic sales without any productivity improvement. To confirm the intuition, the authors find no post-election effect in non-connected firms and in

firms connected with politicians appointed with opposition parties. As expected, the premium from political connections is larger for firms operating in sectors that sell more to the public administration, in areas characterized by higher public expenditure and higher level of corruption.

Summing up, big business and Government relationships have evolved through different stages in the course of Italian economic history; the relationship has been increasingly strict, but also positive in the end, since the Unification of the country until the two decades of the economic miracle when the State intervention gave solution to many deficiencies and flaws in the Italian industrial modernization. From 1970s, however, while State-owned large companies in capital and technology intensive industries found themselves not able to escape the trap of a too ready compliance to politicians' requirements, the governments repeatedly proved to be unable to provide the necessary modernization of the institutional framework for big business.

How to strengthen the Italian productive system today?

The priority objective appears to be the identification of measures that will encourage firms to increase their size and overcome the restrictive vision of family control and management. This is no easy task because it clashes with deep-rooted attitudes and the dominant entrepreneurial culture in Italy[36], but the spread of forms of control other than those centered around the family and a substantial increase in the medium-large component of firms, appear to be key to the survival of the Italian productive system. Well-performing family companies are too often weakened in their competitive potential by issues related to leadership succession and family members involvement. Increasing self-consciousness by entrepreneurs is needed in order to adopt a model of "open family firm" (Casson 1999; Colli 2003) in which skilled managers are sided by selected family members in order to provide the human capital needed when a process of growth and expansion of business is made compulsory by the current globalization process.

This objective can be pursued through the design of incentive mechanisms, by creating the managerial and organizational resources which firms often complain are in short supply, and by facilitating the development of instruments such as private equity for the positive role it can play in transition phases, like reorganizations and generational changeovers. Well designed policies[37] should guarantee support to firms' R&D, innovation and

[36] For example, interpersonal trust by sustaining cooperation among anonymous others and people outside the narrow circle of family members and close friends may attenuate inefficiencies (like a inefficient division of labor) deriving from coordination failures among the different members of an organization and even an economy as a whole (Putnam 1993); for these reasons, trust has long been recognized as the very fundamental factor behind the rise and growth of large organizations, including firms and companies (Fukuyama, 1995, La Porta et al. 1997). Cingano and Pinotti (2011b) test the hypothesis looking at the pattern of comparative advantage (in terms of value added and productivity) and the organization of production (size and number of firms) across Italian regions and European countries. On the Italian data they find that high-trust regions exhibit on average more decentralized and larger firm organizations. In particular, high-trust regions exhibit a larger share of value added and exports in sectors characterized by greater need-for-delegation.

[37] In Italy the scope for improvement in policy design is surely wide (Brandolini and Bugamelli 2009). It is necessary (and not too difficult) to increase the stability and the internal consistency of the regulatory framework. Reducing uncertainty over access and the instruments available helps the medium to long-term planning that characterizes firms' strategic choices; the granting of any incentives or concessions should follow a decision-making process that prioritizes transparency and accountability. Moreover, there should be

internationalization: empirical evidence across the main advanced countries has identified these strategies as crucial for expanding sales and improving efficiency. What has always been missing in Italy is a truly working "national system of innovation", supporting the networking between public and private actors and developing big and applied science, together with a flexible and efficient financial system. Despite the lack of reliable empirical analyses, the high fragmentation of the agencies and the instruments dedicated to the internationalization of firms surely limit their positive impact[38].

Besides promoting greater efficiency at the firm level, policy making should facilitate the reallocation of resources among firms, from the least to the most productive ones. The aim is to create the conditions so that this reallocation can take place, while avoiding the temptation to subsidize firms in difficulty that do not have any concrete prospects of being restructured. Bankruptcy law, for firms, and the social protection net, for workers, play an essential role (Brandolini and Bugamelli 2009; Bobbio, Brandolini, Colonna, D'Amuri, Rosolia, Torrini and Zizza 2011).

In this paper we have dealt exclusively with industrial firms. This is reasonable enough for the more distant years, less for the most recent period in which service sectors account for three-quarter of total value added. Services are very heterogeneous but greater contestability in some of them (above all, professional services and energy) would enable monopolistic rents to be reduced, benefiting both consumers and user (manufacturing) firms (Barone and Cingano 2010). It is worth reminding the example of the 1998 reform of the retail sector: thanks to the geographical differences in the elimination of restrictions on entry into the retail sector, Viviano (2008) could show that in the areas where the restrictions on the number of businesses or on the selling floorspace have been eased, the ratio of workers employed in the sector to the total population has increased by nearly one percentage point. The lowering of barriers has also led to an increase in incumbents' productivity and a reduction in their profit margins, thereby spurring the use of ICT and helping to contain the rise in the prices of food products (Schivardi and Viviano 2011).

Least but not last, the Italian productive system as a whole would greatly benefit from a significant reduction in the tax burden, in the administrative costs placed on firms in every phase of their life and in a overabundant and unstable legislation that increases costs of learning and complying with the rules (Bianco, Giacomelli and Rodano 2011). Laws are effective only if they are backed by an adequate system of enforcement. Various country-specific or cross-country studies confirm the adverse impact on the economy of inefficient judicial systems (Kumar, Rajan and Zingales 2001; Laeven and Woodruff, 2007). In Italy,

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mechanisms for monitoring and assessing policy measures with a view to selecting the most effective; to avoid potential conflicts of interest, these assessment should be made by independent authorities, following the best practices recognized at international level. Finally, economic policy must always adopt a broad perspective that takes account of the interconnections and complementary elements of the various instruments.

[38] While the evidence from other countries suggests that the activities of national or regional promotional agencies, embassies and governmental missions abroad have positive effects on exports (Lederman, Olarreaga and Payton 2006; Gil, Llorca and Serrano 2008; Rose 2007; Nitsch 2007), in Italy this does not seem to be the case. A study focusing on financial services for internationalization suggests that small and medium-sized firms are unfamiliar with the more complex instruments and finds limited support offered by the network of public agencies and organizations abroad (Onida, 2006). The latter finding is consistent with the data of the Mediobanca-Capitalia survey, according to which only 9 per cent of Italian exporting firms received assistance abroad from Italian entities or operators in the three year 2001-03.

the quality of enforcement is heavily compromised by the lengthiness of trials[39]. This situation affects the performance of the Italian economy: comparisons across provinces have shown that less efficient application of the law goes together with a reduction in the birth rate and size of firms (Bianco and Giacomelli 2004), in the availability of credit (Jappelli, Pagano and Bianco 2005) and in recourse to bank debt as opposed to trade credit (Carmignani 2005). The numerous reforms of the civil justice system in recent years have for the most part been uncoordinated and fragmentary and proven to be inefficacious.

[39] In 2006 the average first-level civil action took 966 days to complete, according to estimates based on Justice Ministry data. By international standards, civil trials in Italy are among the longest. According to World Bank estimates, in 2008 it took 1,210 days to complete a procedure for the recovery of trade credit in Italy, compared with 463 days on average in the OECD countries (World Bank, 2008).

Tables and figures

Table 1

Share of employees by sector

(percentages)

	1911	1927	1937	1951	1961	1971	1981	1991	1996	2007
Foodstuffs	13.7	12.5	14.7	10.3	8.9	7.1	7.8	8.8	8.9	10.3
Tobacco	0.9	1.0	1.5	1.5	0.6	0.4	0.4	0.3	0.2	0.0
Textiles	22.5	25.0	18.5	18.8	13.7	10.1	8.9	7.7	7.1	4.8
Clothing	8.1	6.4	7.6	6.4	6.5	7.4	6.8	8.0	7.1	5.0
Leather goods	6.2	4.3	5.2	6.2	4.9	4.5	5.6	4.7	4.7	3.5
Wood	7.8	6.9	6.5	4.9	5.3	3.7	4.1	3.6	3.5	3.7
Paper	1.3	1.2	1.4	1.5	1.6	1.4	1.7	1.7	1.8	1.7
Publishing	2.2	2.2	1.9	2.1	2.5	2.7	3.2	3.7	3.6	3.5
Energy	0.0	0.3	0.5	0.5	0.4	0.5	0.6	0.6	0.5	0.4
Chemicals	3.3	2.9	3.4	5.1	5.9	5.4	5.0	4.6	4.3	4.2
Rubber and plastic	0.0	0.3	0.7	1.0	1.4	2.4	2.1	3.4	4.1	4.4
Glass. cement and bricks	9.8	6.4	6.1	5.6	6.8	6.3	5.7	5.3	5.2	5.3
Basic metals	3.1	3.9	3.0	4.8	5.3	5.0	4.7	3.3	2.8	3.0
Metallurgy	5.9	5.8	3.4	6.3	6.2	7.1	9.6	11.8	12.8	15.8
Mechanical instruments	3.4	5.2	8.8	8.6	11.8	13.8	10.9	10.3	11.4	12.6
Office machinery	0.1	0.1	0.1	0.3	0.5	0.7	0.5	0.5	0.4	0.3
Electrical devices	0.2	0.4	1.1	1.6	2.6	3.8	4.4	4.0	4.2	4.2
Radios and televisions	0.1	0.5	1.5	1.0	1.7	2.5	2.3	2.7	2.1	1.7
Precision instruments	0.6	1.7	1.5	1.7	1.5	1.1	1.7	2.3	2.7	2.9
Automotives	0.3	0.9	2.0	2.1	2.5	4.6	4.7	4.1	3.8	3.6
Other transportation equipment	5.4	5.3	5.9	4.0	3.1	2.0	2.4	2.6	2.1	2.5
Furniture and other manufacturing	4.9	6.5	4.5	5.8	6.4	7.4	6.9	5.9	6.4	6.2
Recycled materials	0.0	0.3	0.1	0.1	0.1	-	-	0.1	0.2	0.4
Manufacturing	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
1st industrial revolution	***71.4***	***69.6***	***63.3***	***61.6***	***54.0***	***49.2***	***51.9***	***52.6***	***52.6***	***51.1***
2nd industrial revolution	***39.4***	***38.7***	***38.7***	***45.7***	***51.7***	***56.4***	***58.0***	***61.0***	***62.9***	***70.7***
3rd industrial revolution	***1.0***	***2.7***	***4.2***	***4.6***	***6.3***	***8.1***	***8.8***	***9.4***	***9.4***	***9.1***

Source: G. Federico (2003) the years up 1996 and Istat for 2007.

Notes: Sectors included in First industrial revolution are: foodstuffs and tobacco, textile, clothing, leather goods, wood and furniture, paper and metallurgy. Sectors included in Second industrial revolution are: energy, chemicals, rubber and plastics, glass, cement and bricks, basic metals, metallurgy, mechanical instruments, automotives and other transportation equipment. Sectors included in Third industrial revolution are: office machinery, electrical devices, radio and televisions and precision instruments. Metallurgy is included in both the first and the second revolution since its products evolved with the two different technologies.

Table 2

Average firm size, by country and sector, 2008

(in percentage of the sectoral average of the five countries)

	DE	ES	FR	IT	UK
Foodstuffs and tobacco	110.6	57.7	38.6	26.8	266.4
Textiles	169.8	60.6	96.6	67.4	105.6
Clothing	213.7	73.5	54.9	67.9	90.0
Leather goods	156.2	68.7	107.3	69.2	98.7
Wood	142.2	80.1	97.4	52.5	127.8
Paper	204.5	59.7	114.1	43.4	78.4
Publishing	197.4	63.7	58.1	61.3	119.7
Energy	115.8	239.0	89.6	17.2	38.4
Chemicals	202.2	52.2	108.2	53.6	83.9
Rubber and plastic	168.8	65.3	131.1	49.7	85.0
Glass, cement and bricks	141.4	92.6	79.3	51.6	135.2
Basic metals	170.8	73.8	131.3	57.7	66.4
Metallurgy	170.6	67.6	108.7	59.3	93.8
Mechanical instruments	217.9	53.7	80.4	57.4	90.6
Office machinery	213.5	31.8	89.9	55.0	109.8
Electrical devices	223.8	83.7	99.2	29.5	63.7
Radio and televisions	186.5	76.9	132.3	34.0	70.3
Precision instruments	154.8	51.1	87.3	48.1	158.6
Automotives	254.5	54.4	88.7	61.7	40.8
Other transportation equipment	218.8	42.2	81.8	39.0	118.2
Furniture and other manufacturing	171.7	78.5	54.7	71.5	123.6
Total manufacturing	**196.8**	**64.5**	**75.9**	**49.5**	**113.3**

Source: Eurostat

Table 3

Average number of workers per plant, by sector

	1911	1927	1937	1951	1961	1971	1981	1991	1996	2007
Foodstuffs	3.9	3.9	2.0	4.6	7.1	7.8	7.6	6.8	5.8	6.0
Tobacco	341.0	477.8	78.7	70.8	35.9	53.2	87.6	68.8	72.7	139.4
Textiles	51.6	56.9	15.2	16.0	12.8	10.2	7.6	8.8	9.5	8.8
Clothing	3.5	2.1	1.7	1.9	2.7	4.5	6.1	7.0	7.0	5.8
Leather goods	2.4	1.9	1.8	2.2	3.3	6.9	9.6	8.8	9.1	7.7
Wood	2.7	2.4	2.0	2.5	3.2	3.1	3.1	3.2	3.4	3.9
Paper	27.8	29.2	28.4	40.7	34.7	31.6	21.3	18.1	16.2	15.6
Publishing	9.8	8.6	10.0	9.9	11.7	11.1	8.6	7.3	6.2	5.6
Energy	.	28.4	36.1	81.2	87.1	65.8	42.7	28.9	29.3	27.1
Chemicals	16.3	18.9	9.7	32.1	48.8	55.7	39.6	33.1	27.6	24.6
Rubber and plastic	15.8	44.9	16.2	17.5	14.8	14.2	12.6	13.5	13.6	13.8
Glass, cement and bricks	11.6	9.8	10.4	11.7	16.4	14.4	12.3	9.4	8.2	8.0
Basic metals	24.2	32.0	38.0	67.4	44.3	43.2	55.3	42.0	33.7	30.7
Metallurgy	3.3	3.7	7.5	3.9	5.7	7.0	6.2	6.7	6.6	6.8
Mechanical instruments	7.4	6.0	6.4	5.5	6.3	6.0	9.6	14.6	12.9	12.1
Office machinery	11.4	18.4	25.7	190.1	375.7	451.7	85.7	66.4	31.4	6.9
Electrical devices	15.6	16.7	16.3	20.6	21.0	14.1	17.9	12.6	11.9	9.5
Radios and televisions	7.1	9.7	5.4	9.0	13.9	12.5	19.7	13.2	10.6	10.1
Precision instruments	6.9	8.0	4.2	10.6	17.6	15.1	7.3	4.5	4.6	5.8
Automotives	5.9	9.2	298.6	115.3	210.2	176.7	105.8	92.6	82.2	59.7
Other transportation equipment	10.6	9.8	9.1	13.2	30.7	42.5	42.0	32.8	22.3	16.8
Furniture and other manufacturing	5.1	5.6	4.3	4.1	6.7	7.0	6.1	5.5	5.2	5.6
Recycled materials	17.5	6.7	4.5	13.2	5.0			3.8	4.0	5.9
Manufacturing	**5.8**	**5.7**	**4.0**	**5.6**	**7.5**	**8.7**	**9.1**	**8.8**	**8.2**	**8.0**

Source: G. Federico (2003) for the years up to 1996 and Istat for 2007.

Table 4

Employees in plants with more than 500 workers as a share of total number of employees. by sector

(percentages)

	1911	1927	1937	1951	1961	1971	1981	1991	1996	2006
Foodstuffs	-	3.7	11.6	4.8	11.1	11.6	9.3	6.9	6.9	6.5
Tobacco	-	92.0	51.3	51.2	48.6	42.4	34.1	28.2	27.1	
Textiles	-	37.3	30.7	40.4	26.2	16.5	7.0	3.2	3.1	3.2
Clothing	-	4.7	2.3	1.9	4.9	11.1	6.7	2.7	3.3	
Leather goods	-	1.9	2.1	5.2	3.4	6.5	2.7	1.7	2.6	1.1
Wood	-	0.1	1.6	1.3	0.5	1.1	0.4	0.0	0.4	0.8
Paper	-	23.0	14.3	27.3	20.7	17.0	15.6	10.1	6.6	4.8
Publishing	-	4.0	11.6	12.3	10.8	15.4	14.9	7.3	7.4	
Energy	-	15.8	25.8	53.6	45.8	46.1	43.0	36.2	38.6	32.2
Chemicals	-	22.1	23.0	46.8	50.0	51.4	42.4	30.6	26.8	20.1
Rubber and plastic	-	67.4	38.9	57.7	25.3	29.2	27.3	10.0	7.5	6.8
Glass. cement and bricks	-	4.6	8.8	7.8	6.8	9.0	8.3	4.2	5.5	3.6
Basic metals	-	48.8	37.7	59.4	48.6	50.5	52.5	37.5	33.4	4.8
Metallurgy	-	15.5	22.0	17.7	12.0	10.4	4.8	1.4	1.3	
Mechanical instruments	-	18.7	45.3	22.3	15.7	19.1	22.1	16.2	14.6	12.2
Office machinery	-	45.2	58.4	76.8	90.5	86.7	69.9	61.5	46.2	13.4
Electrical devices	-	21.7	48.7	42.7	34.0	35.0	25.2	12.9	14.6	
Radios and televisions	-	18.4	35.2	37.5	42.9	47.0	51.4	35.7	35.3	
Precision instruments	-	24.4	29.3	39.0	27.8	23.0	14.9	6.4	8.3	
Automotives	-	52.1	80.9	75.4	75.7	78.7	74.6	65.2	61.3	43.0
Other transportation equipment	-	51.7	60.9	60.7	62.3	56.8	59.9	50.7	45.2	
Furniture and other manufacturing	-	9.0	8.8	4.6	4.8	4.3	1.9	1.2	1.7	2.0
Recycled materials	-	26.0	10.3	n.a.	n.a.	2.3	10.5	-	11.9	

Source: G. Federico (2003) for the years up to 1996 and Istat for 2006.

Table 5

Percentage share of employees by firm size and average firm size, by group of sectors

		1911	1927	1937	1951	1961	1971	1981	1991	1996
1st industrial revolution	< 10 employees	46.6	40.6	43.9	40.6	36.3	29.4	32.3	34.9	34.3
	> 500 employees		17.9	15.5	18.1	12.4	10.4	5.7	3.1	3.2
2nd industrial revolution	< 10 employees	30.8	28.8	19.2	22.0	21.3	20.1	18.2	20.3	21.0
	> 500 employees		24.9	36.1	34.2	28.5	30.4	28.9	19.1	16.3
3rd industrial revolution	< 10 employees	30.1	25.1	28.0	15.1	12.7	13.6	14.5	22.2	23.6
	> 500 employees		23.3	37.1	42.3	39.4	41.1	32.5	20.3	18.8

Fonte: G. Federico (2003).

Notes: Sectors included in First industrial revolution are: foodstuffs and tobacco, textile, clothing, leather goods, wood and furniture, paper and metallurgy. Sectors included in Second industrial revolution are: energy, chemicals, rubber and plastics, glass, cement and bricks, basic metals, metallurgy, mechanical instruments, automotives and other transportation equipment. Sectors included in Third industrial revolution are: office machinery, electrical devices, radio and televisions and precision instruments. Metallurgy is included in both the first and the second revolution since its products evolved with the two different technologies.

Table 6

Share of employees in units/firms with more than 100 workers
(percentages)

Country	Source of data	Year	Firms	Plants
	Federico	1961	49*	43
Italy	Federico	1991		32
	Traù	1996		30
	Eurostat	2001	34	29*
	Istat	2007	34	29
		diff 61-01 pp	*-15*	*-14*
		diff 61-01 %	*-31*	*-32*
	Van Ark	1962	72	61*
France	Van Ark	1990	60	52*
	Eurostat	2001	61	52*
		diff 61-01 pp	*-11*	*-9*
		diff 61-01 %	*-15*	*-15*
	Traù	1962	78*	69
	Van Ark	1967	82	
Germany	Van Ark	1990	81	70
	Eurostat	2001	69	60*
		diff 61-01 pp	*-9*	*-9*
		diff 61-01 %	*-12*	*-13*

Notes: the asterisk * indicates that the figure has been estimated.

Table 7

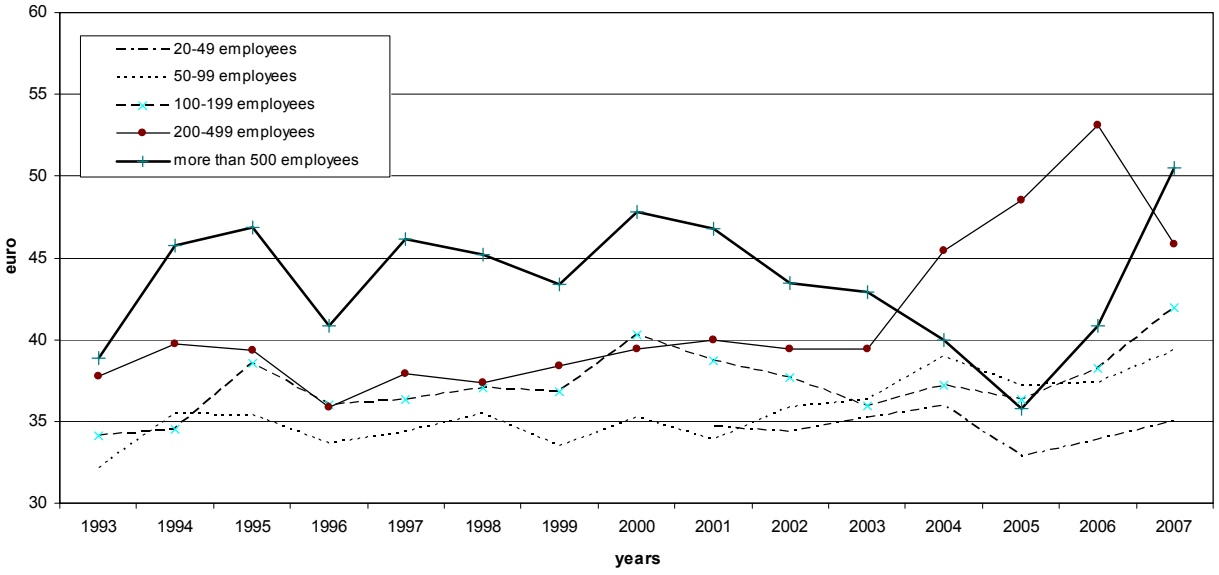
Size distribution of top 200 firms, by group of sectors

	min	median	mean	max
		1st Ind Rev		
1913	52	2209	3224	15000
1927	81	1191	2300	21212
1936	51	1092	2581	16279
1952	24	1192	1964	8009
1960	190	2200	5561	138300
1971	543	2672	3215	7986
1981	674	2151	3126	16137
1991	264	1464	2112	8504
2001	358	1200	2057	11772
		2nd Ind Rev		
1913	41	1400	2688	42222
1927	21	835	2053	27778
1936	4	718	2991	36711
1952	16	1127	2944	39150
1960	134	1712	4199	92891
1971	14	1719	5369	182501
1981	146	1945	4956	119202
1991	23	1551	3463	102997
2001	164	1787	3260	41093
		3rd Ind Rev		
1913	1498	1667	2353	4444
1927	541	991	1081	1802
1936	197	757	926	1645
1952	253	1644	3584	25667
1960	575	2180	3243	16396
1971	1743	3801	5784	33142
1981	1091	3917	5483	21749
1991	300	2393	3175	14727
2001	19	2243	2813	17481

Source: authors' elaborations on Imita and Mediobanca data

Fig. 1

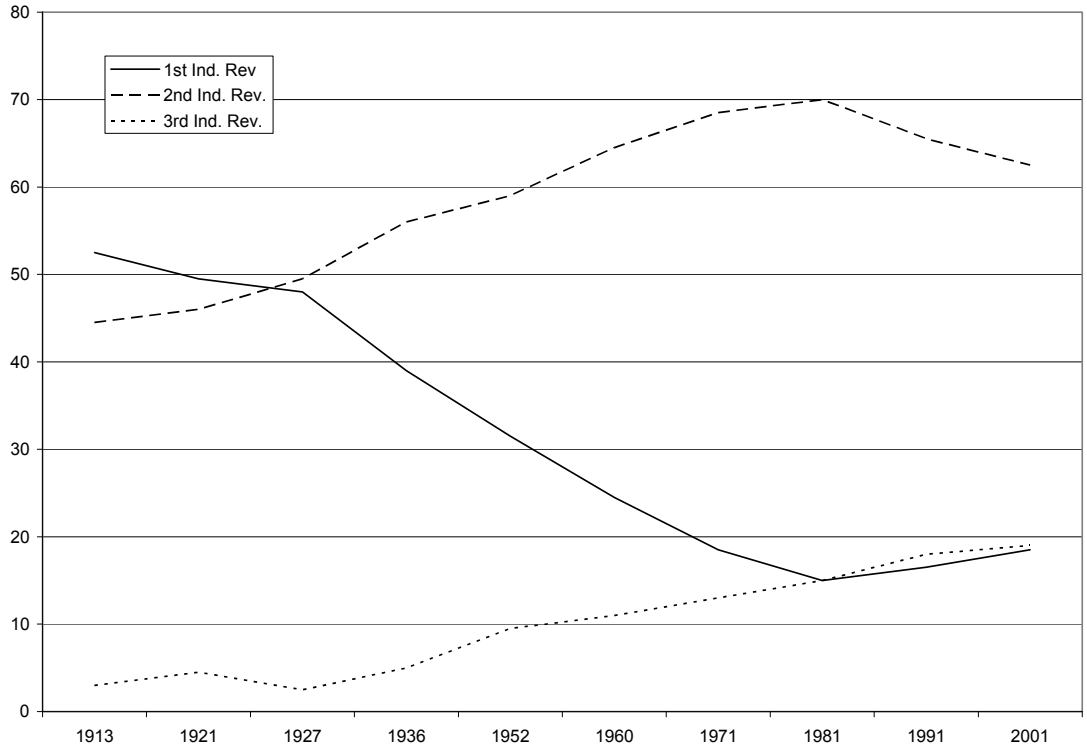
Value added per hour worked by firm size class



Source: Bank of Italy's survey on industrial firms (Invind)

Fig. 2

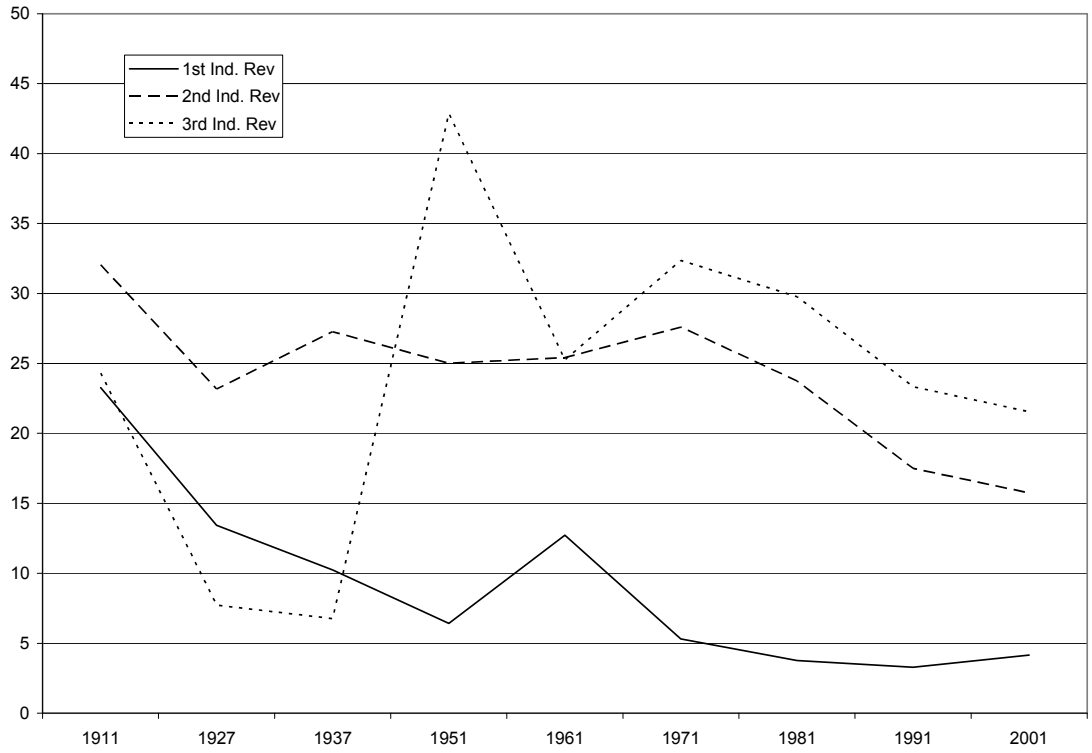
Composition of top 200 firms by group of sectors
(percentages)



Source: authors' elaboration on Imita.db data (Giannetti and Vasta 2006).
Notes: Sectors included in First industrial revolution are: foodstuffs and tobacco, textile, clothing, leather goods, wood and furniture, paper and metallurgy. Sectors included in Second industrial revolution are: energy, chemicals, rubber and plastics, glass, cement and bricks, basic metals, metallurgy, mechanical instruments, automotives and other transportation equipment. Sectors included in Third industrial revolution are: office machinery, electrical devices, radio and televisions and precision instruments. Metallurgy is included in both the first and the second revolution since its products evolved with the two different technologies.

Fig. 3

Share of employment of top 200 over total employment, by group of sectors
(percentages)



Source: authors' elaboration on Imita.db data (Giannetti and Vasta 2006) and census data (Federico 2003).
Notes: Sectors included in First industrial revolution are: foodstuffs and tobacco, textile, clothing, leather goods, wood and furniture, paper and metallurgy. Sectors included in Second industrial revolution are: energy, chemicals, rubber and plastics, glass, cement and bricks, basic metals, metallurgy, mechanical instruments, automotives and other transportation equipment. Sectors included in Third industrial revolution are: office machinery, electrical devices, radio and televisions and precision instruments. Metallurgy is included in both the first and the second revolution since its products evolved with the two different technologies.

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