Italy's decline: getting the facts right

Francesco Daveri — Università di Parma and IGIER

Cecilia Jona-Lasinio — ISTAT

The Italian economy is often said to be on a declining path. In this paper, we document that: (i) Italy's current decline is a labor productivity problem (ii) the labor productivity slowdown stems from declining productivity growth in all industries but utilities (with manufacturing contributing for about one half of the reduction) and diminished inter-industry reallocation of workers from agriculture to market services; (iii) the labor productivity slowdown has been mostly driven by declining TFP, with roughly unchanged capital deepening. The only mild decline of capital deepening is due to the rise in the value added share of capital that counteracted declining capital accumulation.

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1. Introduction

"Italy needs a strong injection of competition in market services"

Luca Cordero di Montezemolo, Chairman of Confindustria; October 15, 2005

"China, the WTO and the Euro changeover have precipitated Italy in a deep structural crisis"

Giulio Tremonti, Minister of the Economy; October 5, 2005

"Italy's decline is due to the disappointing performance of the manufacturing sector"

Antonio Fazio, former Governor of the Bank of Italy; May 31, 2005

No doubt, as witnessed by the opinions reported above (in inverse chronological order), the perception that the Italian economy is on a declining path is now widespread. If anything, the outlook of the Italian economy kept worsening throughout the 2000s, with a definite acceleration of such worsening through the recessionary waves of the last quarter of 2004 and the first quarter of 2005.[1]

As reflected in the quotes above, though, ideas are disparate when one comes to indicate *why and how* Italy ended up on such a path. The variety of opinions is possibly related with the little attention so far devoted to carefully analyze the industry details of the alleged decline of the Italian economy. This is why in this paper we take a close watch of Italy's decline as through the lens of a looking glass. We see this undertaking as a crucial step to achieve a better understanding of what is wrong with the Italian economy and, most of all, what could be done to reverse the current negative trends.

We do so exploiting publicly available aggregate and industry data from the OECD and ISTAT. This gives us a good starting point to analyze labor productivity and total factor productivity trends for the aggregate economy from 1970 onwards and for twenty-seven industries from 1980 onwards and helps us provide the intended snapshot of Italy's declining productivity trends.[2]

We reach three main conclusions. First and foremost, most of Italy's economic decline stems from decreasing labor productivity (not hours). Second, the standard decomposition of industry productivity trends shows that the bulk (80%) of Italy's productivity slowdown originates from a generalized within-industry slowdown (or outright declines), mainly in durable and non-durable manufacturing. Diminished inter-industry reallocation from agriculture onto market services contributed the remaining 20% of the slowdown. Third, the labor productivity slowdown was

[1] The improved results of the second quarter of 2005, even if confirmed in the remaining quarters of 2005, will not change this long-run picture in any way.

[2] Bassanetti, Iommi, Jona-Lasinio and Zollino (2004) have provided evidence on aggregate and industry productivity developments in the Italian economy, with a rather different goal, though: computing the growth contributions of the different factors of production.

mostly accounted for by a marked deceleration of TFP, which was not the result of an unfortunate cyclical contingency (the current slowdown is worse than in any former downturn in the last twenty years). The only mild decline in capital deepening (particularly evident in manufacturing) is due to the rise in the value added share of capital that counteracted the decline in capital accumulation.

The structure of the paper is as follows. In section 2, we start from basics and provide evidence of why Italy may be seen as a declining economy and why productivity is the crucial variable to look at when thinking of Italy's economic decline. This may be seen as an unusually long (but necessary!) motivation for writing this paper. In Section 3, we present basic but detailed enough evidence for Italy's trends in labor productivity growth across industries. In Section 4, standard industry decomposition provides evidence for rating the relative importance of within vs. between components in industry labor productivity growth. In section 5, industry labor productivity growth is decomposed in the standard capital deepening and TFP components. In extensions section 6, we investigate how our main results are affected by some of the simplifying assumptions necessary to carry out TFP calculations at the industry level with the data set we are endowed with. We thus evaluate whether the current TFP slowdown presents similar business cycle properties compared to former downswings, whether the omission of quality improvements from the productivity contributions of each factor of production is biasing our conclusions and finally whether declining manufacturing productivity may be the side-effect of the declining productivity performance of market services. Section 7 concludes.

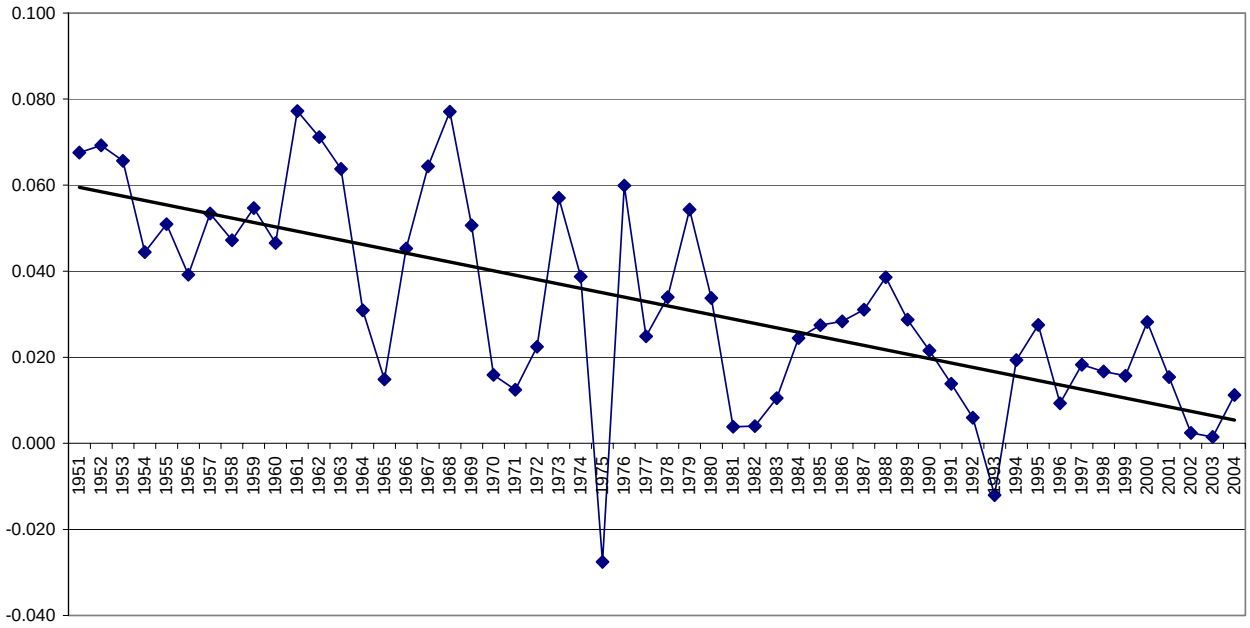
2. Italy's decline is caused by the declining performance of labor productivity

2.1 Italy's "decline" …

When speaking of a country's decline, long-run data on per–capita GDP have to be looked at.

In his book, Angus Maddison (2001) provides such long-run data for a large number of countries. Maddison's data are still being systematically updated by Bart van Ark and his coauthors at the Groningen Center for Growth and Development (GGDC; www.ggdc.net) From the most recent release of their Total Economy Database, one learns that Italy's growth rate of per-capita GDP has been on a mildly declining trend (by roughly -0.1 percentage points per year) for a long while. This is pictured in **Figure 1**.

Figure 1
Per-capita GDP growth in Italy, 1951-2004



Source: GGDC

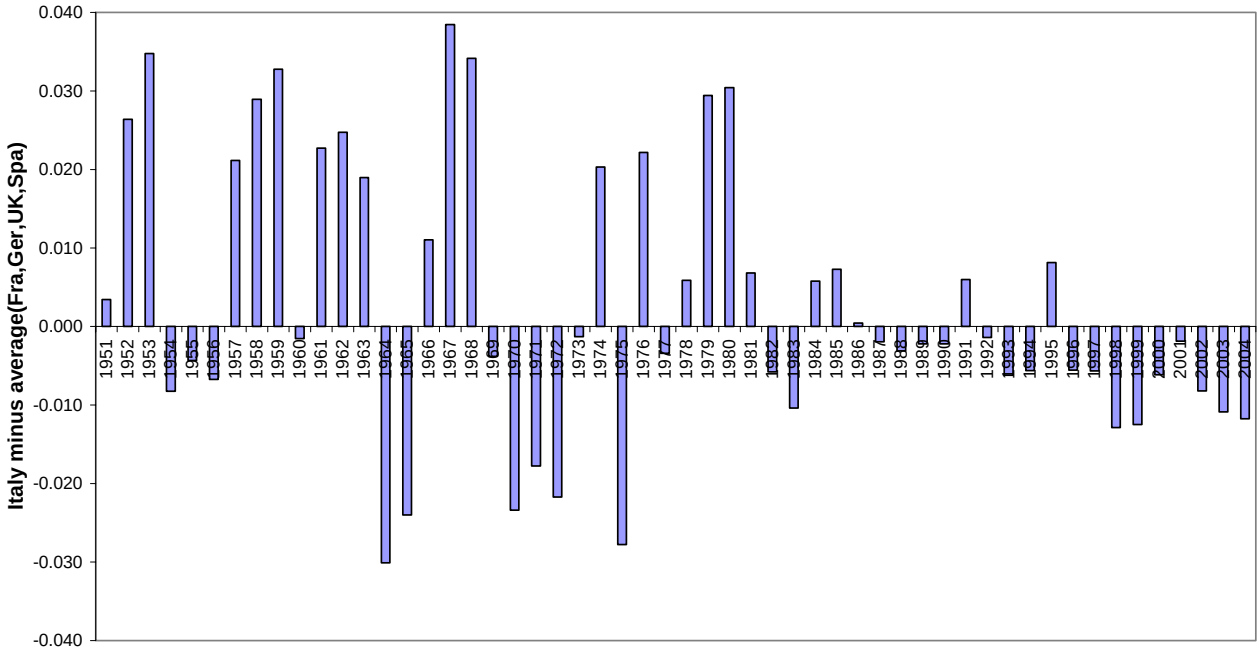
Italy's per-capita GDP growth was 5.4% in the 1950s, 5.1% in the 1960s, 3.1% in the 1970s, 2.2% in the 1980s and 1.4% in the 1990s. A rough-and-ready extrapolation of this decade-long continued slowdown would lead to expect no more than 0.5% in the 2000s (so far we are at some 0.6% over 2000-05, if per-capita GDP stays constant in 2005). In any case, nowadays, the miracle years of the 1950s-1960s seem quite far away in time.

The declining growth performance of "mature" countries over time is in fact a standard prediction of the Solow growth model. And indeed the available empirical evidence (Barro and Sala-i-Martin (1990), Caselli and Tenreyro (2005)) shows that this prediction is broadly borne by a host of other OECD countries. To gain a better understanding of the extent and the boundaries of Italy's *relative* growth slowdown, it is thus more informative to graph how Italy fared against the backdrop of the average growth performance of, say, the other big European countries (France, Germany,[3] the UK, and Spain;[4] "Europe" henceforth). Concentrating on the big European countries cuts short the question of how to properly define a benchmark (the European Union as a whole is a bit of a moving target throughout such a long period of time; the choice of the Euro area would leave the UK out).

[3] By "Germany's growth" we mean the growth of Western Germany before 1991 and the growth of Unified Germany from 1991 onwards.

[4] The inclusion of Spain does not change the qualitative features of the picture. Leaving Spain out of the benchmark, the positive bars in the 1950s and the 1960s would be higher, while the negative bars of the 2000s would be less pronounced. But Spain is indeed one of the big countries in Europe.

Figure 2
Italy's relative growth of per capita GDP, 1951-2004



Source: GGDC

The positive bars in **Figure 2** correspond to years when Italy was growing faster than the rest of Europe, while the negative bars shows the years when Italy's growth lagged behind Europe.

Figure 2 does provide a clear picture. It concisely shows that Italy, being much poorer than Europe (poorer than France, Germany and the UK, but richer than Spain) in 1950, has been catching up fast until – roughly - the early 1990s.

This process of convergence has reversed its course since then, however. In the 1950s and the 1960s, Italy grew faster than Europe six times in each decade; in the 1970s and the 1980s this occurred four and five times respectively. In the 1990s, instead, this occurred only twice, in 1991 and 1995. Since 1995, then, Italy's per-capita GDP has grown less than (the other big countries in) Europe's GDP. [5]

Altogether, the long-run data suggest that the bad performance of the Italian economy is not the figment of the currently unfortunate business cycle contingency. This is why speaking of decline may not be totally unwarranted. With one caveat to add, though: given that the rest of Europe has been and is still growing at a positive pace, Italy's alleged decline is of a relative, not an absolute type. Italy's per-capita GDP has simply grown not as fast as Europe's GDP, but has not diminished over time (yet): since 1995, living standards (as measured by per-capita GDP) have actually gone

[5] Had the benchmark been the average growth performance of France, Germany and the UK (leaving Spain out), 2001 would have been another mildly good year (in relative terms), with Italy growing faster than "Europe Big 3" by a decimal of a percentage point.

up by a cumulative 12%. The problem with this state of affairs is that a diminishing growth rate may herald a true absolute decline in the years to come.

2.2 … is caused by its declining productivity performance

A standard method to describe the evolution of per-capita GDP involves decomposing its evolution in the combined trends of three variables, two economic and one demographic. The two economic variables are labor productivity (output per hour worked), and the total number of hours worked per each Italian in his/her working age (15-64). The demographic variable is the ratio between working age population and total population.

Alesina, Glaeser and Sacerdote (2004) recently documented that, when asking the question of why Europe is poorer than the US, the answer is: mostly because of its lower labor input per person, not because of its lower productivity per hour. Recently released data from the OECD indeed confirm that this continues to be the case in 2004 (see **Table 1**). Per-capita GDP in the Euro area is 29% lower than in the US: two thirds of this much is due to lower labor input and one third is due to labor productivity. This is clearly the case for Germany. It applies to France as well, where labor turns out to be even more productive than the US. It is apparent for Italy too: the 30% gap of Italy's per-capita GDP with respect to the US is accounted for by a "minus 22%" of lower labor input and a "minus 8%" of lower productivity per hour worked.[6]

Table 1: Decomposing Europe's gap with the US, 2004

	Per-capita GDP	Hours per capita	GDP per hour
	[1]	[2]	[3]
Euro area	-29	-20	-9
Italy	-30	-22	-8
France	-26	-33	+7
Germany	-28	-21	-8
UK	-21	-8	-13
Spain	-36	-11	-24
EU-19	-33	-16	-16

Note: the figures in column [1] are the sums of the figures in column [2] and [3]. Each of them measures the gap (in percentage points) between the level of the corresponding variable in the country at hand and the level of the same variable in the US.
Source: OECD productivity database (http://www.oecd.org/statistics/productivity)

[6] **Table 1** also shows that Europe is not completely similar in this respect. The bulk of the UK and Spanish gap with the US originates on the productivity side, not on the labor input side. The same applies to Europe as a whole, when a European aggregate inclusive of some of the Eastern European countries (EU-19) is used. If one does so, the EU-US gap is roughly equally split into its labor and productivity components.

Yet, when thinking about Italy's alleged decline, one is not thinking about per-capita GDP or productivity levels *as they are today*. Today's levels are the result of growth over the indefinite past. Italy's current decline is instead a more recent phenomenon that stems from declining growth rates of the same variables over the last ten years or so, not throughout the indefinite past. But when one looks at such recent growth rates, the picture changes considerably: the declining growth rate of per-capita GDP is mostly due to the declining growth of productivity per man hour and partly to demographic forces, but certainly not to declining labor input – quite the opposite.

This is summarized in **Table 2** where the compounded growth rates of per-capita GDP and its three components (labor productivity, hours per person in working age and potential workers-population ratio) are reported for three periods (1970-1980, 1980-1995, 1995-2004).

Table 2 shows how sharply and deeply the sources of growth in the Italian economy have changed over time. In the 1970s and the 1980s through 1995, the contribution of labor to growth was negative for 0.7-0.8 percentage point per year. This was the period during which the Italian labor market functioned so badly to push unemployment up to more 12% of the labor force. From 1995 onwards, the contribution of labor to growth instead turned positive for about one percentage point per year – the result of rapidly rising employment rates and stagnating average hours worked.

In parallel, labor productivity growth slowed down abruptly after 1995 from the very high rates of the 1970s and the 1980s. As reported in **Table 2**, labor productivity (measured by GDP per hour worked for the aggregate economy) grew by 0.5% per year in the Italian economy in 1995-2004. This is a marked slowdown compared to the 4% growth rate recorded in the 1970s and the 2% growth rate recorded in 1980-95. In turn, the slowdown in labor productivity growth gained further momentum throughout the decade, falling from +0.9% in 1995-2000 to -0.1% in 2000-04.

To immediately grasp the entity of the slowdown one can use the "rule of 70": at the 1970s pace, the number of years required to double productivity levels was about 18 years, while this has gone up to 33 years in 1980-95 and even further up to 54 years at the growth rates that have prevailed in the last decade: at these rates, now it takes three times as long as in the 1970s to double labor productivity levels.

Table 2: Decomposing Italy's per-capita GDP growth, 1970-2004

Growth rates of	Per-capita GDP	GDP per hour worked	Hours per working age person	Working age population over total population
1970-80	3.1	3.9	-0.8	0.0
1980-95	1.8	2.1	-0.7	0.4
1995-04	1.3	0.5	1.0	-0.2

Source: OECD productivity database and OECD Economic Outlook database, September 2005

Altogether, this amounts to saying that the performance of the Italian labor market, so poor in accommodating the entry of the baby boomers as well as, more generally, of women in the past, definitely improved in the last ten years. But this seemingly occurred through an outward shift of the labor supply curve, possibly eased by the piecemeal reforms in the labor market which resulted in liberalization of part-time and temporary employment. The labor demand curve did not seemingly shift out much, instead. This materialized in higher labor input than in the past, but in parallel with a growth slowdown of productivity (and wages, not pictured here).

The previous data say that, although Italy's relative poverty today with respect to the United States (as well as the UK and the Nordic countries in the European Union), has still mostly to do with its labor input deficiencies, the declining tendency of the last ten years or so is instead mostly caused by a declining performance of labor productivity. This is why, when discussing Italy's decline, labor productivity, not hours, is the keyword.

3. The labor productivity slowdown across industries: manufacturing versus services

In the previous section, we clarified that labor productivity, not hours, is responsible for Italy's decline. This is just a first step. Our second step here, motivated by the variety of authoritative quotes reported at the outset, is to present an industry breakdown of Italy's growth of aggregate labor productivity. The main questions are: Is the productivity slowdown mainly due to the decline of Italy's manufacturing? Or, rather, is it caused by the growing inefficiency of services industries?

Our industry data refer to twenty-seven industries corresponding to the sub-sections of NACE Rev.1 classification for mining and manufacturing industries and to the sections for the other sectors, with the exclusion of "Public administration and defense" (section L), "Private households with employed persons" (section P) and "Letting of own property" (group 70.2).

The industry-level data for labor productivity employed here may not be consistent with the aggregate data taken from the OECD Productivity Database. In the OECD Productivity database, the OECD Secretariat provides an estimate of total hours worked reconciling the various national sources; labor productivity is thus measured as GDP per hour worked. Our industry data are instead from the OECD STAN database (in turn derived from the latest release of industry data from ISTAT) where no such attempt is made. Labor productivity is thus GDP per FTE employed person.

To analyze the industry evidence over a long time span, we had to choose a labor productivity measure based on the number of full-time equivalent employed (FTE) persons rather than on the total number of hours worked, for the number of hours worked is not available at the industry level

for the 1970s and the 1980s.[7] The OECD STAN data base allows one to compute labor productivity as the ratio between value added and the total number of full-time equivalent employed persons from 1970 onwards. [8]

Although our underlying data set refers to twenty-seven industries, we present summary tables just for a handful of industries: agriculture, manufacturing (in turn split into its two main durable and non-durable components), utilities, constructions and business sector services, in addition to the aggregate for the total economy. This level of disaggregation is sufficient for conveying our main message: Italy's current productivity slowdown is the combination of a full-fledged productivity collapse in manufacturing productivity, but it looks more like a missed opportunity in the service sector.

Table 3 shows such figures. Before delving into the analysis of how productivity evolved within the broad one-digit industry groups, it is worthwhile to remind that the employment-based indicator in **Table 3** usually grows less than the hour-based indicator in **Table 2**. From column 3 in **Table 2**, one learns that GDP per hour worked grew at, respectively 3.9%, 2.1% and 0.5% per year in 1970-80, 1980-95 and 1995-04. Over the same periods of time, value added per FTE employed person grew at rates of 2.4%, 1.8% and 0.4%. The explanation is simple: given that the number of average hours worked kept declining over time at a particular fast pace in the 1970s and the 1980s, it is no wonder that the growth rate of labor productivity growth, measured in terms of employed persons in **Table 3**, grows at a slower pace than labor productivity measured in terms of hours worked. This discrepancy has become much smaller over time, though, in line with the leveling off of the decline in the average number of hours worked in the Italian economy in the 2000s.

Table 3 shows that, in the last ten years, the decline has been particularly abrupt for manufacturing. This is at odds with the former decade: the mild (with today's eyes) productivity slowdown in the 1970s was mainly driven by the productivity slowdown in market services (and construction), with labor productivity in manufacturing steadily growing at solid rates (3% per year or so). Recently, instead, the growth of labor productivity in manufacturing essentially zeroed. This was a big change if compared to the average yearly growth rates of 3% over 25 years: manufacturing has indeed traditionally been the quintessential fast-growing part of the economy, in Italy as in many other countries, as theorized by Baumol (1967) and documented, among others, by Baumol, Batey Blackman and Wolff (1994) and Caselli and Tenreyro (2005).

[7] Preliminary data on industry hours worked have been released by ISTAT in June 2005, but they only go back to 1993. In order to preserve the long-run flavour of our discussion, we stick to the data currently available in STAN, which only provides the number of full-time equivalent employed persons.

[8] See the Appendix for a definition.

Table 3: Growth of labor productivity (value added per full-time equivalent employed person), 1970-2003, main industry groups					
	1970-80	**1980-95**	**1995-03**	1995-00	2000-03
Economy	**2.4**	**1.8**	**0.6**	1.1	-0.2
Agriculture	**3.1**	**4.3**	**2.7**	5.2	-1.5
Manufacturing	**2.8**	**3.0**	**0.2**	1.0	-1.0
-- non-durables	**2.7**	**3.1**	**0.3**	0.7	-0.2
-- durables	**2.9**	**2.7**	**0.0**	1.7	-2.7
Utilities	**-0.4**	**0.8**	**5.5**	3.7	8.7
Construction	**1.9**	**1.0**	**0.1**	0.5	-0.5
Business sector services	**1.8**	**1.1**	**0.1**	0.5	-0.5
Public services	**1.4**	**0.7**	**0.4**	0.8	-0.1
Source: own calculations from OECD STAN data					

In the 1970s, the manufacturing sector – about 27% of total FTE employment - used to grow above average in Italy too, although just by one half of a percentage point (2.8% against 2.4% which was the average for the whole economy). Not by chance, in the past, a number of Italian economists have concentrated their attention on the difficulties of the Italian manufacturing sector, somehow eternally lagging behind, as the key retarding force for Italy's economic development.

Yet in the 1980s (through 1995), things changed. As seen in the next sections, the rapid growth of capital-labor ratios fuelled a parallel rapid growth rate of value added per employed person in the manufacturing sector by 3% per year over fifteen years. This was the average of the 3.1% growth rate experienced in the industries producing non-durable goods and the 2.7% in the industries producing durable goods. Manufacturing growth was well above aggregate productivity growth, which averaged +1.8% per year in that period of time. This occurred while the sector as a whole definitely declined as a share of total FTE employment, from 28% in 1980 to 22% in 1995 – a reflection of the firm restructuring in non-durable goods production, which fell from 19% to 15% of total employment. This occurred with particular intensity in the last bit of 1980-1995.

In the last ten years or so, another dramatic turnaround – initially gone unnoticed – materialized, with the zeroing of the growth rate of labor productivity in manufacturing. Productivity growth first declined to one per cent per year in 1995-2000 and then turned negative by one percentage point in 2000-2003, with the data for the more recent years (2004 and 2005) confirming such negative trends.

This is startling for such a declining path manifested itself rather uniformly in the whole manufacturing sector, although slightly scattered around over time. In 1995-2000, labor

productivity growth fell first and substantially in non-durable goods industries from 3.1% to 0.7%, while labor productivity for durable producers slowed down just a bit (from 2.7% to 1.7%). In the more recent years, productivity growth collapsed for durable producers as well (-2.7% in 2000-2003) and further slowed down by another percentage point for non-durable producers (from 0.7% to -0.2%).

The bad productivity performance of Italy's manufacturing sector is bad news for two different but equally relevant reasons.

Non-durable production includes textiles, wearing and leather – all landmarks of the "Made-in-Italy" production. If the productivity of non-durable producers declines, this is particularly worrisome, because fast-growing productivity is the only means to restore profits and maintain jobs in such industries threatened by low-cost production from Asia and Eastern Europe.

Durable production, in turn, is meant to be the most likely vehicle of introduction of technical change and new modes of production (and therefore the industry with the potentially highest productivity growth rate). Depending on the availability of such things as human capital, R&D investment and the like, we may expect to see these industries to make a bigger or a smaller share of value added and employment in a given country. But they are anyway supposed to grow fast, no matter what. If this is not the case (and the negative productivity growth rate of about 3% per year in 2000-03 indicates that this is really not being the case in Italy), there are good reasons to be worried. Moreover, this contrasts with secular growth rates in these industries in the order of (positive) three per cent per year in the 1970s and the 1980s through 1995.

So much is for manufacturing. The growth slowdown was unfortunately not restricted to manufacturing, however. As indicated in **Table 3**, labor productivity growth in business sector services also zeroed, going down to one half of a percentage point in 1995-2000 and negative 0.5% in 2000-03. This is bad news in two ways. First, productivity in this sector used to grow by roughly 2% per year in the 1970s and about 1% in the 1980s through 1995. These are much lower figures than the corresponding figures for manufacturing, but they used to be positive anyway.

But there is a second reason for concern. In recent years, productivity in business sector services (such as finance and TLC services, but also wholesale and, crucially, retail trade) in the US started growing very fast (by 3-4% per year), at odds with the past. The US data indicates that there was likely an available technology out there to be adopted. This chance has seemingly not been grabbed – for reasons to be investigated - by Italian service companies. The prevailing idea (see Triplett and Bosworth, 2003) is that the "Baumol disease" puzzle has been solved in the US where, in the second half of the 1990s, labor productivity in traditionally slow-growing industries (such as retail trade and finance) began growing fast. Thinking it through, Baumol's theory was breached in Italy

as well, but in the opposite direction than in the US: rather than transforming the service sector in a fast-growing industry, it was manufacturing which stopped growing fast. Unfortunately, private services have not taken over manufacturing as the new engine of growth.

Finally, **Table 3** also shows that, in the Italian economy, two industries exhibit positive growth of labor productivity in 1995-2003: agriculture and utilities. Yet these industries are small in terms of employment and therefore their good productivity performances cannot do much to reverse the overall productivity trends stemming from manufacturing and services. Moreover, the still positive productivity performance of agriculture in 1995-2003 is actually the result of a productivity slowdown as well, which leaves utilities as the only accelerating industry in the Italian economy.

Indeed, agricultural productivity used to grow very fast in 1980-95 (+4.3% per year) and still in 1995-2000 (+5.2%). In the most recent years, instead, agricultural productivity collapsed at about the same yearly rates as productivity in durable goods producing industries.

The accelerating growth in the industry producing (formerly) public utilities such as electricity, gas and water came about after decades of stagnating productivity. The disappointing productivity performance in these industries was indeed at the root of the repeated privatization episodes undertaken in such industries in the 1990s. The result of such episodes seemingly materialized in revived growth rates of labor productivity in 1995-2003. This acceleration was even more pronounced in 2000-03 than in 1995-00. Whether this apparent productivity acceleration is really productivity and not something else remains to be seen in the next sections.

Summing up, the declining productivity performance of the Italian economy is rooted in a rather sharp and generalized worsening of the productivity performance of all the main industries, with the exception of utilities.

4. The labor productivity slowdown across industries: within versus reallocation effects

The evidence in the previous sections does not say whether the recorded labor productivity slowdown is the result of insufficient reallocation of resources away from backward or slow-growing industries or if it instead comes about as the loss of dynamism of industries which used to grow fast in the past. Understanding which one of these hypotheses is borne by the data adds to our understanding of Italy's decline. Providing such an answer is the goal of this section.

4.1 Decomposing labor productivity growth in within and between components

Any given industry may contribute to aggregate productivity growth in two ways.

Suppose first that the level of labor productivity in industry *j* is the same as the economy-wide average. Then aggregate labor productivity growth is simply the weighted average of each industry's labor productivity growth, with the industry fixed weights equal to the nominal value added shares in some base (usually initial) year. In this economy, the higher the growth rate of productivity in each individual industry, the higher the growth rate of productivity in the aggregate. This is the within-effect of industry productivity growth on aggregate productivity growth. In this economy, resource reallocation across industries would not affect the growth rate of aggregate productivity, for there would be no efficiency gains to reap from such reallocation.

If instead, as is regularly the case in most countries, the various industries differ as to levels or growth rates of productivity, then resource reallocation *across industries* does have an impact on aggregate productivity, holding other things constant. This reallocation (or "between" industries) effect may positively contribute to aggregate growth if industry *j* is expanding (respectively, contracting) employment/hours worked and, in parallel, its level or growth rate of productivity is higher (respectively, lower) than the economy-wide average. In this case, the reallocation effect is positive. If labor moves to industries less productive (or growing at a slower pace) than the average, the reallocation effect is instead negative. Hence, the growth rate of aggregate productivity may still be higher in Italy than, say, in France, even if all of Italy's and France's industries grow at the same pace, as long as, in Italy, labor moves away from low-productivity (or low-growth) into high-productivity (or high-growth) industries, while this does not occur in France.

Following this line of reasoning, we have broken down the growth rate of Italy's aggregate labor productivity at various instants of time into its industry contributions and three industry-specific components, namely the "within" effect, "level reallocation" effect and "growth reallocation" effect described in words above. The formula to implement such decomposition is from Gozzi, Grossi, Ganugi and Gagliardi (2005) - in turn, a modified version of the decomposition in Baily, Bartelsman and Haltiwanger (1996). It is as follows:

$$\frac{LP_T - LP_0}{LP_0} = \frac{\sum_j w_{j0}\left(LP_{jT} - LP_{j0}\right)}{LP_0} + \frac{\sum_j \left(w_{jT} - w_{j0}\right)\left(LP_{j0} - LP_0\right)}{LP_0} + \frac{\sum_j \left(w_{jT} - w_{j0}\right)\left[\left(LP_{jT} - LP_{j0}\right) - \left(LP_T - LP_0\right)\right]}{LP_0}$$

where LP_{it} is the level of labor productivity in industry i (aggregate if industry index is missing) at time t and w_{jt} is the employment share in industry j at time t. The first summation on the right-hand side is the within effect, the second summation is the level reallocation effect and the third summation is the growth reallocation effect. The j^{th} component of the three pieces of the equation above represents the overall contribution of industry *j* to aggregate productivity growth. This

contribution stems from its growth rate of productivity weighted by its initial year employment share plus the reallocation of employment to above-average or below-average productivity industries (second component) and the reallocation of employment to above-average or below-average productivity growth industries. The two reallocation components together are usually called "between-effects".

4.2 Decomposition results

Learning about the relative extent of each component of the formula in previous sub-section is a potentially useful addition to our understanding of the causes of Italy's growth slowdown. Hence we implemented the above decomposition for 1970-80, 1980-95, 1995-03, 1995-00 and 2000-03. The results for 1980-95 and 1995-03 are reported in **Table 4** below.

Two caveats before looking at the numbers. First, being the reported figures the cumulated growth over the period rather than the compounded average growth, the figures in the two panels should be compared keeping in mind that 1995-2003 involves about half as much the number of years as 1980-95. Second, the reallocation we are speaking about here is exclusively the shift of workers between industries. By construction, the within-industry reallocation between firms – clearly the most sizable inter-firm flow of workers - is not looked at here. [9]

Table 4 and **5** nicely sum up a few, well known and less well known, facts on Italy's pattern of growth.

As discussed in the previous section, 1980-95 was a period of relatively fast growth for labor productivity in the Italian economy (compared to the next decade, at least). The cumulated growth of labor productivity over this period of time was slightly above 31% (see column [4] in the leftmost panel in **Table 4**). In 1995-03, instead, the cumulated growth of labor productivity was a bare 5.1% (see column [8]) – about one third of the expected cumulated growth had productivity grown at the same rate as in 1980-95.

In 1980-95, manufacturing and business sector services provided the main boost to the aggregate growth of labor productivity, though in different ways.

The contribution of manufacturing (about 13 percentage points overall) was entirely of a within-type, for the – rather small anyway - level and growth reallocation effects essentially offset each other for this sector.[10] The cumulative growth of thirteen percentage points over fifteen years corresponds to yearly contributions of some 0.8 percentage points, in turn approximately the

[9] On the role of between-firm reallocation, see Bartelsman, Scarpetta and Schivardi (2003).

[10] The productivity contribution of manufacturing is the sum of the within and between contributions of ten manufacturing industries, seven of which producing non-durables and three producing durables.

product of a growth rate of about 2.8% per year times the initial manufacturing share in FTE employment of about 28% in 1980 (2.8 p.p. times 0.28 equals .0784 p.p.).

Table 4 – Within and between effects in aggregate and industry labor productivity growth

	1980-95				*1995-03*			
	Within effect	Level reallocation effect	Growth reallocation effect	Total	Within effect	Level reallocation effect	Growth reallocation effect	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Total	**0.255**	**0.085**	**-0.027**	**0.313**	**0.039**	**0.018**	**-0.005**	**0.051**
Agriculture	0.037	0.042	0.002	0.081	0.008	0.011	-0.001	0.017
Mining	0.005	-0.001	-0.001	0.003	0.000	0.000	0.000	-0.001
Manufacturing	0.129	0.009	-0.008	0.129	0.004	0.000	0.000	0.005
non-durables	0.092	0.006	-0.007	0.092	0.004	0.000	0.000	0.004
durables	0.036	0.002	-0.002	0.037	0.000	0.000	0.000	0.000
Utilities	0.003	0.001	0.000	0.004	0.012	-0.004	-0.003	0.005
Construction	0.011	0.001	0.002	0.014	0.000	-0.001	0.000	-0.001
Business sector services	0.075	0.034	-0.004	0.105	0.005	0.011	-0.001	0.015
Public services	-0.005	-0.001	-0.017	-0.023	0.009	0.002	0.000	0.011

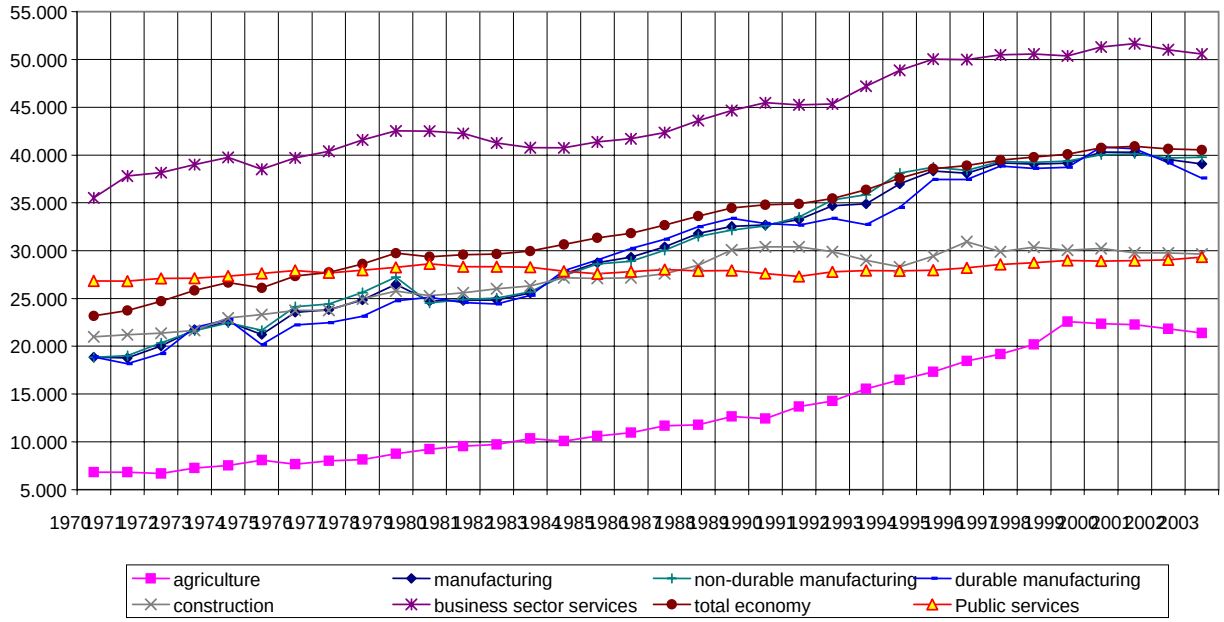
Note: The definitions of within, level reallocation and growth reallocation effects are given in the main text
Source: own calculations from OECD STAN data

Table 5 – Growth of total full time equivalent employment, 1970-2003, main industry groups

	1970-80	**1980-95**	**1995-03**	1995-00	2000-03
Economy	**1.0**	**0.1**	**0.9**	0.8	1.1
Agriculture	**-2.3**	**-3.9**	**-3.0**	-3.7	-1.9
Manufacturing	**1.2**	**-1.3**	**0.1**	0.1	0.0
-- non-durables	**0.7**	**-1.4**	**0.0**	0.0	0.0
-- durables	**2.3**	**-1.2**	**0.3**	0.4	0.0
Utilities	**0.6**	**0.4**	**-3.1**	-2.5	-4.2
Construction	**-1.5**	**-0.8**	**1.7**	0.8	3.4
Business sector services	**2.5**	**1.7**	**2.1**	2.2	2.0
Public services	**2.6**	**1.6**	**0.6**	0.3	0.8

Source: own calculations from OECD STAN data

Figure 3
Industry labor productivity levels in Italy
(Utilities left out for readability)



Source: own calculations from OECD STAN data

The "within" effect also made three fourths of the total contribution of market services to aggregate productivity growth (10.5 percentage points overall). This (7.5 percentage points) was the result of a lower growth rate (+1.1% annually) and a slightly higher - and increasing - employment share than in manufacturing. The data in **Table 4** also indicate that, unlike for manufacturing, a good one fourth of the contribution of market services to aggregate productivity growth (three percentage points) came about in the form of a level reallocation effect.

What happened then in 1980-95? Two things: deindustrialization and tertiarization. As in **Table 5** and **Figure 3** (where, respectively the growth rates of FTE employment and the industry levels of labor productivity in 1970-2003 are depicted), manufacturing employment has been reallocated away to other industries or to the unemployment pool, at a rate of 1.3 percentage points per year. In contrast, employment in market services grew by about 1.7% per year in this period, mainly thanks to the increased shares of "wholesale and retail trade" and "other business services" over total employment.

These developments materialized in positive contributions to productivity growth (partly at variance with the presumption of Baumol's cost disease theory) on both sides, because at least some

manufacturing employment has fled low-productivity non-durable-producing industries to head to high-productivity finance, real estate and properly said business services.[11]

The reallocation contribution to productivity growth was also importantly complemented by the agricultural sector. In 1980-95, the contribution of agriculture to productivity growth has remained substantial to about 8 percentage points, making up about one fourth of the aggregate productivity increase. This contribution is roughly equally split into the within and the between effects, which respectively totaled 3.7 and 4.2 percentage points. As in previous years, the level reallocation effect has been remarkably high for low-productivity agriculture. As apparent in **Table 5** and **Figure 3**, any of the alternative employment destinations would be a more productive use of workers' time than staying in agriculture.

To sum up, the labor productivity data for the Italian economy in 1980-95 describe an economy undergoing a process of structural change roughly in line with those experimented by other countries earlier on or in parallel.

This picture has dramatically changed in the last ten years, though. As explained in previous sections, aggregate productivity growth declined sharply as result of declining growth in almost all industries. Here we can be more precise about whether such declining trends at the industry level have been driven by within or between forces.

The decline in manufacturing productivity has indeed been mainly due to the "within" component, in the same fashion as former contribution of manufacturing to aggregate productivity was of a within-type. In 1980-95, manufacturing used to contribute almost thirteen percentage points to aggregate productivity growth. In 1995-2003, its contribution fell to a bare (cumulated!) one half of a percentage point, almost entirely coming from non-durable goods production. The reduced contribution from manufacturing represents about one half of the aggregate productivity slowdown.

In short, in 1995-2003, everything was astonishingly zeroed in manufacturing productivity. The zeroing of the within component means the loss of positive productivity contributions of nine and three percentage points, respectively, from non-durable and durable goods production. This got compounded with the continued decline of non-durable production in total FTE employment.

The outright zeroing of the reallocation component for manufacturing has mainly to do with the end of the release of manufacturing labor onto other sectors: while the growth of employment had stayed negative in excess of 1% in 1980-95, it became zero in 1995-03.

[11] **Table 5** also shows the continuing rise in public sector employment. This is another part of the tertiarization process, but unfavorable to productivity growth, however, through the growth reallocation component (visible as well in **Table 4**). It should be kept in mind, though, that the productivity contribution of the "public sector services" item is, by definition, very imperfectly captured (to say the least), given the non-market nature of most services supplied by the public sector.

The declining productivity performance in market services has also given a sizable contribution to the productivity slowdown for cumulated nine percentage points. Given the cumulated contribution of 10.5 percentage points in 1980-95, one would expect about half as much over a period long one half. Instead, market services have barely contributed a cumulated 1.5 percentage points in eight years. This decline has come for about seven points from "within" forces and for two points from "between" forces. The productivity contribution from the level reallocation effect is thus much smaller (one percentage point as opposed to three) but still present.[12] In the light of the sharp declines observed for the within effects, such reallocation effects from services and agriculture have become major contributors to aggregate productivity growth in 1995-2003.

Finally, the third main cause of the productivity slowdown has been agriculture, whose productivity contribution fell from 8 cumulative points in 1980-95 to 1.7 points, as a result of equally sharp declines of about three percentage points in the within and between effects. At variance with the other industries, "utilities" positively contributed to aggregate productivity growth due to its accelerating growth rate, although this positive within effect of about 1.2 percentage points has been partly offset (for about one half) by the negative reallocation component caused by the exit of workers (at the fast pace of -3.1% per year) from such high-productivity and high-growth industries.

Altogether, as portrayed in **Table 4**, the relative extent of the "within" vs. "between" components has stayed rather similar in the two periods. The within-effect represents the bulk (more than 80%) of the recorded growth in aggregate productivity both in 1980-95 and 1995-03 (the same applies to the 1970s as well, whose data are not reported here). It is thus still broadly the case that Italy has grown fast or slowly as long as each of its industries has grown fast. The remaining 20% of total productivity growth – hence not a minor part – has been brought about by inter-industry labor reallocation, particularly by labor reallocation towards high-productivity industries.

4.3 Conclusions on within vs. between effects

The evidence on labor productivity growth across industries brings two main facts to bear.

First, the declining growth of Italy's labor productivity mainly finds its roots in declining growth of productivity in each industry, notably manufacturing, services and agriculture: about 80% of the total slowdown is due to the within components and only 20% to the between components.

[12] It should be kept in mind that the level reallocation effect would be smaller had "real estate" been taken away from market services, as the OECD, in its guidelines on productivity measurement, recommends to do. The exclusion of real estate activities may well be motivated by the fact that the imputed rent of owner-occupied dwellings – an item outright unrelated to the business sector's production function – is included with the properly stated business activities in the real estate sector for many countries under SNA93. Yet STAN does not unfortunately provide separate information as to real estate and other business service activities.

Second, the industry decomposition analysis also indicates important differences in the importance of within and between effects across industries. While the manufacturing decline has been almost exclusively of a within-type, the productivity slowdown in agriculture and market services has had an important reallocation component. This piece of evidence - further confirmed when analyzing the extent of between-firm within-industry reallocation - is somehow at odds with the common presumption on the rigidity of Italy's labor markets.

5. Labor productivity slowdown: capital deepening or TFP?

The former sections clarified that Italy's growth problem stems from declining labor productivity in manufacturing, services and agriculture and partly from diminished reallocation from agriculture into services. This was the second step in our analysis. In this section we go beyond and ask a third question: is Italy's labor productivity slowdown due to reduced capital deepening or to declining TFP growth?

This is a well-established question when analyzing productivity data. "Productivity", in common parlance, is indeed "efficiency". So far, however, we have looked at labor productivity, which is not a measure of efficiency in resource allocation. Labor productivity may in fact decline for either diminished efficiency in the use of labor or due to declining accumulation of capital per hour worked. In both cases, the productivity of the labor input falls, but this second circumstance may well be the counterpart of capital-labor substitution induced, in the economists' jargon, by factor price changes along a given isoquant for an unchanged efficiency level. This is why economists, since Solow (1957), have struggled to construct measures of properly said efficiency – the most common of which is total factor productivity (TFP).

In what follows, we decompose the observed growth slowdown in industry labor productivity in diminished TFP growth and capital deepening to clarify whether an efficiency problem or something else underlies Italy's productivity slowdown.

5.1 TFP measurement: assumptions and definitions

Our TFP industry data draw on the OECD STAN database and from ISTAT – National Accounts.[13] We compute TFP under the standard assumptions of constant returns to scale and perfect competition in factor and product markets, using moving-averaged (at times t and t-1) value added

[13] See the Appendix for a more detailed data description.

shares to compute the contribution of productive capital[14] and labor. The value added share of labor is corrected for self-employment. These are possibly questionable but commonly used assumptions that we do not further discuss here.[15]

Moreover, when it comes to market services, measuring TFP becomes an even more contentious issue, as famously pointed by Zvi Griliches who defined services "hard-to-measure activities" and recently discussed by Stiroh (2002) with reference to the role of financial intermediation in the US productivity revival of the 1990s. Once again, we do take our primary data for granted in this respect too.

When computing TFP, the OECD secretariat employs harmonized price deflators to evaluate the contribution of IT capital to aggregate productivity. From Schreyer (2000), this is a shortcut to tackle the quality-adjustment issue in the absence of hedonically adjusted prices.

The same procedure is not followed by the OECD and ISTAT (whose data we employ here) when computing the industry price indices employed to produce constant price items in STAN. This is like saying that the capital deepening computed by the OECD Secretariat is meant to first-hand proxy for capital quality, while the OECD-ISTAT data are not.

While we discuss some of these issues at more length in section 6.2.2 for sensitivity analysis purposes, for the time being, any change in the quality of labor (through education and training) and capital (through machine-embodied technical change) is collapsed in our industry TFP measures, which is therefore to regard – in Denison's words - as a particularly rough summary of our ignorance. [16]

5.2 Industry TFP growth and capital deepening

Table 6 presents data for TFP growth and capital deepening and **Table 7** for the growth of capital-labor ratios following the same industry and time breakdown as in **Table 4**, except that the 1970s column is left empty (productive capital stock data are missing for that decade).

Concentrate on the economy as a whole first. From the leftmost panel of **Table 6**, one learns that Italy's TFP growth essentially zeroed in 1995-03, down by a full percentage point with respect to 1980-95. This TFP growth reduction – a notable change compared to the past - is the bulk of the reduction in labor productivity growth experienced in the same period (-1.2 percentage points, down from 1.8% per year in the 1980s to 0.6% in 1995-03).

[14] "Productive capital" is the stock of capital stock after super-imposing an age-related efficiency decline path that varies depending on the type of capital good.

[15] In a recent paper, Marchetti and Nucci (2004) cannot reject the assumption of constant returns to scale in the Italian manufacturing industries.

[16] We also re-computed TFP after correcting the labor input for labor quality measure provided by Brandolini and Cipollone (2004) for the whole economy. As expected, the TFP netted of labor quality improvements is lower than otherwise. But this simply reinforces our main result – that the overall productivity decline is mainly a TFP matter.

In the rightmost part of **Table 6**, capital deepening (*i.e.* the product of the growth of the capital-labor ratio - the ratio between productive capital stocks and the number of full-time equivalent employed persons - and the value added share of capital at t and t-1) is shown not to have decreased much for the economy as a whole, with a slight rounding down from 0.8 percentage points in 1980-95 to 0.6 percentage points in 1995-2003. Hence, the reduction of labor productivity growth for about 1.2 percentage points is accounted for by TFP growth reduction for about 1% and capital deepening by a mere 0.2%.

Table 6 – TFP growth and capital deepening, 1980-2003, main industry groups

		TFP growth				K deepening			
	1970-80	**1980-95**	**1995-03**	**1995-00**	**2000-03**	**1980-95**	**1995-03**	**1995-00**	**2000-03**
Economy	-	1.0	0.0	0.5	-0.7	0.8	0.6	0.6	0.5
Agriculture	-	2.8	0.5	2.7	-3.2	1.5	2.2	2.5	1.7
Manufacturing	-	1.7	-0.5	0.3	-1.8	1.3	0.7	0.7	0.8
-- non-durables	-	1.9	-0.5	-0.2	-1.0	1.2	0.8	0.9	0.8
-- durables	-	1.3	-0.5	1.3	-3.4	1.4	0.5	0.4	0.7
Utilities	-	-0.6	3.0	1.6	5.6	1.4	2.5	2.1	3.1
Construction	-	0.2	-0.6	-0.2	-1.2	0.8	0.7	0.7	0.7
Business sector services	-	0.2	-0.4	0.0	-1.1	0.9	0.5	0.5	0.6

Source: own calculations from STAN data

This close correlation between labor productivity and TFP (and, in parallel, the diverging behavior of capital deepening and labor productivity) becomes even more evident in the recent period, when the labor productivity slowdown has turned into an outright decline. During 2000-2003, when labor productivity growth fell to -0.2 percentage points per year, TFP growth literally collapsed to -0.7 percentage points, while the productivity contribution of capital per worker gently went down from 0.6 in 1995-2000 to 0.5 percentage points in 2000-03.

Why has the reduction in capital deepening been so mild in 1995-2003 and, within 1995-2003, in 2000-03? This may be for two reasons: a declining factor share of capital, while the growth of the capital-labor ratio has continued unabatedly, or declining accumulation rates of capital per FTE employed for unchanged or even increased factor shares (or both).

The evidence in **Table 7**, where the growth rates of industry capital-labor ratios are reported, is consistent with the latter hypothesis. The 1980-95 value added share of capital implicit in the capital

deepening calculation was 0.3 (0.8 percentage points divided by 2.7 percentage points, the growth rate of the capital-labor ratio), but then it went up considerably (to about 0.4) in 1995-2003. Hence, this upward trend in the factor share of capital almost offset the declining accumulation rates of capital per worker (which fell from 2.8% to 1.5%). Torrini (2005) has further decomposed the evolution of the capital (or profit) shares into the evolution of their two basic components, the capital-value added ratio and the imputed rate of return on capital. It turns out that the 1995-2000 increase in the value added share is entirely accounted for by rising capital-value added ratios, while rates of returns have declined (see Graph 6, 7 and 8 in his paper).

In 1995-2003, instead, the value added share of capital stayed constant between the first half and the second half of the period, while capital accumulation slowed down a little bit (from 1.6% to 1.3%). This produced the only mild slowdown in capital deepening from 0.6 to 0.5 percentage points.

Table 7 – Growth of capital-labor ratios, 1980-2003, main industry groups

	1970-80	**1980-95**	**1995-03**	**1995-00**	**2000-03**
Economy	-	2.7	1.5	1.6	1.3
Agriculture	-	5.5	4.3	5.1	3.1
Manufacturing	-	3.8	2.3	2.3	2.2
-- non-durables	-	3.5	2.4	2.5	2.2
-- durables	-	4.6	2.0	1.8	2.4
Utilities	-	2.9	3.5	3.1	4.2
Construction	-	2.0	1.9	2.2	1.6
Business sector services	-	2.0	1.0	0.9	1.1

Source: own calculations from OECD STAN and ISTAT National Accounts

So much is for the big picture. Next we provide a more detailed description of TFP and capital deepening at the industry level. It turns out that the close correlation between labor productivity and TFP (and the related implications for the behavior of the value added shares of capital) is particularly evident in manufacturing.

To start with, the TFP data in **Table 6** show outright negative figures for all industries but one (utilities) in the 1995-2003 columns and positive figures in the 1980s column (but one: utilities, again). Although the sudden and abrupt zeroing of TFP growth rates was generalized, this was particularly striking for agriculture and manufacturing. In these sectors, TFP used to grow fast at the rates of, respectively, 2.8% and 1.7% per year, in 1980-95. Productivity in “market services” has

never grown fast, instead: these industries simply suffered from the continuation of past productivity stagnation.

Manufacturing In 1995-2003, manufacturing TFP declined by about half a percentage point per year, equally for non-durable and durable producers, and not too dissimilarly from constructions and market services. Such a decline was particularly sizable for the industries producing non-durable goods in 1995-00: in these industries, TFP growth fell to -0.2% per year in 1995-2000 from +1.9% in 1980-95. TFP growth stayed instead roughly constant at about +1.3% in 1995-2000 for durable producers, but then markedly fell to -3.4% in 2000-03. This scattered timing of declines quite closely matches labor productivity developments in these industries. This piece of evidence thus closely mirrors the evidence presented above for the economy as a whole.

Non-durable goods producing industries include producers of consumer and intermediate goods, with the production of intermediates (notably chemicals and pharmaceuticals) being the fastest growing industries in the Italian economy in 1980-95. This was no longer the case in 1995-03, when TFP growth zeroed in chemicals (from 6% in the previous years). More generally, the growth debacle has been striking in all the Made-in-Italy consumer industries, such as “Textiles and Wearing”, “Leather, leather products and Footwear”, “Wood and wood products”, although timing and intensity of the growth reduction was somehow different in the various industries. The decline in “Leather and Footwear” has been unusually abrupt in 1995-00 (falling to -1.7%, from 2.5% in 1980-95) and much deeper than in the other “Made-in-Italy” industries in 2000-03, where a decline of 4.3% per year was recorded.

In industries producing durable goods, as mentioned above, TFP kept growing in the second half of the 1990s, but then it fell more dramatically than in the rest of the manufacturing sector in the first years of the 2000s. In the production of machinery and equipment (which includes many of the industries traditionally classified among the high-tech industries), TFP fell by 4.4% per year in 2000-03 – a cumulated decline of about 14% in three years. This was mainly driven by the negative 6.4% per year in the production of electrical and optical equipment – the industry including, among other things, the production of personal computers and cellular phones (whose diffusion has, in contrast, proceeded at a very fast pace over this period).

In many such industries, capital-labor ratios increased faster than labor productivity, in parallel with sharp TFP declines. This is consistent with the aggregate evidence of rising value added shares of capital and rising capital-output ratios. The steadiness in the growth of capital-labor ratios in non-durable and durable manufacturing throughout 1995-2003 is particularly striking. In this period of time, in these industries the growth of labor productivity zeroed or became negative, but the capital-labor ratios continued to grow at about the same rates as in 1995-00 and 1980-95. This applies to

textiles, leather and footwear and chemicals. All of these industries are examples of particularly abrupt declines in TFP growth and particularly sharp increases in the value added share of capital; in these industries, however, capital-labor ratios continued to grow by 3-4% per year, slightly - but only slightly - below the growth rates in 1980-95. This is in line with the result of a growth accounting exercise carried out by Bassanetti, Iommi, Jona-Lasinio and Zollino (2004) where it was shown that declining TFP came about with a growing contribution of capital to manufacturing output growth in 1996-2001 compared to previous years.

Understandably, manufacturing companies continued to invest in the booming years of 1995-2000. Less easily understandable, the investment process continued even in the face of en economy-wide collapse. Yet, when contrasted with rising value added shares of capital, this is again entirely rational.

Agriculture TFP growth in agriculture stayed roughly constant at 2.7-2.8% from 1980 through 2000 before the sudden decline in 2000-03, when the average growth rate became negative as well (-3.2% per year). The high productivity growth in the past had been the result of continuing modernization and adoption of new techniques in the agricultural sector. This process has seemingly come to a halt in recent years. In the same fashion as in manufacturing, capital accumulation continued in 1995-2000 and 2000-03 (although at a somewhat lower pace). This is mirrored in the evolution of the (implicit) value added shares of capital, which reached almost one half of the value added in 1995-2003 (up from 27% in 1980-95).

Market services Leaving the still unsolved measurement issues aside, the decline in TFP growth in market services from roughly zero in the 1980s and the 1990s to negative figures in 2000-03 are simply the continuation of past stagnation in these sectors.

This is certainly true for traditional low-productivity tertiary industries such as wholesale and retail trade (in short, trade). It also applies, but to a lesser extent, to other industries more directly affected by the IT revolution and the privatization processes going on during these years, such as finance, which includes banks, insurance companies and financial intermediation.

In wholesale and retail trade, TFP growth fell from the modest growth rates in the 1980s (hovering around one half of a percentage point per year) to negative growth of half a percentage point in the second half of the 1990s, further lowered to minus two per cent per year in 2000-03. It should be kept in mind, however, that this further deceleration is common to Germany and France and has instead been paralleled by accelerating productivity in these same industries in the US (due to the well-known productivity wonders of Wal-Mart, Home Depot and other low-price retailing giants).

In the financial sector, confirming the potential measurement issues that make it hard to link productivity developments to movements along the production function in these industries, TFP

growth reached +3.5% per year in the years of the Internet bubble (1995-2000) and then became negative for about 1.3% per year in 2000-03, when financial markets left on the ground the bulk of the rally gains of the previous five years. Altogether, in 1995-2003, the growth rate of "TFP" in the financial sector averaged +1.7% per year.

Interestingly, **Table 6** shows that, in the booming years of 1995-2000, the labor productivity slowdown in market services has been driven by capital deepening, rather than TFP. This is quite different from the manufacturing evidence described above. In the more recent years (2000-03), instead, the sharply downward trend of TFP led labor productivity once again.

Why was 1995-2000 different from previous and subsequent years in market services? The main piece of evidence in **Table 7** is that the growth of the capital-labor ratios declined substantially in market services compared to 1980-95, while the value added share of capital has gone up less sizably than in manufacturing. This was at odds with the rest of the economy. Why was it that capital-labor ratios slowed down earlier and more markedly in market services than in manufacturing?

One possibility is that, as a result of the introduction of piecemeal labor market reform in 1997-98 (the so called "Treu package" legislation), new types of part-time and temporary workers entered the labor market, taking jobs disproportionately more in those market service industries whose labor demand is probably tilted in favor of such relatively un-experienced workers. Within the highly heterogeneous "market services", such low-skill industries are "wholesale and retail trade", "hotels and restaurants", and possibly "real estate activities", while "transports, storage and communications", "finance" and "other business activities" are usually classified among those with a relatively skilled labor demand.

ISTAT has published data on the compositional changes in the labor force distinguished by gender and by type of contract over the last ten years or so. [17] It turns out that, in the last ten years or so, compositional changes in the Italian labor market have been substantial.

In 1996-2003, the employment of full-time workers increased on average by 1%, while the part-time share rose by 2.4%. The rise of part-time employment is partly accounted for by the rapidly rising participation of women to the labor market and, notably a growing female share in total employment (it reached 39% of the total in 2003, up from 35% in 1993). All in all, in 1996-2003, the share of females taking advantage of part-time increased by 3.8%, while the male share decreased by 1%. The remaining part of the story is of course the remarkable increase of temporary contracts, especially among women, resorting to this kind of contract mainly during the second half of the decade (15% vs 11% of male). Moreover, again probably in connection with the revision of

[17] See http://www.istat.it/lavoro/lavret/forzedilavoro/Ricostruzione-serie.htm

the norm regulating the contract of apprentices (Law 24 June 1997, n.196), the incidence of apprentices over total employment had risen to 2.8% as of 2002, up from 1.5% in 1992.

Although all such pieces of evidence testify the relevance of the structural changes undergone by the Italian labor market during these years, the available productivity data does not, however, first-hand indicate that the dynamics of the capital-labor ratios have been driven by labor market reform and the ensuing compostional changes in the labor force. In "Wholesale and retail trade", the pace of labor productivity indeed fell from +1.7% in 1980-95 to +0.4% in 1995-03 (+1.1% in 1995-2000), but this is mainly accounted for by a corresponding reduction in TFP growth, not by lessened capital deepening. In "Hotels and restaurants", labor productivity growth actually increased from the 1980s to the 1990s, going up from -1.2% per year in 1980-95 to +0.1% in 1995-2003 (+0.8% in 1995-2000). The same applies to "real estate", where the negative growth of labor productivity for about negative two percentage points in the 1980s turned into a less negative number in the second half of the 1990s. In the three industries more likely candidates to receive the labor supply shock, this has seemingly not ostensibly materialized.[18]

Why then, when looking at "market services", do we see in parallel lower capital deepening and labor productivity? We don't have productive capital stocks at the three-digit level and are thus unable to provide a full-fledged answer. But even sticking to what we can get a handle of, namely labor productivity, evidence exists that the labor productivity slowdown in "transports, storage and communications" is half accounted by a TFP reduction and half by a reduction in capital deepening. Moreover, the residual item in the "other business service activities" (once "real estate" is taken away) is a heterogeneous item which also includes, however, a large fraction of the so called "advanced tertiary" sector (R&D, computer and software consulting, legal activities). The most dynamic part of this patchwork of industries has shown rising growth of labor productivity and capital-labor ratios over the 1990s, which makes it a rather implausible candidate to account for the observed reduction in capital deepening. In the end, given that "communication services" has clearly been a productivity accelerating industry in 1995-2000, "transports" (land, water, air transport and the related supporting activities; about 5% of FTE employment) is left as the only candidate for driving down the capital deepening of market services as a whole in 1995-2000.

Utilities Finally, in the same fashion as for labor productivity and at variance with the rest of the economy, the utilities industry showed accelerating TFP growth over time, up from -0.6% in the 1980s to +1.6% in 1995-00, and eventually further up to +5.6% in 2000-03. This came about in parallel with accelerating growth of the capital-labor ratios and rising value added shares of capital. Whether this has more to do with shifts of the production function or, rather, with the extra-profits

[18] This point is further discussed below in section 6.2.2, where the changing composition of employment is related to the measurement of TFP growth.

arising in privatized quasi-monopolistic markets is an open issue. Torrini (2005) presents evidence of how the increased value added share of capital in the 1990s has essentially originated in the non-manufacturing part of the economy, particularly in those industries where privatization has taken place, whose main case in point is clearly utilities.

5.3 Summing up on capital deepening vs. TFP

Taken together, the facts described in this section drive one to three main conclusions:

1. Most of Italy's labor productivity slowdown is due to TFP. This result is consistent with the findings from previous work and data sets (Daveri, 2002, 2004; Bassanetti, Iommi, Jona-Lasinio and Zollino, 2004)
2. The TFP growth decline of the last ten years is particularly apparent in (but not restricted to) the manufacturing sector
3. The value added share of capital has gone up in the last few years, particularly in 1995-2000 and particularly in manufacturing and in the industries producing utilities. This counteracted declining capital accumulation and explains the only mild decline in capital deepening.

6. Extensions

In this section we investigate how our main results are affected by some of the simplifying assumptions necessary to carry out TFP calculations at the industry level with the data set we are endowed with.

A first issue is to what extent what we call TFP has really to do with the production function and not with the observed pro-cyclicality of productivity data. A second issue is whether the omission of quality improvements from the productivity contributions of each factor of production is biasing our conclusions. Third, it might be that what we call declining productivity in manufacturing is at least partly the side-effect of the declining productivity performance of market services.

We discuss each of these issues in turn in separate sub-sections.

6.1 TFP and business cycles

Although the residual nature of TFP and the restrictiveness of the assumptions necessary to compute it makes linking the short-term fluctuations of TFP growth to production functions a particularly risky undertaking, a decade-long decline of this size is probably to be taken seriously. Still, a well-known feature of published productivity data is their pro-cyclicality. Such a feature has been extensively documented and the potential biases introduced in the analysis by its neglected

consideration investigated (Hall, 1990) and made up for (Burnside, Eichenbaum and Rebelo, 1995, 1996, Baxter and Farr, 2001).

The problem seems quite relevant here. We do see a productivity slowdown and, in parallel, a cyclical downswing. It is thus legitimate to wonder whether the recorded TFP is really a genuine (but perhaps unlikely as such) technical regress or if today's productivity slowdown is at least partly driven by the unobserved factor hoarding often associated with cyclical downturns.

While giving a full answer to this question is beyond the scope of this article, the data in **Figure 4** and **5** may provide some clues on a smaller but related issue, namely whether current TFP developments in manufacturing and market services are similar to TFP developments during previous downswings.

Figure 4 reports the values of the manufacturing TFP index around cycle peaks for 2000, 1995, 1991, 1980. [19] The chronology of Italy's cycles is taken from the ISAE chronology reported in Bruno and Otranto (2004). **Figure 5** reports the same data for market services. In both pictures, the blue thick broken line represents the data from the latest downswing.

Figure 4 and **5** show quite a bit of after-peak dissimilarity in the behavior of TFP. There is indeed no such a thing as an "average response of TFP" to the onset of a cyclical downturn. The post-1995 slowdown did not negatively affect TFP in market services and lasted for just one year for manufacturing TFP, while the after-1991 recession was seemingly not there for both manufacturing and services TFP.

Having said so, however, **Figure 4** and **5** show that the post-2000 behavior of TFP is most similar to the post-1980 data for both manufacturing and market services TFP. Today's slowdown has been softer during the first year, but then the slowdown in its second year gained momentum and became very similar to the TFP slowdown recorded in the 1980s. In its third year after the peak, though, manufacturing TFP slightly recovered, while instead the slowdown became even deeper in 2003.

For a better understanding, the same pictures can be drawn for those industries which, in the description of the main productivity trends above, have been pinpointed as suffering the worst downfall in 2000-03. These are leather and footwear, chemicals and the electrical and optical instruments industries in manufacturing, and wholesale and retail trade in market services.

Figure 6-9 provides the corresponding pictures for such industries. As above, the blue broken thick line indicates how TFP evolved during the most recent downturn. Note that pictures have been drawn with the same scale on the vertical axis to make them more easily comparable. The pictures deliver a clear message: manufacturing industries are faring much worse than in all previous downswings.

[19] The data before 1980 are not reported because our TFP measures do not go backwards in time beyond 1980.

The broken lines in leather and electrical equipment (which includes most of the so called "high-tech" industries) indicate TFP losses of about 15% in three years – much more pronounced than in any other previous slowdown.

In chemicals, TFP declined only mildly compared to other manufacturing industries. (though former growth rates were about 6% per year). This is hardly good news, anyway. First of all, TFP in the chemicals industry used to grow at rates of 6% in 1980-95. Hence the sudden move to minus one per cent per year is worrisome anyway. Second, during the other slowdowns, TFP in chemicals actually increased – quite substantially in the 1980s. An explanation for this difference may be that two of the previous downswings came about in parallel with (or caused by) sudden oil price increases, which often benefits the chemicals industry, while this was not the case in 2000. It remains that TFP in chemicals has done worse in the early 2000s than even in the downswing around 1995.

Figure 4
Manufacturing TFP around cycle peaks

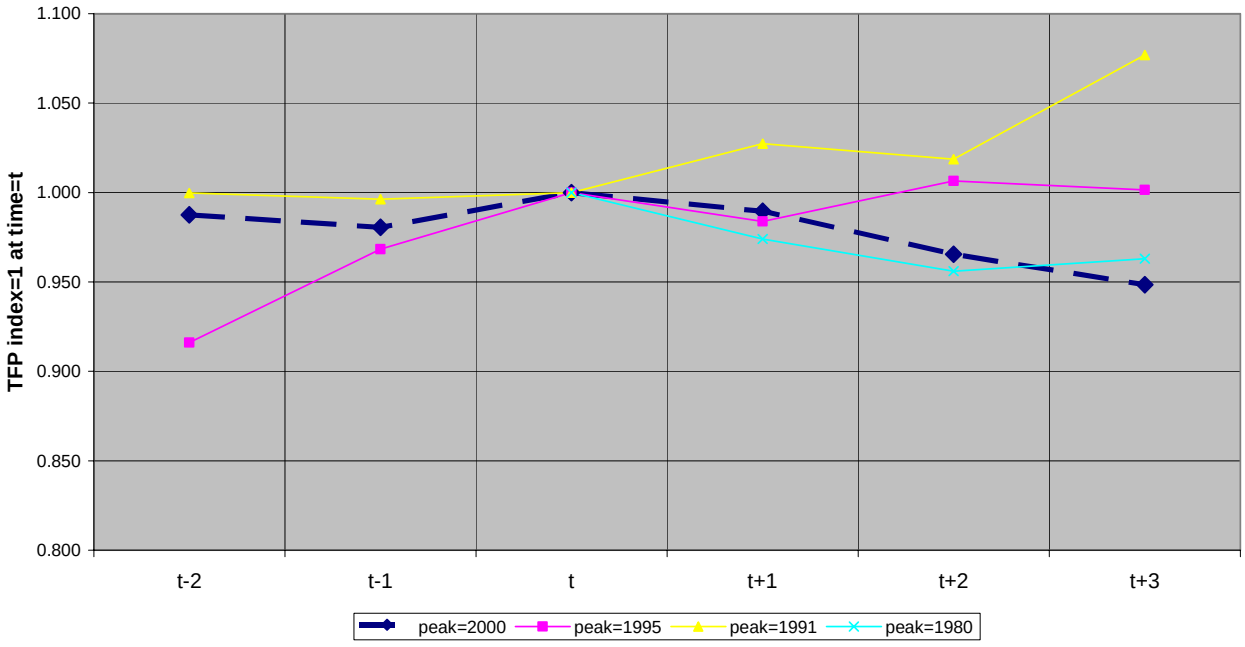


Figure 5
Business sector services TFP around cycle peaks

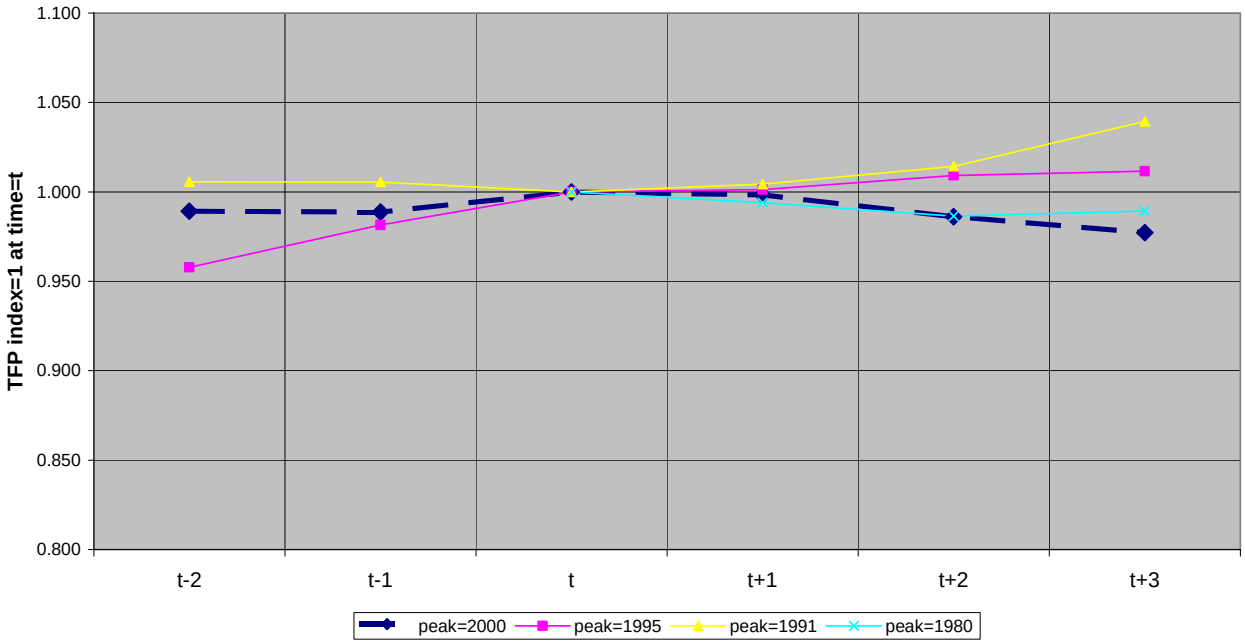


Figure 6
TFP in the leather industry around cycle peaks

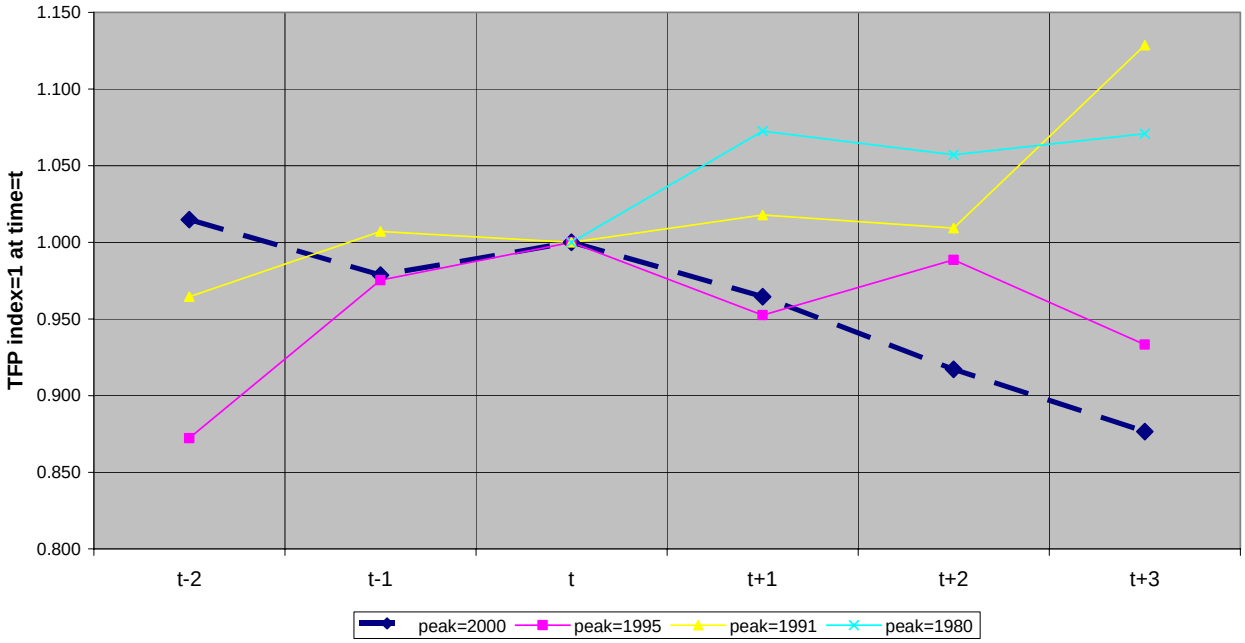


Figure 7
TFP in the chemicals industry around cycle peaks

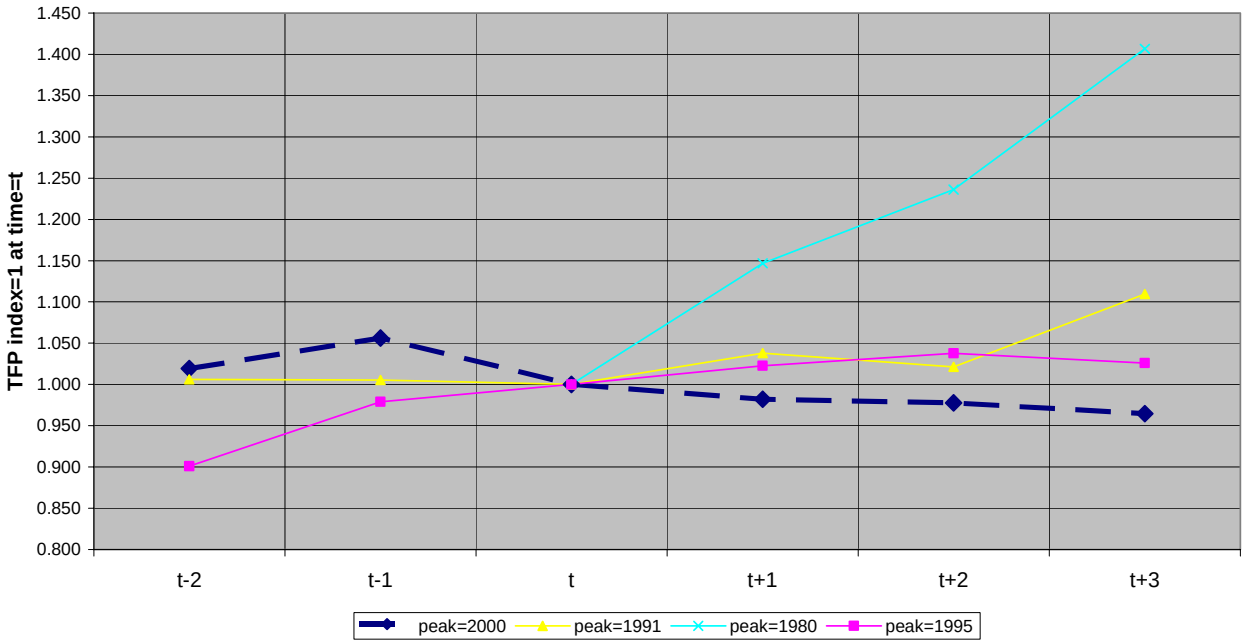


Figure 8
TFP in the electrical and optical equipment industry around cycle peaks

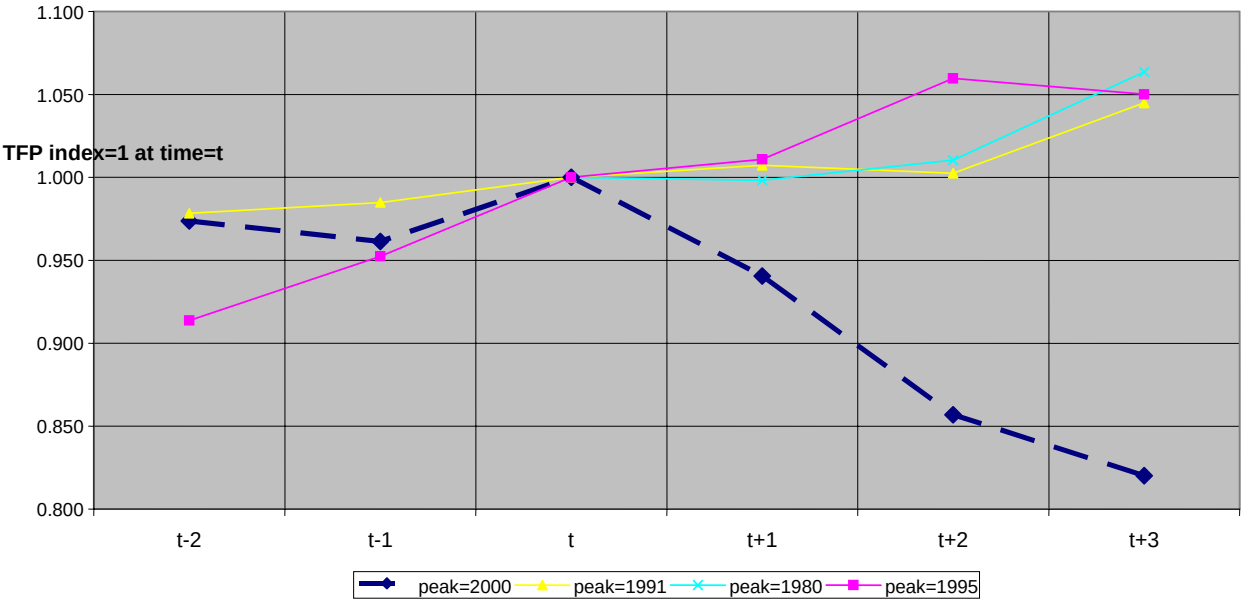
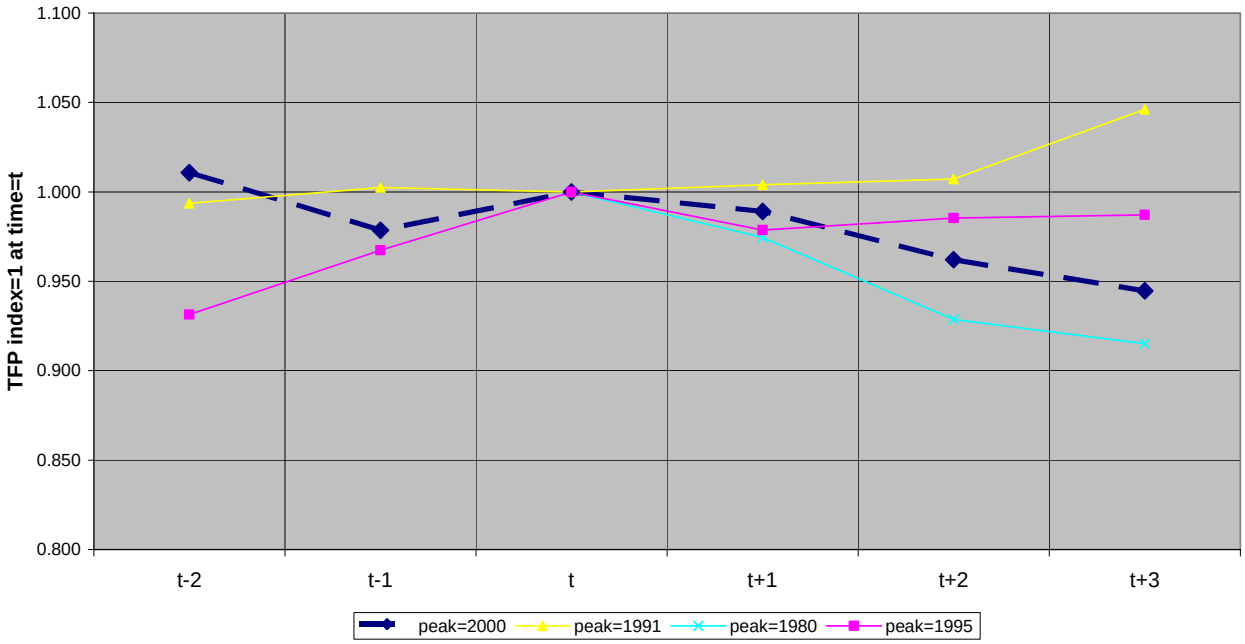


Figure 9
TFP in wholesale and retail trade around cycle peaks



Source for Figure 4-9: own calculations from OECD STAN

Finally, the cyclical downturn is less apparent instead for wholesale and retail trade. Yet, as mentioned above, this is no reason for relief, given that, during two of the previous slowdowns, there was in fact no IT revolution with its potential productivity gains up for grab out there. This was instead the case in the 1990s. Once again, TFP in the trade industry fared better during the 1995 slowdown than in the early 2000s.

Altogether, the comparison with previous episodes suggests that the severity of the 2000s decline in manufacturing TFP does not seem to be of a cyclical nature.

6.2 Factor quality improvements and TFP measurement

As mentioned in section 5, our TFP calculation is also the unwanted result of the failure of current statistical practices to account for factor quality improvements. As time goes by, hand-writing machines have been taken over by computers and illiterate workers by educated workers. In parallel, the labor market reform of the late 1990s may have somewhat changed the composition of employment, by raising the fraction of un-experienced workers. Does this have a bearing on the measured TFP? The likely answer based on the currently available information is: most likely, yes, but the available data can only very imperfectly gauge these phenomena. In the next sub-sections,

we provide some evidence of the importance of such measurement errors for the measurement of TFP.

6.2.1 Capital input

Here we confine ourselves to providing one additional piece of evidence in this respect. We show how aggregate TFP growth is affected by using the so called Schreyer's assumption of weak PPP (thus in growth rates), a way of accounting for improvements in the quality of capital. This is done by the OECD when computing TFP data in the OECD Productivity database.

Box 1 – How the OECD computes TFP growth

The OECD computes TFP growth by subtracting the growth of total inputs (capital and labor) weighted by their respective value added shares from the growth of total output (real GDP). The contribution of labor is computed by adjusting for the self-employment share otherwise not included in the total compensations of employees. The capital input is measured as the volume of capital services (S), assumed to be in a fixed proportion to the productive capital stock. Capital services are computed for seven different types of assets and aggregated to an overall rate of change of capital services by means of a Törnqvist index:

$$\ln(S_t/S_{t-1}) = \Sigma_{i=1,..,7}\, 0.5(v_t^i + v_{t-1}^i)\ln(S_t^i/S_{t-1}^i)$$

Where v_t^i is the share of each asset in the total value of capital services $\Sigma_{i=1,..,7}$ $(u_t^i S_t^i)$. In this expression, the value of capital services for each asset is measured by $(u_t^i S_t^i)$ where u_t^i is the Jorgensonian user cost price per unit of capital services and S_t^i is the quantity of capital services of type i in year t. This is the same as ISTAT. Unlike ISTAT, though, OECD economists also make an effort to account for quality improvements in high-tech capital goods. This is done following Schreyer (2000) by constructing "harmonized" deflator indices. This boils down to superimposing the behavior of the price deflator of IT investment goods in the US economy (where they are computed through hedonic methods for some specific items such as semiconductors and PCs) onto the same goods for other OECD countries (including Italy), after adjusting for differences in GDP deflator inflation. In the end, the nominal investment flows necessary to compute the capital stocks of each capital good through the perpetual inventory method are deflated through this newly constructed index instead of the officially published figures. The result is that, in the growth decomposition, capital deepening becomes bigger at the expense of TFP growth.

The OECD productivity database (see **Box 1**) allows one to construct TFP measures and compare it with labor productivity, although the OECD data do not go backwards in time for TFP as much as for labor productivity (TFP data in the OECD productivity database are only available for 1984-2003).

Such data are summarized in **Table 8** together with the STAN-ISTAT data employed in section 5 and reported here for the sake of comparison. The conclusion is the same as above: Italy's slowdown in labor productivity growth was prominently due to declining TFP growth.

As expected, by controlling for quality improvement in capital accumulation, a bigger fraction of labor productivity growth is now accounted for by capital deepening and less is left to TFP growth, the residual term in the Solow decomposition. But the time pattern remains the same.

Table 8: Decomposing aggregate labor productivity growth with different data sets

	OECD productivity database			OECD STAN + Istat		
	Growth of GDP per man hour	K deepening (in terms of K per hour worked)	TFP growth	Growth of GDP per FTE employed person	K deepening (in terms of K per FTE employed)	TFP growth
1984-95 (*)	2.2	0.9	1.3	1.8	0.8	1.0
1995-03	0.4	0.7	-0.3	0.6	0.6	0.0
1995-00	0.9	0.9	0.1	1.1	0.6	0.5
2000-03	-0.3	0.5	-0.7	-0.2	0.5	-0.7

(*) 1980-95, with OECD-STAN + ISTAT data
Source: OECD productivity database and OECD/STAN and ISTAT

In the years between 1995 and 2003, TFP growth still falls dramatically. With the quality-adjusted data, TFP levels end up falling by 0.3% per year, while the contribution of capital to labor productivity growth remains positive, with only a slight decline to 0.7 percentage points per year (down from 0.9 percentage points). This trend is very similar to the trend observed in the data reported in the rightmost panel of **Table 8**, based on quality-unadjusted data.

Interestingly, in the OECD Productivity database, the same decomposition of labor productivity growth is carried out for other OECD countries. Such comparative data for other European countries indicate that, in 1995-2003, Italy and Spain shared the unpleasant record of exhibiting virtually zero growth of TFP, with a contribution of capital deepening to labor productivity growth close to one percentage point per year - about the same as two other big European countries (Germany and France) and the US. Differences in productivity per hour worked in the OECD are mostly accounted for by differences in TFP growth, though: not by chance, the really fast-growing countries (Ireland, Finland, and Greece as well) exhibit TFP growth rates close to or above 2% per year (with Ireland showing an astonishingly high +4.4%).

6.2.2 Labor input

Now we show how TFP and labor productivity growth is influenced by the adoption of a quality-adjusted labor input measure. There is a long history of measures of labor input that reflect changes in labor quality due to the changes in the age, sex and education composition of workers (Jorgenson, Ho and Stiroh, 2005). There have also been different approaches to explicit

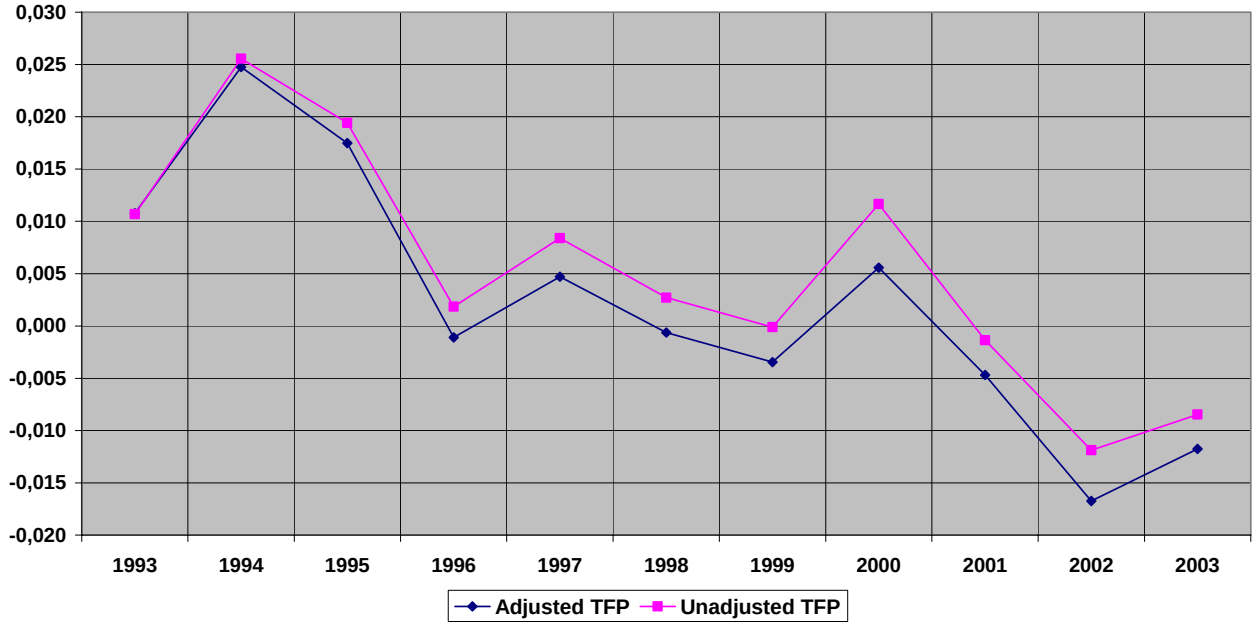
differentiation of labor input according to how skills are measured (OECD, 2001). One possibility is to use characteristics such as age, health occupation and gender to cross-classify labor input (Jorgenson et al, 1987) or to assume a direct relation between skills and occupations and rank occupations by their skill intensity (OECD, 1998). This latter is the approach followed by Baldassarini and Di Veroli (2005) to obtain a labor quality measure both at the aggregate and at the industry level for Italian economy in 1993-2003.

They derive a quality-adjusted labor input by differentiating professional qualifications of registered employees (distinguished between managers, white collars, blue collars and apprentices), unregistered employees, registered and unregistered self-employed workers[20]. Each group is weighted by its corresponding share in total labor compensations.[21]

Employing the data they have kindly provided us with (and thus implicitly following their methodology to evaluate the contribution of quality improvements in the labor input), we compute a labor-quality-adjusted measure of TFP and labor productivity.

Results conform to expectations: as shown in **Figure 10**, controlling for quality changes in the labor input slices out another bit of the former productivity residual thoughout the entire period. The time pattern of TFP growth remains the same, though.

Figure 10
Unadjusted - TFP vs Adjusted - TFP
Aggregate economy 1993-2003

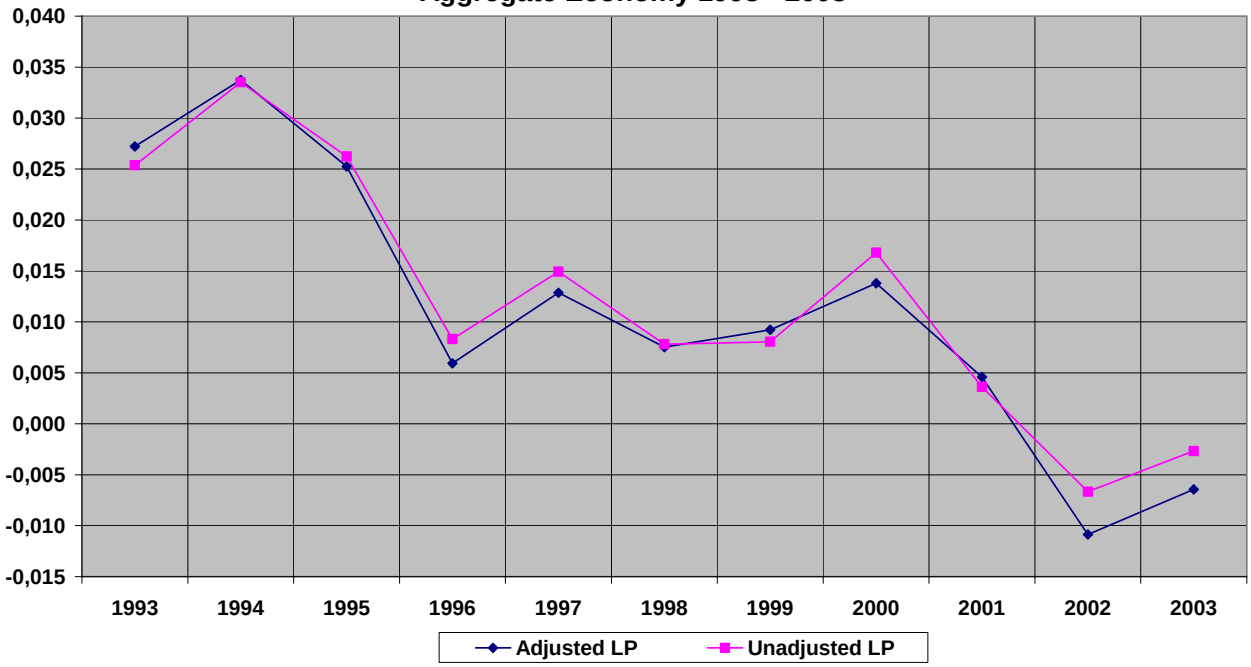


Source: own calculations from ISTAT National Accounts

[20] See Baldassarini and Pascarella (2003) for a description of the method adopted by ISTAT to identify unregistered workers and the underground economy at large.
[21] See Baldassarini and DiVeroli (2005) for a methodological description.

The observed increase in the average quality of the labor input employed in production implies that a quality adjusted measure of labor input would rise faster than an unadjusted measure. Holding the growth rate of GDP constant, this results in lower growth of labor productivity. This is what we see in **Figure 11**, where the growth rates of labor productivity, both adjusted and unadjusted for quality, are reported. The lower rates of growth of adjusted labor productivity indicate the extent of the quality improvements in the composition of the labor force occurred throughout this period of time.

Figure 11
Unadjusted Labor Productivity vs Adjusted Labor Productivity
Aggregate Economy 1993 - 2003



Source: own calculations from ISTAT National Accounts

The data on the composition of FTE by type of employment (Table 9 in Baldassarini and Di Veroli, 2005) show that, during the nineties, the composition of employment has been subject to a deep transformation, with the employment share of the white collars going up by about two percentage points (from 21.8% in 1992 to 23.6% in 2002). On the other hand, the share of the blue collars – traditionally identified as the least qualified workers in the labor force - declined by 1.3 percentage points all over the period. The data on the income shares by type of FTE (Table 8, in Baldassarini, Di Veroli, 2005) reinforce this picture and point to the rising importance of white collars and the remarkable reduction of the blue collar share in total income.[22]

[22] The white collar share went up to 34.4% of total income in 2002 (from 33.1% in 1992. The blue collar share went down by three percentage points, from 30% in 1992 to 27% in 2002.

Altogether, the data for the mostrecent sub-period show that the big picture presented in the previous sections does not signficantly change once variations in the quality of the labor input are accounted for.

6.3 Is there a private services tax on manufacturing?

Many private services, such as many of those classified among the business services, are direct inputs to manufacturing. Hence, to quantify the contribution of services to the overall productivity slowdown, it should be considered that this may be twofold, when services are produced for household final consumption and when they are intermediate inputs to other final goods industries, including, notably but not exclusively, manufacturing.

This may shed additional light on the debate on Italy's decline. If productivity in non-traded services grows slowly, this turns into a supply tax on domestic manufacturers. Notice that the same applies to a much lower extent to the slow productivity growth of manufacturers. Given the essentially tradable nature of manufacturing, domestic providers of private services, faced with inefficient manufacturing producers, may well resort to imported manufacturing goods.

Preliminarily to evaluate the question of whether there is a private service tax on manufacturing, the methodological issue of productivity measurement in the services sector must be taken up once again.[23]

TFP – our measure of efficiency - is computed under a number of simplifying assumptions such as constant returns to scale and perfect competition in product and factor markets. These, while analytically convenient and widely used, are all probably far from truth. Changes in TFP might in fact reflect changes in market power in case returns to scale are not constant. Hence, what we call TFP might simply be market power and non-constant returns to scale.

If this were the case, the evidence of the pronounced productivity slowdown in private services as seen in recent years might simply reflect the increased competitiveness in some of these industries rather than sheer productivity difficulties. By the same token, the improved productivity performance in utilities may simply reflect the enhanced scope for extra-profits enjoyed by the formerly public and now privatized companies providing utilities.

Recent empirical work in this area sheds light on these two issues. In particular, Faini, Haskell, Barba Navaretti, Scarpa and Wey (2005) document that the progress in economic reform in services industries in Germany, Italy and the UK has been extremely slow. The recent OECD (2005) broad report on progress in policy reform concludes the same. According to the data in the OECD Report, Italy remains one of the most protective countries as to professional services, finance, and banking.

[23] Standard references on this topic are Griliches (1992) and Dean and Kunze (1992).

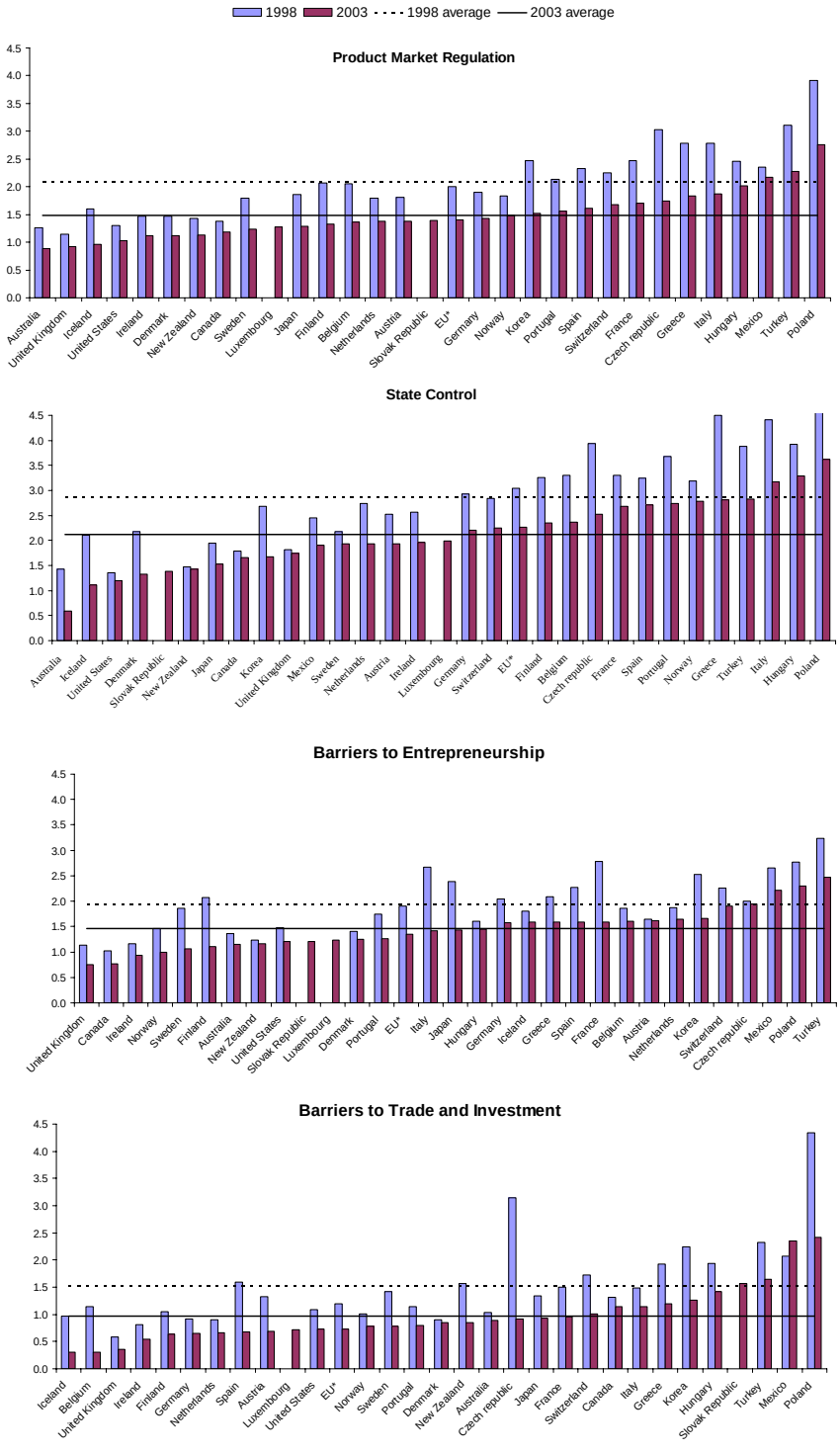
This is nicely summarized in **Figure 12** below, which originates from the data on Product Market Regulation in the OECD Database. These data provide useful tools to monitor the regulatory changes between 1998 and 2003.

The main take-up of **Figure 12** is that Italy did decrease product market regulation between 1998 and 2003. Yet, in spite of all the fuss over the importance of deregulation to regain competitiveness, Italy's position in the OECD ranking has remained the same.

Concerning the effects of reform on productivity, both reports tend to be optimistic. Quoting Faini, Haskell, Barba Navaretti, Scarpa and Wey: "Liberalization has a definitely positive effect on productivity" (meaning *labor* productivity, for they do not look at TFP). At the same time, however, they also recognize that: "(…) energy, water, railways and postal services the most visible effect of reforms has been the reduction in the initial over-manning. Productivity has typically risen, mostly as reflection of the decrease in employment, rather than a post liberalization boom in output. (…) In some cases, productivity may increase even well before privatisation and liberalisation; as shown for instance by Italy's electricity sector, incumbent firms may boost their efficiency enhancing efforts in anticipation of a more competitive environment (..)"

Moreover, in the same Report it also added that: " (…) most often efficiency gains did not fully translate into lower prices (…)" and that "(…) prices did not decrease as much as expected partly because of the limited competition that countries were able and willing to introduce. Equally crucially, the reform process involved a number of sectors where price was initially below average cost, thereby requiring heavy public subsidies. In sectors such as railways or water, market oriented reforms that brought prices in line with costs were bound to result in substantial increases in prices. Finally, the alleged need to fund large infrastructural investments has also resulted in relatively high prices, particularly when regulation has maintained a price setting role. (…)".

Figure 12. Regulation in 1998 and 2003



1. Sorted by 2003 values. The scale of indicators is 0-6 from least to most restrictive of competition.
* EU 15 (simple average)

Source: Conway, Janod, and Nicoletti (2005)

Altogether, these findings point to a still limited extent of product market deregulation and rather small efficiency effects of the deregulation seen so far, given the imperfect transmission of the potential productivity gains onto lower consumer prices. This is consistent with he other pieces of evidence provided by Torrini (2005) where it is carefully documented how the increased value

added share of capital in the 1990s has essentially originated in the non-manufacturing part of the economy.

Adding all these elements up, one may try and roughly quantify the extent of the market services tax on manufacturing costs, by computing the share of the TFP growth reduction in manufacturing accounted for by the TFP reduction in market services and weighted by their share in manufacturing output.[24] When this is done and the Finance, Trade and Other business services shares in total manufacturing output is set to, respectively, 0.09, 0.07 and 0.07 (as reported in Faini, Haskell, Barba Navaretti, Scarpa and Wey (2005, Table 4.3)), the results are as follows: the private services tax on manufacturing is, contrary to the common wisdom, rather small.

If one compares TFP growth in manufacturing in 1995-03 with its long-run average in 1980-95, a negative difference of about two percentage points obtains. How much of this is explained by the TFP growth changes in market services? Practically, zero. This is because the financial sector did actually increase its TFP growth in 1995-03, and this increase was just enough to offset the negative impact of the TFP growth slowdown in Trade and Other services.

If the experiment is repeated considering the 2000-03 period, bigger figures obtain: TFP growth in the financial sector and trade falls by, respectively, 1.7 and 2.4 percentage points compared to 1980-95 (while staying almost constant in Other business services). This gives a negative contribution of declining TFP growth in market services of about one third of a percentage point, a bare one tenth of the overall decline in TFP growth experienced in manufacturing (-3.3 percentage points) in 2000-03.

Based on such calculations, the cause of the declining TFP growth in manufacturing seems not determined by the disappointing performance of Italy's service sector.

7. Conclusions

This article is an attempt to look in detail at the nitty-gritty of Italy's economic decline.

We uncover that Italy's productivity problem is really twofold, on the manufacturing side and the private services side.

To be sure, the manufacturing question was there already when Pasquale Saraceno - perhaps the most authoritative Mezzogiorno expert of the 1950s generation - was writing. Then the main point was that the industrial revolution had been weak and half-hearted in Italy, due to the perverse modes of interaction between banks, firms and the Government.

[24] This experiment is similar to the one undertaken in Daveri and Silva (2004).

We don't know whether Saraceno was right. Our data, however, indicate that, for a long period of time, Italy's manufacturing did well. Now it is not doing well any more and may be on a declining path, having lost ground in its most fundamental engine, its ability to innovate and gain efficiency. Note that this is not a necessary side effect of de-industrialization: often, as employment is released from one sector to other sectors in the economy, this may set off forces that make productivity grow faster. This has not been the case in Italy's manufacturing sector in the last ten years or so.

Altogether, it seems as though the following sentences have not been written long ago:

> "In the first period, the time series of investment flows are stationary. This is possibly due to the general scarcity of capital. (…) This is because after the Unification, capital would rather go to the Savings Institutes rather than towards industrial enterprises. There was moreover a scarcity of machinery made in Italy necessary to carry out the investment plans. In addition to that, the price of energy was high, while skilled labor was rather scarce as well"

This was Ornello Vitali (1969, p.100), when speaking of the dynamics of investment in Italy in 1861-1876: one century ago, it seems today, once "Savings Institutes" is replaced by "newly privatized industries".

On the services side, the productivity issue is not so much in terms of a sudden decline in its growth rate, but in the continuation of a past where the lack of innovation was the rule. With an eye to international trends in this sector, Italy's productivity decline in market services has thus more the flavor of a missed opportunity rather than of an outright decline.

Given the available evidence, the route to take to fight Italy's productivity slowdown looks simple on paper: raise the rate of return of investment and ease resource reallocation to high-productivity industries from low-productivity (but possibly high-rent!) industries. Yet these goals are not necessarily consistent with a continuation of the reform undertaken in the last few years, namely privatization and labor market liberalization, which – although necessary and largely beneficial in other respects – have so far had mixed effects on productivity trends. Deepening our understanding of the productivity counterpart of such reforms remains a relatively little explored area of exciting research for the next few years.

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Appendix – Data description

Data sources

The data used in this paper are gathered from the Groningen Growth and Development Center (GGDC), the OECD STAN and Productivity databases and from ISTAT – National Accounts.

Value added at constant prices (1995), labor compensations per employees and total employment is from OECD – STAN, while the total factor productivity index for the whole economy (Table 3) is from OECD Productivity database. Productive capital stocks are from ISTAT – National Accounts.

Our industry data refer to 27 sectors corresponding to the sub-sections of NACE Rev.1 classification for mining and manufacturing industries and to the sections for the other sectors, with the exclusion of Public administration and defense (section L) of Private households with employed persons (section P) and Letting of own property (group 70.2).

Hours worked vs. full-time equivalent employment

As stated in the main text, we used full-time equivalent employment instead of hours worked in our TFP calculation because these latter are available only for a short time period (1993-2003). Here we report the definition of both measures of labor input in order to clarify why they may differ.

According to ESA95, "total hours worked" represents the aggregate number of hours actually worked as an employee or self-employed during the accounting period "when their output is within the production boundary" (ESA95, 11.26). "Full-time equivalent employment (FTE)" equals the number of FTE jobs, a job being defined as "an explicit or implicit contract between a person and a resident institutional unit to perform work in return for compensation for a defined period or until further notice" (ESA95, 11.22). FTE employment is thus defined as the number of total hours worked divided by the average annual number of hours worked in full-time jobs within the economic territory (ESA95, 11.32).

It is therefore apparent that both level and dynamics of FTE employment and hours worked differ because FTE are determined mainly by the distribution of jobs between full-time, part-time and secondary occupations, while hours worked include also other components like overtime (ISTAT, 2005).