Macroeconomic dynamics and the role of market power. The case of Italy

Mondolo, Jasmine

LIUC-Università Carlo Cattaneo

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Jasmine Mondolo

LIUC-Università Carlo Cattaneo, Corso Matteotti n.22, Castellanza (Italy)

jmondolo@liuc.it

ORCID Number: 0000-0002-8656-1233

In recent years, the US and other advanced countries have experienced macroeconomic dynamics which raise some concerns and which, according to the literature, are at least partly attributable to a rise in product market power. This study mainly aims to understand how Italy performs in terms of five relevant economic variables (i.e., domestic investment rate, labour share, labour force participation, wage inequality and economic dynamism), and whether firms' markups are on the rise. The picture that emerges is mixed, and the negative performance in terms of business dynamism and wage dispersion may be ascribable to an increase in product market power. The firm-level analysis of the Italian manufacturing sector for the years 2011-2018, which complements previous empirical analysis on product market power in this country and accounts for labour market power as well, reveals an increment in the average markup which, however, is not particularly pronounced and unsettling, and which is preceded by a period of steady decline. Moreover, this trend is accompanied by a more remarkable increase in the workers' labour market power, which helps explain the modest growth in the revenue-based labour share observed during the same period.

Keywords: labour share, market power, markup, investment, inequality

JEL Classification Codes: E25, J42, L11

1. Introduction

In recent years, several studies have attempted to shed light on some macroeconomic trends experienced by the economies of the US and other advanced countries, which are somehow puzzling and raise some concerns. These include a decrease in investment over output, a decline in both labour share and capital share, coupled with a rise in the profit share, a decrease in labour force participation, a rise in wage inequality, a slowdown in business and labour dynamism. In turn, these dynamics have implications, for instance, for welfare and resource allocation, as well as potential ramifications for policy, such as antitrust, monetary policy and income redistribution (De Loecker, Eeckhoutz and Unger, 2020).

From the analysis conducted by a recent strand of literature, it emerges that the increase in firms' product market power, which is typically measured by the price-cost margin, or markup[1], is one of the leading factors driving these macroeconomic trends. In particular, De Loecker, Eeckhout and Unger (2020), who employ the methodology proposed by De Loecker and Warzynski (2020) to estimate firm-level, time-varying markups, document a significant increase in product market power across US non-financial corporations over the last few decades, and link it to some of the aforementioned phenomena. Since the working-paper version of De Loecker and co-authors' study was made public, economists have been debating the magnitude, relevance and implications of these findings: discussion has taken place both via the examination of countries other than the US (e.g., Diez, Leigh and Tambunlertchai, 2018; De Loecker and Eeckhout, 2018; van Heuvelen, Bettendorf and Meijerink, 2019; IMF, 2019), and through a comparison of the estimates obtained using different approaches and specifications (Basu, 2019; Syverson, 2019). As an illustration, the IMF (2019) shows that, between 2000 and 2015, most of the advanced countries experienced a moderate increase in corporate markups, and that the latter contributed to the contraction of private investment, labour share and R&D expenses that have affected several advanced countries since the beginning of the new millennium.

In this study, after reviewing the pertinent literature, we focus on Italy, an advanced country that has exhibited a mixed economic performance especially in the aftermath of the economic crisis. Specifically, we first document the evolution of five macroeconomic trends, using aggregate data, in order to understand if, how and to what extent this country differs in terms of such dynamics from the US or other economies. After that, we estimate two indicators of market power (capturing imperfections on the product market and the labour market, respectively) at the firm level, and we analytically and graphically show how they relate to a key labour market indicator which has been the object of intense scrutiny, namely the labour share

[1]Another variable which is often used as a proxy of product market power and which is also employed by some papers reviewed in Section 2 is market concentration. However, as IMF (2019) and Syverson (2019) point out, this measure should be interpreted with great caution, and can be misleading if used to assess the degree of product market power. Indeed, market concentration includes no information about costs or profits, and necessarily requires a definition of market, which is often a point of contention. More importantly, concentration is an outcome, rather than an immutable core determinant of how competitive an industry or market is, and it can be associated with either less or more competition. As for markups, the literature has identified various methodologies aimed at estimating them at the industry level and, more recently, at the firm level (see Mondolo, 2020 for a review).

of income. The analysis is not limited to markups, but investigates the presence of labour market frictions as well. As Blanchard and Giavazzi (2003) posit in a seminal theoretical work, product and labour markets are indeed intimately related: the market power of the firm determines the size of the rents, and the bargaining between the firm and the workers determines the distribution of these rents. In recent years, a fast-growing strand of empirical literature has tackled both product market power and labour market power (e.g., Dobbelaere and Mairesse, 2013; Soares, 2019; Mertens, 2019 and 2020; Caselli, Nesta and Schiavo, 2021), with the latter being held either by the firms' owner ("monopsony power") or by the firms' workers ("bargaining power").

Although Italy has been included in some cross-country studies on markups (e.g., Calligaris, Criscuolo and Marcolin, 2018; Díez, Fan and Villegas-Sánchez, 2019), empirical research on this subject (especially microeconomic research) has been limited so far. Giordano and Zollino (2017) compute macroeconomic total-economy estimates of Italy's markups since 1861 and sectoral markups for the time span 1970-2012, using different methodologies. With regard to the most recent decades, they document a reduction in markups after the completion of the Single Market, which accelerated after the inception of the European Monetary Union. Evidence of a pro-competitive impact of the euro adoption is also provided by Bugamelli, Schivardi & Zizza (2008), while Bugamelli, Fabiani & Sette (2015) show that, in recent years, import competition (especially from China) has contributed significantly to curbing price dynamics and firms' markups. Thus, it seems that the trend in product market power observed in Italy between the beginning of the nineties and the first decade of the new millennium differs from the dynamics reported for the US in the same period. However, Bugamelli, Schivardi and Zizza (2008) and Bugamelli, Fabiani and Sette (2015) do not employ a direct measure of markups, and the work by Giordano and Zollino (2017) produces aggregate estimates. Moreover, none of them cover the most recent years. Our contribution thus advances our knowledge of market frictions in Italy. It also adds to the broader strand of literature on the recent evolution of firm-level markups and their implications (e.g., De Loecker, Eeckhout & Unger, 2020; Calligaris, Criscuolo & Marcolin, 2019; Fan & Villegas-Sánchez, 2019; van Heuvelen, Bettendorf & Meijerink, 2019), and ties particularly well into the recent line of research that analyses firm-level market power in both the product market and the labour market.

The balance of this work is organized as follows. Section 2 briefly reviews the literature on the effect of product market power on five macroeconomic variables. Section 3 illustrates the performance of the Italian economy in terms of the variables described in Section 2. Section 4 presents the microeconomic analysis of the Italian manufacturing sector. Section 5 concludes.

2. A review of the literature on product market power and macroeconomic trends

In this section, we shortly review the literature that investigates the role played by product market power in affecting five macroeconomic variables, namely: (domestic) investment rate, labour share, labour force participation, wage (and wealth) inequality, and economic dynamism.

2.1 Domestic investment rate

Capital investment is often regarded as a key driver of firm-level and industry-level growth. Thus, the decline in the investment rate experienced by the US and other OECD countries from the early two-thousands raises some concerns, and the possible determinants of this trend have been the object of several empirical studies, some of which also account for product market power. Indeed, as De Loecker, Eeckhout and Unger (2020) argue, higher markups typically lead to lower demand for goods and then to lower output, which, in turn, prompts firms to reduce their demand for capital and, therefore, their investment.

Gutièrrez and Philippon (2017) use industry-level and firm-level data on private fixed investment in the US covering more than thirty years to show that the underinvestment relative to measures of profitability and valuation (particularly Tobin's Q) can be attributable to changes in the nature or localization of investment (due for instance to the rise of intangibles or globalization), tightened corporate governance, increased short-termism and also decreased competition. In particular, the authors show that industries with less competition (measured by higher indexes of market concentration, including the Lerner index) invest less. This result, which also holds after controlling for intangible intensity, firm age and Tobin's Q, has been incorporated in the quantitative model of the US economy built by Eggertsson, Robbins and Getz Wold (2018). The authors' framework, characterized by imperfect competition, barriers to entry, the trading of pure profits, and realistic asset pricing, aims to provide a unified explanation of a set of somehow puzzling macroeconomic trends observed in the US in the last three decades: the aforementioned contraction of the investment rate despite historically low borrowing costs and a high value of empirical Tobin's Q, an increase of the latter to a level permanently above one, the decline in both the factor shares, accompanied by a rise in the profit share, and an increase in the financial wealth-to-output ratio, despite low savings rates and a stagnating capital-to-income ratio. Eggertsoon and co-authors hypothesize that the rise of market power is a key force behind these trends. Then, using their estimates of markups and real interest rates, they show that these stylized facts can be explained by an increase in market power and pure profits in the US economy (along with forces that have led to a persistent long-term decline in real interest rates).

Empirical evidence of the linkage between product market power and investment has been found in countries other than the US as well. As an illustration, the microeconomic analysis conducted by the IMF (2019) reveals that private fixed investment has declined by about 25%, on average, across advanced countries since the global financial crisis, compared with its pre-crisis trend, despite a large and persistent fall in borrowing costs, higher rates of corporate profit and higher expected returns on capital. Specifically, the average increase in markups since 2000 is associated with a 0.4 % decrease in the investment rate, while, when only firms in the top decile of the markup distribution are included in the sample, the average growth of markups leads to a 2 % reduction in the investment rate.

However, it is possible that the relationship between markups and investment is not linear. In particular, Diez, Leigh and Tambunlertchai (2018), who estimate the evolution of markups of publicly traded firms in seventy-four economies from 1980 to 2016, identify a U-shaped relation between investment and markups, according to which higher markups are initially associated with growing investment, but, at a certain level, increases in markups become associated with lower investment.

Other empirical analyses for a country other than the US have been recently carried out by Sun, Yuan and Wang (2021) and Armijos and Cuenca (2021). Sun, Yuan and Wang investigate the link between product market power and a peculiar form of investment, namely R&D investment, using an extensive sample of Chinese of manufacturing firms. The authors, who unify two measures of product market power often used in the literature, namely the firm-level Lerner index and the industry-level Herfindahl index, in a hierarchical linear model, find that firms are less likely to invest in R&D as their market power intensifies, and that this effect is nonlinear, namely, firms with higher markups spend even less on R&D than a linear specification predicts. Armijos and Cuenca combine firm-level indicators (including investment and ROA, which are used as the dependent variable in two separate regressions) with industry-level variables (including their proxy of product market power, namely the Herfindahl-Hirschman index) to evaluate the socially optimal levels of investment of Ecuadorian firms and their relationship with product market power, and conclude that the level of market concentration has a positive relationship with profitability and a negative one with corporate investment.

Concerning Italy, the macroeconomic study by Forni, Gerali and Pisani (2010) proposes a dynamic general equilibrium model allowing for monopolistic competition in the labour, manufacturing and service markets. This model simulates the macroeconomic and spillover effects of an increase in the degree of competition in the Italian service sector, which, according to the authors, is characterized by relatively high corporate markups. The results indicate that a reduction of services markups to the levels of the rest of the euro area would have a positive effect on the levels of private investment, production and employment, and would be associated with an 11 % increase in the long-run Italian GDP.

2.2 Labour share

A key labour market indicator which is often under scrutiny is the labour share of income. In particular, in recent years, several researchers have attempted to shed more light on what is often defined as “the secular decline” in the US labour share, which contrasts with the historical stylized fact of stable labour share highlighted by Kaldor (1957). Many possible explanations have been put forward, such as the decrease in the relative price of investment goods due to information technology (e.g., Karabarbounis and Neiman, 2014), the introduction of labour-market institutional reforms leading to a reduction in the bargaining power of labour (e.g. Bental and Demougin, 2010), the change in the industry composition to the detriment of manufacturing

(e.g. Armenter, 2015), the rapid expansion of trade and international outsourcing (e.g. Elsby, Hobyn and Sahin, 2013), and the increasing importance of intangible capital, associated with lower expenditures on labour (e.g. Koh, Santaeulàlia-Llopis and Zheng, 2016). However, an emerging strand of literature underlines the fact that these hypotheses are supported by mixed empirical evidence, and more importantly, that they assume there is a trade-off between labour and capital (namely, that firms have replaced expenditures on labour inputs with expenditures on capital inputs), which does not always occur. Moreover, it shows that the rise in the US corporate markups has played a prominent role in this decrease in the labour share.

Barkai (2020), who develops a calibrated model which considers both labour share and capital share[2], empirically demonstrates that a decline in competition plays a significant role in the decline in the labour share. He also illustrates that an increase in markups is necessary to match the simultaneous decline in the shares of labour and capital. Autor et al. (2020) hypothesize that, due for instance to technological or institutional changes, those companies with superior quality, lower costs, or greater innovation have started to reap growing rewards. Since these firms, which are defined as "superstar firms", have higher profit levels, they also tend to have a lower share of labour in sales and value added. Thus, as they gain market share across a wide range of sectors, the aggregate labour share falls. The predictions of this model are supported by the authors' empirical analysis based on US firm-level data referring to the period 1982-2012.

Also, De Loecker, Eeckhout and Unger (2020) argue that a negative relationship between the expenditure on inputs, including labour, and the markup is directly implied by the expression for a firm's markup (the latter being identified as the ratio of an input's output elasticity and its revenue share) derived by De Loecker and Warzynski (2012) using standard first-order conditions on a firm's cost minimization. The authors corroborate this statement through a simple regression analysis.

Moreover, Dixon and Lim (2020) theoretically and empirically show, by means of a VAR approach, that the decline in the labour share that occurred between 2001 and 2013 in the US is ascribable to both changes in production technologies and a rise in corporate market power (be it on the product market and/or labour market side). Similar results are obtained by Cairo and Sim (2020), who develop a real business cycle model and show that the rise in market power of the firms in both product and labour markets over the last four decades can generate

[2] The capital share of income is typically defined as the ratio between a firm's capital compensation, or capital cost, and its value added. Although this expression is quite simple and intuitive, there is not unanimous consensus on the way this indicator should be computed. The first approach, which is often referred to as the ex-post approach, assumes that all dollars not paid to labour are capital costs. Then, the capital share is simply the residual of the labour share, and profits are zero. However, there is another approach, pioneered by Hall and Jorgenson (1967), which allows them to estimate the capital share directly. This method specifies an ex-ante required rate of return on capital, derived from the standard model of production theory, which, when multiplied by capital stock, makes it possible to compute capital compensation (the numerator of the capital share), and thus, the capital share. When estimated this way, the capital share can decline also when the labour share decreases (see, for instance: Barkai, 2020; De Loecker, Eeckhout and Unger, 2020; Karabarbounis and Neiman, 2014; Rognlie, 2015; Eggertsson, Robbins and Getz Wold, 2018).

a decline in the labour share, as well as other secular trends such as rising profit share and rising income and wealth inequalities.

Gutièrrez (2018), who investigates the trends in labour and profit share across 12 advanced economies during the period 1980-2009, remarks that the well-documented labour share dynamics observed in the US since the beginning of the new millennium differ from those experienced by other advanced countries, most of which have exhibited a quite stable trend in (non-housing) labour share. In this regard, some studies focusing on the OECD countries and Europe indicate that also there, labour share on average has recently fallen, but not as remarkably as in the US, and, importantly, with relevant differences across countries[3]. Nonetheless, a negative link between labour share and product market power is generally detected also by the literature that considers non-US countries. Within this line of research, several studies have estimated firm-level markups using methodologies that imply the estimation of a production function.

As an illustration, the IMF (2019) shows that the (firm-revenue-weighted) average markup based on a sample of 27 countries increased by 6 % during the period 2000-2015, and that this rise has contributed to the recent contraction of firms' labour shares. In particular, for the overall sample, the average increase in markups since 2000 is associated with a 0.2 % decrease in the labour share, whereas for the sample of top decile firms, the average increase in markups is associated with a 1 % decrease in the labour share, a result which reinforces the "superstar firms" hypothesis. Similarly, the cross-country, firm-level study by Diez, Leigh and Tambunlertchai (2018) on the relationship between markup and investment, innovation, and labour share respectively (see also section 2.1) finds that the association between the markup and the labour share is generally negative.

A comprehensive analysis of the determinants of variations in the labour share which includes both firms' markups and labour market power has been recently conducted by Mertens (2019). The author develops a parsimonious micro-founded production side theory offering three competing explanations for the fall in the labour share: an increase in firms' product market power, an increase in labour market power owned by the firm (employer), also known as

[3] Schwellnus, Kappeler and Pionnier (OECD, 2017) report that the average OECD labour share has declined over the past two decades, but that in a number of OECD countries, including France, Italy and the United Kingdom, labour shares have remained broadly constant or have increased. Relatedly, a recent McKinsey's discussion paper by Manyika et al. (McKinsey Global Institute, 2019), which reviews the literature on the determinants of the labour share, including market power, recognizes that declines in this variable across advanced economies have been widespread, but not uniform. According to this study, the adjusted labour share of income (based on the product between the ratio of total compensation of employees to GDP and the ratio of total employment to the number of employees, in order to account for self-employed households too) decreased by 4.5 % in Spain and by 2.5 % in Germany between 2000 and 2017, but, during the same period, rose by 2.2 % in France and by 1.7 % in the United Kingdom. In another OECD Working Paper, Schwellnus et al. (OECD, 2018) shed more light on the determinants of the changes in the labour share that occurred between 1995 and 2011 in 20 OECD countries (including Italy). The authors assert that countries with falling labour shares have witnessed both a decline at the technological frontier, which mainly reflects the entry of firms with low labour shares, and a reallocation of market shares toward "superstar" firms with low labour shares.

monopsony power, or a fall in firms' output elasticity of labour, which reflects the decreasing importance of labour in firms' production activities. The author stresses that, in contrast with what common production models assume, the output elasticities of factors can change over time. He also argues that the assumption of competitive labour markets, employed for instance by Barkai (2020), Autor et al. (2020) and De Loecker, Eeckhout and Unger (2020), makes it unclear whether the documented rise in market power reflects a rise in firms' product or labour market power. Accordingly, he extends De Loecker and Warzynski's (2012) framework to incorporate frictions in the labour market, which can be easily recovered after computing the input cost shares and estimating the parameters of the production function used to derive the markups. When he applies his framework to microdata on German manufacturing firms, he finds that 70% of the labour share decline that occurred between 1995 and 2014 in the German manufacturing sector is explained by a decrease in the output elasticity of labour, while the remaining 30% is attributable to firms' increasing labour and product market power, and then to market distortions. These results suggest that it is important to account for both product and labour market power (which also have different policy implications), and that the common assumption of constant output elasticities of inputs may be rejected by the data.

Another microeconomic study that derives corporate markups from the estimation of a firm-level production function has been recently conducted by Yilmaz and Kaplan (2021). Using a large sample of Turkish manufacturing firms, they identify a negative relationship between the labour share of firms and their markups, and observe that large firms with high markups spend less on labour.

A different approach, which assesses the impact of the effectiveness of the competition policy in place, which in turn affects product market power, is adopted by Zac et al. (2021). The authors, who resort to a panel of 22 industries in 12 OECD economies over the period 1995-2005 and the Competition Policy Index (CPI) compiled by Buccirossi et al. (2013) as a measure of the quality of competition policy, find a positive link between the former and the labour share trend, and show that the main mechanism through which competition policy affects the labour share is through its ability to constrain markups. In particular, the results suggest that the implementation of an effective competition policy could be particularly important in mitigating the decline of the labour share in settings characterized by low levels of labour protection and labour bargaining power.

With regard to Italy, Torrini (2016), who explores the long-run trends and recent patterns in labour, profit and housing rent shares in this country, suggests that the slowdown in the Italian labour share observed between 1975 and 2001 was due in part to the recovery in profits, and in part to a steady increase in housing rents on GDP. He also hypothesizes that the trend reversal in this variable, which started well before the onset of the crises, is mainly attributable to a compression in corporate markups, and to the difficulty experienced by the Italian firms in being rewarded for their innovation in a more competitive environment. Torrini also highlights that, when discussing factor shares, it is necessary to specify the definition of value added used, the way self-employment labour income is dealt with, and the role played by the incidence of

the public administration and the housing sectors. For instance, the inclusion or exclusion of housing rents in the computation of the value-added may cause differences in the estimation of labour share. Microeconometric evidence of a negative relationship between product market power and the labour share in Italy has been provided by Dall'Aglio et al. (2015) and Perugini et al. (2017), who estimate the labour share at the firm level for a large sample of Italian companies (and also for companies from other five EU countries in Perugini et al., 2017), and investigate its main determinants. Both these studies find a significant and negative coefficient for product market power, which, however, is not estimated using a production function, but is simply proxied by the return on sales and the ratio between sales minus variable costs and sales, respectively.

Accordingly, despite a certain heterogeneity in terms of variations in the labour share within the group of OECD countries, it seems that changes in corporate market power may play a role in this regard not only in the US. However, as Torrini (2016) recommends, it is important to keep in mind that the computation of the labour share indicator may affect the results. First, the labour share of employees is easier to estimate than that of self-employed individuals because there are no direct measures of these workers' wage. Elsby, Hobyn and Sahin (2013) focus on self-employment in the US and conclude that a third of the decline in the headline measure of labour share is an artefact of statistical procedures used to impute the labour income of the self-employed. Secondly, labour share trends may be affected by the inclusion of income from the real estate sector. In this regard, Gutiérrez (2018) and Gutiérrez and Piton (2020) show that the non-housing gross labour share remained stable in Europe and declined only in the US. In addition, according to Cette, Koehl and Philippon (2019), since the labour share in many European countries was above its steady-state value in the late seventies, and it was bound to revert to its long-run average, empirical studies that take the period 1973-1983 as a starting point are likely to find a spurious decrease in this variable. Cette, Koehl and Philippon do not find a general decline in the labour share in their sample of advanced economies after correcting for these three potential biases (namely, accounting for residential real estate income, self-employment, and start and end periods for the empirical analysis). This holds even for the US: this economy actually experienced a sharp decrease in the labour share between 2000 and 2015, which, however, cannot be regarded as a "secular decline" according to the authors. Therefore, when interpreting the results of an empirical analysis on the labour share, and when comparing them with those produced by other studies, it is important to pay attention to the way this variable has been computed.

2.3 Labour force participation

As De Loecker, Eeckhout and Unger (2020) suggest, a rise in product market power and the corresponding increase in prices of goods sold implies a decrease in the aggregate output produced. The latter typically leads to lower demand for labour, which in turn should result in lower labour force participation and lower wages. Thus, an increase in corporate markups may

also negatively affect the activity rates. The authors also report that labour force participation of both males and females has actually declined in the US in the last few decades.

Although the literature has identified a range of possible drivers of the trends in the activity rates in the US or other countries (see Mondolo, 2020 for a review), the effect of product market power on labour force participation has been under-researched so far. As far as Italy is concerned, De Philippis (2017) argues that the increase in Italy's participation rate between 2004 and 2016 is mostly related to the rise in the population's share of highly educated individuals (who are more strongly attached to the labour market), and to the positive labour supply effects of the recent pension reforms. It may be worth investigating whether the documented increase in competition and deregulation that occurred in the Italian economy between the beginning of the nineties and the beginning of the new millennium has contributed to some extent to the steady increase in the Italian activity rate.

2.4 Wage inequality

Wage (or income) inequality, which, since the seventies, has increased substantially not only in the United States, but also in the UK and many other countries (see Atkinson and Piketty, 2009), has been the subject of extensive investigation. A comprehensive review of recent contributions on this topic has been performed by Nolan, Richiardi and Valenzuela (2019), who identify the following main drivers of wage inequality: globalization; technological change; finance, monetary policies, macroeconomic cycles and shocks; labour market institutions and labour market power; product market power; redistribution of market income by the state via taxation and social expenditure. The authors also argue that it is difficult to properly disentangle the impact of specific factors, that the possible interactions between them have been neglected so far, and that the importance of institutions and policies is likely to be under-estimated. Moreover, they posit that more evidence on the evolution of market power in both product and labour markets and on the role market power plays in recent inequality trends is a "particular priority".

As Han and Pyun (2021) explain, since extra profits are distributed in proportion to current firm ownership claims, higher markups hurt consumers, who pay higher prices, but benefit those individuals, such as business owners, corporate managers, and executives, with firm ownership claims. As these individuals are concentrated at the top of the income distribution, market power and corporate rent-seeking lead to a redistribution of income from consumers to firm owners. In the long run, this accumulated redistribution from consumers to firm owners helps top-income groups accrue more firm ownership claims, thereby raising their income even more disproportionately. As a result, the lack of competition is associated with rising income inequality.

Even though they do not delve into this topic, some previously mentioned studies hint at a potential causal link between product market power and inequality. For instance, Eggertsson,

Robbins and Getz Wold (2018) assert that, when markups are higher, workers are given a lower share of output, while capitalists get a larger share. Since, generally, individuals with higher incomes receive a consistent percentage of their earnings as capital income, whereas the poorest individuals do not hold financial assets, this mechanism will tend to increase income inequality. De Loecker, Eeckhout and Unger (2020) notice that the secular decline in US wages mainly concerns low-skill wages, suggesting that the increase in markups has mainly affected the compensation of low-skill workers. Autor et al. (2020) contend that linking the rise of superstar firms and the fall of the labour share with the trends in inequality between employees should be an important avenue of future research. Zac et al. (2021) argue that an effective competition policy may be an important contributor to lowering levels of economic inequality (i.e., income and/or wealth inequality) in the long run via changes in the labour share.

An early attempt to explore the distributional effects of product market power was made by Comanor and Smiley (1975), who formulate and estimate a model of monopoly and wealth inequality and argue that the lack of competition leaves 93% of the population worse off. The main quantitative approach introduced and applied by Comanor and Smiley has been more recently extended and updated by Ennis and Kim (2016), who calibrate the impact of wealth distribution for eight OECD countries. The authors show that the disproportionate effect of product market power on the poor and the wealthy, despite some inter-country heterogeneity, is substantial across all the economies examined, and that the lack of competition increases the wealth share of the top 10% of households by 10-24%. Ennis, Gonzaga and Pike (2019) model the potential impacts of product market power on wealth distributions for the sample selected by Ennis and Kim employing a new approach that addresses the model limitations in prior work and makes a comparative static analysis between two different scenarios (one with existing levels of market power and another with competition enhanced). In addition to a similar effect on the share of wealth, Ennis, Gonzaga and Pike find that a lack of competition reduces the income of the poorest 20 % by a percentage ranging between 14% and 19%.

Gans et al. (2019) look at the role played by product market power in wealth inequality focusing on corporate equity. They recall that economic theory suggests that monopoly prices hurt consumers and benefit shareholders, and that in a world where individuals or households can be both consumers and shareholders, the impact of market power on inequality depends in part on the relative distribution of consumption and corporate equity ownership across individuals or households. Then, they report that, in 2016, the top 20 % consumed approximately as much as the bottom 60 % but had 15 times as much corporate equity and, because ownership is more skewed than consumption, increased markups increase inequality. Also, Khan and Vaheesan (2017) argue that the failure of antitrust to preserve competitive markets contributes to regressive wealth and income distribution.

Although there are a considerable number of studies on this topic, quantitative evidence on the link between income inequality and direct measures of product market power is still limited. Drawing upon Han (2014), Han and Pyun (2021) assess the relationship between income dispersion and an increase in markups (measured at the country level by applying De Loecker

and Warzynski's definition as the ratio between the output elasticity of labour and the labour share) in 20 countries during the years 1975-2011, and find that a rise in markups is positively associated with rising income inequality. Their study, which accounts for the role of labour market policies, also reveals that the positive relationship between markups and income inequality is less pronounced in countries with better labour protection, such as the statutory protection and power of labour unions, generous unemployment benefits, and mandatory minimum wages.

Finally, according to Bakir, Hays and Knoedler (2021), who briefly recall the history of American antitrust and analyse the data on rising profit shares and market concentration and declining labour share in the US manufacturing sector, the laissez-faire bent of the Chicago School of Antitrust toward corporate bigness should be recognized as another strong contributor to rising income inequality in the country.

2.5 Economic dynamism

Following ECB (2019), the term "economic dynamism" used in this work encompasses business dynamism and labour-market dynamism. The former typically refers to the rates of firm entry and firm exit, while the latter concerns job flows and can include labour reallocation, job-to-job transitions, non-employment to employment transitions and employment to non-employment transitions, and/or job creation and job destruction. Market economies are characterized by a continuous reallocation of resources (capital and labour) across firms and sectors. This reallocation raises aggregate productivity directly, as resources move from less to more productive firms (and less efficient firms are replaced by productive, and often young firms), but also indirectly, since the increased availability of resources allows these firms to expand further. However, such economic dynamism can be hindered by incumbent firms with high market power, which may be used to deter entry through the threat of a price war or privileged access to partner firms, or lobby for the establishment of occupational licenses.

In this respect, De Loecker, Eeckhout and Unger (2020) posit that, in an environment characterized by corporate market power, when productivity shocks occur, firms adjust their variable inputs to a lesser degree than they would in a competitive market. This is consistent with Decker et al.'s (2014) finding that, in the US economy, it is not the volatility of productivity shocks, but rather the responsiveness of firms' output and labour force decisions to the existing shocks that has declined over the last three decades. Thus, De Loecker and co-authors suggest that the rise in market power can rationalize the decrease in labour reallocation across firms even if the observed shocks to firm productivity have remained constant.

Drawing on OECD data, Furman (2018) suggests that the reduced fluidity and dynamism of the economy is partly a "natural" reflection of trends like the increased importance of network externalities and partly a "manmade" reflection of policy choices, like increased regulatory barriers to entry, which have favoured the rise of market power.

The ECB (2019) regards economic dynamism as an expression of product market power, and documents its evolution together with the dynamics of what it considers to be two additional indicators of product market power, namely market concentration and the markup, at the sectoral and the firm levels, across a group of four relevant economies of the euro zone (i.e., Italy, Germany, France and Spain) during the years 2006-2015, drawing comparisons with the US. According to this study, in contrast to the situation in the US, the aggregate markup of the portion of the euro area under scrutiny has been fairly stable, and has gone through a marginal decline since the late nineties/early two-thousands which is driven largely by developments in the manufacturing sector, and potentially by the impact of trade and monetary integration in the euro area. However, it should be noticed that, in this report, the markup is simply calculated as the ratio between output and input (labour and materials) costs. Concerning economic dynamism, while labour market dynamism in the US declined over the last two decades, in the euro zone it has not shown a clear trend. ECB also documents the decline in business dynamism in the US between 1980 and 2015, and argues that it is not easy to replicate such analysis for the euro area and then make comparisons for various reasons[4].

To sum up, several studies suggest that increasing product market power has contributed to the decline in economic dynamism observed in several countries, but robust empirical analysis is still limited. Concerning Italy, few studies specifically address dynamism in the Italian labour market. As an illustration, Cefis and Gabriele (2009) analyse job flows in Trentino from 1991 to 2001 using firm-level data from INPS provided by the local Institute of National Statistics (Istat) bureau. The authors do not directly investigate the effect of changes in product market power. However, they reckon that the positive relationship between the GDP growth rate of the local economy and the rate of job creation-job destruction confirms the role played by macroeconomic conditions in generating job flows, and implies that higher competition leads to higher job creation for "winning" firms and higher job destruction for "loser" firms.

3. Macroeconomic trends in Italy based on aggregate data

In this section, using aggregate data compiled by Istat and, to a lesser extent, by some international organizations, such as Eurostat, ILO (International Labour Organization) and OECD, we show how the variables illustrated in Section 2, namely investment rate, the labour share of income, labour force participation, wage dispersion and economic dynamism, changed in Italy during the period 1995-2018 (or a shorter one, in case of limited data availability). We also make some comparisons with the US and/or the European Union as a whole to assess

[4] Some of the reasons reported by ECB are: the EU data suffer from severe asymmetries in coverage (especially before 2006); business demography is quoted in terms of establishments (defined as the physical location a business operates in, and which can be more than one in the same firm) in the US, and in terms of firms in the EU; the definition of births and death can vary across different countries: in the US, the focus is on employer establishments, namely units of firms with at least one employee, while in the euro area, the unit of measurement is the firm (which corresponds to at least one establishment), irrespective of whether it has employees or not.

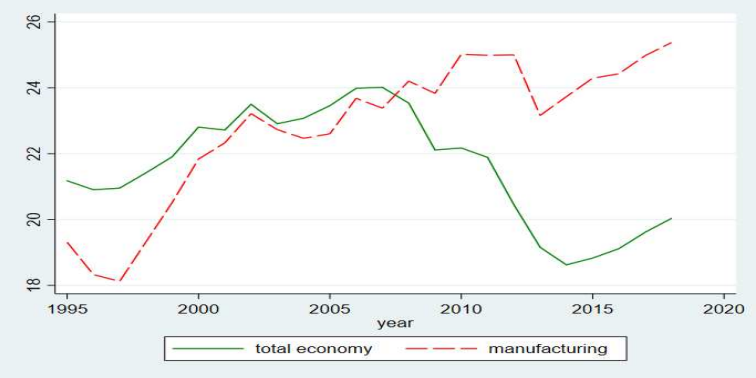
whether, how and to what extent Italy differs from other countries in terms of the macro-trends under scrutiny.

3.1 Investment trends in Italy

Data on aggregate investment trends in Italy can be recovered from the "National Accounts" section of Istat Statistics, which reports annual data on gross fixed capital formation ("investimenti fissi lordi"). A limitation of this indicator lies in the impossibility of breaking it down into its private and domestic components and of disentangling tangible and intangible assets. Thus, the picture that emerges from the analysis of investment based on gross capital formation may partially change if private investment only were investigated.

Figure 1 plots the Italian domestic investment for the total economy as a percentage of national gross value added, as well as the investment attributable to the manufacturing sector only (as a percentage of gross value added from manufacturing): total investment over output peaked in 2007, and then rapidly decreased until 2014, the year in which investment reached its lowest value of the 1995-2018 time-period. In recent years, total investment has shown a positive trend, growing at a rate which is similar to that of investment in the manufacturing sector. The latter has been characterized by a more stable, positive average investment trend and, since 2008, despite a contraction between 2008 and 2009, and later from 2012 to 2013, it has been outperforming the economy as a whole in terms of investment.

Figure 1 Domestic investment rate in Italy (%), total economy and manufacturing, 1995-2018.



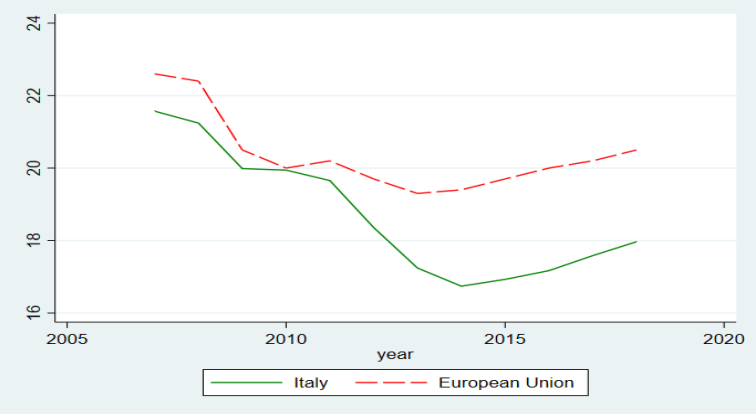
Source: Istat

The dynamics of the two indicators diverge especially after the economic recession, and do not noticeably change when the investment rate is replaced by absolute investment.

Figure 2 offers a comparison between the domestic investment rate (gross fixed capital formation over GDP) in Italy and the investment rate attributable to the whole European Union for the period 2007-2018. Investment over output in the EU fell from 22.6 % to 20.5 % between

2007 and 2009, and further declined from 2011 to 2013. Except in 2010, when investment over GDP amounted to about 20% in both Italy and the European Union on average, the EU investment has been higher than the Italian one also in the aftermath of the economic recession. In the last few years, the two series have followed a similar path, but the gap between the two is still significant: while in 2010 it amounted to about 0.06 %, in 2015 it was equal to 2.83 %.

Figure 2 Domestic investment rate in Italy and in the European Union (%), 2007-2018.



Source: Eurostat

The gradual recovery of European investment may have been partly fostered by the "Investment Plan for Europe" proposed in November 2014 by the European Commission, which was supposed to mobilize at least 315 billion euro in private and public investment.

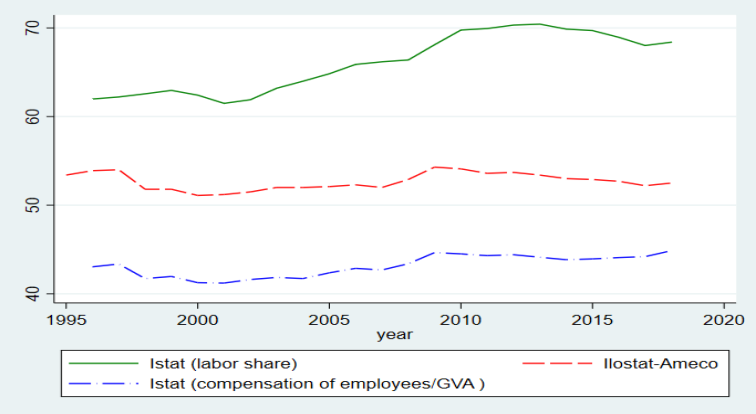
3.2 Trends in labour share in Italy

Data on the Italian aggregate labour share can be derived from both Istat Statistics and Ilostat. The labour share series based on these two data sources and referring to the years 1995-2018 are plotted in **Figure 3**. Looking at this figure, it can be noticed that the two indicators differ not only in terms of the absolute level (in particular, the labour share construct based on Istat data systematically and remarkably outperforms the one based on Ilostat data) but, more importantly, also in terms of trend. In particular, Ilostat-based labour share decreased slightly from 2009 to 2017, while Istat-based labour share peaked in 2013 and then also declined slightly from 2013 to 2017. Anyway, the latter shows an average positive trend over the selected period, while the Ilostat indicator does not display a clear prevailing direction. The main source of such a divergence seems to lie in the way the two indexes are computed (an issue which has been dealt with by a number of researchers and briefly illustrated in section 2.2). Istat defines the labour share as labour compensation over value added at current prices. Labour compensation is measured as the sum of compensation of employees (which includes both wages and salaries and employers' social contributions), an estimate of the compensation of self-employed workers

based on the attribution of the same average hourly compensation to self-employed workers as to employees (which is debatable), and a share of net taxes on production (which are allocated proportionately to labour and capital according to their shares in value added). ILO, which for the EU uses labour share data (available from 1960) stored in Ameco (i.e., the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs), measures the labour share as total compensation of employees over GDP, both provided in nominal terms. Total compensation refers to the total remuneration, in cash or kind, payable by an enterprise to an employee in return for the work done by the latter during the accounting period. Thus, it seems that the numerator of the Istat labour share includes more elements than the Ilostat-Ameco one. Moreover, the former uses gross value added at the denominator, while the latter uses GDP.

Interestingly, the trend in the labour share indicator calculated as the ratio between compensation of employees and gross value added, whose data come from Istat as well and which is plotted in Figure 5, is very similar to the trend in the Ameco labour share, apart from a few years towards the end of the sample.

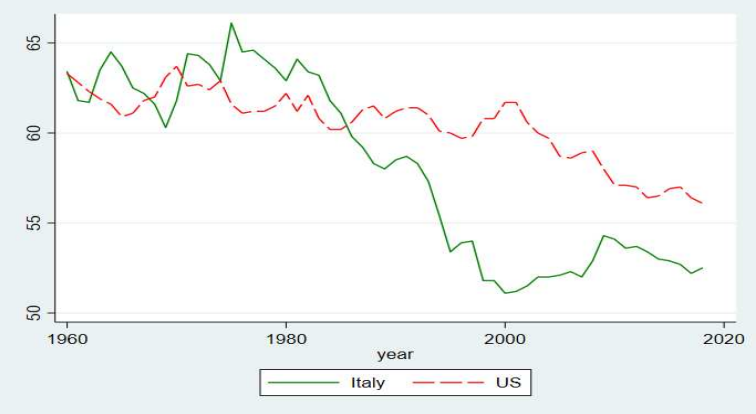
Figure 3 Italian labour share series based on different data (%), 1995-2018.



Sources: Istat and Ilostat-Ameco

Labour share data compiled by Ilostat, which is a cross-country dataset, can be used to draw some comparisons between Italy and other economies. **Figure 4** plots the labour share of both Italy and the US for a considerable time horizon, from 1960 to 2018.

Figure 4 Labour share in Italy and the US (%), 1960-2018.

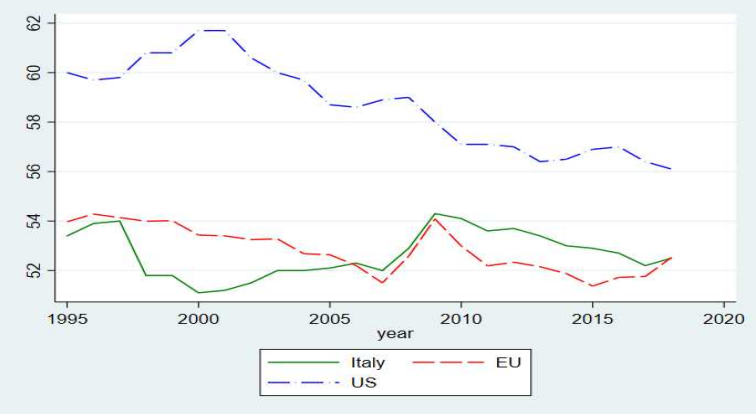


Source: Ilostat-Ameco

Figure 4 shows a steady average decline in the US labour share over time, and a sharp drop in the Italian labour share, which peaked in 1975 (amounting to 66.1%) and scored its lowest value (51.1 %) in 2000. From 1986 onwards, the level of the Italian labour share has been systematically lower than the level of the US one. More specifically, the two series overlap in 1974, whereas in 2000 they exhibit the largest gap of the selected period. Since the beginning of the new millennium, the US labour share has been going through a well-documented phase of decline, while the Italian labour share shows a mixed trend.

After considering the US, we assess whether Italy differs noticeably from the rest of Europe in terms of labour share trend. To this purpose, in **Figure 5** we plot the average labour share in Italy, in the European Union (and in the US, too) for the period 1995-2018.

Figure 5 Labour share in Italy and the EU (%), 1995-2018.



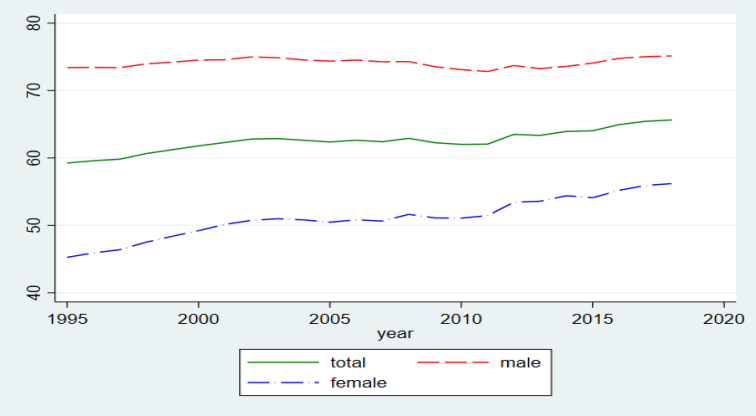
Source: Ilostat-Ameco

It can be observed that, in the European Union, the average labour share gradually declined from 1995 to 2007, and then experienced an increase of about 2.6 percentage points between 2007 and 2009, which is likely to be ascribable to its typically countercyclical behaviour. The labour share further decreased from 2009 to 2015, and then started growing again. Thus, the Italian performance diverged from the European experience in the period 1995-2005, and since then it has become more similar to the rest of the EU. Moreover, despite its negative trend since 2000, the US labour share has been systematically higher than both the Italian and the EU labour shares.

3.4 Trends in labour force participation in Italy

The recent dynamics of the Italian labour force participation are captured by **Figure 6**. The activity rate (age 15-64) increased from about 59.3 % in 1995 to about 65.6 % in 2018; as expected, female labour force participation was always noticeably lower than male force participation[5]; however, the gap between the two fell over time, from about 28.14 % in 1995 to about 18.94 % in 2018. Moreover, the male activity rate slightly decreased between 2009 and 2011 (from 73.54 % to 72.83 %), and then recovered in recent years.

Figure 6 Labour force participation rate (total, male and female) in Italy (%), 1995-2018.

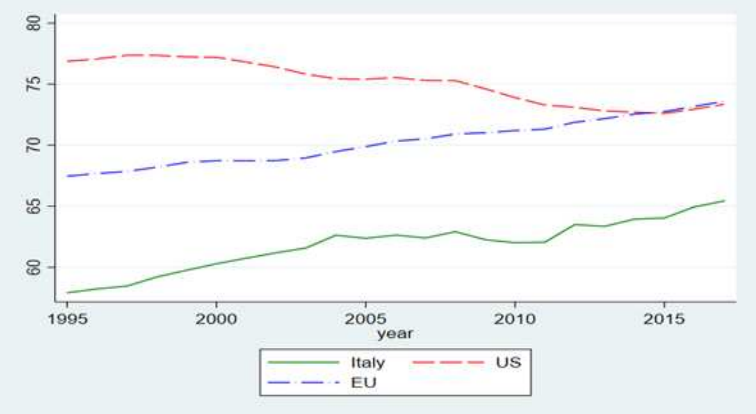


Source: Istat

Figure 7 compares the Italian participation rate with the participation rate of the European Union and the US. While, as discussed in Section 2.4, the activity rate in the US declined (from 76.9 % in 1995 to 72.6 % in 2015), the activity rate in the EU increased steadily over time, and in the last few years available it is very similar to the US one. Conversely, it is higher than the Italian activity rate during the whole period.

[5] The values for total labour participation rate (15-64) reported by Istat are slightly higher (by an amount varying between 1.3% and 1.5%) than the ones reported by OECD for the years 1995-2003 although both the organizations collected these data from the Labour Force Survey. It is possible that Istat has revised upwards the estimates for the years 1995-2003.

Figure 7 Labour force participation rate in Italy, the EU and the US (%), 1995-2017.



Source: OECD

3.5 Trends in wage dispersion in Italy

A widely used indicator of wage dispersion, and whose interpretation is very intuitive, is the Gini coefficient. Annual data on this indicator for the OECD countries since the early two-thousands (with several missing values for some countries) are available in the OECD Income Distribution Database (IDD) and are also reported in the OECD Stat database. **Figure 8** shows the Gini coefficient based on the gross income (before taxes) of Italian workers and the Gini coefficient based on disposable income (after taxes and transfers)[6]. Focusing on the latter, for which data since 2004 are available, we observe that wage dispersion declined between 2004 and 2007, and then rose. In the 10 years between 2007 and 2017 the Gini index increased by 0.017 points. If we compare the Italian data with those referring to other countries, we can see, for instance, that in 2017 the level of the Gini coefficient in Italy was very similar to the level of this index found in Spain (0.334 and 0.333, respectively), and was higher than the one measured in other Western-European countries, such as France (0.292), Germany (0.289) and Sweden (0.282); however, the Gini coefficient suggests that wage dispersion in Italy in the whole period 2004-2017 is less pronounced than in the UK, which, in 2017, exhibits a Gini index equal to 0.357 (for more information and further comparisons, see the OECD Income Distribution Database).

[6] These series are based on the definition of income which has been used by OECD since 2012. Details on income definitions and on income components can be found at this link: http://www.oecd.org/els/soc/IDD-ToR.pdf

Figure 8 Gini Coefficient in Italy, 2004-2017.

Source: OECD

3.6 Trends in business dynamism in Italy

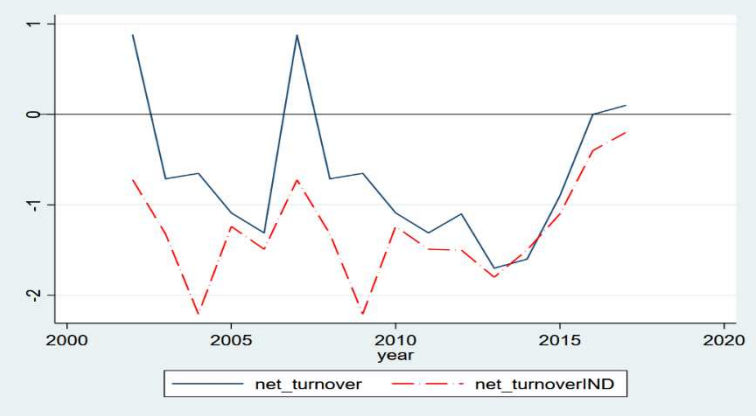
As the indicators of labour dynamism mentioned in section 2.5 require the use of individual-level data to which we do not have access, in this section we only look at business dynamism in Italy. Istat publishes on its website a section labelled "business demography" which reports data on the birth rate (i.e., the number of enterprise births in the reference period divided by the number of enterprises active in that period, in percentage terms), the death rate (i.e., the number of enterprise deaths in the reference period divided by the number of enterprises active in that period), the business churn (i.e., the sum of birth rate and death rate) and, in recent years, also the net turnover rate (i.e., the difference between the birth rate and the death rate) of Italian firms at the national, regional and macro-sectoral level. A birth (death) amounts to the creation (dissolution) of a combination of production factors with the restriction that no other enterprises are involved in the event. Then, births (deaths) do not include entries into (exits from) the population due to mergers, break-ups, split-off or restructuring of a set of enterprises, as well as entries into (exits from) a sub-population resulting only from a change of activity[7]. As of 2021, the last update dates back to July 2019 and covers the period 2012-2017, whereas the earliest available data refer to 2002. Since 2008, data on birth rate and death rate are also reported by Eurostat, which collects data on business demography from the national statistical institutes of the EU members[8]. However, the Eurostat data for Italy, especially the ones referring to the death rate, do not perfectly coincide with the Istat data, probably because, unlike Istat, Eurostat does not regularly replace the estimates of the death rate with the official values once

[7] Indicators of business dynamism can also be computed using annual data on the number of firm registrations and cancellations to the business register, which are compiled by the Italian Chamber of Commerce. However, the inclusion criteria partly differ from the ones adopted by Istat; for instance, registrations (cancellations) to the business register can be also attributable to firm entries into (exits from) the population due to mergers, break-ups, split-off or restructuring of a set of enterprises.

the latter become available. In addition, Eurostat itself recognizes that it is difficult to harmonize data coming from countries that use different definitions of business birth and death. For these reasons, we do not make comparisons between Italy and the EU in terms of business dynamism.

Figure 9 plots the average net turnover rate of Italian firms for both the total economy and the macro-sector "industry" (the main contribution to which is represented by the manufacturing sector) based on Istat data and referring to the period 2002-2017.

Figure 9 Business dynamism (net turnover rate) in Italy, total economy and industry (%), 2002-2017.



Source: Istat

The net turnover rate referring to the total economy was negative in 11 out of 16 years, peaked in 2007, then went through a phase of decline and in 2013 inverted its trend again. In 2016, the birth rate and the death rate were approximately the same. The net turnover rate observed in the industry macro-sector follows a similar path, except for years 2004 and 2009, and, even though in the last years available was on the rise, it was systematically negative. All in all, the Italian economy and, in particular, the industry macro-sector exhibits a relatively poor performance in terms of business dynamism, even though it is likely that the economic recession has played a negative role, and it seems that, in recent years, it has started to improve.

4. Microeconomic analysis of market power and the labour share of income in the Italian manufacturing sector

The picture of the Italian economy that emerges from the descriptive analysis of Section 3 is somehow mixed: on the one hand, it displays a gradual but steady growth in labour force participation, an average trend in the labour share that is less worrying than the US one (especially if we consider the one based on Istat data), and an investment rate that has been recovering. At the same time, it exhibits some weaknesses, such as a low firms' turnover rate (especially in the industry macro-sector, where it is always negative or around zero) and

increasing income inequality, which have been regarded as possible symptoms of increasing product market power. In this section, we complement the overview of the macro-trends depicted in Section 2 by uncovering the recent trends in market power in Italy. Focusing on the manufacturing sector, which in this country still represents an important industry in terms of output and employment, we estimate firm-level markups, as well as a measure of labour market power, by estimating a production function. We also calculate the labour share of income and show how the dynamics of market power can help explain the trends in this important labour market outcome. The data come from the commercial database AIDA by Bureau van Dijk and cover the years 2011-2018. We retrieve information on revenues, labour costs, number of employees, the book value of the capital stock, expenditures on intermediate inputs (i.e., materials), the industrial sector of activity and the year of birth of the firm. We merge these firm-level data with industry-level deflators of value added, intermediate inputs and tangible assets compiled by the National Statistical Office (Istat) and OECD-Stan. The raw data require intensive cleaning to net out the influence of measurement error and extreme values, and we exclude firms that remain in the sample for less than five consecutive years. The resulting dataset contains 277,883 observations.

4.1 Analytical framework

In order to identify product and labour market imperfections in the Italian manufacturing sector, we first estimate the parameter of corporate markup drawing upon De Loecker and Warzynski' s (2012) methodology. This approach assumes that firms minimize costs and at least one input (materials) is adjusted freely, while the other factors (capital and labour) may show frictions in their adjustment. Unlike previous contributions, this framework requires neither assumptions on demand and how firms compete, nor the computation of the user cost of capital, and provides firm-level, time-varying estimates while controlling for unobserved productivity.

By combining the optimal input demand conditions obtained from cost minimization with the standard definition of markup (i.e., price over marginal cost), De Loecker and Warzynski show that the price-cost margin can be identified as the ratio of the output elasticity of materials and its revenue share:

$$\mu_{it} = \frac{\theta_{it}^{M}}{\alpha_{it}^{M}} , \qquad (1)$$

where μ_{it} is the markup of firm i at time t, θ_{it}^{M} is the output elasticity of materials and α_{it}^{M} is the revenue share of materials, also known as cost share or expenditure share of materials.

If $\mu_{it} = 1$, the firm operates in a product market characterized by perfect competition; if $\mu_{it} > 1$, there is imperfect competition in the product market and the firm owns some degree of product market power, namely, it charges a price that is higher than the marginal cost.

Then, we introduce our measure of labour market imperfections, that we label φ, as the ratio between the average labour cost paid by firms (w), which we observe in the data, and the marginal revenue product of labour (MRP^L):

$$\varphi_{it} = \frac{w_{it}}{MRP^L_{it}} \qquad (2)$$

The parameter φ captures the wedge between the cost of an additional unit of labour and the revenue it generates (both in nominal terms); therefore, it is a measure of (labour) market power on the side of firms' employees. If $\varphi = 1$, the wage is equal to the marginal revenue product of labour and the labour market is competitive. On the other hand, any departure from unity signals frictions, stemming from either the existence of labour market power owned by the firms, resulting in $\varphi < 1$ and implying that the marginal revenue of labour is higher than the wage, or from some degree of market power by firms' employees ($\varphi > 1$).

As Mertens (2019, 2020) and Caselli, Nesta and Schiavo (2021) demonstrate, φ can be expressed in terms of the ratio of the output elasticity of materials over the revenue-based materials share and the output elasticity of labour over the revenue-based labour share:

$$\varphi_{it} = \frac{\frac{\theta^M_{it}}{\alpha^M_{it}}}{\frac{\theta^L_{it}}{\alpha^L_{it}}} \qquad (3),$$

where $\frac{\theta^M_{it}}{\alpha^M_{it}}$ represents the markup, θ^L_{it} is the output elasticity of labour and α^L_{it} is the revenue-based labour share of firm i at time t.

While the revenue shares can be easily computed using data from firms' balance sheets, the output elasticities need to be estimated. In the Appendix, we briefly illustrate how we estimate a firm-level production function that permits us to uncover the parameters θ^M_{it} and θ^L_{it} and then to compute our indicators of market imperfections.

4.2 Trends in market power

This section presents some descriptive analysis of our estimated parameters**. Table 1** reports the sectoral and total-manufacturing averages of the parameters μ and φ, by sector. A substantial degree of between-sector heterogeneity can be observed. While the "Rubber and plastic" sector exhibits among the highest degrees of product market power with an average price-cost margin of 1.24, "Chemicals and pharmaceuticals" shows an average price-cost margin of 1.163. As for labour market power, all sectors display a labour market power parameter above 1, implying that firms and workers engage in efficient bargaining resulting in

some degree of market power that favours workers, with the exception of the "Chemicals and pharmaceutical" sector.

Table 1. Average market imperfection parameters by sector

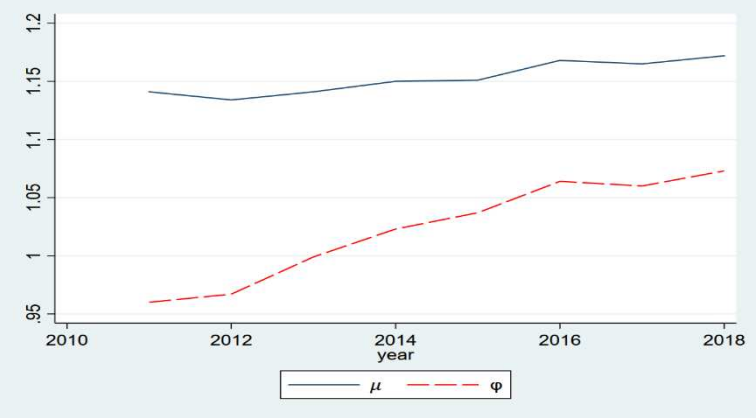
Sector	μ	φ
Food, beverages and tobacco (10-12)	1.204	1.311
Textiles, apparel and leather (13-15)	1.182	1.085
Wood and paper products (16-18)	1.198	1.048
Chemicals and pharmaceuticals (20-21)	1.163	0.932
Rubber and plastic products (22-23)	1.240	1.197
Basic metals and fabricated metal products (24-25)	1.227	1.077
Computer, electronic and optical products (26)	1.237	1.104
Electrical equipment (27)	1.221	1.168
Machinery and equipment (28)	1.194	1.046
Transport equipment (29-30)	1.230	1.163
Other manufacturing (31-33)	1.221	1.104
Total manufacturing	1.211	1.103

Notes: Number of observations = 277,883. The sectoral averages of the parameters are unweighted.

Researchers and policymakers are typically more concerned about the dynamics, rather than the levels, of market distortions (for instance, in the US it is mainly the growth of the markups over a considerable number of subsequent years that has caused worries). Moreover, the absolute value is influenced by the model specification, making it difficult to draw comparisons between different studies.

Accordingly, in **Figure 10** we document the trend of product and labour market power based on our sample of Italian manufacturing firms. Both the average values of μ and φ, which are weighted by the firms' revenue shares, have risen during the period under scrutiny. Specifically, μ grew by 2.7% between 2011 and 2018, signalling a positive but limited increase in product market power which, however, can be regarded as a "natural" recovery after the contraction experienced in the years of the economic recession and, more in general, after the gradual decline since the end of the nineties reported by previous research conducted by the Bank of Italy. Interestingly, φ experienced an 11.8% rise during the same period, indicating a shift of labour market power from the employers towards their employees. In a forthcoming study (with Stefano Schiavo and Mauro Caselli), we show that the increase in φ is mainly associated with the increase in the average gross nominal wage, which is mainly attributable to an increment in the compensation for employees, but which is likely to hide considerable between-worker heterogeneity, as data on wage inequality suggest. More information on how φ relates to the average wage and other variables can be found in Caselli, Nesta and Schiavo (2021).

Figure 10 Product and labour market power in the Italian manufacturing sector, 2011-2018.



Source: authors' calculations based on firm-level data from Aida

4.3 Linking the revenue-based labour share with market imperfections

The evolution of product and labour market power can help explain the trend of another important variable which has been the object of intense scrutiny, namely the labour share of income. Drawing upon Mertens (2019), we show that a rising (falling) revenue-based labour share is associated with increasing (decreasing) output elasticity of labour, decreasing (increasing) product market power, and increasing (decreasing) labour maker power detained by workers[9]. Specifically:

$$\alpha_{it}^{L} = \varphi_{it}\, \theta_{it}^{L}\, \frac{1}{\mu_{it}} \qquad (5)$$

Taking the logs of equation (5) yields a simple linear expression that decomposes $log(\alpha_{it})$ into three additive terms:

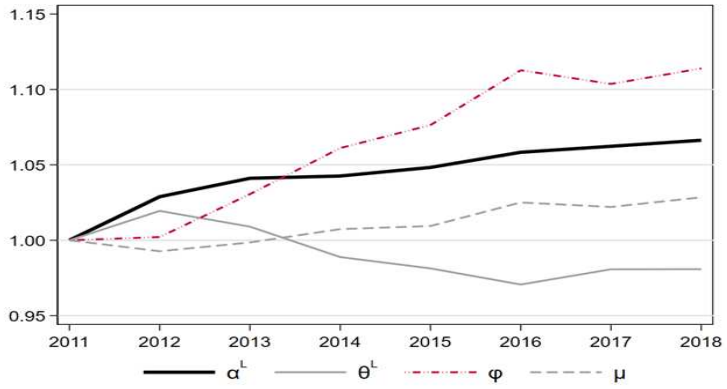
$$log(\alpha_{it}^{L}) = log(\varphi_{it}) + log(\theta_{it}^{L}) - log(\mu_{it}) \qquad (6)$$

The dynamics of the labour share and its components are represented in **Figure 11**. Without claims on the direction of causality, we see that, in recent years, the (revenue-based) labour

[9] In Mertens (2019), the indicator of labour market power φ is calculated as MRP_{it}^{L}/w_{it}, hence an increase in Mertens' φ corresponds to a shift of labour market power from the employees to the employers, namely to a rise in monopsony power. In equation (5), which can be recovered by simply rearranging the terms of equation (3), φ is computed as w_{it}/MRP_{it}^{L}, consistent with our definition of labour market power introduced in equation (2) and applied in the rest of this work.

share[10] slightly increased despite the (muted) rise of the markup and the contraction of the output elasticity of labour. The negative contribution of θ^L and μ to α^L is indeed more than offset by the positive trend in φ. A diminishing output elasticity of labour, which is also detected by Mertens in the German manufacturing sector, may reflect a change in the firms' production technology that boosts capital intensity and reduces the importance of labour to firms. Moreover, in line with Mertens, it is in contrast with the assumption of constant output elasticities of factors, thus stressing the need to choose a translog specification, rather than a Cobb-Douglas one (which does not allow elasticities to vary).

Figure 11. Decomposition of the revenue-based labour share in the Italian manufacturing sector, 2011-2018 (2011 = 1).



Source: authors' calculations based on firm-level data from Aida

5. Conclusions

In recent years, a number of papers have attempted to shed light on the macroeconomic dynamics observed in some economies, especially in the US, which raise some concerns and which may be partly attributable to a rise in product market power. In this paper, we first review the vast and heterogeneous body of macro and microeconomic literature which investigates how changes in this variable influence five relevant macroeconomic variables, namely, domestic investment rate, labour share, labour force participation, income (and wealth) inequality and economic dynamism. Even though the studies under scrutiny differ considerably in terms of methodology, sample and proxy of product market power, and different countries typically experience quite dissimilar dynamics, from the review of the literature it emerges that a decrease in competition and a rise in product market power are associated with a worsening

[10] The value-added labour share, calculated as the ratio between compensation of employees and value added, exhibits a more ambiguous trend. We focus on the revenue-based labour share because it is the one that is linked to product (and labour) market power by the specific relationship captured by equation (5) and equation (6).

of the socio-economic performance of the country under scrutiny in terms of the aforementioned macro-trends. Moreover, empirical evidence on the role played by product market power in economic dynamism, and especially in labour force participation, is still limited and may require more examination.

After reviewing the relevant literature, we focus on a specific country, namely Italy, for which we document the changes in the five selected variables using aggregate data and drawing some comparisons with other economies. According to this descriptive analysis, the Italian overall performance is quite mixed: even though it does not exhibit a marked decrease in the labour share, the investment rate, especially in the manufacturing, has been recovering after the economic crisis and labour force participation is constantly increasing over time, it has experienced low levels of business dynamism (especially in the industry macro-sector) and growing wage inequality.

Finally, after restricting the object to the manufacturing sector and the period 2011-2018, we recover the trends in corporate markups, as well as the trends in labour market power, using a rich firm-level dataset. Even though the average markup increased during the period under scrutiny, its increment is not particularly marked and can be interpreted as a market adjustment after a prolonged period of declining product market power. Moreover, this trend is accompanied by a shift of labour market power from the employers to the employees, which is driven by a growth in the average gross nominal wage and which helps explain the muted increase in the revenue-based labour share observed between 2011 and 2018. The empirical analysis strengthens the importance of accounting for both product and labour market power and allowing input elasticities to vary over time, and the result of the decomposition shown in Section 4.3 is in line with the literature reporting a negative link between product market power and the labour share.

We acknowledge that this paper has a mainly descriptive stance, and that the empirical analysis focuses on a relatively short period due to data limitations. Despite that, it provides a review of the literature on market power and an overview of the macro-trends and the market frictions in Italy which can boost further research on these topics. For instance, in a forthcoming paper (with Stefano Schiavo and Mauro Caselli) where we mainly focus on labour market power, we find that monopsony power still represents a relevant issue in some sectors and areas, and we assess how the introduction of a potential minimum wage (which has often been the object of debate, but which has not yet been implemented in Italy) may mitigate labour market frictions. Moreover, future research may analyse more in depth the patterns and sources of wage inequality and business dynamism, which represent two weaknesses of the Italian economy. As for wage inequality, recent data on wage and employment compiled by the European Union Statistics on Income and Living Conditions (EU-SILC) reveal that low-educated workers have been experiencing a wage compression, with a subsequent increase in the income gap between low-educated and high-educated workers. This suggests that initiatives aimed at boosting education, including on-the-job training, which help workers keep up with a rapidly changing

environment and with the challenges implied by technological progress and help them move to other jobs and sectors, may attenuate wage dispersion and then inequality.

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*Note: the articles marked with an asterisk are quoted in the Appendix.

Appendix

Estimation of the production function

In Section 2, following De Loecker and Warzynski (2012), we defined the firm-level markup as the ratio between of the output elasticity of materials and its revenue share:

$$\mu_{it} = \frac{\theta_{it}^{M}}{\alpha_{it}^{M}} , \qquad (1)$$

where μ_{it} is the markup of firm i at time t, θ_{it}^{M} is the output elasticity of materials and α_{it}^{M} is the revenue share of materials, also known as cost share or expenditure share of materials. While the expenditure share of materials can be easily computed using firm-level data that are generally available, the related output elasticity needs to be estimated.

In order to get unbiased estimates of θ_{it}^{M} at the firm-year level, we consider the following general production function Q for firm i at time t:

$$Q_{it} = Q_{it}(L_{it}, M_{it}, K_{it,} w_{it}) , \qquad (2)$$

where L_{it}, M_{it} and K_{it} are the firms' inputs (i.e., labour, materials and capital, respectively) and w_{it} is firm's productivity. Unobserved productivity shocks are potentially correlated with input choices, and if not controlled for, can lead to inconsistent estimates of the production function. Accordingly, we employ the Wooldridge-Levinsohn-Petrin (WLP) estimator, as derived from Wooldridge (2009) and implemented in Petrin and Levinsohn (2012). The WLP estimator does not assume constant returns to scale, is robust to the Ackerberg, Caves and Frazer's (2015) criticism of Levinsohn and Petrin's (2003) estimator and is programmed as a simple instrumental variable estimator. The potential endogeneity issues related to the simultaneous determination of inputs and unobserved productivity are addressed by introducing lagged values of specific inputs as proxies for productivity.

Specifically, the estimation strategy used in this paper consists in two steps.

First, we run:

$$q_{it} = g(l_{it}, k_{it}, m_{it}) + \in_{it} , \qquad (3)$$

where we use a third-order polynomial on all inputs to remove the random-error term $\in_{it}$ from the output and hence to obtain estimates of the expected output $\widehat{q_{it}}$. Then, we use a general production function of the following type:

$$\widehat{q_{it}} = f_s(\, l_{it}, k_{it}, m_{it}, \mathrm{B}) + \, \omega_{it} + \varepsilon_{it}\,, \qquad (4)$$

where $\widehat{q_{it}}$ is the natural log of real sales of firm i at time t, l_{it}, k_{it} and m_{it} are, respectively, the natural logarithms of the quantities of labour, capital and materials used by the firm and that get transformed into the output according to the production function f_s, B is the parameter vector to be estimated in order to calculate the output elasticities, ω_{it} is the firm-level productivity term that is observable by the firm but not by the econometrician, and ε_{it} is an error term that is unobservable to both the firm and the econometrician. Productivity is, thus, assumed to be Hicks neutral and specific to the firm, as in the approach using inputs to control for unobservables in production function estimations (Ackerberg, Caves and Frazer, 2015; Levinsohn and Petrin, 2003; Olley and Pakes, 1996). We assume that labour is a variable input, and instrument current labour and materials and their interactions with the first and second lags of labour as well as the second lags of capital and materials. To control for time-variant shocks common to all plants, we add year fixed effects.

We adopt a translog specification, which, unlike the Cobb-Douglas, permits us to recover firm-level time-variant output elasticities. The production function is a revenue function, since data on firms' output prices are not available, and is allowed to change across different sectors, as implied by the subscript s. Leaving subscripts i and t aside for simplicity, the translog function f_s can be written as:

$$f_s = \, \alpha + \beta_L l \, + \, \beta_K k + \beta_M m + \beta_{L^2} l^2 + \, \beta_{M^2} m^2 + \, \beta_{K^2} k^2 + \, \beta_{KL} kl + \, \beta_{KM} km + \, \beta_{LM} lm \quad (5)$$

Thus, the parameter vector is made up of nine parameters for each sector.

The estimated parameters of the translog production function allow us to compute the output elasticity of materials. Using the estimates of the output elasticity and the calculated revenue shares of materials, we can now compute markups at the firm-year level based on Equation (1).