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(Economic History Working Papers)

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and Competition Policy in Italy, 1911-1951

Claire Giordano and Ferdinando Giugliano

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A Tale of Two Fascisms

Labour Productivity Growth and Competition Policy in Italy, 1911-1951

Claire Giordano* and Ferdinando Giugliano**

Abstract

This paper offers the first quantitative assessment of labour productivity dynamics within Italy's industrial sector over the period 1911-1951 and of their links with competition policy. By relying on a newly compiled dataset and on fresh labour productivity estimates, we find that the earlier period of the Fascist era was characterised by a productivity boom, which ended and was reversed following the switch to a more interventionist industrial policy. In the overall period 1911-1951, new industries did not perform any better than the old ones and labour productivity growth was explained largely by internal productivity growth within industrial sectors rather than from the contribution of structural change from old to new industries. Finally, we find that reductions in the level of competition, induced by specific policies, were associated with lower productivity growth. This paper thus casts a shadow on the optimist accounts of Fascist industrial policy and confirms the findings of a revisionist literature minimising the positive role played by the State in the earlier stages of Italian industrialization.

JEL Classifications: L16, L52, N14

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1 Introduction¹

The evolution of labour productivity in Italian industry over the interwar era has been mainly looked at from an aggregate point of view. Filosa, Rey and Sitzia (1976) have shown that it was generally slow throughout the 1922-1938 period. More recently, Broadberry, Giordano and Zollino (2011), in their century-and-a-half analysis of Italy’s development, find similar results, with not only growth rates falling but also comparative labour productivity levels relative to the United Kingdom deteriorating after 1911. And since the United States were ploughing ahead in those years, it is clear that Italy was dropping even further behind from the new technological frontier. Only after World War Two did Italy decidedly embark on a catching-up trajectory.

An aggregate analysis is, however, far from satisfactory. Studies conducted over the last twenty years on a range of countries² have shown that the evolution of labour productivity in the different branches of the industrial sector was generally heterogeneous. Even when grouping branches together, “new” industries often experienced rates of productivity growth which were very different from those registered by the ‘old staples.’³ Disaggregated analysis, important *per se*, also enables researchers to use shift-share analysis to distinguish whether industrial productivity growth was due to internal productivity growth or to structural change, i.e. shifts of resources from low-productivity level industrial sectors to high-level ones. Lastly, disaggregated data can allow researchers to exploit the cross-sectional variation between industries to better study which factors truly drove productivity growth and, in particular, whether a given type of industrial policy had a positive or a negative effect on productivity growth.

All the mentioned lines of research are particularly appealing in the Italian case. The asymmetric performance of old and new industries, the role of structural change and the impact of active industrial policies in the interwar period have all been referred to in the literature. The division between new and old industries is particularly important, so much that Tattara and Toniolo (1976) have openly talked about a “dual economy:” using information from the industrial censuses taken in the second half

¹We are very grateful to Brian A’Hearn, Federico Barbiellini Amidei, Emanuele Felice, Knick Harley, Anna Missiaia, Paolo Sestito, Gianni Toniolo and an anonymous referee for commenting on earlier versions of this paper. We also thank Stephen Broadberry, Carlo Ciccarelli and Kevin O’Rourke for useful suggestions, as well as participants of a seminar in Oxford, and Stefano Fenoaltea and Emanuele Felice for sharing unpublished data with us. All errors remain our own. The opinions herein expressed are those of the Authors and do not necessarily reflect those of the Institutions represented.

²For example, for Britain and the United States, see, among others, Broadberry and Crafts (1990b; 1992), Broadberry (1997) and De Jong and Woltjer (2011); for Britain and Germany, see Broadberry and Fremdling (1990) and Fremdling, De Jong and Timmer (2007).

³For example, in the British case, see Broadberry and Crafts (1990a).

of the 1930s, they argued that the productivity gap between new and old industries, measured in levels, was larger in Italy than in Germany or in Britain (Tattara and Toniolo 1976, p. 150). In their view, this gap was the consequence of the different dynamics in investments, with the level of horsepower rising much faster in the new industries than in the old ones. Although the two scholars do not analyse productivity dynamics in detail, they hint at the fact that such differences in levels may have not translated into large productivity growth differentials. This is because employment dynamics largely followed those of investments, so that structural change might have actually hampered productivity growth within new sectors by increasing employment more than output.

An analysis of structural change within industry cannot, however, be detached from a more general analysis of Fascist industrial policy, which tended to favour new industries over the old staples. The decision to revalue the lira in 1926-1927 and the increase in import duties which accompanied it favoured the more modern sectors of the Italian economy while penalising the export-oriented old industries, starting what has been defined as ‘a deliberate policy of forced redistribution of resources’ (Tattara and Toniolo 1976, p. 105). This included a general retrenchment from competition in the product market. Although the literature has emphasized the importance of this retrenchment, doubts remain over whether its impact on productivity growth was positive or, in fact, negative. This question can also be answered via a disaggregated analysis of productivity growth.

The only study that has thus far looked at the evolution of labour productivity in the individual sectors of Italian industry is a preliminary conference paper by Bardini (1998),⁴ which presented information on labour productivity of 28 sectors of Italy’s manufacturing industry for the three benchmark years 1911, 1936 and 1951.⁵ Bardini found that *(i)* Italian heavy industries did not start off badly in 1911; *(ii)* structural change during Fascism was accompanied by some gain in relative productivity in the heavy-industry sectors; and *(iii)* the light industries generally experienced only small improvements in productivity. The main conclusion of his paper is that ‘Italian heavy sectors seem to have been in better waters than it is generally thought [...] and the growth of their relative weight results as the major dynamic component of Italian manufacturing in the first period of our study; if anything, one could rather argue that the restructuring in favour of them was not pushed far enough’ (Bardini 1998, p. 99).

The limitations of Bardini’s study are twofold. Firstly, Bardini treats the period between 1911 and 1936 as a single time span, without accounting for its discontinuity.

⁴This work builds on Bardini (1996).

⁵The nature of the paper is such that little information is provided on how the estimates are obtained and why certain data choices were made. Furthermore Bardini himself states that his results are preliminary, ‘with much room for improving them’ (Bardini 1998, p. 95), a venture he unfortunately never pursued.

This appears unfortunate, as industrial policy changed quite dramatically towards the end of the 1920s and a good understanding of the period calls for an examination of this policy break. Secondly, Bardini does not attempt to single out the drivers of productivity growth. The techniques he employs allow to distinguish between internal productivity growth and structural change, but do not provide an examination, for example, of the potential impact of Fascist industrial policy.

Our paper aims to address these two shortcomings. Firstly, by employing the new disaggregated yearly series of industrial value added produced by Carreras and Felice (2010), we are able to analyse the performance of the different sectors of Italian industry between 1911 and 1951, introducing a larger set of benchmarks and paying close attention to the regime break occurring at the end of the 1920s. By doing so, we are able to track down more precisely when productivity growth accelerated and when exactly structural change occurred. Secondly, by relying on a newly compiled dataset, we construct an econometric model to better explain the determinants of productivity growth. In particular, following Broadberry and Crafts (1992), we aim to assess whether the anticompetitive industrial policy pursued by the Fascist regime was positively or negatively correlated with productivity growth, therefore helping or hindering the development of the Italian economy.

The paper is constructed as follows. Section 2 provides a short account of industrial policy in post-Unification Italy, with a specific focus on the Fascist era. A range of qualitative and quantitative indicators show that competition in the product market was effectively reduced circa 1927 and that this reduction largely characterised the new industries. This section justifies our choice of splitting the analysis of labour productivity into more sub-periods than was done in previous work; it also confirms the importance of analysing the impact of competition policy on the evolution of labour productivity. The first task is undertaken in Section 3, which displays our findings on the evolution of labour productivity growth in Italian industry between 1911 and 1951, using a larger number of benchmarks than in Bardini (1998). Three sets of results emerge. Firstly, over the 1911-1951 period old industries grew at rate which is comparable to the one of new industries. Secondly, the 1930s were characterised by slower productivity growth than the 1920s. Thirdly, productivity growth was largely driven by internal productivity growth, with structural change only playing a role in the 1920s, that is before the regime's active intervention. These results, which are found to be largely robust to the inclusion of newly compiled data on changes in the number of hours worked, would suggest that Fascist industrial policy hampered productivity growth. This claim is corroborated by evidence presented in Section 4, in which we employ standard panel data techniques to better understand the link between Fascist competition policy and labour productivity growth. Our econometric evidence shows that the reduction of competition went hand in hand with a slowdown in productivity. This result, which is robust to the inclusion of a range of control variables, is confirmed by a set of more qualitative evidence which

we also include in Section 4. Finally, the conclusions of our paper are presented in Section 5.

2 Shifts in Italian industrial policy

The existing quantitative literature on productivity in Italian industry has treated the Fascist era as a homogenous period. The analysis by Bardini (1998) went as far as finding a continuity between the 1910s and the years of Fascism. Bardini's argument is that World War One marked a strong acceleration in State intervention in the economy which was neither interrupted nor reversed by the Fascist regime. On the contrary, in the post-war environment the latter took measures to support those industries which had developed throughout the conflict. For this reason Bardini concludes that 'it does not seem too incorrect to look [...] at the changes in the whole 1911-1936 time span as the results of Fascist economic policy' (Bardini 1998, p. 96).

Such considerations, however, clash with the periodisation conventionally used in the historiography. As remarked by Rossi and Toniolo, '1914-46 and even 1922-43 (the Fascist years) were far from being homogenous periods: not only were there exogenous shocks of a hitherto unprecedented magnitude, but economic policies were anything but consistent over time' (Rossi and Toniolo 1992, p. 545). More specifically, the Fascist era has traditionally been divided between a more liberal period, covering the early part of the 1920s and one characterised by a more invasive industrial policy, which spanned between the end of the 1920s and World War Two.

As will be argued in this Section, the significance of this rupture goes beyond the mere periodization of Fascism. In fact, the promotion of the new industries occurring in the second era of Fascism and the tools through which this was carried out marked a discontinuity with the approach to industrial policy which had been taken before World War One and which had been temporarily suspended during the War before being resumed in the early 1920s. While industrial policy in these more liberal phases had come in the shape of trade policy, sporadic industrial bailouts and State purchases of goods, the late 1920s and 1930s saw four sets of measures being introduced, namely heavy intervention in the labour market, autarky, direct State management of firms and cartelisation in the product market.

This section and this paper are mainly concerned with this last set of measures, which, we argue, had a significant effect on Italian industry. We first outline the evolution of competition policy in Italian industry between the late 19th century and World War Two and then offer some quantitative evidence to back up our claims. In Section 2.1 we argue that industrial policy in the pre-World War One era was largely unconcerned with competition issues and was pursued through alternative

avenues. In Section 2.2 we outline the changes introduced during the War and argue that they were largely reversed by the policies enacted in the first years of Fascism. This policy stance changed following the revaluation of the lira in 1926-1927, which led to the introduction of a range of measures promoting concentration and cartelisation. In Section 2.3, we present a range of new quantitative indicators, showing that competition in the product market did decrease significantly over the 1930s. This evidence justifies our decision to break up the Fascist era into two phases, in particular by separating its early *laissez-faire* stage from its second, more interventionist spell. It also suggests that a full understanding of productivity growth over the Fascist period has to take into account the role played by the regime's anticompetitive policies.

2.1 Pre-Fascism industrial and competition policy

2.1.1 A three-pronged approach to industrial policy, 1861-1913

It would be a gross mistake to assume that active industrial policy came to Italy only with the advent of Benito Mussolini. In fact, after a relatively liberal period in the decades immediately following the country's political unification in 1861, the 1876 elections, which brought a left-wing government to power, led to a more interventionist policy stance. A detailed account of the policies pursued in those years and their impact is beyond the scope of this paper.⁶ Yet, two points should certainly be made. Firstly, it is noteworthy that industrial policy in this period took a three-pronged direction, namely trade policy, public procurement and industrial bailouts.⁷ Secondly, as it has been emphasised by a more recent literature, its effects were not particularly significant. Economic historians had long been convinced that industrial policy had significantly shaped the development of the Italian economy in the late 19th century.⁸ However, more recent research by Federico and Tena (1998b)

⁶For an excellent summary, see Federico and Giannetti (1999, pp. 126-130) and, more recently, James and O'Rourke (2011).

⁷The Italian State, which had until then pursued a relatively free-trade policy inherited from the Piedmontese tradition, started to pursue an activist trade policy, initially raising its duties on a range of products (mainly textiles). In 1887, a new tariff on textiles was introduced, together with a duty on wheat and a new duty on pig iron and steel products. This policy was accompanied by State purchases of a range of goods, including weapons and railway stock, whose scale became more significant after national suppliers were given preferential treatment over foreign ones. With the support of the mixed banks, the Italian State also organised a range of industrial bailouts, including, for example, that of the steel-making firm Terni in the late 1880s.

⁸For instance, for the case of trade policy, Gerschenkron (1962) criticised the choice made by the government to protect textiles, arguing that mechanical engineering would have been a better choice. Bailouts and State purchases were also seen as helping the development of a "military-industrial" complex, with heavier industries being helped to benefit from economies of scale in spite of a small domestic market.

has shown that duties were not particularly high by European standards⁹ and that their impact on the performance of individual sectors was quite small.¹⁰ Even more recent research conducted by James and O'Rourke (2011, pp. 9-13) subscribe to the same conclusions. State purchases in the so-called 'military-industrial' complex were also relatively limited, with railways procurement only accounting for around 10% of total value added of engineering and steel products (Fenoaltea 1982, p. 129). Finally, industrial bailouts occurred with a much less pronounced frequency than what would happen during the Fascist era. These considerations have led recent researchers to suggest that Italy before World War One followed a "Mancunian" path to industrialisation (Sapelli 1992; Amatori 1980), characterised by a relatively limited level of State intervention in the economy which favoured, in particular, the more traditional industries located outside the "military-industrial" complex. The firms of these sectors displayed a remarkable proficiency in adapting foreign machinery (Giannetti 1994) and in exploiting the low cost of labour to exploit modern labour-intensive technology (Federico 1996), which allowed them to increase their competitiveness both domestically and abroad.

On the back of these considerations, it should not be surprising that, in spite of the absence of a strong competition law regime, such as the one present in the United States,¹¹ pre-World War One Italy did not see a rapid rise of industrial concentration or a widespread formation of cartels. There is little quantitative evidence on this aspect, most of which is presented in the work by the economist Francesco Vito, who thoroughly researched the role of cartels in the world and in the Italian economy (Vito 1930; 1932; 1960; 1961). When describing the rapid evolution of concentration and cartelisation in the Italian economy of the 1930s, Vito noticed how different this process was from what had occurred in the previous years. His figures show that the number of mergers and acquisitions occurring in Italy between 1883 and 1927 was only 219, which, as will become clear when we will examine evidence relative to the Fascist era, was quite low. Cartels were also not particularly widespread. In his 1932 *magnum opus* on the subject, Vito remarked that 'in Italy, at the turn of the century, cartels were an exceptional form of industrial organisation, which explains why Italian commentators who wanted to write on the subject at the time had to look abroad for examples.' In later years, Vito notices, the creation of cartels accelerated, though this process occurred at a pace which was 'relatively less intense than elsewhere' (Vito 1932, p. 291).

The scarcity of cartels can be easily reconciled with the pattern of industrial policy

⁹They hardly ever exceeded 25 – 30% and were often around 15%.

¹⁰See Toniolo (1977) on the relatively small losses caused by the protection of steel. Even more recently, Federico and O'Rourke (1999; 2000), by estimating a Computable General Equilibrium (CGE) model for Italy in the year 1911, have come to the conclusion of the 'unimportance of tariffs' (Federico and O'Rourke 2000, p. 29), at least in the twenty years running up to 1911.

¹¹The Sherman Act was passed in the United States in 1890.

and development outlined by the revisionist literature. This association is made by Vito himself. The scholar, in fact, noticed that cartelisation is more effective and easier to coordinate in an economy with few large firms. As Italy was characterised by a large number of small and medium enterprises, and as the government had done little to promote those industrial sectors which tend to be characterised by larger firms, the role of cartels in Italian development was way smaller than in Germany or even the United States, despite the presence of the Sherman Act (Vito 1930, pp. 281-284). As emphasised by another contemporary economist, Fausto Pitigliani, most of the cartels organised in the pre-World War One era were in fact agricultural or highly localised (Pitigliani 1940).

2.1.2 The impact of World War One

Similarly to other countries in Europe, World War One played a significant role in increasing the scope and intensity of industrial policy in Italy. Public procurement became larger in scale, particularly towards the industries of the “military-industrial” complex. There was a proliferation of planning bodies, with the creation of 297 *commissioni speciali per l'economia di guerra* (“special commissions for the war economy”). A particularly important body was the *Mobilizzazione Industriale* (Industrial Mobilisation), the arm of the Ministry of War in charge of dealing with private producers.¹² This body was in charge of determining which firms were to be considered as “auxiliary firms,” and could therefore enjoy special prices, contributions to investment and a range of fiscal exemptions.¹³ Because of the advantages tied to this status, it is unsurprising that the number of auxiliary firms kept rising throughout the war, going from 221 in 1915 to 1,976 by the end of the war, when they would employ over 580,000 workers (Caracciolo 1978b, pp. 208-210). Most importantly for our analysis, these firms were not located uniformly across sectors. Of the mentioned 1,976 auxiliary firms, over 56.7% was located in chemicals, engineering and iron and steel (Caracciolo 1978b). As a result, this particular discrimination introduced during the war helped the development of new industries in a significant way.

Although they were not part of a deliberate attempt to curb competition, other aspects of the war economy also ended up distorting the market and favouring a switch towards a more concentrated industrial sector. In particular, the progressive rationing in the supply of raw materials meant that firms either had to lobby to receive a large share of a depleting stock or had to find ways to obtain raw materials

¹²The *Mobilizzazione Industriale* was created with two decrees passed on 26th June and 22nd August 1915.

¹³The *Mobilizzazione* could also coordinate the activity of auxiliary firms with the military factories, intervene in case of economic controversies, supervise the work done by women and minors, and manage the training schools for new employees.

independently from the State. This problem was particularly acute in the case of energy supplies, which the government often had to import from its war allies. The rationing process ended up favouring larger firms. It also contributed to the growth of concentration and the strengthening of oligopolistic or monopolistic powers by certain groups (Caracciolo 1978b, p. 212). Overall, as put by Caracciolo, ‘one can conclude that this emergency situation, which was prolonged for many years, represented a non-negligible discriminating factor among producers and strengthened dominant groups in the heavy industry’ (Caracciolo 1978b, p. 215). The list certainly includes the vertically integrated conglomerate Ansaldo whose production ranged from iron ore to warships, as well as the aircraft manufacturer Caproni and the car manufacturer Fiat.

2.2 Industrial and competition policy in the age of Fascism

2.2.1 A “liberal” Fascist phase

The discontinuity marked by the war did, initially, spill-over into the post-World War One era. This is evident from the decision taken in 1921 to approve a new general tariff which raised duties on chemicals, engineering goods and steel products. The new tariff was the most tangible sign of the fact that the war had strengthened the arguments of protectionists against free-traders and that trade policy was now taking a stance which was more openly in favour of the new industry. Furthermore, in 1921 a banking consortium led by the Banca d’Italia bailed out the industrial giant Ansaldo, enacting a rescue operation which resulted in the State taking over the industrial concern (Saraceno 1981). Although this was different from previous bailouts, in that for the first time the State actually came to own a manufacturing firm, it must be noticed that the government’s main preoccupation was that of swiftly selling off the shares and not starting out a full-scale industrial policy such as the one which will be undertaken as of the 1930s (Toniolo 1980, p. 244). In fact, the surprising aspect of the first phase of the Fascist era is that, differently from what is argued by Bardini, the discontinuity brought in by the War did not seem to be long-lived. The measures introduced in the early era of Fascism were largely reminiscent of the three-pronged industrial policy promoted in the pre-World War One era and their scale also appears limited.

When Fascism came to power in 1922, in fact, its industrial policy was very much contiguous to the one of the pre-World War One era. The rhetoric displayed by Mussolini around that time was supportive of a ‘hands-off approach’ to the running of the economy.¹⁴ This belief was mirrored by the appointment as Finance Minister

¹⁴Mussolini’s initial rhetoric displays a belief that government intervention ‘was absolutely ruinous

of the liberal academic Alberto De' Stefani, 'one of the few ministers, in twenty-three years of Fascism, who was above average competence' (Mack Smith 1981, p. 118). Although one should not exaggerate the view of De' Stefani as a free-marketeer,¹⁵ the measures he took during his short term as minister remained largely in line with the industrial policy observed in the pre-World War One period.

Although the government insisted in bailing out firms in trouble, either directly or through mixed banks,¹⁶ De' Stefani's management of public finances showed a decisive drive in reducing the amount of government spending, which fell from 35% of GDP in 1922 to 13% in 1926 (Toniolo 1980, p. 49). This was also the year in which the government budget was finally balanced (Toniolo 1980, pp. 48-49), falling from a deficit of 23% of GDP registered in 1921 (Toniolo and Salsano 2010, p. 11). As for the trade policy the government chose to pursue, this took a decisively pro-competitive turn. Between 1922 and 1926, De' Stefani signed 19 agreements, all aiming at reducing the rate of protection enjoyed by Italian goods abroad. The 1921 tariff was also mildly lowered, so that the average rate of protection on Italian goods fell from 10.3% in 1922 to 8.4% in 1925 (Toniolo 1980, pp. 53-54). De' Stefani's tentative attempt to reduce protectionism did not gain him friends and, in fact, contributed to his downfall.¹⁷ When, in March 1925, he attempted to curb a flurry of speculation on the stock market, this resulted in a market crisis which 'helped to crystallise smouldering resentment against him' (Sarti 1971, p. 58).¹⁸ His free-trade policies, which had done little to help newer industries, were criticised by a number of influential senators. Unsurprisingly, on 8th July 1925, Mussolini announced the resignation of his Finance Minister, a decision which was also very much welcome by the industrial establishment (Lyttleton 1974, p. 546).

In his seminal account of the economic history of Fascist Italy, Toniolo writes that, when judging De' Stefani's term, 'the view that it consisted in "continuity" with the previous financial, fiscal and banking policy would seem to be much nearer the mark than the idea that it represented a form of free-market, liberal policy [...],

to the development of the economy' (Mack Smith 1981, p. 117). Also, the contemporary economist Benvenuto Griziotti (1926, p. 26) recalls that when the programme of the Fascist National Party came out in 1922, the liberal economist Luigi Einaudi described it on the Italian daily *Corriere della Sera* as marking 'a return to the liberal ideas of classical economic policy.'

¹⁵Marcoaldi (1986, p. 14) has argued that, at the theoretical level, his conception of the economy was 'very different from that of theoretical liberalism,' whereas, more recently, Guidi (2000, p. 34) has defined De Stefani's economic policy as inspired by an 'authoritarian *laissez-faire*.'

¹⁶This was the case of Ilva, a steel-producing firm, which was rescued by Banca Commerciale Italiana and Credito Italiano under the auspices of the Italian government. See Toniolo (1980, p. 56).

¹⁷See Toniolo and Salsano (2010, p. 13) for a description of the opposing views on trade policy amongst industrialists in those years. Whereas industries which depended on imported raw materials, fuel and machinery were in favour of reducing tariffs, Italian exporters were against this measure.

¹⁸See also Toniolo and Salsano (2010, pp. 18-20).

which is basically foreign to this country' (Toniolo 1980, p. 247).¹⁹ This appears largely correct, as his policies were hardly liberal in an orthodox sense. Yet, two points should be made. Firstly, differently from what is argued by Bardini, the period by De' Stefani does mark a break from the more intrusive industrial policy which had unsurprisingly characterised the Italian economy during World War One. His decision to limit government expenditure and reduce tariffs are emblematic in this direction. Secondly, if one accepts the revisionist view that, despite all the false rhetoric about the importance of the "military-industrial" complex, pre-World War One economic development in Italy was more "Mancunian" than it was previously thought, the continuity view on De' Stefani's term rightly emphasised by Toniolo can be easily accompanied by a relatively benign judgement on De Stefani's free-marketism. As State intervention had not been so significant before World War One, De' Stefani's policies were both relatively "Mancunian" and continuative of the stances taken by previous governments.

2.2.2 Quota 90

More importantly, De' Stefani's policies appear significantly different from the stances taken by the Fascist government as of his resignation. His successor was Giuseppe Volpi, a Venetian industrialist and financier who was close to the entrepreneurial establishment.²⁰ Although Volpi's holding office as Finance Minister was short-lived,²¹ his appointment was a clear message to the industrial establishment, which had long demanded more State support (Toniolo 1980, p. 79). Unsurprisingly, among Volpi's first decisions there was an increase in a range of tariffs.²² This was certainly symbolic, though not sufficiently significant to make it a breakpoint in Italian industrial policy.²³ The true paradigm shift in industrial policy occurred circa 1926-1927.²⁴ The key moment was Mussolini's decision to wage the "battle for the lira," that

¹⁹More recently, in Toniolo and Salsano (2010, p. 11) the two scholars define the Fascist liberal phase as 'the revival of the Giolitti era fiscal orthodoxy.'

²⁰For a detailed biography of Volpi, see Romano (1979).

²¹His term only lasted between July 1925 and July 1928.

²²Volpi re-introduced the tariff on wheat, cereals and their derivatives, which had been suspended as of 9th June 1921. He also doubled the duty on sugar which, again, had been suspended by De' Stefani in July 1923. Volpi also increased the duty on newspaper paper and on artificial silk, as well as abolishing the customs exemptions on import machinery.

²³In this respect, Toniolo's definition as 1925 as an *anno cerniera*, or "hinge year" (see Toniolo 1980, p. 74), in Italian Fascism appears true more from a political than an economic point of view. This seems to be confirmed by the author: 'The change of pace [caused by the replacement of De' Stefani with Volpi] was self-evident and quick. It was a very clear political message' (Toniolo 1980, p. 79).

²⁴This periodisation has ample support in the literature. See Ciocca and Toniolo (1976, p. 17); Rossi and Toniolo (1992, p. 545). Even more recently, Toniolo and Salsano (2010, p. 18) describe these years as a shift from an exchange policy based on 'benign neglect' to a more interventionist stance.

is the regime's decision to re-enter the gold standard and to fix the exchange rate parity with the pound sterling at 90 to one, the so called *Quota 90*.²⁵ The intention to pursue this policy was first announced during the so-called Pesaro Speech held on 18th August 1926, but only became reality on 21st December 1927, when full convertibility of the lira to gold and to foreign currencies was reinstated. In particular, the lira was pegged at 92.46 lire to the pound.

Although Toniolo has argued that, in terms of purchasing power parity, *Quota 90* was just right (Toniolo 1980, p. 123),²⁶ it is also true that most industrialists, economists and policymakers favoured a lower exchange rate. Before the Pesaro Speech, the lira had been fluctuating around an exchange rate of 150 to the pound, so rejoining at 120 lire appeared a more realistic target as it would have entailed less deflation and fewer trade restrictions.²⁷ There has been a wide debate over the reasons behind this decision. Some have argued that the rate had an intrinsic appeal, as it was the one in force when the Fascists took power in 1922. Restoring it was a way for Mussolini to gain prestige (Mack Smith 1981, p. 123), both internationally and at home. Conversely, others have argued that *Quota 90* was consciously chosen to promote autarky, favour newer industries and facilitate government intervention (Gregor 1979). This view has been rebutted by Cohen. In Cohen's view, the idea that *Quota 90* rewarded those who relied heavily on imported raw materials, while punishing those such as textile and food producers who exported a large proportion of their produce, was wrong. His argument was that, by lowering the price of all tradeables, *Quota 90* adversely affected both exporters and import-competing firms. To Cohen (1988, p. 103), 'showing his usual political astuteness, Mussolini saw in *Quota 90* a way to gain prestige for his regime at home and abroad and, at the same time, to impose his political will on big business, the one group that still retained some autonomy.'²⁸

Cohen's view, however, appears to be somewhat narrow-minded. *Quota 90* did not come on its own but was accompanied by a range of policies which were clearly aimed at favouring some sectors of the economy over others. In particular, there was a generalised increase in tariffs (Guarneri 1953, p. 134), which largely favoured the newer industries over the older ones. This is acknowledged by Cohen, who does not deny that such measures affected the composition of domestic demand. The point is that

²⁵The wide-reaching consequences of this decision have widely been recognized in the literature. De Felice (1968, p. 222) went as far as defining it one of the key moments in the formation of the Fascist State. For a discussion of the short- and long-term macroeconomic costs of the return to the gold standard, which went hand in hand with a package of stabilization measures (that included raising interest rates, budgetary stabilization and debt consolidation), and restrictions of note issuance by Italy's central bank, see Ripa Di Meana (1993).

²⁶See also more recent work by Di Nino, Eichengreen and Sbracia (2011) on the topic.

²⁷Volpi himself was sceptical of the *Quota 90* as he had long tried to stabilise the lira around *Quota 120*.

²⁸See also Cohen (1972).

Quota 90 and the new type of industrial policy should not be evaluated separately, as they were part of the same overall strategy. As argued by Toniolo, *Quota 90* was ‘tied to a game with the industrial leadership’ (Toniolo 1980, p. 118) whereby concessions were awarded to a given set of industries in exchange for support in the implementation of the new policies. These negotiations were complex and, at times, quite tumultuous.²⁹ Yet, the concessions were sufficiently large to bring at least big industrialists on the side of the regime. In April 1927, Antonio Stefano Benni, who was then heading Confindustria³⁰ wrote on *Il Popolo d’Italia* that rumours concerning the industrialists’ disapproval of Mussolini’s monetary policy were ‘stupid nonsense’ (Adler 1995, p. 400). As underlined by Toniolo, some industrialists such as textile producers continued to complain (Toniolo 1980, pp. 118-119), but their lamentations remained largely ignored.

2.2.3 Competition policy

A fundamental part of the deal struck between the regime and the industrial establishment was the decision by the government to favour concentration and cartelisation in the product market.³¹ As it has been mentioned beforehand, these had remained largely limited phenomena in the Italian economy before World War One. Yet, all of this changed as of 1927. The political game started with *Quota 90* was, in fact, ‘aimed at commencing a large-scale experiment of corporatist management and cartel formation in the main economic sectors, similar to the one which was occurring in Weimar Germany’ (Toniolo 1980, p. 118). The first step in this direction was a 1927 law providing fiscal incentives in favour of industrial concentration.³² It stated that mergers and corporate purchases were to be subject to a lump-sum tax of 10 lire, a low amount, so as to explicitly encourage industrial concentration (Guarneri 1988, p. 374).

The effects were immediate. According to later work by Vito, ‘many firms decided to form links,’ leading to ‘a powerful wave of concentration and cartelisation’ (Vito 1961, pp. 44-45). This wave did not halt shortly after, but continued over the following couple of years. According to data published in Vito (1930), between the second half of 1927 and the first nine months of 1929, 215 mergers occurred, as many

²⁹For a full account, see Adler (1995, pp. 353-357).

³⁰This is the Italian entrepreneurial association. From 1st January 1926 Confindustria had to add the word *fascista* in its name, hence becoming *Confederazione Generale Fascista dell’Industria Italiana* (Castronovo 2010, p. 202) to then revert to its former name after the demise of Mussolini.

³¹In an international perspective, Italy was, however, not the only country to introduce cartelization-enhancing measures during the 1930s. For example, see Broadberry and Crafts (1992) for the United Kingdom or Alexander (1994) and Cole and Ohanian (2004) for the United States.

³²This was announced in a speech given by Mussolini to the Chamber of Deputies on 26th May 1927 and was implemented only a month later in the R.D.L. 23rd June, n. 1206.

Table 1: The number of domestic cartels in the major European countries, 1929

Austria	94	Poland	58
Czechoslovakia	91	Russia	357
Hungary	41	Estonia	4
Switzerland	84	Latvia	3
Netherlands	15	Lithuania	4
Belgium and Luxembourg	59	Italy	28
France	66	Spain	17
United Kingdom	161	Portugal	2
Denmark	9	Jugoslavia	10
Sweden	31	Romania	21
Norway	44	Greece	5
Finland	31	Turkey	4
Danzig	3		

Source: Vito 1930.

as between 1883 and 1927. These involved 528 companies, for a total value of almost 9 billion lire of the time.

On the other hand, Table 1 offers some evidence that, even in 1929, the number of cartels in Italy was still relatively small by international standards.³³ The Great Depression was the true watershed. The crisis in fact led the government to pass legislation which was more obviously favourable to cartels, in an attempt to rationalise industrial production and to boost profits via price increases. Two laws, in particular, stand out. The first one was a law on ‘obligatory cartels’ (*consorzi obbligatori*), which was passed in June 1932,³⁴ while the second one was the one on ‘voluntary cartels’ (*consorzi volontari*),³⁵ passed in April 1937. In the case of “compulsory cartels”, all firms in a given industry were required by law to join the industry-specific cartel. Conversely, in the case of “voluntary cartels”, firms could voluntarily decide to join, leading to a less drastic reduction of competition in the given sector.³⁶ We

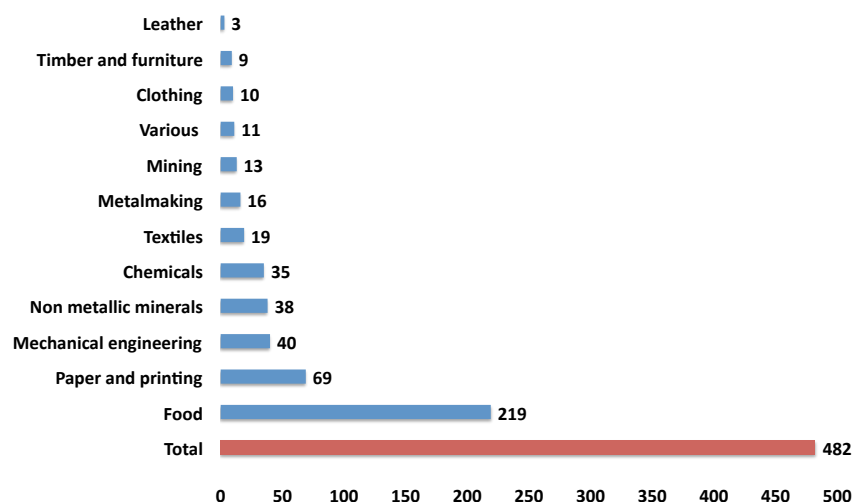
³³It is clear that the absolute number of cartels in different countries (where Germany is, surprisingly, excluded) is a poor indicator of the extent of cartelisation. The size and economic structure of the countries considered in the sample, in fact, differ significantly. Secondly, the data give no information on the coverage and effectiveness of the cartels at raising prices and reducing output. Nonetheless, Table 1 still offers some support for our overall argument.

³⁴R.D.L. 16th June 1932, n. 834.

³⁵R.D.L. 22nd April 1937, n. 961.

³⁶Confindustria however ‘saw to it that compulsory cartels were essentially consensual: they

Figure 1: Cartels present in the different branches of Italian industry, 1942



Source: Giordano, Piga and Trovato 2012.

will seek to assess the impact of these laws quantitatively in Section 2.3. Yet, it is useful to present here some initial evidence. According to Federico and Giannetti (1999), by 1938 the number of cartels in manufacturing had risen to 144 national and 111 local ones. This number rose further across World War Two. Figure 1, shows that the total number of cartels in Italian industry in 1942 was as high as 482.³⁷

Having favoured concentration and cartelisation, the regime also made it more difficult for new firms to enter a given market. This was done through a law on the discipline of industrial plants which was passed in 1933.³⁸ This law obliged firms to apply for a licence in order to create new productive units or to expand existing ones.³⁹ According to evidence by Cianci, only 71% of the requests sent in between

would have to represent at least four-fifths of any given sector, and their deliberative assemblies could take action only if two-thirds of the members were present' (Adler 1995; p. 424-425). This meant that Confindustria made sure that the law on "compulsory cartels" 'remained a dead letter' (Sarti 1971, p. 101) and that the legislation on *consorzi obbligatori* was effectively transformed into a promotion of *consorzi volontari*.

³⁷Unfortunately, the sources consulted do not reveal the share of the market which was cartelised in each individual sector or whether the cartel was regional or national. This limits the usefulness of this type of evidence.

³⁸R.D.L. 12th January 1933, n. 141.

³⁹The law disciplined all industrial sectors with the exception of construction and mining which had their own specific legislation.

1933 and 1937 were actually approved (Cianci 1977, p. 233). The three major beneficiaries of the licenses were the chemical, steelmaking and engineering sectors (Sarti 1971, p. 108), evidence which, once again, points to a sectoral bias.

This law immediately stood out as an anti-competitive device. In Gualerni's words, the law 'allowed large incumbents to tactically use permits in order to create a powerful barrier to entry against possible competition'. As the firm applying for a permit was not obliged by law to build or enlarge the plant, a 'large number of applications was, therefore, made, only to prevent competition' (Gualerni 1976, p. 177). In fact, once a license was issued, government officials would most likely reject similar applications to competing firms. In theory, a 10,000 lire fine would then be imposed on those failing to act upon a granted license. Yet, as Covino, Gallo and Mantovani (1976) have pointed out, the sanction was rarely applied. Furthermore, as explained by Sarti, even when it was applied, the fine was 'a relatively small sum given what is at stake' and was therefore treated as an 'insurance against competition' (Sarti 1971, pp. 108-109).⁴⁰ The quantitative evidence seems to support this view. Gualerni shows that, by the end of World War Two, when licensing was discontinued, only 414 out of 5,114 new plants for which an authorisation had been requested were actually built (Gualerni 1976, p. 177).⁴¹

2.2.4 The creation of IRI and foreign exchange policy

Another development, which was probably the most innovative policy of the entire Fascist period, concerned the creation of the *Istituto per la Ricostruzione Industriale* (IRI) in 1933. It was created as a temporary institution, whose aim was to alleviate the balance sheets of the Italian mixed banks, weighed down by their frozen industrial stakes, following their aggressive purchase strategy pursued in the 1920s.⁴² The financial troubles affecting these banks were ultimately threatening the solidity of

⁴⁰The same conclusion was reached by the contemporary economist Luigi Einaudi, then correspondent of *The Economist*. As he wrote at the time: 'It appears that some people have asked for authorisations to start new plants, without any real intention of starting them, hoping instead that entrepreneurs already on the job would be willing to purchase those rights for the sake of avoiding competition' (Einaudi 1934, p. 356).

⁴¹A large debate, fuelled by Gualerni himself, has discussed the reliability of these numbers. As Covino, Gallo and Mantovani (1976 p. 198) recall, the first figures on the number of authorizations were presented in Istat (1941) and covered the period until 31st December 1940. ISTAT (1946) then published the number of authorizations until 1941 and, for the first time, the number of authorized plants actually built. However in Del Buttero (1946), a publication by the *Ministero per la Costituente*, a much lower ratio of plants built to authorizations released was published, but was later defined 'too strict' by Gualerni (1976 p. 177), who, in turn, revised the numbers. Finally, Covino, Gallo and Mantovani (1976) presented numbers disaggregated by sector. Anyhow, all figures produced point to a low share of plants actually built.

⁴²Italy's main mixed banks were Credito Italiano, Banca Commerciale Italiana and Banco di Roma.

the Bank of Italy, as the latter was exposed towards the banks for sums equivalent to 54% of the total circulation in place at the end of 1932 (De Mattia 1967, p. 459). In order to definitively end the crisis and to reorganize the banking system, the regime thus opted for the creation of IRI.⁴³

Before the 1930s there had been episodes of the State acting as a lender of last resort of the banking system and, directly or indirectly, supporting industrial shares.⁴⁴ However, in these occasions, the State had paid little interest in using these operations to pursue an independent industrial policy.⁴⁵ As argued by Cohen, this was also the initial intention of the government when it created IRI.⁴⁶ Yet, following the initial moves which were largely targeted at reducing its debt towards the Bank of Italy, a new type of policy was pursued.⁴⁷ Given the abolishment of mixed banks by the 1936 Banking Act,⁴⁸ it became obvious that IRI could provide a key role in re-organising the industrial activity of the country.⁴⁹ This action was aimed at supporting the whole of Italian industry, including small and medium enterprises, which were defined in an internal document as ‘the basis on which Italian industrial structure can be preserved and strengthened.’⁵⁰ Its impact was to be long-lasting as, despite the initial intentions by the government, IRI was made permanent in

⁴³R.D.L. 23rd January 1933, n. 5.

⁴⁴Institutions such as the *Consorzio per Sovvenzioni su Valori Industriali* (CSVI), founded in 1914, and the Liquidation Institute (*Istituto di Liquidazioni*), created in 1926, financed by the State, organized and managed relevant bank bailouts in the 1920s (see, for example, Barbiellini Amidei and Giordano 2012, p. 26). IRI actually absorbed the Liquidation Institute.

⁴⁵Furthermore, these previous interventions were generalised and concerned all industrial sectors with no particular sectoral bias. For example, Biscaini Cotula, Gnes and Roselli, when analysing the CSVI, claim that the Governor of the Bank of Italy, also head of the CSVI, ‘never showed any sectoral “vocation” in the credit extension of the Consortium, neither initially nor in its later phase. Conversely, he emphasized, probably in order to avoid risk concentration, the need to commit to multiple industrial branches’ (Biscaini Cotula, Gnes and Roselli 1985, p. 157).

⁴⁶‘IRI was not the logical fulfillment of a long-term plan but it was instead an emergency measure taken to avert an economic disaster’ (Cohen 1988, p. 106).

⁴⁷Already in May 1934, Mussolini threatened that: ‘Those who still speak of a liberal economy make me laugh or weep, both at the same time. But three quarters of the Italian industrial and agricultural economy is in the hands of the State. And if I dare to introduce to Italy State capitalism or State socialism, which is the reverse side of the medal, I will have the necessary subjective and objective conditions to do it’ (Giordano 2007, p. 35).

⁴⁸As well as explicitly aiming at preventing banking instability, the Banking Act also opened up the way to an active direction of financial flows on behalf of the State towards selected sectors of the economy. The so-called “long-term liability” credit institutions, financed by State-guaranteed bonds, were the only banks allowed to extend long-term loans, as this activity was forbidden to “short-term liability” institutions. Via the guidance of these long-term credit institutions and the extension of subsidised credit, the State replaced the former mixed banks in allocating credit to the Italian economy. See Barbiellini Amidei, Gigliobianco and Giordano 2012 for an analysis of the long-run relations between long-term and subsidised credit, and sectoral economic performance in the decades following World War II.

⁴⁹This aim was stated in the preamble of the decree which set up IRI. See Toniolo (1980, p. 245).

⁵⁰See an IRI memorandum quoted in Toniolo (1980, p. 267).

1937.⁵¹

Despite the intent to support the whole of Italian industry, however, IRI invariably ended up having an immediate distortionary effect across sectors. The shareholdings acquired by IRI were, in fact, unequally distributed among sectors and largely included the more capital-intensive ones, with which the former mixed banks had closer ties to. To get an idea of its sphere of influence, IRI came to hold: 100% of the iron and steel war industry, of the artillery industry and of the coal-extraction industry; 90% of the naval industry; 80% of naval companies and of the locomotive industry; 40% of the iron and steel industry; 30% of the electricity industry; 20% cent of the artificial silk industry; 13% of the cotton industry (Toniolo 1980, p. 250). It also controlled the mechanical and armaments industries, telephone services, as well as the three ex-mixed banks. In all, IRI owned over 40% of the Italian shareholders' capital, hence resulting the greatest holding company in Italy. IRI also grouped similar concerns under the control of new sub-holding companies: STET (1933) for telephone services, Finmare (1936) for shipping companies, Finsider (1937) for steel, Finmeccanica (1947) in the mechanical engineering sector, and Finelettrica (1952) in the electrical sector (Barbiellini Amidei and Giordano 2012, p. 64).⁵² All these sectors, which were also those where the investment of private capital was riskier and least likely to occur after the Great Depression (Toniolo 1980, p. 256), ended up benefitting largely from the *Istituto*.

Interestingly, IRI outlived the Fascist regime and became a key actor in Italy's Golden Age.⁵³ Following the confirmation of the 1936 Banking Act by the *Assemblea Costituente* at the end of World War Two, the segmentation of Italy's banking sector in short-term and long-term credit institutions remained even after the demise of the Fascist government which had introduced it. IRI too was saved since it was widely recognized as not being an arm of the Fascist regime, but rather the product of a highly technical and committed braintrust which had used its experience in bank bailouts to reorganise Italy's financial system, and industrial sector as a result. The contribution of IRI to innovation and growth in Italy in the 1950s and '60s goes beyond, however, the scope of this paper.

Finally, to complete the picture, in the 1930s, as in many other countries hit by the Great Depression, controls on the foreign exchange were introduced, again with an asymmetric effect on Italy's industrial sectors. In 1931, in fact, the Minister of Finance Antonio Mosconi, who had replaced Volpi, was given the power to issue

⁵¹IRI Report of 6th May 1937, reported fully in Cianci (1977, pp. 362-371).

⁵²IRI further enlarged its reach in the 1950s, obtaining an absolute majority of shares of RAI (the national broadcasting company) in 1952 and taking control over Alitalia (the national airline) in 1957.

⁵³See for example Barca and Trento (1997); de Cecco (1997), Pastorelli (2006) and Antonelli, Barbiellini Amidei and Fassio (2012).

measures regulating foreign exchange.⁵⁴ Interestingly, Mosconi himself had abolished similar measures only the year before, in 1930, introduced by his predecessor. However, Mosconi used his new power solely to dictate general guidelines to Italian banks, guidelines which however were not mandatory and which therefore were not enforced by many parties involved (Guarneri 1953, p. 432). The next Finance Minister, Guido Jung, changed stance, and regulated foreign exchange heavily. For instance, operations in foreign currency were forbidden if they did not respond to the true needs of industry.⁵⁵ Moreover, clearing agreements were drawn with Bulgaria, Romania and Germany.⁵⁶ In 1935, the *Sovrintendenza agli scambi e alle valute* (Superintendence of exchanges and currencies) was created. Its aim was to coordinate the complex foreign exchange issues, but also to distribute the scarce means of payments to Italian importers according to the priorities dictated by the needs of the nation (Toniolo 1980, p. 281). This implied strict, but also discretionary, controls on imports. As the head of the *Sovrintendenza* Felice Guarneri later declared in 1939: ‘the distribution of imported raw materials is to be organised with the aim of insuring the manufacturing firms which export sufficient resources also for the internal market, putting them in a position of clear superiority relative to those firms that enjoy relying on the internal market’ (Guarneri 1939). This implied that import-dependent sectors, such as cotton, cited in Toniolo (1980, p. 275), were forced to export to survive, which often meant relying on dumping procedures given the international closure of those years. The controls on imports also led to corruption and speculation, hidden behind the golden propaganda of the Fascist regime (Toniolo 1980, pp. 286-287). Once again industrial policy was tailored in such a way so as to favour certain sectors, namely the modern ones, to the detriment of the other, traditional sectors.

Overall, the account presented in this Section shows that Italian industrial policy underwent a significant shift after the decision to fix the exchange rate with the pound at *Quota 90*. Far from signalling continuity relative to the previous period, the years which followed were characterised by an innovative approach to industrial policy. This included a decisive attempt to tamper with competition in the product market which was followed by a new, more intrusive, State action through the newly created IRI and foreign exchange controls. These policies often affected the market in an asymmetric way, favouring newer industries at the expenses of the more traditional ones. Their impact was all more significant, as they came after an era of relative liberalisation, the age of De’ Stefani, that had reversed at least some of the trends which had characterised the economy during World War One. Although the legislative evidence appears relatively strong to back-up our claims *a)* that any analysis of the evolution of labour productivity in Italian industry cannot treat the

⁵⁴Royal legislative decree of 29 September 1931, no. 1207.

⁵⁵Ministerial decree of 26 May 1934, no. 124.

⁵⁶See Guarneri (1953, pp. 433-434) for details.

Fascist era as a homogenous period and *b*) that the relation between industrial policy and productivity ought to be tested empirically, it appears essential to provide evidence that the legislative changes occurring in the era did change the behaviour of Italian firms. The relationship between industrialists and the regime was, in fact, relatively complex with continuous games being played between the two actors (Sarti 1971; Adler 1995). Hence, it is possible that the propaganda by the regime masked a lack of application of its laws. Using the limited existing evidence and some newly constructed measures, Section 2.3 shows that the legislative changes in competition policy were truly matched by changes in various indicators of concentration in the economy. We also provide evidence that these changes affected old and new industries asymmetrically.

2.3 Measuring the effects of shifts in competition policy

The policy shift occurring as of the second half of the 1920s can be traced in a range of economic indicators showing changes in the level of competition in the industrial sector.⁵⁷ This Section looks at two sets of indicators. The first one, presented in Section 2.3.1, is evidence on concentration indices. Although an imperfect proxy for competition, disaggregated data on concentration are available for a number of benchmarks over the 1911-1951 period. In order to complement these results, in Section 2.3.2 we present a second set of indicators, namely changes in prices and in the Cowling index. Although they are only available for a limited number of branches and years, these measures have the advantage of looking at the effects of anti-competitive behaviour rather than at one of the possible causes. As both indicators behave quite similarly in response to the main changes occurring over the period, we find strong evidence that the legislative changes outlined in the previous Section did have an impact on the behaviour of Italian firms.

⁵⁷This may have not necessarily been the case for the economy as a whole. In two distinct papers, Rossi and Toniolo (1992; 1993) calculated the aggregate mark-up in the Italian economy. In their first paper, the two scholars assumed the presence of three factors of production (labour, imports and capital). Their estimates of market power over the period between 1922 and 1938 are high and volatile. They find that market power declines almost continuously between 1922 and 1929 (from 2.03 to 1.29), before rising between 1929 and 1932 (from 1.29 to 1.92). Surprisingly, this value then falls throughout the 1930s, reaching 1.40 in 1938. In the estimates presented in their later paper, the scholars re-calculate the aggregate mark-up for an economy with five factors of production (labour, energy inputs, other imported inputs, private capital and public capital). In this case the level of the mark-up remains high but the volatility disappears (their estimate of market power is mostly bound between 1.65 and 1.75). In this case, the decline in market power is steady and happens almost continuously throughout the 1920s and 30s. Since this evidence refers to the economy as a whole rather than to the industrial sector, it does not contrast directly with our findings. Moreover, the results remain controversial (Federico 1996, p. 781).

2.3.1 The evidence on concentration

Studies on the evolution of concentration in Italian industry in the first half of the 20th century trace back to the pioneering work by two contemporary statisticians, Felice Vinci and Mario Saibante. In particular, using data on corporate capital and an aggregate Gini inequality index, Saibante found that concentration in industrial joint-stock companies stayed substantially stable between 1916 and 1926, only increasing from 78.80 to 80.82, before jumping to 88.92 in 1932 (Saibante 1934).⁵⁸ This would suggest that there was a sudden acceleration in the concentration of Italy's industrial structure after *Quota 90*. However, this evidence is of limited use as it does not allow one to explore the evolution of concentration in the different industrial branches. This was done by a later economist, Profumieri, who in the 1970s calculated the percentage of share capital which was controlled by the largest firm in a number of sectors for 1938, using data taken from an extensive study carried out in the *Rapporto della Commissione Economica all'Assemblea Costituente* (Ministero per la Costituente 1948, pp. 289-300). His results⁵⁹ led him to conclude that, in the 1930s, 'there is much evidence that the reorganization and concentration of share and financial capital went along with State intervention' (Profumieri 1972, p. 684). Notwithstanding the limited size of this dataset, this study also confirms that the policies we outlined in the previous Section did have a relevant impact on the market structure of Italian industry.

A more comprehensive dataset, looking at broader indicators than Profumieri's C1 ratios, is the one on the evolution of concentration in the corporate capital-base, put together more recently by Giannetti and Vasta (2006).⁶⁰ The two scholars calculated the C4 index of assets of listed manufacturing firms.⁶¹ The firms considered were those present in the *Imita.db* dataset over seven benchmark years for the period 1913-1971.⁶² Giannetti and Vasta define as *competitive* a sector whose C4 index is

⁵⁸This study builds on the earlier work by Vinci (1918) and Saibante (1926).

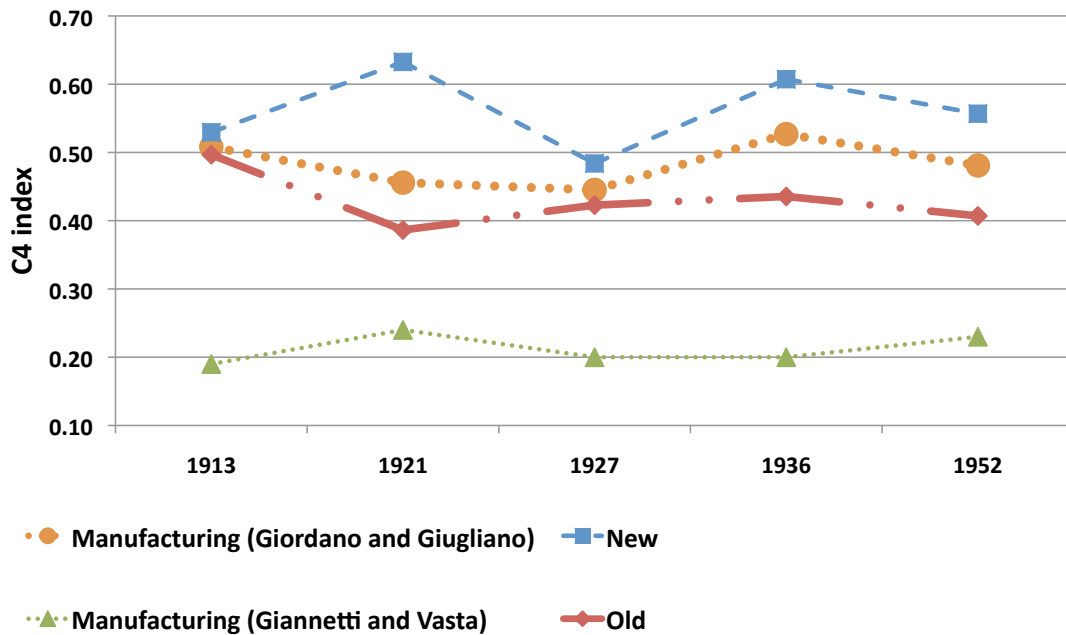
⁵⁹He found the C1 ratio to be: 100% for tyres, 70% for phone cables, 100% for rayon, 75% for chemical fertilisers, 83% for cars, 65% for artificial fibres and 45% for electricity. See Profumieri (1972, p. 684).

⁶⁰This work builds on a previous paper by Giannetti, Federico and Toninelli (1994).

⁶¹C4 is the percentage quota of the observed variable (in this case, assets) for the four largest firms. This is an imperfect indicator, since ideally one would like to base the calculation on value added or production of the considered firms. However, this evidence is not available. The authors also constructed a Herfindhal index, which was strongly correlated (0.85) with their C4 indicator (Giannetti and Vasta 2006, p. 51). Furthermore, the fact that the database only takes into account listed firms could potentially bias the results. Giannetti, Federico and Toninelli (1994) effectively rebutted this criticism, underlining how the selection of firms subjects the dataset to two contrasting biases. On the one hand, the database understates concentration because it ignores the role played by cartels. On the other, however, it overstates it, as multisectoral firms are counted only once and because it ignores the presence of firms which either were too small or were not joint stock.

⁶²IMITA.db (IMprese ITALiane Data Base) is the historical archive of the Italian joint stock companies. It represents the digital version of a serial source based on a collection of published

Figure 2: C4 ratios in Italian manufacturing, 1913-1951



Sources: Giannetti and Vasta 2006 and our elaborations on their data.

below 40%, *semi-competitive* if its value is between 40% and 59% and *monopolistic* if the index is above this last threshold. The scholars present both their raw results and those adjusted for the role of groups, that is consolidating assets for those firms linked by interlocking directorates. Since we find the latter measure to be more interesting for our study, we only present Giannetti and Vasta’s ‘consolidated’ C4 index for manufacturing in Figure 2. The Figure looks at the five benchmarks which are most relevant for our work, namely 1913, 1921, 1927, 1936 and 1952.

Giannetti and Vasta’s consolidated index shows little change over the five benchmarks which are most relevant to this study. Despite being relatively small, the changes occurring between 1913 and 1927 are consistent with what we expect from the historical narrative. Concentration rose over the war, before declining between

volumes, edited from 1908 to 1926 by the Credito Italiano, and then from 1928 by the association of Italian joint-stock companies, the *Associazione fra le società italiane per azioni* (Asipa). This source includes all the joint-stock companies listed in at least one of the Italian stock markets, together with all those companies based in Italy, which in their last balance sheet reported capital higher than a given threshold, which was fixed at different levels in different years. The database includes information on individual companies and on boards’ members, for the period between 1900 and 1983. The years chosen by Giannetti and Vasta were selected to be close to the years of the industrial censuses (Giannetti and Vasta 2006, p. 52).

1921 and 1927. Conversely, there seems to be no change in the C4 index between 1927 and 1936 and only a small change between 1936 and 1952. Such results would suggest that the liberal phase of Fascism was only able to return concentration levels in the manufacturing sector to those registered in the pre-World War One era, and that there was practically no “regime break” in the Fascist years. Finally, manufacturing results as a “competitive” sector throughout.

However, drawing such conclusions from this piece of evidence appears quite rushed. The indicator presented by Giannetti and Vasta appears of little use for those interested in the level of competition within Italian manufacturing. In fact, Giannetti and Vasta compute their index by considering the four largest firms in the aggregate manufacturing sector: they therefore analyse a market which is too broadly defined and which dilutes the resulting concentration measures since the denominator of the index is disproportionately large relative to the numerator (hence their small index). In Figure 2 we compute an alternative C4 index for manufacturing, in which we weight the C4 ratios for each branch (available in Giannetti and Vasta 2006) by branch-specific value added at current prices.⁶³ The immediate result is that our manufacturing concentration index is much higher than Giannetti and Vasta’s, since the assets of the four largest firms in each branch are divided by the total assets of the same branch, and not by the total assets of the aggregate manufacturing sector. As well as being higher, our new indicator also behaves differently from Giannetti and Vasta’s over time. According to our measure, the level of concentration between 1913 and 1927 was roughly stable, with the period of liberal Fascism being characterised by a gentle decrease in concentration. The second phase of the Fascist era was, conversely, characterised by a rise of our indicator from 0.47 (semi-competitive) to 0.56 (nearly monopolistic) in just under ten years, providing some useful support to the theory that the new policy regime introduced as of 1926-1927 did have a significant effect on concentration in the product market.

Our further elaborations on Giannetti and Vasta’s data, which divide the industrial sector into new and old industries,⁶⁴ and which are also presented in Figure 2, shed some light on the heterogeneous performance of the different branches of Italian manufacturing.⁶⁵ Generally speaking, concentration was quite high in both groups.⁶⁶ The old industries were characterised by falling concentration between 1913 and 1921 and by a relatively stable C4 ratio thereafter. Conversely, between 1913 and

⁶³For the years 1913, 1921, 1927 and 1936, we employ data from Carreras and Felice (2010). For the year 1952, we employ data relative to 1951, taken from Fenoaltea and Bardini (2000b).

⁶⁴For a description of this classification, refer to Section 3.2.

⁶⁵Note how our aggregate manufacturing concentration index is consistent by construction with the new and old industries’ concentration measures.

⁶⁶This is confirmed by Giannetti and Vasta (2006, p. 61): ‘competitive sectors diminish greatly, while the monopolistic sectors prevail; amongst these we find both those sectors linked to the technological regime of the second industrial revolution, as also the majority of the traditional sectors.’

1952, concentration increased quite substantially in the newer industries. For the latter, changes in the individual sub-periods were rather dramatic. Concentration rose fast during World War One, and then fell below 1913 levels during the era of liberal Fascism. Conversely, the 1930s saw a fast acceleration in the process of consolidation in the new industries, as our indicator rises by 0.12 in less than 10 years. In particular, the C4 ratio for the coke and petroleum products industry rose by 0.22, while the one for chemicals and chemical products by 0.13.⁶⁷ These results contrast with what happened over the same period to the textiles, textile products and leather industries, where the C4 ratio fell. Overall, these findings suggest that the new industries underwent the most dramatic changes in concentration, and that these changes closely map the historical narrative we have outlined in the previous Section. Conversely, the regime break we have identified over the period was less pronounced for the old industries.

2.3.2 Prices and Cowling indices

The concentration data presented in Section 2.3.1 provide some initial evidence that the level of product-market competition responded to the policy changes introduced over the period and that these changes were particularly dramatic for the new industries. However, concentration may not be indicative of what is happening to the level of competition in a given product market. Although a high concentration ratio can favour the establishment of an anticompetitive environment, there is no monotonic relation between the number of firms in a sector, or the concentration of production, and the level of competition.⁶⁸ Therefore, it is useful to look at the changes in prices to understand whether increased concentration was also accompanied by reduced competition.

Unfortunately, evidence on the pricing behaviour of firms is more piecemeal than the one on concentration.⁶⁹ Some evidence is however presented in a recent study by Giordano, Piga and Trovato (2012). Similarly to Cole and Ohanian (2004), who analysed the US manufacturing sector, Giordano, Piga and Trovato (2012) measured

⁶⁷This is based on our elaborations, here not shown. The rise in concentration in these branches was due not only to the increase in size of existing firms, but also due to the emergence of new, successful players who gained relevant market shares in these years.

⁶⁸For example, the standard Bertrand (1883) model shows that, under stringent assumptions, the presence of only two firms in a market can result in competitive pricing. The theory of contestable markets, first presented by Baumol (1982), has shown that the threat of entry can be sufficiently severe to induce a reduction in the mark-up even in a monopolistic market. Conversely, although collusive agreements are harder to sustain in the presence of a large number of firms, a market with many firms can be characterised by super-normal profits when a cartel is created.

⁶⁹'Despite the importance which some attribute to the measures aiming at regulating competition, it is impossible to evaluate quantitatively their relevance in slowing down the fall of the prices of industrial products' (Toniolo 1980, p. 163).

the relative prices of a selection of goods produced by cartels in Italy for the period 1932-1938, after the introduction of the law on *consorzi obbligatori*, mentioned in Section 2.2. The ratio is computed with respect to a private services deflator, where private services represent one of the few not-cartelised sectors in the 1930s. Their main finding is that the relative prices of cartelised goods rose after 1932, and remained high throughout the decades. Their conclusion is that, ‘even if the Fascist cartels rarely included all the firms of an industry, they seem to have been effective in reducing competition and raising the prices of goods’ (Giordano, Piga and Trovato 2012, p. 15).

The problem with this type of evidence is two-fold. Firstly, because of data limitations, Giordano, Piga and Trovato (2012) cannot offer a systematic view of all sectors of Italian industry and have to limit their analysis to selected products. Secondly, the evidence they present can be misleading in the case of processed goods. In this case, rather than being a consequence of the establishment or of the improvement in the functioning of a cartel, their result may be due to changes in the prices of inputs, not necessarily due to the presence of other cartels, which could have driven up the prices of the final output.⁷⁰

In order to avoid the problems related to the comovement of inputs and output prices, one possible approach is to calculate branch-specific price-cost margins, through the so-called Cowling index. For branch i , this means calculating $(VA_i - w_iL_i)/VA_i$, where VA is value added and wL is the wage bill (Cowling 1982).⁷¹ This indicator has been used extensively in the international literature, as it has the advantage of looking at the *effects* of competition rather than at the possible *causes*.⁷²

The calculation of price-cost margins in the Italian case is not straightforward, as information on ‘value added’ and on ‘wage bills’ only began to appear in the official statistics in the 1937-1939 industrial census. However, thanks to the recent effort in the reconstruction of the Italian national accounts, branch-specific data on value added at current prices are now available in the literature. Conversely, calculating the wage bill is less straight-forward and requires using a wide range of sources.

⁷⁰In Giordano, Piga and Trovato (2012)’s sample of products, two are in fact processed goods.

⁷¹Broadberry and Crafts (1992) use this measure in their analysis of the impact of cartelisation on productivity growth in Britain in the 1930s. Alexander (1994) uses a slightly modified version in order to examine the effects of the National Industrial Recovery Act in the United States. One must be aware, however, that a potential problem with the price-cost margins estimated through the Cowling index is that they inappropriately include in the supernormal profits the return on capital. Data limitations are however such that this issue cannot be tackled.

⁷²Another recently developed index of the effects of competition is the profit elasticity (Boone and van Leuvensteijn 2010), which measures the percentage fall in a firm’s profits in response to a 1% fall in the firm’s efficiency. The more competitive the environment, the bigger the fall in profits due to a given loss in efficiency. The data required to compute this measure are profits and marginal costs, which, however, are not available for Italy in the period under study. Hence this type of indicator has not been explored in this paper.

Data on payroll is only available for the 1937-1939 and 1951 industrial censuses and, even in these cases, because of the incomplete coverage of the industrial censuses,⁷³ they only refer to a fraction of Italian workers. To make these figures comparable with the available evidence for value added, which refer to the whole of the Italian working population, we combine information from the relevant industrial censuses with data from the population censuses. This procedure is also applied to the pre-1938 datapoints, where a range of independent sources is employed to obtain data on hourly and daily wages and on the number of hours worked.⁷⁴ The main point to be made here is that this procedure only allows us to calculate Cowling indices for four benchmark years, namely 1911, 1927, 1938 and 1951, instead of the five benchmarks available in the analysis of concentration ratios. The absence of an industrial census between the years 1911 and 1927 prevents us from constructing a post-World War One benchmark, which would be useful to distinguish between the war and the De' Stefani era.⁷⁵ However an analysis of the Cowling index limited to the years available can still be useful to confirm or refute the previous findings drawn by observing the concentration index, as in the previous Section.

Figure 3 shows the Cowling index for the benchmark years 1911, 1927, 1938 and 1951. We present data for the whole of industry,⁷⁶ for manufacturing,⁷⁷ and for old and new industries. All the indicators represent weighted averages, which are calculated multiplying the price-cost margin of each branch by weights based on the value added generated in that year. This figure shows that there was a significant difference in the behaviour of the product market between, respectively, 1911 and 1927, and 1927 and 1938. In industry as a whole, price-cost margins stayed roughly stable between 1911 and 1927, before rising substantially in the second period. This increase is then followed by a fall in the margins which characterised the 1938-1951 period, showing that the experience of the post-World War Two era was different from what occurred in the 1930s.

Generally speaking, the trends observed in industry as a whole are confirmed by the data relative to manufacturing, which allow a more direct comparison with what was happening to the concentration ratios supplied in the previous Section. Although it is not possible to say how the two measures relate over the 1911-1927 period because of the lack of a post-World War One benchmark, for the other periods the movements of the aggregate price cost margins tend to mirror those of the aggregate concentration

⁷³For more details, see Section 3.2.

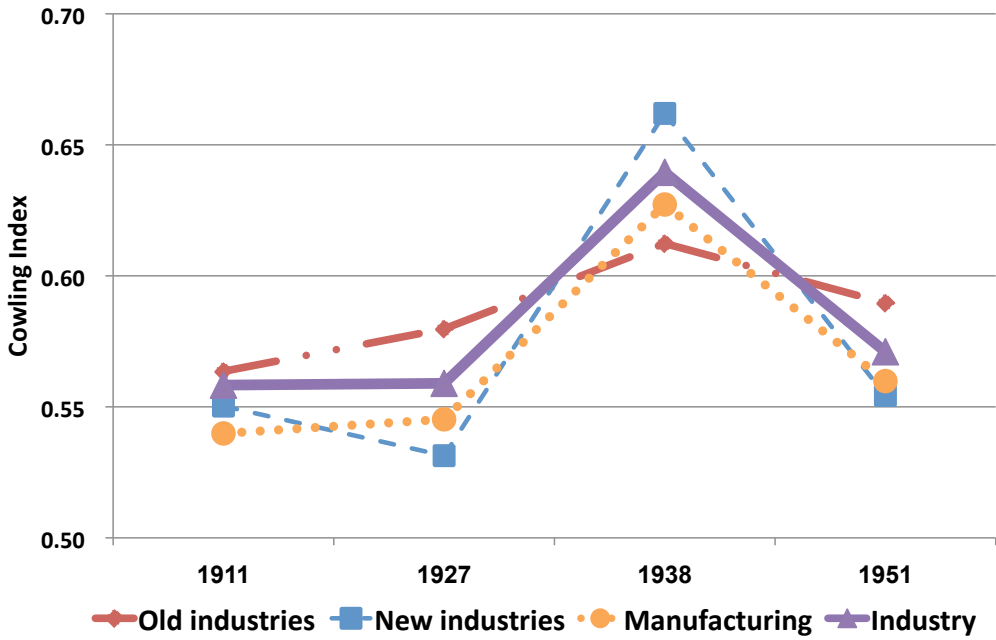
⁷⁴Full details of how the estimates are obtained are provided in Appendix A to which we refer.

⁷⁵This will also be the reason why, in our econometric exercise performed in Section 4.2, we prefer to rely on concentration ratios rather than on the Cowling indices.

⁷⁶As in the later Sections of this work, we prefer to drop construction, a sector whose behaviour is deemed to be excessively cyclical to produce meaningful results in this type of study.

⁷⁷We plot data referring only to manufacturing (hence dropping utilities and mining in this graph) so as to allow comparability with the data on C4 presented in Figure 2, which refer to manufacturing only.

Figure 3: Cowling Index for Italian industry and manufacturing, 1911-1951



Sources: see text.

ratio. In both cases, a significant break is present after 1927, proving that the second phase of Fascism was characterised by a much less competitive industry.

When we look at the different behaviour of the price-cost margins for the new and old industries, just as in the case of the concentration ratios, we can appreciate some significant differences between the two categories. In the case of old industries, price-cost margins rose gently in both 1911-1927 and in 1927-1938, before falling, again quite mildly, between 1938 and 1951. These changes contrast vividly with those occurring among new industries. In this case, the period between 1911 and 1927 is marked by slightly falling price-cost margins, which then rose very fast in the 1930s, before falling in the 1940s. These results confirm the view that the anticompetitive shift occurring in the 1930s was largely driven by what occurred in the new industries.

Overall, the evidence on concentration ratios and on the pricing behaviour of firms shows that the legislative changes occurring between 1911 and 1951 did have an effect on the behaviour of agents in the product market. The era of liberal Fascism marked a shift from the war economy which was then reversed throughout the 1930s, when product market competition was severely limited, largely because of what occurred in the new industries. This analysis fully justifies our decision to analyse productivity growth in Italian industry over the period using a larger set of benchmark years than done in previous work, something which we spell out in Section 3. It also justifies our decision to assess whether these changes had a positive or a negative impact on productivity growth, a task which we undertake in Section 4.

3 Labour productivity growth dynamics and structural change

This Section examines the evolution of labour productivity growth in Italian industry, during its different phases and within its component sectors, between 1911 and 1951. Building on a new dataset described in Section 3.1, in Section 3.2 we present crude figures on the growth rates of output per worker in key sub-periods, whereas in Section 3.3 we attempt to refine our results in order to account for changes in the number of hours worked. What clearly captures our attention is the different growth rates registered in the two phases of Fascism, as well as the heterogeneous performance of new and old industries. In both sections, we complete our analysis by decomposing, via shift-share techniques, our estimated productivity growth rates, so as to disentangle the effects of internal productivity growth and of shifts of labour resources from low-level productivity sectors to high-level productivity ones.

3.1 Output per worker: the data

In order to analyse the patterns in Italian industrial labour productivity growth, many issues concerning the data available have to be first tackled. Value added estimates for the period under study were heavily unreliable until the most recent past. Official ISTAT (1957a) and semi-official ISTAT (Fuà 1978) data, constructed on the basis of dubious, or simply not described methodologies, were found to suspiciously amplify Italy's industrial growth during World War One, which thus led Italy to outperform all other European belligerent countries (Broadberry 2005), and to underestimate the impact of the Great Depression on Italian industry (Giugliano 2011a). In general, the extant 1911-1951 data were unanimously deemed highly unsatisfactory for economic analysis.

Very recently, Carreras and Felice have produced new annual estimates of Italy's industrial VA for the period 1911-1951 (Carreras and Felice 2010; Felice 2011) which have overcome the flaws in the previous series. Giugliano (2011a) has in turn revised some of the underlying elementary series, thus providing even more refined estimates for the decade 1929-1938. For the present paper, however, Carreras and Felice's VA estimates are used, given the too short a time-span in Giugliano (2011a)'s work. A brief description of Carreras and Felice (2010) and Felice (2011) data may be found in Appendix A to which we refer.

If the existing VA series present some problems, the choice of the labour input data is even more controversial. For the headcount of labourers, two possible sources exist: industrial census (IC) or population census (PC) data.⁷⁸ Not all the mentioned censuses, however, have the same degree of reliability. For example, the 1921 PC figures were revised at the next census date, in 1931, due to recognized irregularities in the data-collection process (Vitali 1970, p. 272). Similarly, the 1937-1939 IC is problematic in that it was taken over three years, so as to measure each industrial branch when it was working at full capacity (Chiaventi 1987, p. 131). Furthermore, IC data are known to underestimate the labour input as they exclude seasonal and part-time work, and cottage industry; PCs on the other hand, by measuring the active population, are known to overrate employment, since they also count in seasonal workers and (temporarily) unemployed. All things equal, the use of ICs as labour input increases the labour productivity estimate at a given date, whereas the use of PCs brings the estimate down.⁷⁹

These measurement issues are not unknown to other countries, yet in Italy a particularly heated debate concerning the correct measure of employment to be adopted is still ongoing. Just to mention a recent example, when constructing Italy's regional

⁷⁸For those not familiar with Italian censuses, ICs were taken in 1911, 1927, 1937-1939 and 1951, in the period considered, whereas PCs date back to 1911, 1921, 1931, 1936 and 1951.

⁷⁹It is noteworthy that the difference between the two census-based estimates decreases significantly over time (Zamagni 1987, p. 44).

estimates of industrial production for the period 1861-1913, Fenoaltea vouched for PC figures (e.g. Fenoaltea 2003, p. 1061), after having criticized Zamagni's use of the 1911 IC in Zamagni (1978). Felice (2005, p. 5) diplomatically opts for an intermediate solution, assuming that the workers counted in the PC but not in the IC had half the productivity of those who were both in the PC and in the IC. Finally, in their estimates of labour productivity, Broadberry, Giordano and Zollino (2011) in some sense sidestep the issue, by using PC data as an upper-bound estimate of labour in Italy and the IC as a lower-bound in the period 1861-1951, with the "true" value falling within this interval.⁸⁰

In this paper we mainly rely on PC figures due to consistency issues: the VA estimates at constant prices used in this paper are constructed assuming that the working population was the one counted in the PCs rather than in the ICs. Sources and methodology are explained in detail in the above-mentioned Appendix A; here we only provide the general gist of our choices and elaborations. Our benchmark years, subject to data availability as well as to the purposes of our analysis, are: 1911, 1921, 1927, 1938 and 1951. The starting and ending years (1911 and 1951) coincide with the two years in which both population and industrial censuses were taken. For both years we use PC data as revised by Vitali (1970), with minor exceptions for a couple of branches in 1911. In order to isolate the World War One years from the rest of the period, the 1921 PC turns out to be crucial. Although the latter census is not the most reliable,⁸¹ it has been used in other studies (e.g. Zamagni 1987) and was deemed too precious for our analysis to be discarded. Next, so as to highlight the switch in Fascist industrial policy stance as well as the Great Depression years and Italy's subsequent recovery, the two benchmark years supplied by IC data, respectively 1927 and 1938, are ideal. Yet switching to IC data for these two years would jeopardize our estimates. In order to construct a hypothetical PC figure for 1927 we follow a procedure which is roughly analogous to the one employed by Fenoaltea and Bardini (2000a) for 1938,⁸² that is we retropolate the PC figure revised by Vitali (1970) for 1931 to 1927 using a range of branch-specific production series, taken from Carreras and Felice (2010). Finally, for 1938, we again adopt Fenoaltea and Bardini's (2000a) estimation procedure pushing forward the 1936 PC figures to 1938. For those branches in which yearly production indices were not available, we employed data on employment coming from a range of other sources, including the

⁸⁰Recall, however, that Broadberry, Giordano and Zollino (2011) examine productivity trends in the overall Italian economy from 1861 through 2011. PC data are therefore necessary to cover the first fifty years of Italian development, as well as to gain information on the agricultural and services sectors which are not covered by the ICs. Refer to Giordano and Zollino (2012) for more details concerning historical labour data sources and connected issues.

⁸¹The 1921 PC suffered from a range of irregularities, which were particularly acute in the Southern regions and which led to an overestimation of the population. The data we employ are anyhow those from Vitali (1970), who made a number of correction to solve this problem. For details, see Vitali (1970, pp. 272-284).

⁸²See in particular Fenoaltea and Bardini (2000a, pp. 181-184).

Bollettino di Notizie Economiche from Assonime⁸³ and Banca d'Italia (1938).

Finally, before presenting our labour productivity estimates, a brief description of the industrial sectors analysed may be of use. Compared to Bardini (1998), we expand our viewpoint by considering not only manufacturing, but also mining and utilities since they too present interesting productivity growth patterns in the period under study.⁸⁴ Manufacturing is then further disaggregated as in Fenoaltea and Bardini (2000a, p. 116) at a two-digit level. Furthermore, a special effort was made to disaggregate the textile industry (woollen and worsted; cotton weaving and spinning; other textiles; silk and artificial textiles), in that whereas the former branches belong to Italy's "old industries", artificial textiles are new.⁸⁵ It was unfortunately not possible to disaggregate the mechanical engineering industry, which similarly includes new and old branches. Estimates of value added for this branch are based on the apparent consumption of raw material and this type of data cannot be separated among its different products.⁸⁶ The industrial sectors thus identified and listed in Table 2 were then grouped into new and old industries.⁸⁷

⁸³This source includes the results of the statistical survey run by Confindustria, in agreement with ISTAT and the *Ispettorato dell'Industria e del Lavoro*.

⁸⁴As stated in footnote 76, we choose to exclude construction because of their strongly cyclical nature. "Other industries" are also dropped from the sample as what is included in this residual category changes over time.

⁸⁵Unfortunately, it is not possible to separate silk from artificial textiles, owing to the fact that they are combined in the 1937-1939 IC. This is problematic (but unavoidable given our data sources) since silk was a traditional, labour-intensive and competitive industry, tied to agriculture and export-oriented (Federico and Ishii 2001). Federico and Wolf (2011, p. 8), by arguing that most of silk's value consisted in cocoons, a purely agricultural raw material, and since the processing of cocoons settled close to the production areas, actually push the argument even further, and classify silk as an agricultural product until 1939. Conversely artificial textiles were a much more recent and modern industry. Given the impossibility of separating silk from artificial textiles, we have decided to assign them both to the new industries since, in the period under study (1911-1951), the latter passed from virtually no production to an estimated value added of 13,664 million lire in 1951 (Fenoaltea and Bardini 2000b, p. 230). The sensitivity of our overall results to the inclusion or exclusion of the silk/artificial fibres sectors in new industries is, anyhow, minimal.

⁸⁶On the problems associated with disaggregating the mechanical engineering sector, also see Tattara and Toniolo (1976, pp. 145-146).

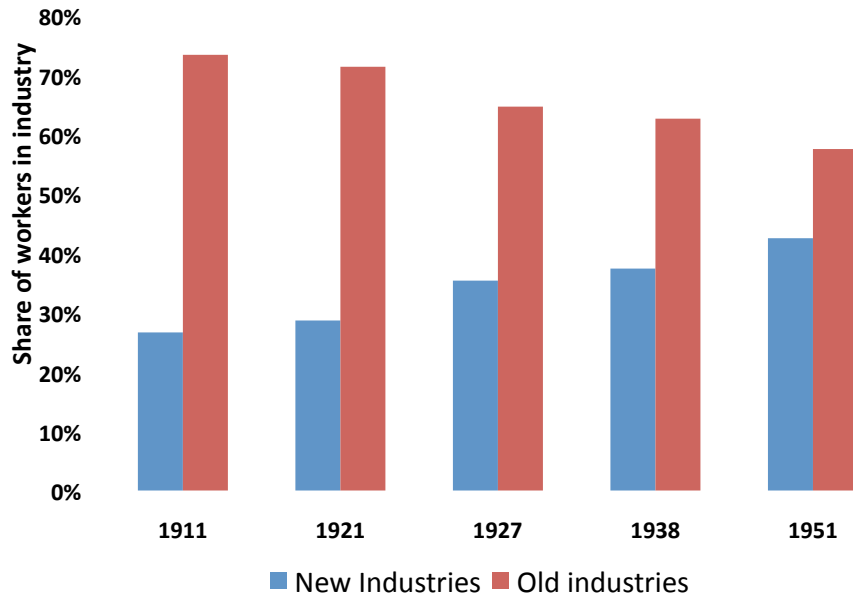
⁸⁷This classification mirrors the one reported in Richardson (1967) and may also be found in von Tunzelmann (1982, p. 30) and Broadberry and Crafts (1992). Federico (2003, p. 44) has criticised the use of a new/old classification on the grounds that it may change over time. However, the distinction between heavy and light industries which he favours is also not entirely aloof from this criticism. Anyhow, we do not expect a heavy/light classification to yield substantially different results. Tattara and Toniolo (1976, p. 148) in fact apply it for the period 1927-1937 and what they include in their categories roughly matches our choices. Finally, we prefer to classify branches according to the old/new divide also to be free to employ a new/old dummy alongside the different degree of capital intensity in our econometric model presented in Section 4.2.

Table 2: Taxonomy of the different sectors of Italian industry

	Old	New
Mining	✓	
Food	✓	
Tobacco	✓	
Silk and artificial textiles		✓
Cotton	✓	
Wool	✓	
Other textiles	✓	
Clothing and leather	✓	
Timber and furniture	✓	
Paper		✓
Printing		✓
Photography and cinema		✓
Metalmaking		✓
Engineering		✓
Non metallic minerals	✓	
Chemicals		✓
Rubber		✓
Utilities		✓

Source: see text and Appendix A.

Figure 4: Employment shares in Italian industry, 1911-1951



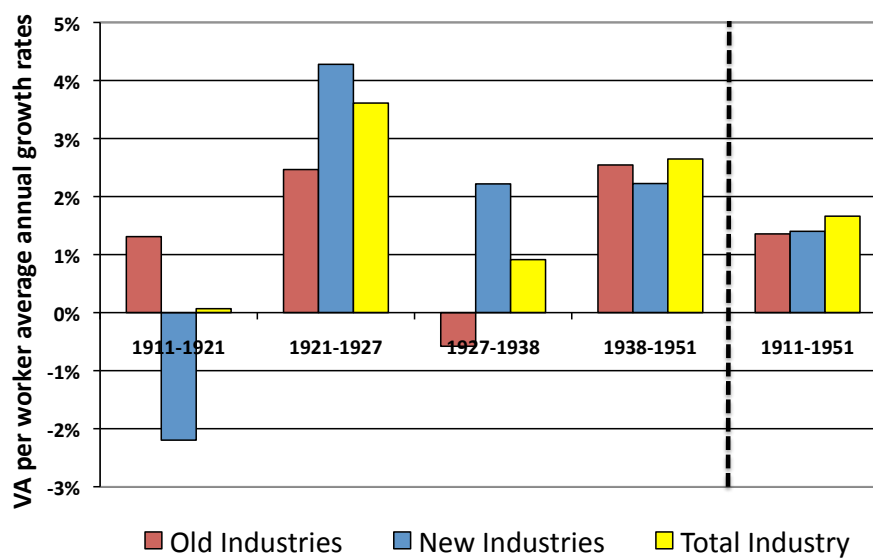
Sources: see Appendix A.

3.2 Output per worker: results

Figure 4 presents employment shares in our chosen benchmark years, divided into ‘new’ and ‘old’ industries. We see new industries monotonically increasing from 26% in 1911 to 42% in 1951. Conversely, the share of old industries drops from 74% to 58%. As for the different periods, the era between 1911 and 1927 was the one in which Italian industry modernised fastest: more than half of the shift of employment from old industries to new industries occurred in this particular period.

Figure 5 computes average annual labour productivity growth rates in Italian industry, in four key sub-periods. Between 1911 and 1927 (figures here not shown), yearly labour productivity growth (1.4%) was just below the average for the overall period (1.7%). Yet the former average growth rate is biased by the potentially distortive effect of World War One on Italy’s productivity performance. This “World War One critique,” that one can advance relative to the aforementioned study by Bardini (1998), loses significance if we introduce our 1921 benchmark year, as we do in Figure 5. The latter shows that the performance in 1911-1927 was extremely heterogeneous. Productivity growth during World War One halted, with rates close to zero being experienced. Conversely, the 1920s were years of booming productivity

Figure 5: Labour productivity growth in Italian industry, 1911-1951 (in %, per annum)



Sources: see text and Appendix A.

in all sectors: growth rates rose to 3.6% in the overall industrial sector. These were the years of fastest growth in the overall 1911–1951 period. When compared to the “roaring Twenties,” the performance of the 1930s appears very feeble, with labour productivity growth averaging around 0.9% per year and hence dropping to a quarter of previous growth rates. In the 1940s output per worker growth rates picked up again, but averaged 2.2% per year.⁸⁸

We then analyse differential growth rates in the old and new sectors. Over the whole period 1911–1951 the two categories’ labour productivity tended to grow at similar annual rates.⁸⁹ This is consistent with the hypothesis by Tattara and Toniolo, by us referred to in Section 1, that the differences in levels present at the time between new and old industries may not have translated into large productivity growth differentials (Tattara and Toniolo 1976, p. 150). However, breaking down the period, striking differences appear. In the decade 1911–1921 new industries were a strong drag on overall productivity growth. This result may appear surprising in light of our earlier discussion on the decision by the government to direct its industrial policy towards the promotion of new industries. Yet, it reflects the fact that the increase in

⁸⁸The period 1938–1951 is extremely heterogeneous, as it encompasses both World War Two and the early post-World War Two phase. It is therefore hard to pin-point what explains the 2.2% per year growth rate which we observe in our data. Generally speaking, changes in labour productivity growth can be driven both by changes in the capital stock and by an increase in total factor productivity. We concentrate on the former and on how World War Two might have affected Italy’s capital stock. Firstly, we note that between 1938 and 1939, in the run-up to World War Two, total fixed investments increased significantly (14.5% relative to 0.4% the previous year; Baffigi 2011), reaching a local maximum which would be exceeded only in 1946 during Italy’s reconstruction phase. Secondly, if the capital stock of a country is destroyed by a war, this destruction can lead to a fall in output. Were the labour input to remain constant, the destruction of the capital stock could lead to a fall in productivity growth. The increase in capital stock, output and labour productivity occurring in the reconstruction phase will compensate for the initial fall and may not result in fast labour productivity growth such as the one we observe in our data. However, Italy did not suffer from large destruction of the capital stock during World War Two. An excellent survey and discussion on the matter is provided in Zamagni (1997, pp. 35–39). Furthermore, new estimates reconstructed in Giordano and Zollino (2012) indicate an erosion of total capital stock at 2010 constant prices from approximately 380,354 to 371,364 million euros which would confirm that it suffered relatively little during the war, at least from an aggregate economy perspective, hence not slowing labour productivity growth down significantly via this channel. Thirdly, another aspect to be considered is what occurred to the labour-force. Unfortunately data on employment are very few for this period, but between 1945 and 1951 there is quantitative evidence of total industrial labour (both headcount and full-time equivalent) being almost stationary (Giordano and Zollino 2012), given the high number of workers fired by large firms specialised in war production, who however often became small self-employed entrepreneurs (Zamagni 1997, p. 22). Relative to an increasing output, this stationarity of the labour-force also could have contributed to an increase in labour productivity.

⁸⁹The growth rate of total industry is higher than that of both old and new industries’ rates. This is due to shift effects – which we will analyse more in detail further on – with the transfer of labour resources from the former to the latter as an additional, and independent, source of productivity growth.

resources devoted to these sectors did not necessarily translate into a proportional increase in output. The main problem faced by the Italian economy was the haste with which it had to accelerate production in these sectors. As remarked by the contemporary liberal economist Attilio Cabiati, ‘the speed at which new huge plants were created, existing ones were expanded, blast furnaces were built [...] workers were turned into technicians, companies were concentrated and cartelised both horizontally and vertically was a liability for the economy and for firms’ organisation’ (Cabiati 1920, p. 10).⁹⁰ These limits, which were not foreign to larger groups,⁹¹ affected severely small firms which had expanded rapidly as a result of the war. One such example is that of the aircraft manufacturer Caproni, which, in spite of a fast rising number of employees, was incapable of meeting the promised output targets. This was largely because of its lack of a ‘real industrial management of its workforce,’ which was noticed in a range of inspections by army officers and which Caracciolo again attributes to its ‘hasty growth and to its desire to speculate’ from the war effort (Caracciolo 1978b, p. 238).

Despite the problems associated with rapid industrialisation, the war did contribute to the transformation in the structure of production. The contemporary statistician Corrado Gini (1921) emphasised the importance of learning-by-doing approaches, while the commentator Riccardo Bachi (1920) emphasized the relevance of the Taylor system of production which was slowly adopted throughout the war. Such factors can help to explain why, after the war, the new industries experienced a real productivity boom. As shown in Figure 5, throughout the 1920s, their growth rates were well above those of the old industries, peaking at 4.3%. The pace of this growth was, however, halted in the 1930s, when new industries held the fort, but registered halved annual growth rates relative to the preceding decade. In the last sub-period the old industries bounced back to their 1920s average annual growth rates, outperforming the stable new industries.⁹²

Overall productivity growth rates can also be additively decomposed, via a shift-share analysis, as the sum of internal productivity growth rates and the effect of structural change, i.e. shifts of resources from low-level productivity sectors to high-level productivity sectors. In particular, we are interested in searching for evidence of the effect of a disengagement of labour from the old industries in favour of the

⁹⁰Also see the remarks by another contemporary commentator, the engineer Giuseppe Belluzzo, who also commented on the amount of disorganisation and incompetence present in Italian industry over the period (see Caracciolo 1978b, p. 244).

⁹¹To only give one example, the quality of the weapons built by the Ansaldo group was severely questioned by the Italian army towards the end of the war. See Caracciolo (1978b, p. 234).

⁹²The finding that old industries did better than new ones across World War Two mirrors the results found by Vonyó (2011) for the German case. Vonyó attributes it to the fact that the increase in resources devoted to the new sectors did not necessarily translate into a proportional increase in output. Workers relocated to these sectors during the war effort were not as productive as those who had been working there in peacetime.

new ones.⁹³ The basic approach is derived from Nordhaus (1972), which allows us to break down the overall productivity growth of Italian industry into its two structural components:

$$\frac{\hat{X}_T}{X_T} = \sum_{i \in N, O} \frac{\hat{X}_i}{X_i} \times \frac{VA_i}{VA_T} + \sum_{i \in N, O} \frac{VA_i}{VA_0} \times \left(\frac{\hat{L}_i}{L_i} - \frac{\hat{L}_T}{L_T} \right) \quad (1)$$

Where: X_i is labour productivity growth in sector i , VA_i is the value added in sector i , L_i is employment in sector i and i can take two values (O , if the sectors are old, N if the sectors are new).⁹⁴ The first term on the right hand side of equation 1 is the “direct productivity effect” (Stiroh 2002), or “intensity effect” (Salter 1966), or “within effect” (Antonelli and Barbiellini Amidei 2007). It is a weighted average of the productivity growth rates in component sectors, where the weights are base year nominal value-added shares of each sector and it indirectly reflects technical improvement within industries. The second term is the “shift effect” (Salter 1966) or “reallocation effect” (Stiroh 2002), which captures the effect of shifts in resource allocations within the industrial sector on aggregate productivity.

We apply this decomposition to the overall growth rates and present it in Figure 6.⁹⁵ This figure shows how structural change, with old industries releasing labour to the advantage of new industries, was, in relative terms, dominant in the period 1911-1921, when productivity gains from switching to the new industries were high and sufficient to offset negative internal productivity growth. This finding is consistent with the account of World War One given by Caracciolo (1978b), who emphasised the role of structural change in the war economy.⁹⁶ The contribution of structural change to growth was instead quite small in the other decades, accounting on average for only 12% of overall growth in the remaining sub-periods.⁹⁷ Sectoral productivity growth was hence the main driver of overall industrial productivity growth in Italy in the period 1911-1951.⁹⁸

⁹³Broadberry, Giordano and Zollino (2011) measure the effects of structural change from 1861 through 2011 between agriculture, industry and services, which we here do not touch upon. The industrial and services sectors are in turn however aggregations of sub-sectors whose internal structure also changed over time; hence the importance of our exercise here, although limited to industry and to the 1911-1951 period.

⁹⁴The “hat” symbol denotes time derivatives.

⁹⁵Following Stiroh (2002), the value-added shares are computed as average two-period sectoral value added shares.

⁹⁶‘The exceptional importance of the war in moving resources towards the more modern and dynamic sectors appears now to be well-established’ (Caracciolo 1978b, p. 246).

⁹⁷This result is hardly surprising, since in periods of fast growth structural change generally weighs less; viceversa in periods of slow growth. In the remaining three sub-periods, reallocation of labour was most important in the 1921-1927 years, when it accelerated labour productivity growth by 0.5 percentage points, contributing to 13% of aggregate growth.

⁹⁸This result mirrors the one found by Broadberry and Crafts (1990a) for the United Kingdom

Figure 6: Structural components of Italy’s industrial labour productivity, 1911-1951



Sources: see text and Appendix A.

To sum up, in this section we have seen how average annual labour productivity growth rates for new and old industries in the overall period 1911-1951 miss out completely on a heterogeneous performance of the two groups in different sub-periods. Netting out the World War One years in which productivity growth was low and supported by the traditional sectors, it is clear that the Fascist period is to be divided into two distinct phases. The “liberal age” coincided with a productivity boom propelled by the new sectors. The Great Depression did not spare either new and old sectors, yet the latter were hit more severely. However, the old industries recovered and even outperformed the new sectors across World War Two, stressing their vitality in a changing world. Finally, the shift of labour from the old to the new sectors was significant in boosting aggregate productivity growth in the decade 1911–21; in the remaining 30 years of relatively fast growth, internal productivity growth was what counted most as to be expected.

3.3 Accounting for changes in hours worked

Labour productivity computations based purely on the headcount of workers are known to be crude measures, which can lead to misleading conclusions. For example, in their study of the Anglo-American productivity gap in the interwar years, De Jong

in the same years.

and Woltjer (2011) have shown how Broadberry's (1997) finding that the productivity gap in manufacturing between the two countries was stable throughout the 1930s no longer holds when changes in the number of hours worked are correctly accounted for. As the average number of hours worked declined more rapidly in the United States than in Britain, relative output per hour worked rose faster in US than in British manufacturing.⁹⁹

Not accounting for changes in the number of hours worked can also be deceptive in the Italian case. As it is well documented in Toniolo and Piva (1988), the Italian official trade unions made work-sharing one of the pillars of their action in the 1930s. As shown by Tattara and Toniolo (1976), the average working day in manufacturing fell from 7 hours and 17 minutes in 1929, to 6 hours and 43 minutes in 1932. The 11th October 1934 agreement signed by the trade union and Confindustria introduced the forty hours working week. It was then established by law on 26th October 1937.¹⁰⁰ Changes in the number of hours worked did not however only affect the 1930s. Zamagni (1976) shows in fact how the average working day fell by as much as 20% between 1911 and 1919. Some important changes also occurred across World War Two. Federico (2003) argues that the average number of hours worked by factory workers rose by as much as 25% between 1937 and 1951, with light industries experiencing an increase in the region of 30%.

In order to account for these differences, we have put together a new dataset on the yearly number of hours worked in the four benchmark years of 1911, 1927, 1938 and 1951. In our attempt, we had to overcome significant problems of data availability. Data on hours worked are in fact presented only in the 1937-1939 and 1951 ICs and they refer exclusively to blue collar workers. For 1927 we use data from Assonime, a publication including data on the number of employees and hours worked for a sample of large firms. For 1911, no data are available, so we rely on the work by Zamagni (1976, p. 378), who has estimated that daily hours worked per worker fell from 10 to 7.7 between 1911 and 1927.¹⁰¹ Table 3 shows changes in the hours worked per worker in the sectors considered in our work. We find a descending trend between 1911 and 1938, which is followed by an increase in the number of hours worked between 1938 and 1951.¹⁰²

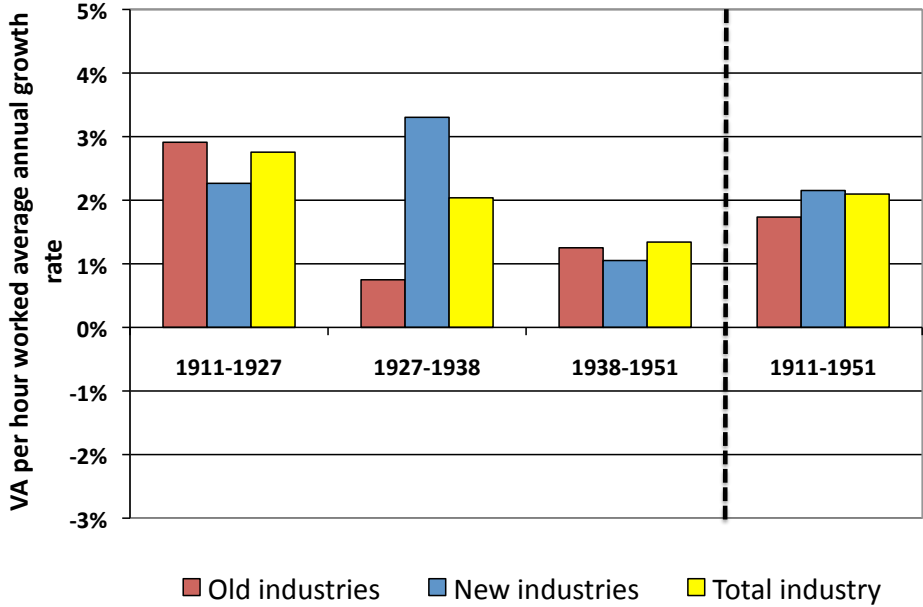
⁹⁹See also Scott and Spadavecchia 2011 on the relations between hours worked and labour productivity.

¹⁰⁰For an analysis of the effects of the 1934 agreement on unemployment, see Mattesini and Quintieri (2006).

¹⁰¹We refer to Appendix A for details.

¹⁰²This increase is less pronounced than what was found by Federico (2003), particularly for what concerns old industries. The difference has to do with a different handling of data from the 1937-1939 IC. Federico seems to have divided the total number of hours worked, which only refers to industrial workshops, by the number of manual workers in both artisan and industrial workshops. This leads him to underestimate the number of hours worked by an amount which is particularly significant for those trades in which the number of craftsmen was large.

Figure 7: Hourly labour productivity growth in Italian industry, 1911-1951 (in %, per annum)



Sources: see text and Appendix A.

Table 3: Yearly hours worked by industrial workmen, 1911-1951

	1911	1927	1938	1951
Mining	2,646	2,037	1,877	1,816
Food	2,360	1,817	1,458	2,143
Tobacco	2,995	2,306	2,042	2,193
Textiles	2,576	1,984	1,762	1,855
<i>Silk</i>	2,391	1,841	1,555	1,808
<i>Cotton</i>	2,723	2,097	1,903	1,886
<i>Wool</i>	2,902	2,235	1,867	1,930
<i>Other textiles</i>	2,289	1,762	1,723	1,797
Clothing and leather	2,182	1,877	1,652	2,088
Timber and furniture	2,478	1,908	1,757	1,818
Paper	2,931	2,256	1,956	2,236
Printing	2,899	2,232	1,935	2,310
Photography and cinema	3,704	2,852	2,473	1,887
Metalmaking	3,241	2,496	2,083	2,143
Engineering	2,798	2,180	1,819	2,099
Non metallic minerals	2,243	1,727	1,591	1,967
Chemicals	3,348	2,578	2,222	2,082
Rubber	2,671	2,057	1,773	2,036
Utilities	2,343	1,804	1,991	2,411
Old Industries	2,535	1,974	1,763	1,960
New Industries	2,925	2,255	1,979	2,112
Total	2,730	2,115	1,871	2,036

Sources: see text and Appendix A.

Figure 7 provides average annual sectoral VA per hour worked growth rates for the overall period and for three sub-periods. The average industry labour productivity measure from 1911 through to 1951 rises to 2.1% relative to 1.7% derived from the headcount measure. Unfortunately, due to data availability, it is not possible to separate the 1910s from the 1920s as we previously did, so we miss out completely on any 1920s productivity boom¹⁰³. However, the annual labour productivity growth

¹⁰³In order to calculate the total number of hours worked in a given year we need both an IC and a PC. In fact, we assume that only the workers counted in the IC worked “full time;” 50% of the ‘full-time’ number of hours worked is instead assigned to those workers, counted in the PC but not in the IC. This assumption is necessary due to the fact that, as discussed in Section 3.2, PCs include seasonal and part-time workers. For 1921 and for the nearby years we are lacking an IC. Hence we unfortunately cannot build a feasible estimate of total hours worked for this year. For more details, we refer to Appendix A.

rate between 1911 and 1927 in the overall industrial sector is 2.8%, and the highest measured in the forty years considered.¹⁰⁴ Overall labour productivity growth rates were just below 2% in the 1927-1938 period, which means that industrial hourly labour productivity grew twice as fast as labour productivity per worker during the 1930s. The drop relative to the previous period is still, however, significant and even more so given that it is impossible to separate the fast-growing 1920s from the slow-growing 1911-1921 period. As for the 1940s, it is now clear that much of the positive result one could find when looking at output-per-worker figures was due to an increase in the number of hours worked. From 1938 to 1951, hourly labour productivity growth dropped to 1.3% in the overall industrial sector, which is half than the output-per-worker growth rate of 2.6%.

We again present figures on average annual labour productivity growth rates for new and old industries respectively. When considering hourly labour productivity, differences between old and new industries increase somewhat: in the forty years considered, new industries annually grew 0.5% faster in productivity terms than old industries. Whereas new industries' growth increases during the Great Depression relative to the previous 1911-1927 period (reaching 3.3% per year), old industries' growth slows quite substantially (down to 0.5%). As for the case of output per worker, the period across World War Two saw the old industries doing better than the new ones, although less markedly.

Finally, we perform a shift-share exercise on hourly labour productivity data in the same manner as Section 3.2. Figure 8 confirms ever more strongly our previous claim that structural change was almost never significant in explaining industrial productivity growth. The biggest contribution was achieved in the 1940s, when it accounted for almost 15.4% of productivity growth, whereas on average in the former two sub-periods it only accounted for around 4.5%.

To conclude, does accounting for hours worked add to our knowledge of labour productivity growth under Fascism and during the two World Wars? Unfortunately data limitations are severe up to the point that output per worker remains our preferred labour productivity measure, used in the econometric analysis of our next Section. Yet, when comparing the two sets of estimates, a few remarks can be made. Although accounting for hours worked improves the overall performance of the 1930s, the fact that hourly productivity growth in the 1927-1938 period was roughly similar to the average 1911-1927 would confirm the finding that there was a slowdown between the 1920s and the 1930s. Since the hourly productivity performance in Italian industry across the Great War is in fact likely to have been worse than the one of the 1920s, the average over the 1911-1927 period is likely to hide productivity figures for the 1920s which were better than those registered for the 1930s. As for the different

¹⁰⁴In headcount terms, labour productivity growth increased annually by 1.5% on average in the period 1911-1927, with new industries growing at 0.2% and old industries at 1.8%.

Figure 8: Structural components of Italy's industrial hourly labour productivity, 1911-1951



Sources: see text and Appendix A.

performance of the new and old industries, their labour productivity growth rates, however measured, were roughly similar in the period 1911-1951. Old industries dominated in productivity terms in the period 1911-1927 (but presumably only in the 1911-1921 period, as the output per worker data show) and during the 1940s. New industries ruled the roost in the 1930s, yet it is unclear the extent to which they deteriorated their hourly productivity performance relative to the 1920s. Finally, internal productivity growth is confirmed to be the main determinant of aggregate productivity growth. The general patterns outlined in Section 3.2 are thus confirmed even when correcting our measures by the number of hours worked.

4 Labour productivity growth and competition policy

Section 2 has shown that industrial policy differed significantly between the two eras of Fascism, moving from a pro- to a significantly anti-competitive stance. Section 3 has put forward evidence that the era of liberal Fascism was characterised by faster rates of growth of labour productivity than the second period and that both new and old industries enjoyed slower rates of productivity growth following the regime shift. The current Section aims to explore whether changes in competition can explain changes in productivity growth, or whether the asymmetric performance of the different sectors of the Italian economy can be explained in terms of other factors.

In Section 4.1, we highlight the fact that there is no consensus over whether competition helped or hindered productivity growth in the Fascist era. As the theoretical literature on the matter is also inconclusive and since there is no existing econometric study on the period, economic historians of Italy who have tried to answer this question largely had to compare a wide range of qualitative evidence, with results which are often contradictory. In Section 4.2, we perform the first empirical study on this matter, building an econometric model which is similar to the one presented in Broadberry and Crafts (1992). The main result is that, although the growth of capital intensity explains changes in productivity, there is a strong and significant negative relationship between our indicator of competition and productivity growth. This evidence confirms that the competition policy pursued after 1926-1927 was related to a poor performance of Italian industry.

4.1 The existing evidence

That economic historians of Fascist Italy disagree over whether the measures limiting competition had a positive or negative effect on productivity growth should not come

as a surprise. In fact, the economic literature has identified at least three theoretical channels through which competition and productivity growth are related, yet has not been able to unambiguously predict the sign of this relationship.¹⁰⁵ The first channel shows that competition has an effect on static efficiency, also defined as productive efficiency: a change in competition could affect the level of effort put in by workers and managers to improve the performance of a given firm. A fall in competition can in fact lead to an increase in slack by both workers and managers, as it reduces the number of opportunities for comparing performance across firms.¹⁰⁶ Furthermore, Schmidt (1997), has argued that a reduction in competition reduces the threat of bankruptcy, lowering managers' incentives to avoid this scenario. These two claims showing that more competition increases productivity growth are countered by a third one which shows that greater competition will actually lead to less effort. This is because an increase in the number of firms in the market may lead to a reduction in demand, which may in turn reduce the level of effort by workers and managers required by the owner of a given firm (see Willig 1987; Hermalin 1992; Martin 1993; Horn, Lang and Lungren 1994).

Competition may also affect productivity growth through two other, dynamic, channels, which have to do, respectively, with R&D and with market entry. As for R&D, it has been argued that innovation may be reduced in the presence of lower product market competition as firms will benefit less from possible innovations and therefore will prefer enjoying a "quiet life," in which incentives to innovate are low (Nickell 1996, p.728). Seen from an opposite perspective, a firm's gains from innovation at the margin are larger in a more competitive industry. As Arrow (1962) pointed out, assuming perfect appropriability of profits deriving from innovative activity (via the concession of patents, for instance), an incumbent monopolist's returns to innovation are only the increment beyond the monopoly rents that it was earning beforehand ("replacement effect"). In contrast, a competitive firm would not be displacing any monopoly profit and would gain the full return from innovation: hence its greater incentive to invest in R&D. Yet, other studies lead to different conclusions. Schumpeter (1943) has claimed that an oligopolistic market structure makes rival behaviour more stable and predictable, thus increasing the incentive to invest. Also, the presence of *ex ante* market power may actually induce firms to innovate to capture the *ex post* monopoly rents.¹⁰⁷ Furthermore, a reduction in competition may lead to more inno-

¹⁰⁵This section only offers a brief summary of the links between market structure and productivity growth. Refer to Cohen (2010) for a comprehensive recap of the literature on the topic.

¹⁰⁶For the case of workers, see, in particular, Nickell, Vainiomaki and Wadhvani (1994). For the case of managers, see Hölmstrom (1982) and Hart (1983).

¹⁰⁷Aghion, Bloom, Blundell, Griffith and Howitt (2005) find evidence of an inverted-U relationship between industry-level market power, measured by an averaged Lerner index, and industry innovation, measured by the average number of citation-weighted patents. They argue that more competition fosters innovation and growth when an incumbent firm's pre-innovation rents are reduced by more than its post-innovation rents. Competition, hence, increases the incremental profits of innovating; R&D investments take place in order to 'escape competition.' This occurs in sec-

vation if credit constraints and other failures in financial markets make investments in R&D solely dependent on internal sources of funding (Blundell, Griffith and Van Renssen 1999). The profits derived from market power (“deep pockets”) would in fact provide firms with the cash flow necessary to invest in innovative activity.

As for the role of entrants, Jovanovic (1982) has argued that competition fosters efficiency by letting “many flowers bloom” and ensuring that only the best ones survive. Similarly, Hopenhayn (1992, p. 1142) points to higher costs of entry entailing less selection in an industry, lower average productivity and a higher expected lifetime of firms, including the less efficient ones. Conversely, Salop (1977) and Dixit and Stiglitz (1977) argue that more intense product market competition cuts post-entry rents, hence reducing the equilibrium number of entrants, in turn discouraging innovative activity; Gilbert and Newbery (1982) claim that an incumbent monopolist has an incentive to pre-empt entry by investing more aggressively in innovation than an innovating entrant.

These three channels have been widely referred to by those who have tried to gauge the impact of competition policy on industrial productivity growth in the Fascist era. In particular, the “optimist” field, which naturally included the regime and Confindustria, as well as a range of economic historians, underlined the role cartels had in promoting technical progress. An anonymous document found in the Confindustria archives and cited in Giordano, Piga and Trovato (2012, p. 13) lists among the advantages of introducing *consorzi* in the Italian economy the fact that the higher prices cartels guarantee to the producers allow firms to have greater revenues and to be able to invest in new technologies. This was also the opinion of Vito (1932, p. 173), who argued that cartels can favour productivity improvements, as they can promote new technical and scientific experiments and favour the diffusion of best practices.¹⁰⁸

A similar advantage was attributed to large groups by Petri (1997; 2002), who has looked at the Schumpeterian process of innovation occurring, in particular, in the chemical and metal-making industries, and in the industries for the production of electricity and of oil and coal derivatives (Petri 1997, p. 245). To Petri, the innovative activity pursued by large Italian firms was essentially of two types. Firstly, there was some in-house R&D activity, whose results occasionally came with some

tors in which all incumbent firms have similar technologies and are “neck-and-neck.” Conversely, if there is a leader and a laggard, greater intensity of competition dampens a laggard’s incentive to innovate, as it has little to gain from innovation, given that post-innovation rents remain low due to the competition with the leader. In this scenario, the Schumpeterian effect dominates the escape-competition effect.

¹⁰⁸Vito continues by listing a number of productivity improvements favoured by cartelisation in Germany. However, when he later describes the advantages brought to the Italian economy by the existence of cartels, interestingly his list does not include any specific technical advance. See Vito (1932, pp. 174-177).

delay. This was the case of the discovery of polypropylene by the future Nobel prize winner, Giulio Natta. Although this discovery only occurred in 1954, Petri argues that Natta greatly benefitted from his work at the *Società anonima italiana gomma sintetica* (SAIGS), which had been created in 1939 by the rubber-making firm, Pirelli and then purchased by the chemical giant, Montecatini. Further to pursuing original innovative activity, large groups could facilitate the transfer of know-how from foreign firms into Italy.¹⁰⁹ This was the case of the cooperation between Montecatini and the German cartel IG Farbenindustrie, facilitating the transfer of know-how for the production of a range of organic chemicals, or the agreements between the same IG and Pirelli over the production of synthetic rubber. Another example was the transfer into Italy of the hydrogenation and the catalytic refinement processes, invented by IG Farbenindustrie and Standard Oil. These were transferred to Italy in 1936 thanks to an agreement between these companies and ANIC, a joint venture involving Montecatini and the recently established oil firm, AGIP. The large sum paid by ANIC (US\$ 2.5 million, around 10% of its capital) for the licenses supports the argument that super-normal profits could be an important pre-condition for innovative activity.

While the “optimists” have mainly referred to R&D as the channel through which the reduction in competition occurring in Fascist Italy helped to increase productivity, evidence can be found to show that the anti-competitive measures taken by the regime hindered productivity growth through all three channels referred to in the theoretical literature. Firstly, there are signs that cartelisation limited the industrialists’ incentives to increase efficiency. This was a problem which had been recognised by contemporaries. In January 1933, the *Rivista di Politica Economica* published an essay by the engineer Tullio Ortu Carboni. In a rare example of official dissent to the mainstream views, Ortu Carboni underlined how ‘an excessively favourable sale price could induce firms to neglect industrial rationalisation, as the individual firm will not be worried about producing at low costs’ (Ortu Carboni 1933, p. 165). This also meant limiting the positive effect the Great Depression could have in pushing the least efficient producers out of the market. In Sarti’s later opinion, ‘voluntary cartels seldom led to significant improvements in the methods of production,’ as ‘they usually took the form of price agreements whereby prices were pegged at a sufficiently high level to assure the survival of even the least efficient producers’ (Sarti 1971, p. 100).¹¹⁰

¹⁰⁹For a peripheral, backward country, such as Italy was at the time, the process of knowledge transfer is undoubtedly an important path to productivity growth. Antonelli and Barbiellini Amidei (2007) dedicate many pages of their analysis of technological innovation in Italy in the period 1950s-1990s to the relevance of the process of “creative adoption” of foreign innovation which demands social capabilities and a certain degree of “technological congruence” between the follower and leader countries, in terms of market size, demand characteristics, factor endowments and availability of natural resources.

¹¹⁰Unfortunately, Sarti does not offer any evidence for this claim. It should also be noticed that

Secondly, it can be argued that innovation was hindered by a limitation of competition. Contemporaries had worried about this particular aspect, too. In a speech given in Parliament during the vote on the law for the establishment of the *consorzi obbligatori*, the MP Francesco Paoloni warned against the risk that cartels may ‘oblige those who have the best equipment not to use it and therefore hinder the improvement of the production process’. Such choices – Paoloni warned – ‘may cause damages to the whole nation [...] as resting on a lazy and comfortable position which is, however, technically backward, may one day lead Italy to a condition of suffocating inferiority *vis-à-vis* the technical development of foreign competitors’ (Ministero delle Corporazioni 1932, p. 680). His worries were, in fact, well founded.¹¹¹ Despite what is claimed by Petri, in fact, several points can be raised to challenge the evidence he presents. Firstly, his examples refer to far too few branches that it is impossible to generalise from their experience.¹¹² Furthermore, even in these branches, innovation was limited. Barbiellini Amidei, Cantwell and Spadavecchia (2011, pp. 11-12), confirm that systematic research and the establishment of laboratories even in the “innovative” chemical industry was of a limited scale in Italy in the interwar years, the only exception being the short period between the introduction of autarky (1935) and the onset of the Second World War, which witnessed the establishment of laboratories and research offices, since ‘developing new technologies was considered a matter of national interest’. However, even in this period, the scale of research activity was far less significant than in contemporary Germany, United States and Japan. Evidence from Giannetti (1998) shows that the national share of chemical patents deposited in Italy in the late 1930s increased ‘only by a few dozen’ in absolute terms, and hence ‘cannot be interpreted as a watershed towards a greater innovational potential’ (Giannetti 1998, p. 109).¹¹³ Furthermore, there is little evidence that the

this was also the reason why banks were generally in favour of the creation of cartels: by preventing firms from going bankrupt, they would also increase the probability of banks’ credits being paid back (Cianci 1977). Efficiency arguments simply did not have a place in this mindset.

¹¹¹As underlined by Caracciolo (1978a, p. 188), during the 1930s Italian industry became ‘sclerotic’ and, even when it expanded after the crisis, it did so ‘strengthening acquired positions and with the minimum amount of risk or innovation.’ This is also the view expressed by Cianci (1977, p. 210) who argues that increased concentration and cartelisation led to ‘a drop in those creative incentives that are in every epoch crucial for industrial progress’. In this economic and political climate contacts and relations between firms ‘did not end in higher productivity, technical progress, research of new raw materials and sales markets, but in the search for perks in confederations and ministries, in the Fascist party, in the government’ (Cianci 1977, p. 210).

¹¹²Petri’s only examples in sectors which are not the four fore-mentioned ones, include some limited innovation in the wood industry and the introduction of an alternative way of producing cellulose (the *processo Pomilio*). This process, whose benefits were not visible until the post-war period, could diffuse thanks to the links between the large firm Burgo and a range of small-medium firms.

¹¹³More in general, Barbiellini Amidei, Cantwell and Spadavecchia (2011, p. 12), by analysing data on Italian patents deposited in the US, concluded that ‘the Italian innovation activity measured in terms of Italian patenting abroad began a decreasing trend from the second half of the 1920s and remained at a relatively low level until the Second World War [...]. A weak connection between science and industry was considered a major weakness of the Italian industrial system.’

Italian breakthroughs happening in these industries were significant by international standards. With the exception of water electrolysis via the Fauser technique, the production of synthetic ammonia and of nitrogenous fertilizers (Giannetti 1998, p. 110), few Italian innovations were adopted outside the country. As for the process of knowledge transfer, this did not always lead to positive results. The different bargaining power between the Italian firms and the foreign conglomerates often meant that the processes introduced in Italy were not necessarily the best available ones. In 1939, IG Farbenindustrie and the Italian steel producing firm, Cogne, built a new plant for the extraction of magnesium in order to experiment a new, riskier, type of process at a lower cost than it would have been incurred in Germany. Its results were, unsurprisingly, meagre (Petri 1997, pp. 269-271).

As a last point, one can present evidence that the anti-competitive measures taken by the regime did, in fact, prevent “flowers from blooming,” that is impeded the entry of new competitors who could enhance sectoral productivity through their newly developed processes. As explained in Section 2, laws such as the one disciplining the construction or the enlargement were effective at keeping entrants out of the market and so was the decision by cartels to assign raw materials, production and market quotas on the basis of a firm’s past share of the market.¹¹⁴ An excellent example of the hostility faced by entrant is the case of Bombrini Parodi-Delfino (BPD), a chemical firm which tried to challenge the quasi-monopoly enjoyed by the chemical giant Montecatini. Having developed as a successful producer of explosives since the mid-1920s, BPD wanted to expand into other areas of the chemical industry. In particular, it was interested in entering the field of organic chemicals through the production of dyeing products, pharmaceuticals and plastic. As accounted by Petri (1997, p. 282), this attempt was not blocked by the absence of a strong techno-scientific base at BPD, but because of the mutual exchange of favours going on between IG and Montecatini, which in fact had formed an international cartel agreement. Although BPD managed to obtain a limited number of patents from Germany, it was obliged to only use them to produce explosives, so as not to challenge Montecatini’s dominance in the other markets. These difficulties and the breaking out of World War Two meant that its plans to expand into other areas of the chemical industry were effectively thwarted. As admitted by Petri himself, in this case ‘the institutional rigidities of the interwar and war eras and the monopolistic positions

Furthermore, in their empirical exercise, when regressing the share of industrial Italian patents abroad on a set of explanatory variables for the period 1920–1948, they found ‘positive and statistically significant coefficients on the variables that depict the share of university students studying engineering, and the share of manufacturing industry in total Italian output. This was a phase of increasingly inward-looking development, in which the continued building of local technical skills and the commitment to industrialization were what mattered for innovation’ (Barbiellini Amidei, Cantwell and Spadavecchia 2011, p. 35).

¹¹⁴According to Sarti, these measures acted as ‘a powerful brake on the economy’ (Sarti 1971, p. 102).

enjoyed by its rivals' hindered the development of BPD, even though the firm 'had what it took to expand' (Petri 1997, pp. 282-283).

Overall, this Section has reviewed the evidence presented by the "optimist" and the "pessimist" field with regard to the impact of Fascist anti-competitive measures on industrial productivity growth. While the case of the "optimists" largely rests on the existence of a Schumpeterian process of innovation, that of the "pessimists" is based on three sets of arguments, namely that the lack of competition hindered innovation, that it reduced workers' and managers' effort and that it impeded the entry of more efficient producers. The next Section aims to adjudicate between these two views.

4.2 New econometric evidence for Italy

In this Section we apply panel data techniques to look for evidence of a link between the competition policy analysed in the previous Sections and labour productivity growth in Italy in the era of Fascism. In particular, we are interested in the role played by the decisions to support new industries and to restrict competition in the product market. This is the first study of this kind and, despite its methodological and data-related limitations, provides a useful framework to appraise the impact of these policies on the development of Italian industry.

In order to achieve this aim we employ a model which is a modified version of the one developed in Broadberry and Crafts (1992), concerning labour productivity growth in the United Kingdom in the 1930s. Relying on a cross-section of 79 industries, the two scholars regressed the average annual growth rate of labour productivity from 1924 to 1935 on an array of independent variables: the growth rate of the capital-to-labour ratio, as measured by the ratio of horsepower per worker; the decline in employment from peak (1929) to trough (1932) during the Great Depression, which presumably reduced labour's bargaining power; a dummy variable taking value one for highly unionised industries; a second dummy variable taking value one for new industries; a third dummy variable taking value one for industries in which the price-cost margin fell by more than 25 per cent in the period under study.¹¹⁵ Their results point to a positive correlation between labour productivity and capital intensity growth. Their new industry variable also presents a positive sign, yet it 'is by no means dominant' (Broadberry and Crafts 1992, p. 537). High union density and an increase in competition both affected labour productivity growth significantly, the former negatively, the latter positively. Broadberry and Crafts conclude that 'the recessionary shock of the early 1930s improved labour productivity by weakening the

¹¹⁵As previously mentioned in Section 2.3.2, Broadberry and Crafts (1992) measured price-cost margins as in Cowling (1982).

resistance of organized labour, but the tendency for the market power of firms to increase had an offsetting effect' (Broadberry and Crafts 1992, p. 538).

We build upon this study and apply a modified version of this model to our data on Italy. The first difference rests upon the nature of the datasets available: an 18 sector-level disaggregation of Italian industry, compared to Broadberry and Crafts' 79 sectors for the UK industry. We hence move from a cross-sectional dimension to a panel data setting, as we also have observations through time at our disposal. Wishing to focus solely on the Fascist period, we employ average annual labour productivity growth rates (LPRODGR) in three sub-periods 1921-1927; 1927-1938; 1938-1951 as our dependent variable. Our first independent variable is the growth in capital intensity (HPWORKGR), measured as in Broadberry and Crafts (1992).¹¹⁶ Our second regressor (NEW) is defined as in Broadberry and Crafts (1992): it is a dummy variable taking value one for new industries.¹¹⁷ Next, we need a measure of competition. Differently to Broadberry and Crafts who use a dummy variable taking value one for industries in which the price-cost margin fell by more than a quarter, we prefer to use a continuous variable since it contains more accurate information and since we find the definition of their dummy variable somewhat arbitrary.¹¹⁸ As seen in Section 2.3.2, we too have estimated industry-specific price-cost margins. Yet, as previously discussed, it is not possible to compute the Cowling index for the year 1921 due to lack of data. By using this competition measure, we would be therefore compelled to consider the overall period 1911-1927 in our empirical analysis, hence missing out on the precious possibility of isolating Italy's Fascist liberal period. We thus revert back to the industry-specific concentration indices, as published in Giannetti and Vasta (2006), which anyhow we have seen in Section 2.3.2 to have similar evolutions to our Cowling index in the period under study. C4GR is hence our third explanatory variable and it expresses the average annual rate of growth in C4.¹¹⁹ Finally, conversely to Broadberry and Crafts' model, we do not include

¹¹⁶Recall our initial choice of comparing new vs. old industries rather than capital-intensive vs. labour-intensive industries as in Federico (2003), so as to be able to exploit this variable in our regression. Details on how these data are obtained are provided in Appendix A. As Federico (2003, p. 48) points out, horsepower per worker may underestimate capital intensity in that the complexity and sophistication, and hence the cost, of machinery probably grew much more than the power necessary to drive them. However, given the lack of sectoral capital data, and given the similar problem faced by Broadberry and Crafts' regressions, we confirm the use of our proxy for capital intensity.

¹¹⁷The list of new industries is the same as the one provided in Section 3.2.

¹¹⁸Note that when Broadberry and Crafts (1992) replace their price-cost margin dummy with a continuous variable, the latter loses in statistical significance.

¹¹⁹Another possible competition measure considered was the number of cartels in each industry. Yet two problems arise when handling this measure. First, it is not a truly reliable indicator of the degree of concentration of a certain industry. As discussed in Section 2.2, there may be few but dominant cartels in an industry, or many and ineffective cartels. Secondly, archival sources do not allow us to pinpoint a reasonably correct figure of the number of cartels in each industry for the four years considered.

the 1929-1932 drop in employment since our time-span covers a much longer period than that of the Great Depression years, nor do we include the unionized industries' dummy. As Mattesini and Quintieri (2006) and Giordano, Piga and Trovato (2012) point out workers' conditions after the Palazzo Vidoni Agreement of 1926 were placed into the hands of a sole Fascist trade union, acquiescent towards the regime, who did not oppose a series of mandatory wage cuts in the following years, officially justified by the widespread deflation. Workers' bargaining power was hence small for most of the period and in all of the industries considered; thus this channel was here not investigated.¹²⁰

As a result, our baseline specification is the following:

$$LPRODGR_{i,t} = \alpha + \beta_1 HPWORKGR_{i,t} + \beta_2 C4GR_{i,t} + \beta_3 NEW_i + \epsilon_{i,t} \quad (2)$$

where i indicates each of the 18 industries, t each of the three sub-periods considered, α is a constant, and ϵ is a random error. We report our results in Table 4 after having run our regression with pooled OLS.¹²¹

Column 1 is our baseline specification. Growth in capital intensity (HPWORKGR) is significant at a 1% level and presents its expected positive sign. The economic significance of this variable is considerable: the impact is more than three times larger than that found by Broadberry and Crafts (1992) for the British case. C4GR is also significant at a 5% level and presents a negative sign. The magnitude of the coefficient tells us that an increase in the average annual rate of growth of the C4 index by 1 percentage point decreased labour productivity growth by approximately a third of a percentage point. The "new" dummy variable is not significant.¹²² Notwithstanding the small number of explanatory variables introduced into our baseline model, the R^2 is satisfactory (0.34).¹²³

¹²⁰Another channel which we do not investigate is trade policy, which, as it has been explained in Section 2.2, was also employed by the regime. In particular, duties spiked in reaction to the Great Depression and were then accompanied by quotas and other restrictions to trade during Italy's autarkic period. As tariffs are levied on individual goods and not on entire sectors, a proper investigation of this channel would require the construction of a new dataset and this is beyond the scope of this paper. It is worth mentioning, however, that a detailed study by Federico and Tena concerning the period 1870-1930 has already concluded that 'there was no consistent strategy to favor any broad category industry over others – apart perhaps from a small preference for consumption goods over investment goods. So, as a first approximation, one would not expect big effects on the overall structure of the economy or on the growth rates of large sectors' (Federico and Tena 1998a, p. 17).

¹²¹A Breusch and Pagan Lagrange multiplier test confirms the absence of random effects in our model. The presence of a time-invariant dummy variable (new) in our model prevented us from using a fixed effects model, which would anyway be too demanding for our data given the limited number of observations (54).

¹²²We however retain the variable in our model, in accordance to Broadberry and Crafts.

¹²³The R^2 reported in Broadberry and Crafts (1992) is 0.24.

Table 4: Estimation results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	LPRODGR	LPRODGR	LPRODGR	LPRODGR	LPRODGR	LPRODGR	LPRODGR	LPRODGR
HPWORKGR	0.626*** [0.0056]	0.637*** [0.0085]	0.624*** [0.0050]	0.616*** [0.0090]	0.622*** [0.0089]	0.625*** [0.0068]	0.655** [0.0157]	0.648** [0.0276]
C4GR	-0.339** [0.0459]	-0.336* [0.0636]		-0.325* [0.0660]	-0.358* [0.0558]	-0.347** [0.0476]	-0.395* [0.0748]	-0.408* [0.0877]
NEW	0.009 [0.4067]	0.009 [0.4407]	0.012 [0.3111]	0.010 [0.3868]	0.009 [0.4561]	0.011 [0.3525]	0.009 [0.4166]	0.009 [0.4473]
NEWC4			-0.387* [0.0888]					
HRSGR				0.2 [0.5928]				0.2 [0.7376]
L_C4GR					-0.044 [0.8860]			-0.044 [0.8923]
IRI						-0.01 [0.3747]		-0.001 [0.8865]
t1927							0.024 [0.2141]	0.024 [0.2293]
t1938							0.008 [0.5243]	0.011 [0.5146]
CONSTANT	-0.009 [0.4297]	-0.012 [0.3055]	-0.012 [0.3190]	-0.009 [0.4351]	-0.008 [0.5479]	-0.007 [0.5283]	-0.02 [0.2448]	-0.02 [0.3113]
<i>Observations</i>	54	48	54	54	54	54	54	54
<i>R-squared</i>	0.3429	0.3425	0.3346	0.3445	0.3434	0.3491	0.3816	0.3829

Robust p values in brackets
*significant at 10%; **significant at 5%; ***significant at 1%
Regressions are run with pooled OLS.
Note that regressions (1) and (3)-(6) refer to overall industry; regression (2) is restricted to manufacturing.

Conversely to Broadberry and Crafts (1992) who seem to ignore the issue, we have considered the possibility of both the capital intensity and the C4 growth variables being endogeneous. As well as capital accumulation affecting labour productivity, over long periods of time we may in fact also see increases in labour productivity, translated into a higher profitability, spurring on investments and thus contributing to a rise in capital stock. Similarly, in the 1930s low productivity growth may have allowed only the largest firms to survive, hence increasing concentration. This reverse causality problem may be solved by using instrumental variables. However, data availability severely limits our choice. We therefore ran a two-stage least-squares (2SLS) regression in which we instrumented the variable HPWORKGR and C4GROWTH with their lagged value. The latter is in fact presumed to be highly correlated with the instrumented variable, yet uncorrelated with the error term.¹²⁴ The signs of the coefficients obtained in our baseline model are confirmed, but the coefficients turn out to be not significant under the IV specification. On the other hand, an endogeneity test did not allow us to reject the null hypothesis of exogeneity of the two regressors (p-value 0.8675). This reassured us into validating the estimates of our pooled OLS regressions, which moreover have the advantage of being strictly comparable to Broadberry and Crafts' results.

Different specifications of the model were also tested. Column 2 restricts our analysis solely to the manufacturing sector; hence the drop in the number of observations. The model does not lose power nor do LPRODGR and C4GROWTH lose much significance. The results of our baseline model are confirmed. Column 3 includes an interaction variable (NEWC4) that measures the C4 growth solely in new industries, which hence attempts to test the assumption, put forward by Aghion *et al.* (2005), according to which the newer industries, i.e. the industries closer to the technological frontier, respond more in terms of innovation/productivity growth to an increase in competition *vis-à-vis* the farther-from-the-frontier/older industries. This claim seems to be confirmed the case of Fascist Italy: an increase in concentration in the new sectors is significantly and negatively linked to total labour productivity growth.¹²⁵

We also try out some augmented model specifications in order to reduce the omitted variables issue, if it exists. When adding the growth of hours worked (HRSGR) to our model (column 4), justified by the possible effect of variations in working hours on output per worker growth, the new variable turns out to be not statistically significant. This may, however, be due to the construction of the hours worked variable in the period 1921-1927 for which no industry-specific data exist (see Section 3.3). We cannot therefore draw strong conclusions from this piece of evidence.

¹²⁴However, a Sargan-Hansen test deemed the lagged variables used by us to be weak instruments.

¹²⁵When including the C4GROWTH variable, as well as NEWC4, in specification (3), both estimated coefficients present negative signs, although they lose their significance (results here not reported).

In column 5 we introduce into our model, alongside the growth rates of our concentration indices (C4GR), their lagged growth rates (L_C4GR). The latter in fact are included in order to test the assumption that an increase in concentration has positive effects on labour productivity not immediately, but with a time lag, a possibility which, as we have explained in the previous Section, can be derived from Petri (2002). Yet no significant correlation between labour productivity growth and the growth in concentration registered in the previous period emerges from the model. Interestingly, however, L_C4GR too presents a negative sign. This piece of evidence goes against the claim that, in the period under study, less competition was beneficial for productivity with a lag. On the contrary, an increase in concentration is confirmed to have affected labour productivity growth, immediately and negatively. Column 6 includes a dummy variable which takes value one for industries controlled by IRI. State management and ownership of key industries could in fact have affected labour productivity growth.¹²⁶ Yet the IRI dummy variable is also rejected as not statistically significant. Finally two time dummies (t1927 and t1938) are introduced, in order to discriminate between the Great Depression years and the other sub-periods. These dummies are however not significant, separately but also jointly.¹²⁷ Column 8 simply includes all the mentioned regressors simultaneously (with the exception of the NEWC4 variable), with the only advantage of boosting the R^2 , and does not add any extra information to what previously stated. What emerges clearly from Table 4 in general is that the two variables, HPWORKGR and C4GR, always retain their statistical and economic significance in all alternative model specifications.

To conclude, our econometric evidence points to two main results for Italy's industrial labour productivity performance in the three decades from 1921 to 1951: *a*) labour productivity growth and capital intensity growth were strongly and positively correlated. This could imply that capital accumulation was particularly important in Italy's growth process in those years and that it might have mattered more than TFP growth which we know at the aggregate economy level to have been slow (Broadberry, Giordano and Zollino 2011); *b*) an increase in the C4 growth index, a measure for the level of concentration in each industry, was negatively correlated to labour productivity growth, nor did it contribute to the latter growth in later sub-periods. Furthermore, the reduction of competition was particularly detrimental for new industries, as the theory of Aghion et al. (2005) would predict. These findings therefore confirm that, as in the contemporary British case, the competition-reducing industrial policy enacted during the 1930s was negatively linked to the growth of labour productivity in Italian industry, especially in the new sectors.

¹²⁶On the one hand, studies such as Antonelli and Barbiellini Amidei (2007, p. 73) point to State ownership having encouraged R&D expenditure in firms and contributing to technological spillovers (in the specific case of Italy in the 1960s and 1970s). On the other hand, mismanagement, corruption and rent-seeking in State-owned firms can also lead to a slowdown in productivity. Hence, the expected sign of this variable is ambiguous.

¹²⁷The latter result was obtained by performing a joint significance F-test on the two variables.

5 Conclusions

Between 1911 and 1951, Italian industry underwent a phase of significant modernisation, which the Fascist regime attempted to accelerate through active industrial policy. Using a newly compiled dataset, this paper analyses the evolution of labour productivity in the different branches of Italian industry, grouped into new and old industries, paying particular attention to the impact of the changes in competition policy occurring as of the late 1920s. The qualitative and quantitative evidence presented in this paper confirms the presence of a policy shift occurring around 1926-1927. Following this shift, competition in the product market became more limited and the government began an active promotion mainly of the new industries. To assess the impact of these changes, we therefore construct a new benchmark for 1927 and analyse how labour productivity changed over four different benchmark periods between 1911 and 1951. We look at the evolution of industry as a whole, but also present disaggregated data for both ‘new’ and ‘old’ industries.

Three main results emerge. Firstly, in the sub-periods considered, there is a notable variance in the labour productivity growth patterns: in particular, exceptionally high productivity growth rates were experienced in the 1921-1927 period, while there was a slowdown in the performance of Italian industries in 1929-1938. Secondly, new and old industries, on average and over the whole period, do not present significantly different labour productivity growth rates. Thirdly, when we perform a shift-share exercise, we find that industrial labour productivity growth was driven by growth *within* sectors rather than by the effect of reallocation of labour *between* industrial sectors. The condition of structural change was minimal, especially in the 1930s, after the Fascist policy shift. Accounting for changes in the number of hours worked does not modify the general results, although the performance of the 1930s appears less severe than what is indicated by the output-per-head measure.

The paper also explores what were the main determinants of productivity and, in particular, whether product market competition played any role. In our econometric exercise, we find that capital accumulation was a significant driver of productivity, a finding which is consistent with the measurement of limited TFP growth over the period considered in other studies (Broadberry, Giordano and Zollino 2011; Giugliano 2011b). Changes in current and lagged product-market competition were also negatively related with productivity growth, especially in the new industries, a finding which is robust to a set of different specifications and is confirmed by a range of qualitative evidence.

The current study could be expanded in a number of directions. Firstly, the newly constructed benchmarks could be used for an international comparison which would allow to trace the relative positioning and repositioning of the different branches of Italian industry more accurately. Secondly, our impression that capital accumulation

may have overshadowed TFP growth as a driver of labour productivity needs to be confirmed by a more careful analysis. Research efforts should be pointed in the direction of estimating branch-specific estimates of the capital stock, which currently do not exist, in order to obtain branch-specific estimates of total factor productivity. Thirdly, this paper has focused mainly on competition policy, one aspect of industrial policy in the years considered. Our econometric evidence does point to the presence of IRI not being significantly correlated with labour productivity growth in the sectors it operated in until 1951. However, the binary dummy variable constructed by us is a very rudimentary measure of the institution's effect. Furthermore, we have ignored the impact of trade and labour policy in our empirical analysis, which has already been taken into account separately for Italy in the 1930s (see Federico and Tena 1988a for trade; Mattesini and Quintieri 2006 and Giordano, Piga and Trovato 2012 for labour), yet should be taken into account jointly, together with competition policies. Moreover, this study could be extended to later time periods, so as to better understand whether there was any impact of the industrial policy conducted in the 1930s on the post-World War Two boom. The preliminary evidence present in this paper would suggest that it did not, but more research is needed to confirm the plausibility of this statement. Finally, more empirical evidence on causal links is called for, also for other countries (i.e. the 1930s U.K. case). This research goal would require a significant expansion of the current dataset and the use of appropriate instrumental variables and other econometric techniques, but it would lead to the rewarding measurement of the actual effect of Fascist competition policies on Italy's productivity growth.

A Data Appendix

In this Appendix we describe the sources and methodology underlying the industrial data used throughout our paper, namely labour productivity and price-cost margins. In particular, we describe value added, employment, hours worked and wage data. In section 4.2 we also used horsepower data to build our capital intensity variable. The latter will also be discussed here.

I. Classification: The first issue to be tackled is the classification of industrial sectors. Not only do the classifications between different sources (PCs, ICs and the more recent works by scholars who have calculated industrial VA) differ, but the classification used by the same source (IC or PC) also changes over time. This second problem is solved using studies by Vitali (1970), furthered by Zamagni (1987), and Chiaventi (1987). These works have reclassified, respectively, the PCs and ICs in order to make them comparable diachronically. For this reason, they are largely employed in our work.

The first problem (standardisation between different sources) was harder to solve and severely limited the number of branches in which we could disaggregate industry. Our final classification is the one chosen by the Bank of Italy in the computation of the benchmarks of value added in Italian industry (Fenoaltea and Bardini 2000a, p.116), which we extend to include a disaggregation of the textile industry. The full list of sectors covered by our study has been presented in Table 2. As it is clear from the table, all industries except construction and “other industries” were included. The former was dropped because of its extreme cyclicity; the latter because its definition changed significantly over time. Thereby classified VA data were then matched with the corresponding data from Vitali (1970), whenever we intended to use the PC, and with the corresponding data from Chiaventi (1987), whenever we intended to use the IC.

II. Value Added at Constant Prices: In order to compute labour productivity estimates over time we were in need of industry-specific VA estimates at constant (1938) prices. These are conveniently provided by Carreras and Felice (2010), who estimate yearly industry-specific VA from 1911 through to 1938. For 1951, we use unpublished data which were kindly provided to us by Emanuele Felice (2011). These estimates are fully consistent with Carreras and Felice (2010).

III. Value Added at Current Prices: In order to estimate price-cost margins, value added at current prices is also needed. We here use different sources for different years.

1951. See Fenoaltea and Bardini (2000b).

1938. See Fenoaltea and Bardini (2000a).

1927. See Carreras and Felice (2010).

1921. See Carreras and Felice (2010).

1911. Data for industrial value added at current prices for this year are mostly taken from Fenoaltea (1992). A special effort was made to update these figures in light of the scholar's more recent work. The estimate for tobacco, as well as those for the paper and printing industries therefore come from Fenoaltea (2000). The data for the non-manufacturing industries, namely mining and utilities, come from Ciccarelli and Fenoaltea's (2009) new regional estimates, which were aggregated by us. The data for the chemical and rubber industries come from Fenoaltea (2007). Data for metalmaking come from the new regional estimates by Ciccarelli and Fenoaltea (2009). Data for the textile industry come from the new regional estimates by Fenoaltea (2004), which were by us aggregated. Data for mechanical engineering and the production of non-metallic minerals come from new unpublished figures which were kindly provided to the authors by Carlo Ciccarelli and Stefano Fenoaltea.¹²⁸

IV. Employment: The headcount number of workers in the different branches of the industrial sector is calculated on the basis of the PC figures. As explained in Section 3.2 this decision is based on the fact that the VA estimates at constant prices used to compute the labour productivity estimates assume that the working population was the one included in the PC rather than that of the IC. In order to compute our employment figures, we have made extensive use of the estimates by Vitali (1970). These estimates have the precious advantage of being reclassified homogenously, and hence of being comparable over time. Yet they also present some problems, which led us to adjust Vitali's estimates in a number of cases. These adjustments are listed below:

a) Vitali provides estimates for 1911, 1921, 1931, 1936 and 1951. Since we were interested in having figures for 1911, 1921, 1927, 1938 and 1951, we had to extrapolate the figures relative to 1931 and 1936 to 1927 and 1938 respectively. This procedure has been previously employed by Fenoaltea and Bardini (2000a) as one of their steps in the calculation of VA at current prices for 1938. Therefore, to compute the extrapolation relative to 1938, we follow the exact procedure by Fenoaltea and Bardini (2000a). The two scholars employed branch-specific "employment" indices, which are, in fact indices of production largely taken from Carreras (1982). We replicate this exercise, extrapolating the figures relative to 1936 present in Vitali via the same indices. To be consistent with this procedure, a similar exercise is followed for 1927: here we employ the branch-specific estimates by Carreras and Felice (2010) to retropolate the 1931 data to 1927. Since the work of Carreras and Felice (2010) is largely based on Carreras (1982), this makes the two procedures consistent.

¹²⁸The new estimates for mechanical engineering include the new data for the shipbuilding industry contained in Ciccarelli and Fenoaltea (2008).

b) Vitali's estimates are at constant 1951 boundaries, while the VA estimates we use to compute productivity are at the boundaries of the time. This is a problem, as Italy gained territory after World War One, to then lose part of it after World War Two. We therefore needed to adjust Vitali's figures to compute employment at the boundaries of the time. To do so, we used the coefficients published in Zamagni (1987, p. 43). In particular, we subtracted 2.1% employment from the 1911 figure and added on 1.7% in 1921, 1931 and 1936. One problem with this procedure is that these coefficients was applied to the aggregate industry figure and to all the sectoral data. This would mean assuming that the territories which were gained and lost following the conflicts had the same sectoral distribution of labour as the Italian economy as a whole, which is clearly not necessarily true. However, given the small size of the adjustment, we do not expect this to significantly bias our estimates.

c) A range of other, smaller adjustments is also made. Firstly, Vitali's estimates do not disaggregate the textile industry, while we found it helpful to do so. In order to make this adjustment, we had to revert back to original PC figures. For 1911, 1936 and 1951, the PCs offered sufficient disaggregation so that we could combine the different categories present in the censuses into the four sectors we have divided the textile industry into. In this case, therefore, we simply re-proportioned these four figures, so that their sum would match the total from Vitali. As for the 1921 and 1931 PCs, they provide a lower level of disaggregation for textiles, which did not allow us to combine existing categories into the four branches we had identified. Hence, to break these more aggregate figures down to a lower disaggregation, we used the average of the relevant proportions from the 1911 and 1936 censuses. Secondly, for the case of 1911, the more accurate employment data for the chemical and rubber industry comes from Fenoaltea (2007). Thirdly, for all years, the relevant IC figure is taken instead of the actual/extrapolated PC figure, when the former is found to be higher. This adjustment is rarely made, since, as we have discussed, the IC figure is almost always lower than the corresponding PC figure.

V. Hours worked: Our main sources were the ICs, since PCs contain no information on hours worked. However, even the ICs report hours data only in 1937-1939 and 1951, hence the use of different sources and methodologies, which we describe in detail in this paragraph. In general, in order to calculate the total number of hours worked in a given branch, we first calculate a branch-specific coefficient of number of hours worked per year by an individual worker. These figures correspond to those we have presented in Table 3. Because of the nature of the sources used, this figure normally assumes that the worker is fully employed. However, since our employment figure is largely based on PCs, we expect some of the workers counted to be under-employed or seasonal. Since we do not have an accurate measure of how many were exactly this kind of workers, we follow Felice (2005)'s methodology. We exploit the difference between the PC and the IC figures and assume that the workers who were counted in the PC but not in the IC were under-employed or seasonal workers. We

therefore attribute to the latter a number of hours worked per person which is only half of that we have estimated on the basis of our sources. Conversely, we attribute to the workers who were counted in the IC the full number of hours worked per person. Since no IC was held in 1921, it was impossible to compute a comparable figure for this year. This explains why we could not construct an estimate for 1921. We now provide a description of the sources used to calculate the number of yearly hours worked per person relative to each individual benchmark year.

1951. We took the branch-specific total number of hours worked by manual workers from the IC and divided it by the total number of manual workers present in the same census. However, since the number of hours worked refers to 1950, whilst the number of workers refers to 1951, and since the total number of hours worked is likely to have increased between 1950 and 1951, the resulting effect is probably an underestimation of the number of hours worked by each workman. Unfortunately, there were no available employment indices for 1950-1951, which is why the data have been left uncorrected.

1938. We took the number of hours worked by manual workers in industrial plants from the IC and divided it by the total number of workers in industrial plants. In this case, too, the data on the number of hours worked usually referred to the year preceding the one in which the headcount was made. Differently from 1951, however, in this case we could employ a range of branch-specific indices on the number of hours worked, which are largely taken from Assonime. When such an index was not available, we used branch-specific indices of employment taken from Fenoaltea and Bardini (2000a).

1927 . The procedure used to obtain the number of average number of hours worked per year in 1911 and 1927 is more complicated, as the relative ICs did not collect data relative to the number of hours worked. To calculate these estimates, we have to rely on other sources. For 1927, we largely employ data on the total number of hours worked and the total number of employees as taken from Assonime. This source does not allow us to cover all sectors, which is why we have to do a rough matching. In order to minimise the inconsistencies between this source and the IC, we rescale the thereby obtained figure by using the ratio of the figure from this source relative to 1938 and the figure coming from the IC.

1911. The 1911 data are calculated using the branch-specific estimates for 1927, corrected by the average reduction of daily hours in industry, which is taken from Zamagni (1984, p. 75). This corresponds to a fall from 10 hours a day to 7.7 hours.

VI. Wage bill: Data on the wage bill are needed to calculate the price-cost margins. Our main sources were the ICs, since PCs contain no information on wages. However, even the ICs report wage data only in 1937-1939 and 1951, hence the use of different sources and methodologies, which we describe in detail in this paragraph. In general,

in order to calculate the total wage bill in a given branch, we first calculate a branch-specific coefficient of the total amount earned in a year by an individual worker. Because of the nature of the sources used, this figure normally assumes that the worker is fully employed. However, since our employment figure is largely based on the PCs, we expect many of those who are counted to be under-employed or seasonal workers. This problem is analogous to the one encountered in building the estimates for the number of hours worked. Hence, we adopt the same methodology, comparing the IC and the PC figures. In particular, we attribute a wage which is only two-thirds of that we have estimated on the basis of our sources to the workers included in the PCs but not in the ICs. Conversely, we attribute to the workers who were counted in the IC the full wage. Since no IC was held in 1921, it was impossible to compute a comparable figure for this year. We now provide a description of the sources used to calculate the amount earned per person relative to each individual benchmark year.

1951. We took the branch-specific total wage bill for workers from the IC and divided it by the total number of workers present in the same census. Since the first figure excluded craftsmen, we had to exclude craftsmen from the headcount data and we did so on the basis of information provided in Chiaventi (1987). As in the case of the number of hours worked, the wage bill calculated in the IC refers to 1950, while the number of heads is counted in 1951. Unfortunately, as there is no index of industrial employment relative to the years 1950-1951, we do not correct the wage bill figure for the change in the number of employees which occurred between the two years. Since we expect this number to have risen between 1950 and 1951, this is likely to underestimate the yearly wage each worker received. However, we do correct for the growth in wages which occurred between the two years. This is done using data on the aggregate wage which is taken from Rossi, Sorgato and Toniolo (1993).

1938. We took the branch-specific total wage bill for manual workers in industrial plants from the 1937-1939 IC and divided it by the total number of workers in industrial plants. In this case, too, the data on the figure for the wage bill usually referred to the year preceding the one in which the headcount was made. Differently from 1951, however, in this case we could employ a range of branch-specific indices on the number of employees, which are largely taken from Assonime, in order to correct the wage bill figure for changes in employment occurring between 1937 and 1938. Furthermore, we used branch-specific data on hourly wages taken from Zamagni (1976, p. 374) to correct for wage inflation between the two years.

1927. The procedure used for 1911 and 1927 is more complicated, as the relative ICs did not collect data relative to the wage bill. To calculate these estimates, we have to rely on other sources. For 1927, we rely on data on hourly wages. Most of these data come from Zamagni (1976, p. 374) and actually refer to April and July 1928. We take the average of the two months and extrapolate it to 1927 using an index of industrial wages also from Zamagni (1976, p. 378). For the textile

industry, a slightly different procedure is followed: rather than relying on the data relative to 1928 which refer to all textiles, we prefer to use data relative to 1925, also taken from Zamagni (1976), which refer to individual textile industries. We then extrapolate these data to 1927 using the fore-mentioned index. On the basis of these sources, we now have a dataset of branch-specific hourly wages relative to 1927. In order to transform it into the total wage bill, we use two different procedures for those workers who appear in the IC and for those workers appearing in the PC and not in the IC and which we assume are seasonal or underemployed workers. For the workers present in the IC, we multiply the hourly wage times the yearly number of hours worked by an individual worker in 1927 (as calculated in “V. Hours Worked”), and then multiply this number times the number of workers present in the IC. For the workers present in the PC but not in the IC, we first multiply the hourly wage times two-thirds and then multiply it times half the yearly number of hours worked by an individual worker in 1927. Finally, we multiply it times the number of workers present in the PC but not in the IC. The sum of these two figures constitutes the total wage bill.

1911. The 1911 data are calculated using branch-specific data on the daily wages of industrial workers from Zamagni (1984, pp. 68-69 and 87), which we divide by the typical number of hours worked per day taken from Zamagni (1976). On the basis of these sources, we now have a dataset of branch-specific hourly wages relative to 1911. In order to transform it into the total wage bill, we use two different procedures for those workers who appear in the IC and for those workers appearing in the PC and not in the IC and which we assume are seasonal or underemployed workers. For the workers present in the IC, we multiply the hourly wage times the yearly number of hours worked by an individual worker in 1911 (as calculated in “V. Hours Worked”) and then multiply this number times the number of workers present in the IC. For the workers present in the PC but not in the IC, we first multiply the hourly wage times two-thirds and then multiply it times half the yearly number of hours worked by an individual worker in 1911. Finally, we multiply it times the number of workers present in the PC but not in the IC. The sum of these two figures constitutes the total wage bill.

VII. Horsepower: The data for on horsepower come from the various ICs, as standardised in Chiaventi (1987). This source has the advantage of dealing with the inconsistencies in the calculation of the number of horsepowers which characterised the ICs. In particular, Chiaventi (1987) eliminates the duplications relative to the 1927 IC, when ISTAT incorrectly summed primary and secondary engines, largely overestimating the total number of horsepower in the Italian economy of the time.¹²⁹ As no IC was held in 1921, the figure for the number of horsepower relative to this year is interpolated using the 1911 and 1927 data.

¹²⁹For more details, see Chiaventi (1987, pp. 126-131 and 148-149).

B Robustness check: labour productivity growth based on industrial census data

As a robustness check, in this Appendix we present the results obtained by calculating our labour productivity estimates using employment data from the ICs rather than from the PCs. Differently from the PCs which included information on the “active population,” the ICs provide information on the number of workers present in industrial plants on the day of the census. Therefore, in theory, the IC is a more accurate source from which to measure employment than the PC. However, its imperfect coverage has made scholars skeptical of the information therein contained. This is particularly true for the first IC, held in 1911, which, as Fenoaltea has remarked in his many contributions to the literature, failed to pick up “domestic” activity as well as all production carried out at the same address as the mater’s residence (this included the large rubber-making firm, Pirelli).¹³⁰ The 1911 IC also formally excluded any plant with less than two employees, which were around 241,000 in 1927. This, and the other reasons which led to our choosing the PC figures as our preferred estimate, are described in detail in Section 3. We here however feel the need to implement a robustness check.

B.1 The data

As the numerator of our labour productivity estimates, we use VA at constant prices described in Appendix A. What changes is the denominator which we here describe. The headcount of workers is taken from the following sources.

1911. We employ the figures published in Chiaventi’s (1987) work, which standardised the data relative to the 1911-1951 ICs. In particular in 1911, to tackle the formal exclusion of one-employee firms from the underlying IC, Chiaventi calculated the number of employees working in plants with one employee as a share of the total number of employees for 1927 and applied this coefficient to 1911. We apply the same methodology in order to add on the excluded workers, yet do so branch by branch (conversely to Chiaventi who does it for industry as a whole). Our corrections range from zero (for branches such as chemicals, metalmaking or tobacco), to almost 30% (for branches such as the leather industry).

1927. We use the figures present in Chiaventi (1987) with no further adjustments.

1938. We employ the figures relative to the IC taken from Fenoaltea and Bordini (2000a), which are more precise than Chiaventi’s in that they are corrected for

¹³⁰For a more detailed explanation on the problems associated with the 1911 IC, see Fenoaltea 2003, pp. 1095-1100.

seasonality. The 1937-1939 census was, in fact, conducted over several months of different years, in order to measure each sector at the peak of its productive capacity. We however include in Fenoaltea and Bardini's numbers the workers in *servizi generali di stabilimento*, which were by them excluded, but included by Chiaventi (1987).

1951. Again, we use Fenoaltea and Bardini(2000b)'s figures, which are very similar to Chiaventi's. The only major departure concerns the data for the the oil industry: Fenoaltea and Bardini (2000b) in fact substantially reduce the number of employees working in the branch so as to exclude those involved in agricultural activities. We accept their revision.

In our VA-per-hour-worked measures, which we also compute in this section, we multiply our IC-based employee figure and multiply it by the same branch-specific coefficient of hours worked used for our benchmark estimates and described in Appendix A.

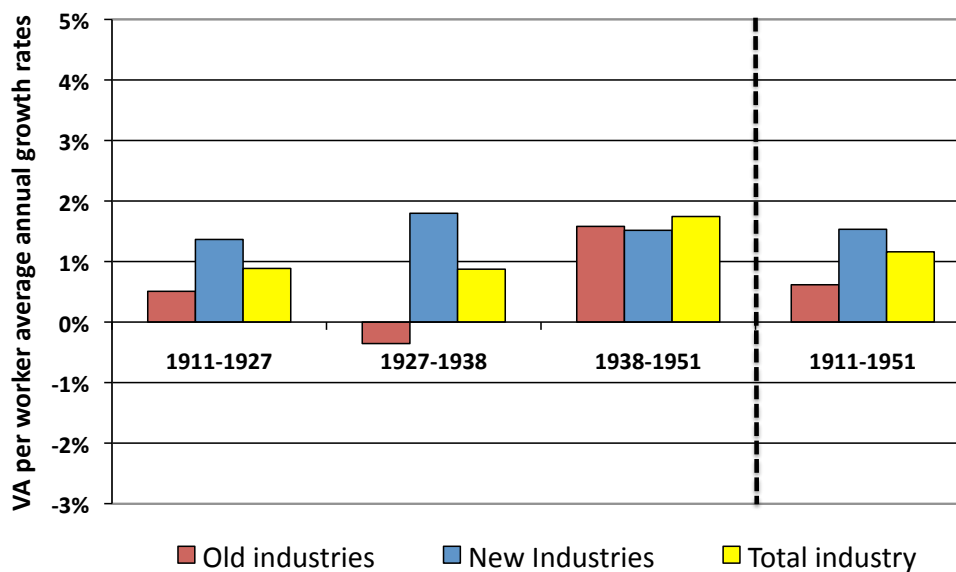
B.2 The results

Given the IC data constraints, we could only measure productivity over three benchmark years, thus failing to separate the World War One period from the era of liberal Fascism. The results are presented in Figure 9 and confirm that the 1927-1938 period is the one of slowest productivity growth, even though the difference with the earlier period is much less marked than in the case of our preferred estimates. Once again, the 1938-1951 period is characterised by the fastest productivity growth, although this robustness check suggests that our preferred measure may have exaggerated the speed of the process.

When one differentiates between new and old industries, the finding that the new industries did much better than the old industries in the 1930s is confirmed. Some important differences with our preferred measure emerge as far as the first period is concerned: using the IC data the performance of the new industries over the 1911-1927 era appears much better than the one provided by the PC figures. This finding also has an impact on the overall rate of growth for the whole 1911-1951 period, which is now fairly different between new and old industries. Unfortunately, because of the nature of this dataset, it is impossible to say whether the fast productivity of the new industries over the 1911-1927 period is due to changes in the World War One or in the liberal Fascist era.

Figure 10 aims to understand whether productivity growth in Italian industry was due to internal productivity growth or to the shift of resources from low-level productivity sectors to high-level productivity sectors. As in the case of our preferred estimates, a large part of labour productivity growth appears to be due to internal

Figure 9: Labour productivity growth in Italian industry, 1911-1951, annual percentage growth rates, industrial census



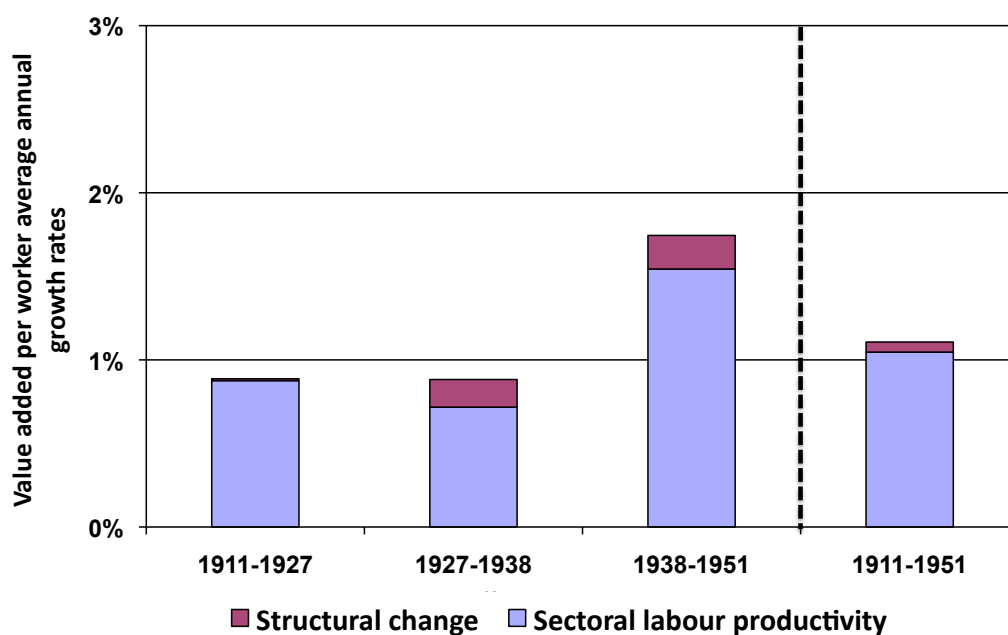
Source: see text and Appendix B.2.

productivity growth.¹³¹ Differently from them, however, this robustness check would imply that structural change was proportionally more important in the 1930s than in any other period.

The same exercise is repeated by using the data on hours worked. Figure 11 plots annual average output per hour worked growth rates. Figure 12 highlights the contribution of structural change to labour productivity growth. In general, also for construction reasons, the results concerning output per hour worked growth rates based on IC figures are similar to those based on PC figures. Labour productivity growth rates in the new industries do not seem to vary between 1911-1927 and 1927-1938, whereas old industries still see a fall, hence contributing the the slower growth in the 1930s relative to the previous period. No other significant difference appears relative to Figure 7. Structural change again played a marginal role in contributing to labour productivity growth. World War Two and the reconstruction years show up again those in which a shift of hours worked from old to new industries had a

¹³¹This is consistent with the evidence provided by Federico (2003, pp. 56-58) who conducts a shift-share analysis on other indicators, such as capital intensity and employment, and concludes that the within effect contributes most to growth, yet for the longer period 1911-1996.

Figure 10: Structural components of Italy's industrial labour productivity, 1911-1951, industrial census

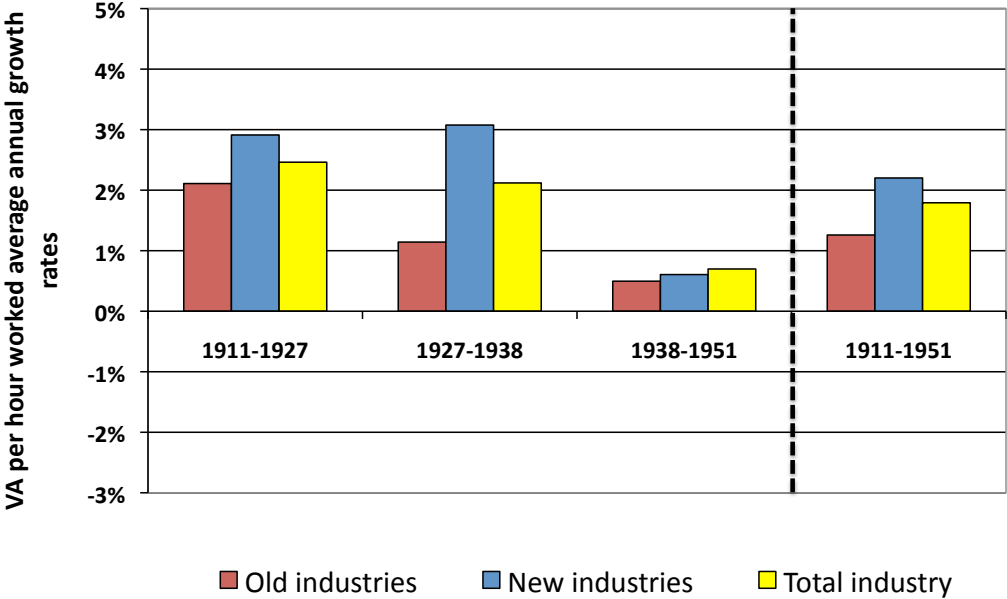


Sources: see Appendix B.2.

minimal impact.

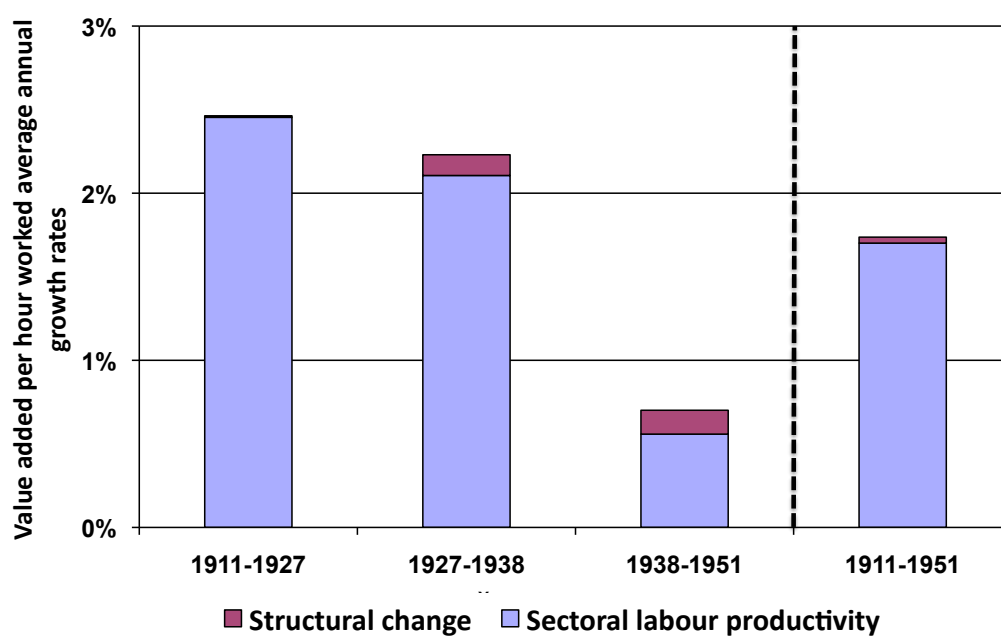
To conclude, the robustness check conducted in this section reassuringly does not contradict our main results obtained via PC estimates of employment, which for both theoretical and empirical reasons are anyhow the data to be used in the context of this paper.

Figure 11: Hourly labour productivity growth in Italian industry, 1911-1951, industrial census (in %, per annum)



Sources: see text

Figure 12: Structural components of Italy's industrial hourly labour productivity, 1911-1951, industrial census



Sources: see Appendix B.2.

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