

## Challenges to Technology Innovation in Italy

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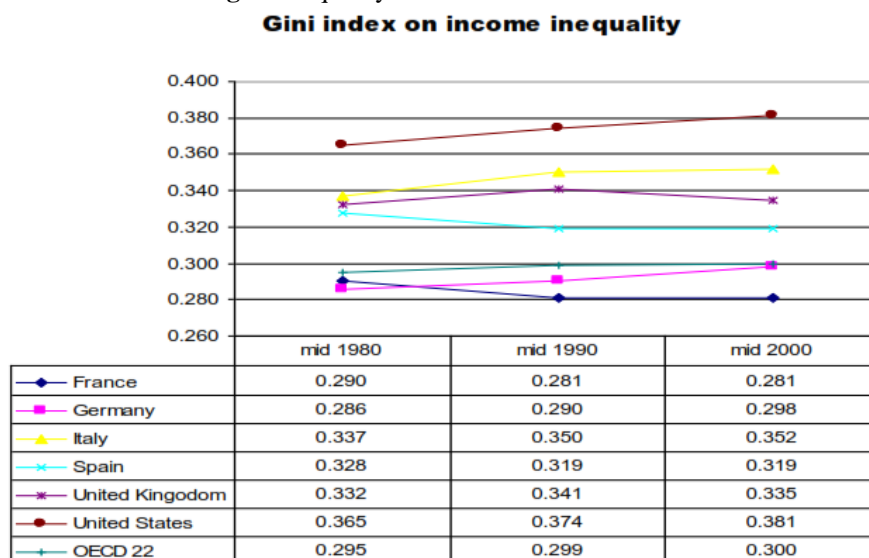
**Abstract:** Italy is an economy with few incentives for technology innovation, due to the social, cultural, and economic consequences of a society that is based on privilege rather than merit. The lag in innovation in Italy vis-à-vis the other main industrial countries is one of the effects of the fragmentation of the production system into many small firms that have trouble bearing the high cost of R&D and taking the related risks. Most people have little incentive to create innovative companies, as they perceive that those with privileges have an unfair business advantage and consequently many entrepreneurs are wary to invest in innovation. The mainstay of this paper is to list and understand the challenges that affect technology innovation in Italy. The paper suggests the necessary involvement of all members of the society in the process of design public policies and socio-technical infrastructures in order to overcome this existing innovation gap. In particular, Italian entrepreneurs should work together to transform the network of pernicious institutions that perpetuate the lack of a meritocracy, as well as the corruption that hinders the development of Italy.

**Keywords:** Higher education, Justice system, Meritocracy, Privilege-based society, Technology Innovation.

### I. Introduction

Historically, the Italian Industry had overcome many challenges to bootstrap<sup>1</sup> innovation. Italy's socioeconomic development has been challenged by aspects of its historic, cultural, social, political, and economic situation. The country suffers from an income inequality, with powerful special interest groups such as monopolies and privileged unions that have slowed down many necessary reforms. The weakness of the state is a major reason to explain the relatively high level of inequality observed in contemporary Italy. The weakness of the state indirectly increases social inequality, as it is complemented by individualistic, market-based mobilization (Pizzorno,1993) and by the strength of particular social groups. Among the latter, the most important is surely the family: the classic concept of "amoral familism", developed by Banfield (1956) on the basis of his fieldwork in Southern Italy, is still useful to express how Italian families act for their own particular interests, without taking into account the welfare of society at large. When compared to other OECD countries Italy appears as one of the most unequal countries in terms of income distribution. The Gini index of income inequality stand at 0.34 and rising, very similar to the UK value.

**Fig. 1.** Inequality indices – main OECD countries



Source: OECD (2008)

<sup>1</sup> The term bootstrap is used to emphasize that companies are in an environment with scant innovation infrastructures, and little precedent and support for innovation activities.

This is rather striking when considering that this country is characterized by educational institutions and labour market institutions that are typical of social economies. More recently, despite an inflow of young cohort who attain levels of education in line with the Lisbon 2020 target (at least 85% of the population with a secondary school degree), there is still almost half of the population in working age missing this target. Clearly Europe remains a two-speed continent, with Mediterranean countries lagging behind continental ones in terms of socio-economic development. The lack of a robust industrial structure, the presence of powerful family firm that have long controlled large parts of Italy's industry, a large share of small firms and self-employment, a large share of employment in the service sector (exceeding 50%) are all underlying forces that tend to create inequality and scant infrastructure to support innovation-based industries.

Therefore, the objective of this paper is to analyze the challenges to technology innovation in Italy in order to clarify how they affect the technology growth and competitiveness of the country and to suggest new reflections to be used in turn to design public policies and socio-technical infrastructures that incentivize technology innovation.

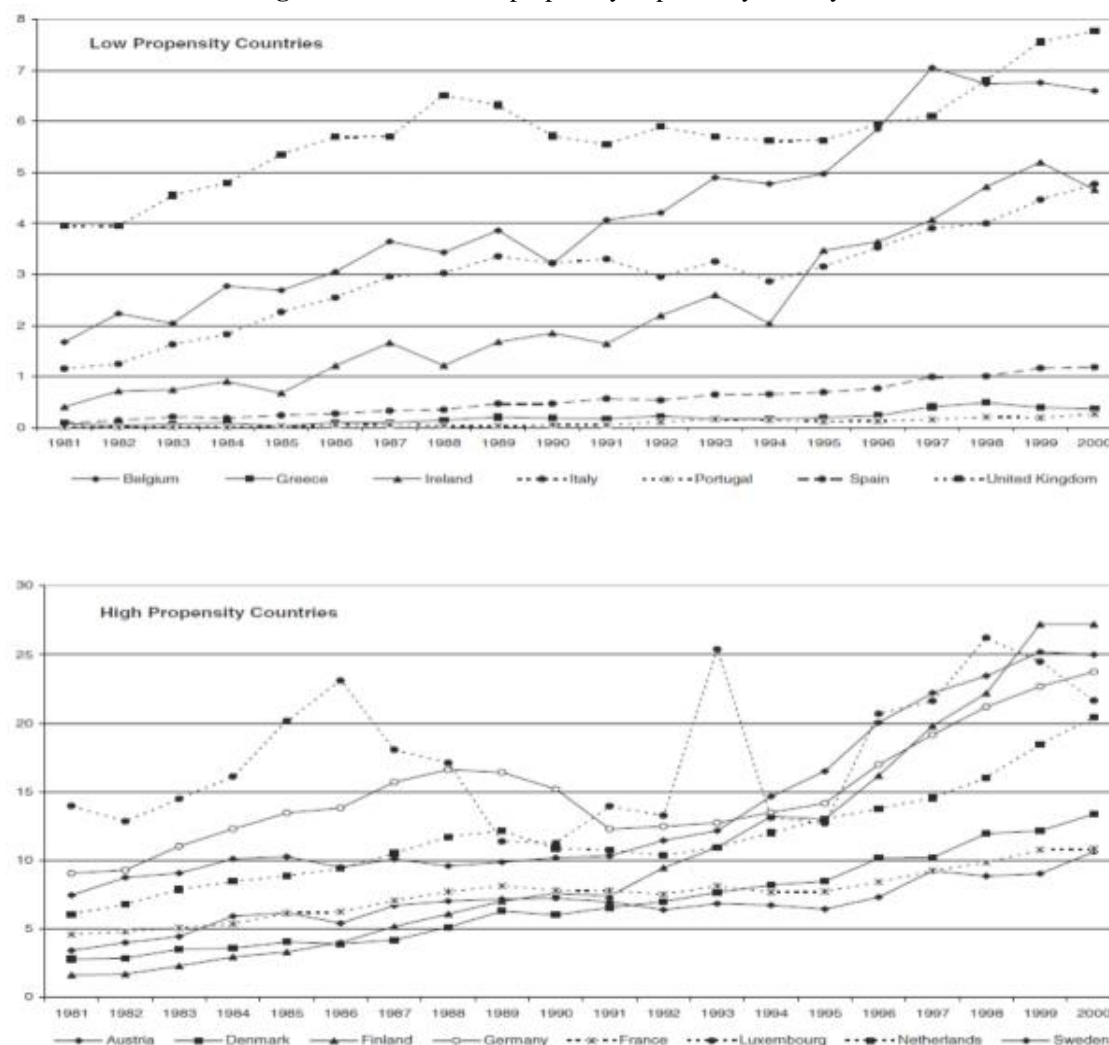
## II. An Economy With Little Incentive For Innovation

The lag in innovation in Italy vis-à-vis the other main industrial countries is one of the effects of the fragmentation of the production system into many small firms that have trouble bearing the high cost of R&D and taking the related risks. Such other causes as shortages in human capital for management and R&D and excessive labour flexibility, undermining the incentive to invest in training, also play a role. Lack of financial sources is a further hurdle; equity, more suitable than debt for financing innovation, is less common than in other countries. Public incentives for firms have had modest results. To enhance the capacity for innovation some actions should be taken to help firms grow, adopt a more managerial approach, and increase their equity. It is important to support the venture capital market, which is less developed than in other countries. The design and management of public funding for innovation need improvement (Bugamelli et al., 2012). The European Commission – Directorate General Regional Policy stated that “in 2005, Italy’s innovation performance was in 12th position out of the 25 EU Member States. Its main strength is the public funding of innovation; its main weaknesses are the lack of venture capital, the low level of cooperation between firms and the low level of business RTD. In addition, there is a predominance of SME<sup>2</sup>s (98% have less than 20 employees) specializing in low and medium technology sectors.” (Directorate-General Regional Policy, *Innovation in the National Strategic Reference Frameworks*, 2006). In the National Strategic Framework (NSF) 2007-2013, the poor innovation capacity of the private and public sectors is identified as the principal source of competitive lag in the country. The systemic weakness of Italy is linked to the modest amount of private research conducted even in very large firms, the insufficient capacity to institute relationship mechanisms between the latter and SMEs, the limited aptitude of SMEs to dialogue with the research supply system, the inadequate level of training of entrepreneurs and the poor involvement of workers in the innovation process both in businesses and in the public administration (Coletti, 2007). Indicators of innovative output such as patents filed at the European Patent Office (EPO) confirm the Italian delay in innovation (Lotti and Schivardi, 2005). Of the total number of patents filed at the EPO in 2001 Italy had a share (7.8 percent) is significantly lower than one of the main European countries. The relationship between the number of patents and population puts Italy in the group of countries with a low propensity to patent (which also includes Belgium, Greece, Ireland, Portugal, United Kingdom) set against Austria, Denmark, Finland, France, Germany, Luxembourg, Netherlands, Sweden. Since 1980, Italy has the propensity to patent a flat profile until the mid-nineties, followed by a phase of growth. Overall, at the European level there is no weak signs of convergence between countries, more visible when comparing countries with low than high propensity to patent; signals are almost absent within each group.

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<sup>2</sup> SMEs stands for Small-Medium-Enterprises

Fig. 2. Evolution of the propensity to patent by country



Source: Bank of Italy (2012)

### III. Special Privileges Disincentive Cooperation and Innovation

Privileged and interest groups such as de-facto monopolies and oligopolies, corrupt political cliques, and dishonest sectors of workers' unions have been a constant burden for Italy's development. Their presence engenders systemic corruption, deters cooperation in business, and discourages technology innovation. The problem with this explanation is that a number of different metrics suggest that interest groups in Italy grew weaker, rather than stronger, in the period between the early 1990s and the late 2000s. In the early 1990s, trade unions commanded around 40% of the labour force in the private sector. In 2007, this figure had declined to a mere 19% (Baccaro and Pulignano 2009). This data is mirrored by decline in company-level wage bargaining. During the 2000s, 30.6% of firms with more than 20 employees have reached a company agreement, down from 43.4% in the 1990s (CNEL - CESOS 2009). From an Olsonian viewpoint this decrease should have had beneficial effects because unions in Italy have not historically been an "encompassing" group that internalizes the systemic consequences of its strategies. Italian unions have been characterized for their factionalism and militancy, which followed national political cleavages (Olson 1982; Golden 1988; Baccaro, 2003).

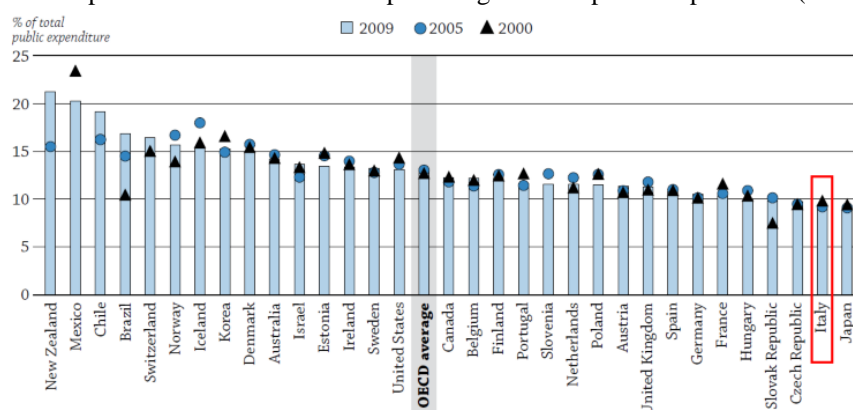
The most notable interest group in Italy are the Italian political parties. It is precisely because Italian parties collude to protect/promote their collective interests that the Italian party system should be viewed as a cartel party system rather than as an instance of consociationalism (Bogaards, 2005). Historically privileged and lobby groups have made Italy a very conservative society. To avoid losing their position, the privileged have held back many reforms and slowed the transformation of institutions that could make the country more competitive. The assurance, pharmaceutical and banking sectors are prominent examples. Due to lack of competition among assurance companies, the cost of insurance own vehicle in Italy remains high in comparison with many other European countries. The banking system has been slow in giving credit to small businesses.

Until very recently, it has not participated in the creation of solutions for online payments, hindering the ability of internet entrepreneurs to create new products. These privileged groups, formed by specific business people, politicians, bureaucrats, and union members, have historically supported corrupt governments and companies in exchange for special favors. The history of a privilege-based society can be traced back to the Spanish Colonial period, when the government favored some groups to increase the incipient state power. In a privilege-based society most people have little incentive to create innovative companies, as they perceive that those with privileges have an unfair business advantage (Elizondo Mayer-Serra, 2011). While in every country connections are important, in Italy there is a generalized perception that only the privileged can enter the most profitable industries such as banking, pharmaceutical and companies serving the public sector. These special privileges are linked to a high degree of corruption in the public and private sectors. Business people in Italy feel that they will have to bribe someone or ask a special favor at some point, if they want to stay competitive in the market. In this environment, many Italians are wary to cooperate with each other. Their lack of cooperativeness created a system characterized by many small companies. The behavior of business people is perceived to be similar to that of crabs trapped in a bucket, pulling each other down instead of cooperating to get out of the trap. Several indicators show that the lack of trust in collective endeavors goes beyond a mere perception. In fact, counter-intuitive findings about cooperation, that theoretically is a tool to overcome internal barriers to innovation, can be explained taking into account the less propensity to cooperate by Italian firms that means a too low experience of Italian firms in cooperative agreements and consequently the ineffectiveness of cooperation and the “inability to access to partners resources or to exploit the synergies among partners human resources” (Galia et al., 2012). For example, by comparing Italian and French SMEs, results that French SMEs are more prone to enjoy R&D cooperative agreements (11.5% of French SMEs are engaged in R&D cooperation compared to only 4.3% of Italian SMEs). Early stage venture capital in France is 0.03% of GDP whilst in Italy is 0.002%.

#### **IV. Lack of Support to Achievers, Lack of Support to Innovation**

In times of economic crisis, higher education often becomes a central part of the political discussions. On the one hand, there seems to be agreement that higher education is a key factor in finding a way out of the crisis, and in creating a stable and competitive knowledge economy that would be able to better absorb potential future economic downturns. However, the role and value of higher education in society and the economy, vary from country to country. Indeed, in the European context, it is clear that while certain countries have provided new investment to fund higher education since the start of the crisis (Germany, France and Portugal), others have decided to renege on previous commitments to increase funding (Hungary, Flemish Community in Belgium, Spain and Austria) or to introduce budget cuts varying from minor (less than 5% in the Czech Republic, Poland, Croatia, Serbia and Macedonia) to major up to 20% such as Italy (Garben, 2012).

In 2009, public expenditure on education in Italy represented an amount equal to 4.7% of GDP, well below the OECD average of 5.8%. As a figure of total public expenditure, public expenditure on education in Italy (9%) was the second lowest after that in Japan (Figure 3). Between 2000 and 2009, public expenditure on education as a percentage of total public expenditure decreased from 9.8% to 9.0% and increased by only 4% in real terms (the OECD average increase in real terms was 33%). Between 2000 and 2009, funding for educational institutions from private sources increased in real terms by 77%. In particular, funding for higher education shifted more markedly from public to private sources than on average in OECD countries. Whereas public sources accounted for 82.9% of funding in 1995 (above the OECD average of 78.9% that year), they accounted for 68.6% in 2009 (below the OECD average of 70%). The increase in public spending on tertiary educational institutions, equaling 4% in real terms between 2000 and 2009, is the lowest among OECD countries.

**Fig. 3.** Total public expenditure on education as a percentage of total public expenditure (2000, 2005, 2009)

Source: OECD (2012)

Today's graduates need to combine transversal, multidisciplinary and innovation skills and competences with up-to-date subject-specific knowledge so as to be able to contribute to the wider needs of society and the labour market, but in Italy, according to the last figures, this is not possible. It is clear that educational system in Italy has produced uneven results in educating people for innovation-based industries. The root causes of this deficient system are the lack of a merit-based educational system that would encourage students to give their best effort, along with the historical lack of access by unprivileged groups. In Italy, most private universities are open to anyone who can afford them. There is likely to be a significant difference in terms of resources between public and private institutions, one should note that in contrast to the USA, the proportion of students enrolled at private universities in Italy is extremely low (Di Pietro and Cuttillo, 2006). In Italy in 2002 the proportion of students enrolled at private universities was 6.5 %, significantly lower than the OECD average of 11.4 % (OECD, 2004). Second, in contrast to other countries, in Italy (with the exception of some private universities) there are no selective barriers to entry to university. All the individuals successfully completing high school are free to enroll at the institution they prefer. In addition, choice is unlikely to be affected by the direct cost of university education as Italian tuition fees are significantly lower than in other countries (e.g. the USA), and do not significantly vary across institutions. This general openness to education, testify that education system in Italy is not meritocratic based. Generally, in a non-meritocratic system there are limited economic resources to support elite institutions that produce world-class research. The lack of tuition fees at University in Italy, decrease the resources available for research and investment in innovation.

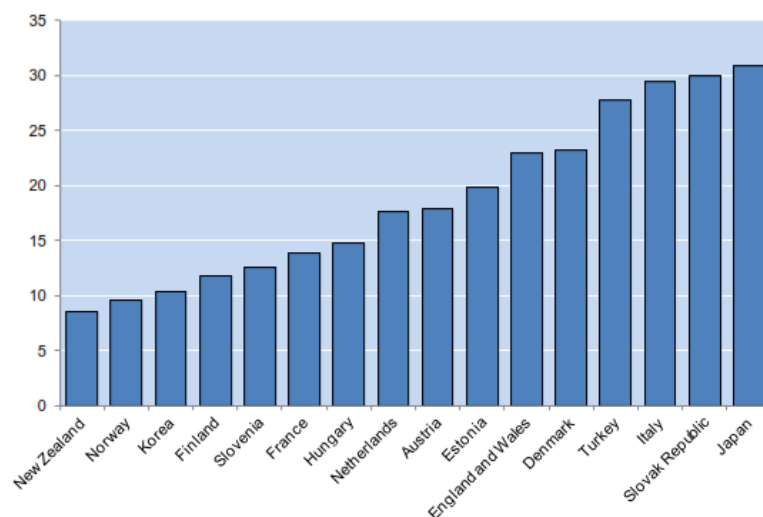
In contrast, country such as India has invested heavily in its higher education and research systems since its independence in the 1950s, creating a series of world-class, elite scientific, engineering, and management institutes, colleges, and universities, including the prestigious Indian Institute of Technology. These public institutions are reserved for the best students in the country. The privileged groups and the State failed to support an Italian research and innovation system. During many years there was no support for the highest achievers in science, technology, and innovation. This systemic absence of support for the highest achievers is one reason why Italy lacks a tradition of world-class research programs.

## V. The Italian Justice System—A Contributor to a Difficult Environment for innovation

Some Italians perceive that the lack of technical innovation can be explained by an inefficient justice system. Judicial systems serve important purposes in up-holding social values but also in determining economic performance. Well-functioning judiciaries guarantee security of property rights and enforcement of contracts. Security of property rights strengthens incentives to save and invest, by protecting returns from these activities. A good enforcement of contracts stimulates agents to enter into economic relationships, by dissuading opportunistic behavior and reducing transaction costs. This has a positive impact on growth through various channels: it promotes competition, fosters specialization in more innovative industries, contributes to the development of financial and credit markets and facilitates firm growth. A well-functioning, independent and efficient justice system is one where decisions are taken within a reasonable time, are predictable and effectively enforced, and where individual rights, including property rights, are properly protected. As further, improving the efficiency of the judicial system can help improve the business climate, foster innovation, attract FDI, secure tax revenues and support economic growth (IMF, 2013). The performance of the Italian justice system is well below European and OECD averages. Of note, it takes an average of 1,200 days to enforce a contract in Italy, more than twice the OECD high-income country average (OECD, 2013, and Council of Europe's European Commission for the Efficiency of Justice (CEPEJ), 2012).

The regulatory and legal environment is commonly held to be an important factor in determining a country's economic performance. Trials length and the costs of accessing the judicial system (court fees, expert fees, lawyers' fees) are very important for enterprises that invest in innovative activities. With some exceptions (Slovenia), systems characterized by lengthy trials tend to be more costly, discourage the creation of new businesses, foreign direct investment and investment in innovation. Thus, lengthy trials undermine certainty of transactions and investment returns, and impose heavy costs on firms.

**Fig. 4.** Trial costs net of legal aid as a percentage of the value of the claim

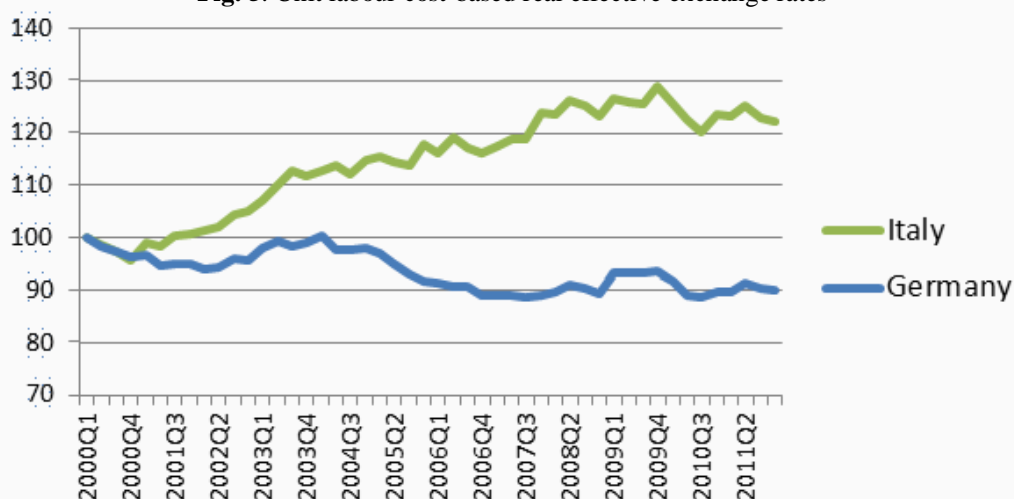


**Source:** OECD, CEPEJ and World Bank (2013)

Further, very important for companies is the enforcement of contracts. According to *Doing Business*, in Seoul resolving a standard contract enforcement dispute takes 230 days, while in Italy 1185 days (**Doing Business, 2014**). In fact, SMEs usually try to avoid going to trial, effective contract enforcement systems matter for them. Efficient courts and enforcement reduce informality, improve access to credit and increase trade. Dabla-Norris and Inchauste Comboni (2008); Safavian and Sharma (2007), in a study on Eastern Europe, found that in economies with slower courts, firms tend to have less bank financing for new investments. Yann and Utoktham (2009) found that simplifying contract enforcement procedures increases bilateral trade.

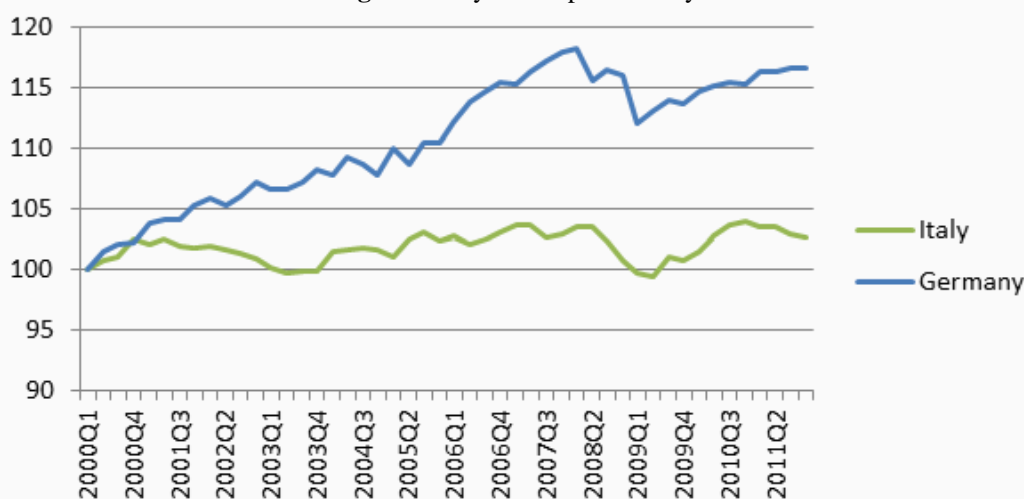
## VI. High recruiting costs weakens the incentive to innovate

High recruiting costs associated to scarcity of skilled labour weakens the incentive to innovate, on the other and, lower innovation and less productive technology reduce the economic return to human capital (Colonna, 2014). Taxes on labour, such as social security contributions and taxes on personal income, tend to discourage the labour supply, while, on the demand side, increase labour costs and depress the labour demand. In the ranking of the level of the tax wedge on the labour, Italy lies in an intermediate position. In Italy, the amount of social contributions amounts to 32.2% of the average wage level, compared to 31.0% for the average of the 15 EU countries. Income tax is 14.2%, compared to 14.1% for the EU average (Dell'Arringa, 2003). "When an investor asks about severance costs, all the other countries can provide an answer," says Pietro Ichino, an Italian senator and professor of labour law at the University of Milan. "Italy can't." Duccio Astaldi, president of Condotte, one of Italy's largest construction companies, says the difficulty of firing often prevents him from hiring when times are good. "It's easier for me to get rid of my wife than to fire an employee," he says. The result is crippling. The World Economic Forum ranks Italy 123rd out of 142 countries in the efficiency of its labour market. Employers are robbed of their ability to innovate, from experimenting with hours of operations to introducing new forms of wage structures. Meanwhile, national strikes roll around like federal holidays, one every month or so and almost always on a Monday or Friday to guarantee participants a three-day weekend. On average, Italian workers spend almost six times as many hours on strike as their German counterparts, according to the European Industrial Relations Observatory. In the past decade productivity has remained flat, even as its neighbours to the north have continued to work more efficiently. Comparing Italy and Germany, the unit labour costs-based indexes for Italy (green line) and Germany (blue) are shown in Figure 5. Between the first quarter of 2001 and the last of 2011, unit labour cost in Italy rose by 23% more than in its trading partners (a real appreciation), while unit labour costs in Germany declined by 9.7% (a real depreciation).

**Fig. 5.** Unit labour cost-based real effective exchange rates

Source: Darvas (2012)

Labour productivity, however, did not follow wages. Figure 6 shows that labour productivity completely stagnated in Italy (+2.7% in the entire period) while it rose considerably Germany (+16.7%). As a result, net of taxes, unit labour costs in Italy rose about 32.5% more rapidly than in Germany.

**Fig. 6.** Hourly labour productivity

Source: Darvas (2012)

These figures show that a country becomes more competitive if the domestic relative (to foreign) average wage per hour falls, if the domestic relative average labour productivity rises, if the relative social security tax rate paid by domestic employers falls, if the domestic relative sales tax rate rises, and if the (trade weighted) nominal exchange rate depreciates (Manasse, 2013).

Italy's unit labour costs grew by nearly 28 percent cumulatively during 1995-2007, compared to a European average of just over 20 percent during the same time period (Schindler, 2009). The high cost of labour is the reason why Italian companies have a specialization toward unskilled labour intensive sectors. Lack of skilled labour might reduce firms' incentive to innovate; on the other hand, low technological growth can curb economic returns to human capital. Colonna (2013) finds that multiple equilibria and "low skill-low innovation" traps can arise when the matching process between labour demand and supply is very. In particular, Italy differs significantly from the others countries in two dimensions. First Italian labour market is characterized by a more costly matching process: a 1% increase of the labour supply reduces the associate recruiting cost by around 2% against 1% in Spain and 0.2% in France and Germany. Second, Italian system exhibits a bias toward sectors with a relatively low skilled labour productivity. These two factors can explain respectively almost 50% and 30% of the Italian gap in graduation and innovation rate. Thus, a large part of the innovation between Italy and other leading European countries can be explained by labour market frictions. Thus, labour cost and high recruitment cost can play a pivotal role in shaping firms' innovation activity. In Italy, labour markets, suffocated

innovation and productivity growth, and resulted in wage dynamics that were completely decoupled from labour productivity and demand conditions.

## VII. Conclusion And Recommendations

Italy is still at a crossroads in building an innovation-based industry. The new local and global resources can help the country overcome the challenges from old institutions and practices. The economic crisis and the awareness that political reforms are needed society can create a culture emphasizing education and merit. While the Italian Industry is having initial experiences that are foundational towards creating an entire industry based on innovation, there is a long road to create a full transformation. D'Costa (2011) cautioned against being naively optimistic about innovation-based industries: the socioeconomic differences between those who are qualified for the new economy and those who are not are widening rapidly. Thus, it is urgent to create mechanisms to ensure equal access to a better education for all members of society in order for everyone to benefit from innovation-based industries. Enabling more members of society to participate in these industries will contribute to overcoming the existing innovation gap in Italy. Scholars and practitioners should look into potential structural and cultural changes that can enable the overall development of society. These reflections can be used in turn to design public policies and socio-technical infrastructures that enable or modify this social development. Finally, Italian entrepreneurs should create collective aspirations to build strong innovation-based industry that benefits all, beyond the mistrust of cooperation amongst SMEs. For defeating the many challenges affecting Italy, entrepreneurs should transform the entire business context. They should transform the network of pernicious institutions that perpetuate the lack of a meritocracy, as well as the corruption that hinders the development of Italy.

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