Are Pro-Productivity Policies Fit for Purpose? The Case of France

Authors:
Antonin Bergeaud
HEC Paris, CEP-LSE, and CEPR
Gilbert Cette
Neoma Business School
Hélène Figaro
ENS Paris-Saclay

Date:
January 2026

The Productivity Institute
Productivity Insights Paper No.073

Pro-Productivity Policies: Country Experiences Series

Key words
Structural reforms, labour market, product market, human capital, pension reforms, 35-hour workweek, social contribution cuts, Crédit d'Impôt Recherche (research tax credit), PACTE law.

Author's contacts
bergeaud@hec.fr
gilbert.cette@neoma-bs.fr
helene.figaro@ens-paris-saclay.fr

Acknowledgements
We are grateful to Bart van Ark and Dirk Pilat for their support.

Suggested citation

A. Bergeaud, G. Cette, H. Figaro (2026) *Are Pro-Productivity Policies Fit for Purpose? The Case of France.* Productivity Insights Paper No. 073, The Productivity Institute.

The Productivity Institute is an organisation that works across academia, business and policy to better understand, measure and enable productivity across the UK. It is funded by the Economic and Social Research Council (grant number ES/V002740/1).

The Productivity Institute is headquartered at Alliance Manchester Business School, The University of Manchester, Booth Street West, Manchester, M15 6PB. More information can be found on The Productivity Institute's website. Contact us at theproductivityinstitute@manchester.ac.uk

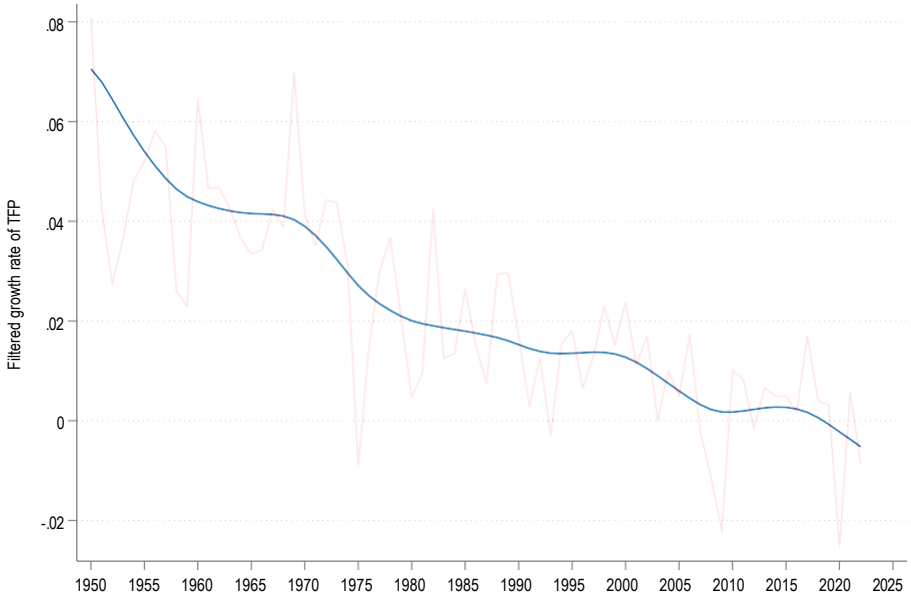
Abstract

In 2000, French workers produced slightly more value per hour than their American counterparts; by 2023, they lagged by 10%. This paper asks how structural reforms implemented in France since the 1960s have influenced this reversal. We review sixty years of labour market, product market, human capital, and pension reforms to assess their theoretical and empirical effects on productivity and GDP. Drawing on official policy evaluations and academic research, we analyse emblematic reforms such as the 35-hour workweek, social contribution cuts, the Crédit d'Impôt Recherche (research tax credit), the PACTE law, and successive pension adjustments. The result is a comprehensive, long-run audit of the instruments deployed to support productivity in France, and a discussion of why their cumulative effects have fallen short of preserving the country's position on the global productivity frontier.

Introduction

Like most European countries, France's productivity performance has been rather weak since the end of the 1990s with an average 0.5% growth rate of Total Factor Productivity (TFP) compared to 1.1% in the US (Bergeaud *et al.*, 2016). This figure is far from the long-run development of productivity since World War Two, where the trend of TFP growth progressively declined from peaks above 5% per year (see Figure I).

FIGURE I. Growth rate of TFP in France: 1950-2023



Notes: TFP growth rate (in red) and filtered trend obtained using an HP filter with a smooth parameter of 100. Source: Bergeaud et al. (2016).

In the early post-war decades, France enjoyed extraordinary productivity growth. During the *Trente Glorieuses* (roughly 1950–1973), output and labour productivity grew at around 5% per year, allowing France to rapidly catch up to the United States (Bergeaud et al., 2018). This period was characterised by a powerful combination of catch-up dynamics, large-scale industrialisation, high investment rates, and rapid technological diffusion. The transition from an agrarian to an industrial economy was supported by rising human capital, infrastructure development, and state-led planning through efficient industrial policies (Owen, 2012). Labour reallocation from low- to high-productivity sectors—especially from agriculture to manufacturing—also played a significant role, alongside increases in capital deepening and the spread of American technologies, managerial and production techniques, notably in the automotive and chemical industries (Servan-Schreiber, 1967).

This dynamic boom came to an end in the 1970s. After the first oil shock, the post-war "virtuous circle" of growth ground to a halt, with sharply lower productivity gains and investment rates. The era of (artificially) low oil prices during which the correlation between GDP and oil consumption was close to 1 was over (Bergeaud, 2024) putting a drag to European competitiveness. The 1980s and 1990s never saw a return to the previous pace: productivity growth stabilised at a much weaker level. By the end of the 1990s, like much of Europe, France was entering a phase of chronically sluggish productivity performance (Cette et al., 2016b).

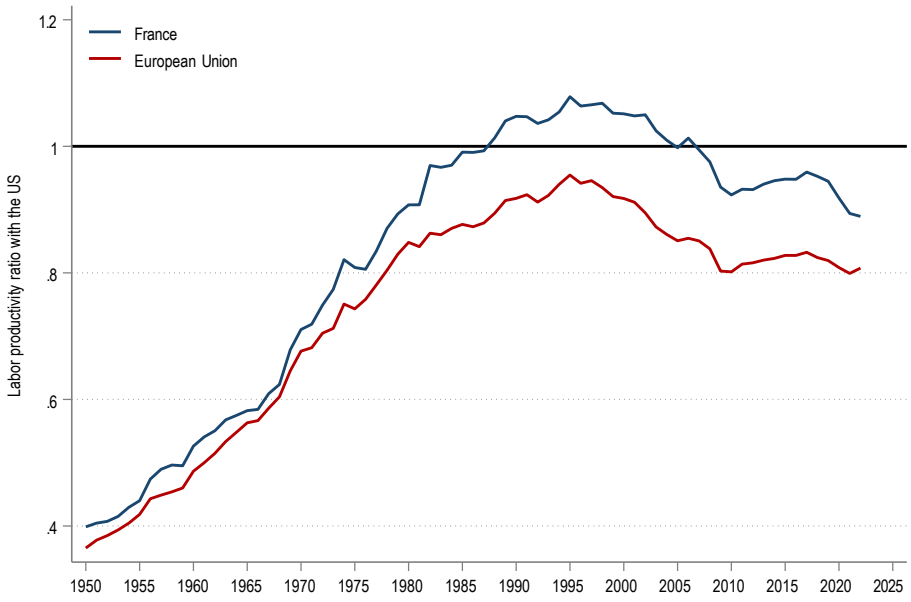
Since then, France's productivity advances have been modest, with several clear turning points. Notably, the acceleration of U.S. productivity in the mid-1990s (spurred by information technology) left France and Europe with a widening gap (Figure II): in 1995, French labour productivity per hour was on par with the US, but by 2019 it was roughly 18% lower (Gordon, 2021). Total factor productivity growth also shifted downwards. Even before 2008, France's TFP gains were underwhelming, and after the global financial crisis they essentially stalled (OECD, 2023). The 2008–09 recession dealt a heavy blow to an already weakening trend. By 2018, France's market-sector total factor productivity was lower than it had been in 2015 (EU-KLEMS), epitomizing a "lost decade" for productivity. The COVID-19 shock in 2020 further rattled the trajectory, initially deepening the malaise. France's productivity growth collapsed after 2021 and notably deviated with the pre-pandemic trend (Devulder et al., 2024). Europe as a whole moved even further away from the United States (Bergeaud, 2024) and among the largest Euro Area countries, France was the worst performer in terms of productivity growth (see Conseil national de productivité, 2025). Although there were hopes that post-COVID digitalization might ignite new efficiency gains (Consolo et al., 2021), any sustained productivity rebound in France remains tentative.

The challenge of reviving growth, through competitiveness and productivity, has been a recurrent theme in French political and policy discourse for decades. Successive governments have repeatedly acknowledged the productivity shortfall and sought to address it through structural reforms and national strategies. For example, France's *Conseil national de productivité* has consistently pointed to structural weaknesses—from skill mismatches in the labour force to delays in technology diffusion—as key obstacles to faster productivity growth (Conseil national de productivité, 2023). Compared to Nordic and Scandinavian countries, and to Germany and Netherlands, France suffers also from a low employment rate, concerning mainly young, seniors and less educated individuals which further impact negatively GDP per capita. In response, successive waves of reforms have targeted labour markets, product-market regulation,

innovation, education and training, and pensions, all with the aim of enhancing efficiency (both productivity and employment rate) and long-run growth.

However, it must be noted that, while productivity has grown to become an important aspect of policies over the past decades, it is often seen as the by-product of a more important policy goal, namely boosting the employment rate. One of France's key characteristics is its rather low employment rate, for instance when compared to Germany, the Netherlands and other Nordic countries. As such, most policies have tried to target certain populations to boost their employment rate, through the development of dual apprenticeships for young people, or the successive reforms of the pension scheme to incentivize older workers to stay in the labour market. This trend in policy has had a positive impact on GDP per capita, but in return has had a negative impact on productivity, though France still remains one of the most productive economies.

FIGURE II. Labour productivity, ratio with the US



Notes: Labour productivity is defined as the ratio of GDP over total hours worked. The values are converted in constant US dollars using constant purchasing power parity (see Bergeaud et al., 2016). The European Union is an aggregate of 13 countries: Germany, France, Italy, Spain, Netherlands, Belgium, Austria, Greece, Ireland, Finland, Sweden, Denmark and Portugal. Source: Bergeaud et al. (2016).

Over the past decades, several ambitious reform packages have been enacted to boost competitiveness. Yet, sustaining France's position at the global productivity frontier has proven difficult. Although France continues to display relatively high productivity levels by international standards, this partly reflects institutional features that make low-productivity labour costly and offer generous transfers to low-income households. These factors weigh on both labour demand and labour supply for low-skilled

workers, contributing to persistently low employment rates. The endurance of lacklustre productivity growth—despite repeated reform efforts—helps explain why the issue remains at the forefront of national economic debates.

Recent initiatives such as the *France 2030* investment plan reaffirm the priority given to productivity, especially in a context where demographic pressures, environmental constraints, and energy transitions demand higher efficiency. At the same time, the emergence of a new wave of general-purpose technologies presents an opportunity to revive productivity dynamics—provided that France can address the structural bottlenecks that have long held it back.

1 Productivity growth and its drivers in France

This paper begins with a brief overview of long-term trends in GDP and productivity in France, compared with those observed in the main advanced countries and economic zones, namely the US, the Eurozone, the UK, and Japan (Figure III). A more detailed analysis of these trends is provided by Bergeaud et al. (2014, 2016, 2017).

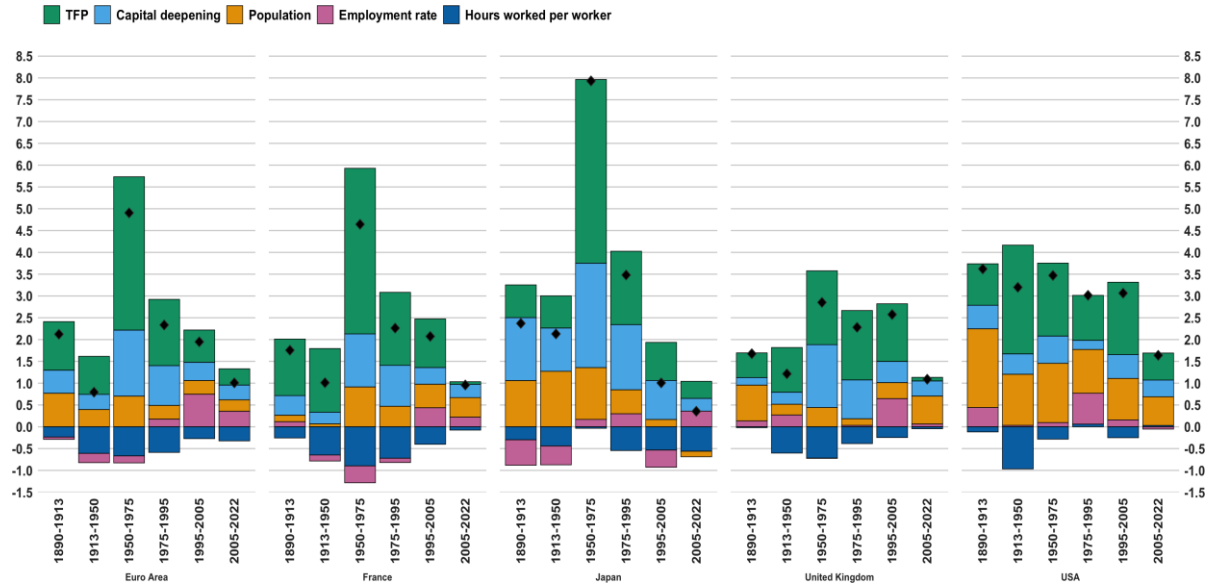
Over the very long period from 1890 to 2022, average annual GDP growth was strong in France (2.2%), the eurozone (2.2%) and the UK (1.9%), but weaker than in the US (3.2%) and Japan (3.3%). This difference can largely be explained by lower population growth and, consequently, lower employment growth, with average annual GDP per capita growth of around 1.8% for France, 1.7% for the eurozone and 1.5% for the UK, compared with 2% for the US and 2.4% for Japan. The contribution of hourly labour productivity to GDP growth rates varies considerably between countries and economic zones: this contribution is, on average, 2.4pp for France, 2.2pp for the eurozone, and 1.7pp for the UK, compared with 2.1pp for the US and 2.9pp for Japan. These differences mainly reflect differences in total factor productivity (TFP) contributions and, to a lesser extent, capital intensity. Over such a long period, they largely correspond to catch-up effects, which are discussed below. Finally, the change in the ranking between countries and economic zones in terms of GDP per capita growth and productivity per hour worked can be explained in accounting terms by differences in the contributions of working hours (which are always negative, due to the decrease in the number of hours worked) and the employment rate (positive or negative).

The long period from 1890 to 2022 is broken down in Figure III into six different sub-periods: before World War I (1890-1913); from World War I to after World War II (1913-1950); from after World War II to the first oil crisis (1950-1975), this sub-period often referred to as "The Golden Age"; from the first oil crisis to the beginning of the period of productivity rebound in the United States (1975-1995); the decade of productivity rebound in the United States linked to the spread of ICTs (1995-2005); and finally the recent years (2005-2022), characterized by major economic shocks: the Great Financial Crisis that began in 2008-2009, the COVID health crisis that began in 2020, and the inflationary crisis of 2022 and 2023.

The interwar period saw the strongest productivity growth in the US. It was higher than in France and the other advanced countries and economic zones considered here, because the US benefited earlier and more than others from the favourable effects of the second industrial revolution on productivity. However, France and these other countries and economic zones subsequently benefited from higher productivity growth than the US during the sub-period of the Golden Age, as they caught up thanks to the spread of technologies associated with the second industrial revolution. Over the following two sub-periods, productivity growth was significantly higher in the US than in France and other countries and regions. These differences reflect the fact that the US benefited more than elsewhere from the favourable effects on productivity of technological transformations associated with ICTs, the digital economy, and, in recent years, artificial intelligence.

Compared to the US, hourly labour productivity levels in France, as in other advanced countries and regions, changed significantly during the long period from 1890 to 2022 (Figure IV). Before World War I, the UK was the country with the highest level of productivity, but the US gradually caught up, while other countries and regions remained stable at a significantly lower level. The US became the leading country in terms of labour productivity after World War I and until the first oil crisis. The level of hourly labour productivity in France then exceeded that of the US during the 1980s and 1990s, but Bourlès and Cette (2007) showed that this performance can be explained by a much lower employment rate, with the least productive people of working age being more often in employment in the US than in France and the Eurozone. Finally, the last two sub-periods saw a marked decline, with productivity relative to that of the US falling by more than 10 percentage points in France and elsewhere.

FIGURE III. Average annual GDP growth and contributions



Notes: This graph shows the average annual growth rates of GDP (in % represented by the black diamond) and its accounting components (in percentage points). This accounting breakdown of growth is based on the assumption of a Cobb-Douglas production function with constant returns comprising two factors of production: capital stock and hours worked. The elasticity of GDP with respect to capital (labour) is assumed to be equal to 0.3 (0.7). The employment rate here corresponds to the ratio of total employment divided by the total population. The contribution of hourly labour productivity is here accounted for as the sum of the contributions of TFP and capital intensity. Source Bergeaud et al. (2016).

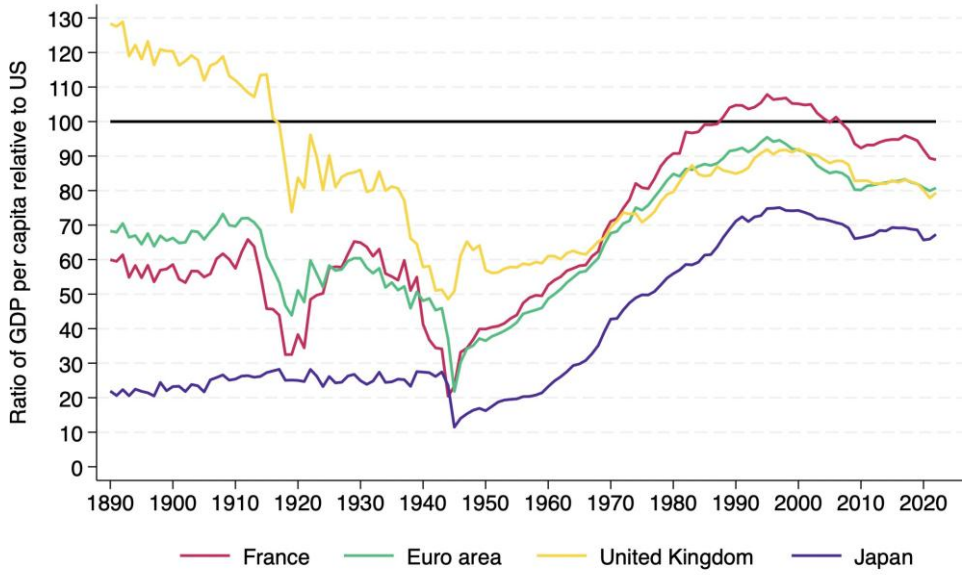
The decline in productivity growth in France and other European countries relative to the US since the mid-1990s has been the subject of extensive literature. It can be partly explained by various factors, including a delayed increase in the average employment rate corresponding to the entry into employment of people who are less productive than average. This effect therefore reveals a significantly lower structural productivity (at an average employment rate equivalent to that of the US) in France and Europe than in the US. Beyond this accounting explanation, the Draghi report (2024) and Bergeaud (2024) have shown that it also reflects the effects of a set of more institutional factors. More numerous and stringent standards and regulations increase the cost of taking risks in innovation spending and the mobilization of cutting-edge technologies. They also lead to a less favourable allocation of production factors and capital to innovation and productivity.

Figure V shows the gap (in percentage) between the GDP per capita of France and other advanced countries and regions compared to that of the US in 2022, and the contributions (in percentage points) of the various components that explain these gaps in accounting terms. It appears that GDP per capita is around 30% lower than in the US in France, which is also the case for the eurozone, the UK and Japan. However, the decomposition of this gap is not the same for these different countries and regions.

Everywhere, a productivity gap helps explain the gap in GDP per capita, but less so in

France and the UK (10 to 15 percentage points) than in the eurozone (around 20 percentage points) and especially in Japan (around 30 percentage points). This productivity gap is the result of the developments and slowdown discussed above. A gap in working hours also contributes to the gap in GDP per capita everywhere (by 10 to 15 points). On the other hand, a gap in employment rates only contributes to the gap in GDP per capita in France (by around 15 points). France therefore stands out from other countries and economic zones in this respect due to its low employment rate.

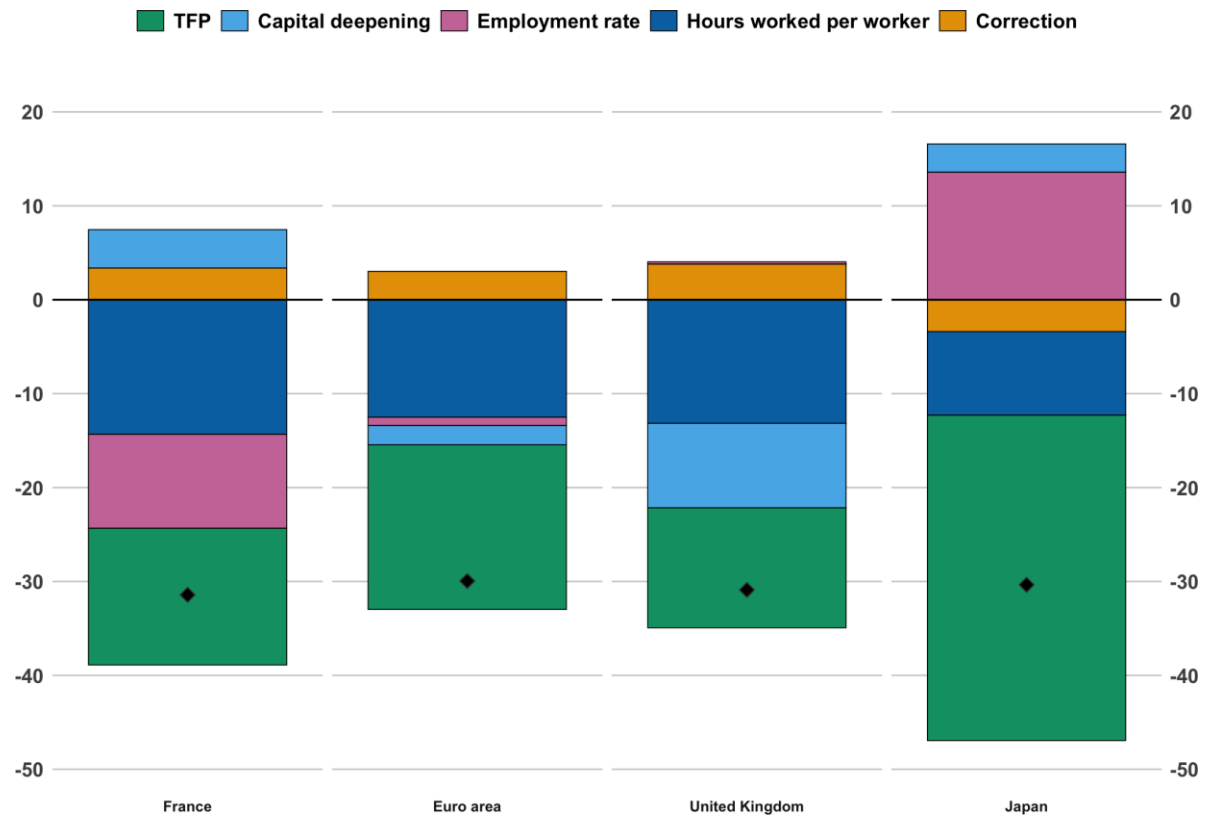
FIGURE IV. Hourly labour productivity levels compared to that of the United States



Notes: The values of GDP over total hours worked are standardized by the US value (100) after being adjusted for purchasing power parity. Source; Bergeaud et al. (2016).

The productivity gap with the US is a significant factor in explaining the difference in GDP per capita for France and the other advanced countries and regions considered here compared to the US. This productivity gap, which is the result of the slowdown observed since the mid-1990s, may itself be partly due to more stringent regulations on labour and goods markets, which hamper innovation, the use of the most advanced technologies, and the efficient allocation of factors. The rest of this analysis aims to provide some insights into how some of these regulations and reforms impacted on productivity and GDP per capita in France of that have changed them.

FIGURE V. Per capita GDP gaps compared to the United States in 2022



Notes: This graph shows the differences (in %) in GDP per capita (black diamond) compared to that of the US, and the contributions to these differences (in pp). The accounting breakdown of differences in GDP per capita is based on the assumption of a Cobb-Douglas production function with constant returns comprising two factors of production, capital stock and hours worked. The elasticity of GDP with respect to capital (labour) is assumed to be equal to 0.3 (0.7). The employment rate here corresponds to the ratio of total employment divided by the total population. The contribution of hourly labour productivity is here accounted for as the sum of the contributions of TFP and capital intensity. Source: Bergeaud et al. (2016).

Like the other papers in this country series of comparisons of pro-productivity polices across major advanced and emerging economies, we start from the productivity policy framework presented by Van Ark et al. (2023). The framework identifies policies that affect productivity through five main channels: institutional foundations, factor accumulation, technology and structural change, markets and resource allocation, and internationalisation. In this paper we focus primarily on the "markets and resources allocation" (labour market and goods and services market regulations in sections 2 and 3 respectively), "technological change and innovation" (innovation policy in section 4), "human capital" (education and skills in section 5), institutions (pension reforms in section 6) and "internationalisation" (European integration, migration policy and trade and FDI in section 7).

2 Labour Market Regulation

The French labour market is traditionally viewed as heavily regulated, which is often seen as limiting the scope for market-based adjustment mechanisms (Garicano et al.,

2016). It is characterised by a dense legal framework and strong social protections. France is perhaps the most prominent example of a civil law system: the *Code du Travail* (labour code), which codifies all labour legislation and regulations, contains over 10,000 articles—a significant portion of which pertain to conflict resolution procedures.

Since the 1960s, successive reforms have sought to modernise and adapt these regulations to a changing economic environment. These reforms can be broadly grouped under three categories. First, a long-running process of working time reduction, analysed in Subsection 2.1. Second, a series of labour cost reductions, particularly through lower employer social contributions, discussed in Subsection 2.2. And third, efforts to increase labour market flexibility, examined in Subsection 2.3.

Although these reforms have typically been justified on employment grounds—whether to reduce unemployment, stimulate hiring, or improve job quality—their effects on productivity are theoretically well understood. On the one hand, increased labour market flexibility may facilitate more efficient resource allocation and boost firm-level productivity. On the other hand, policies such as working time reduction or large-scale payroll tax cuts can generate ambiguous or even adverse effects on productivity, especially in the short term.

2.1 Reduction of Working Time

From 1960 to 2020, the average effective working time in France declined by nearly 10 hours, from around 45 to fewer than 36 hours per week (Bouvier and Diallo, 2010). Combined with shorter annual working durations—fewer days worked and a greater prevalence of part-time and short-time work—this reduction amounts to approximately 600 fewer hours worked per employee each year.

The culmination of this long-standing process came with the *Aubry I* and *Aubry II* laws, adopted in 1998 and 2000 respectively. These laws set the statutory weekly working time at 35 hours, a threshold that remains in force today. They built upon earlier reforms, including the *Auroux* laws of 1982, which had reduced the working week to 39 hours and introduced a fifth week of paid leave (PTO), and the *Robien* law of 1996, which served as a forerunner to the Aubry legislation. The *Auroux* laws also addressed overtime, allowing up to 130 hours annually with a 25% wage premium, although they introduced only limited flexibility in working arrangements. As for the *Aubry* laws this reduction was a decrease of the statutory weekly working time.

The *Robien* law marked a turning point by offering substantial subsidies to firms

that agreed to significantly reduce working hours while simultaneously increasing employment. Its aim was to encourage early adoption of shorter working time prior to the rollout of a nationwide mandate, primarily by reducing social contributions. The law included two mechanisms: an "offensive" component to stimulate job creation, and a "defensive" component to mitigate lay-offs. Under the offensive component, firms were required to reduce working time by 10% and expand their workforce by a similar proportion, with employment levels maintained for at least two years. This framework helped lay the groundwork for the more ambitious *Aubry* laws.

The legal working time in France had previously been set at 40 hours in 1936, then reduced to 39 hours in 1982. The Aubry laws marked the final major step in this trajectory of working-time reduction. Their principal goal was to combat unemployment through redistribution of working hours. Although primarily employment-focused, the laws also had indirect implications for productivity, as discussed later in this paper. Their incentive structures closely mirrored those introduced under the *Robien* law. A second policy component—reductions in social contributions—was implemented alongside the working time cutbacks.

The first *Aubry* law, adopted in 1998, mandated a 35-hour workweek for firms with more than 20 employees starting in 2000, and for smaller firms by 2002. These changes were accompanied by financial incentives both for firms that reduced hours directly and for those creating new jobs. The law also mandated a reduction in days worked for managerial staff and simplified procedures for implementing flexible work schedules. The second *Aubry* law, adopted in 2000, reaffirmed the 35-hour benchmark and introduced permanent payroll tax cuts and the annualisation of working time (Askenazy, 2008).

According to Bunel and Jugnot (2003), this sequence of policies largely achieved its employment objectives. On average, firms participating in the *Aubry* laws created between 3% and 5% more jobs. In certain cases, notably among "offensive" Aubry I firms, job creation reached 10%, and up to 13% for firms applying the offensive provisions of the *Robien* law. Importantly, these new positions often diverged from existing firm structures, primarily reinforcing production teams rather than expanding managerial staff. The shift in collective working hours was mainly achieved by increasing the number of employees working fewer than 35 hours per week, rather than reducing overtime. Among firms adopting the 35-hour workweek, the relationship between workload and employment, and between productivity and employment, was clearly negative. Firms whose productivity levels remained unchanged and did not increase most of their workers workload, experienced on average job creation up to

7%, whereas firms which experienced productivity growth and increased their workers workload only created 5% jobs.

Data from the French statistical agency DARES support these findings. According to DARES estimates, the reduction in average hours worked led to a 4% to 5% increase in hourly productivity. Most of the legislation aimed at reducing statutory working time was introduced in tandem with reforms targeting another key aspect of labour market flexibilisation—namely, reductions in employer social contributions.

These intertwined measures underscore a broader policy logic: that working time reduction alone was unlikely to be effective for employment creation without adjustments to labour costs, particularly in a country with structurally high unemployment and strong employment protection legislation.

2.2 Labour Cost Reduction

As briefly discussed in the previous subsection, another policy instrument used by the French government to stimulate employment has been the reduction of employer social contributions. These measures were frequently implemented alongside working time reforms, although the most recent iterations have extended well beyond the scope of statutory working time reductions.

The overall objective was to lower the cost of labour, particularly for low-wage workers. The first significant reduction in employer contributions was introduced in 1993 under the *Balladur* law, which lowered the contribution rate from 45% to 39.09% at the minimum wage level. This was followed by a series of further cuts, including the "Juppé discount" in 1995, and the "Robien" and "Aubry" reductions in 1996 and 1998, respectively. The latter two were closely tied to the working time reforms of the same name. These schemes aimed not only to encourage shorter workweeks but also to support firms in meeting the hiring objectives embedded in the 35-hour work-week legislation. The period from 1996 to 2005 was marked by a proliferation of overlapping measures. To simplify the system, the *Fillon* discounts were introduced between 2006 and 2012. According to Bozio and Wasmer (2024), these reforms collectively reduced the average employer contribution rate from 26.27% in 1996 to 20.26% in 2006.

The last major policy of this kind was the introduction in 2013 of the *Crédit d'Impôt Compétitivité Emploi* (CICE), or Competitiveness and Employment Tax Credit. The CICE aimed to reduce labour costs at the median wage level, reflecting the fact that industrial employment—particularly exposed to international competition—relies

heavily on medium-skilled workers.

Before these contribution reductions, the French labour market was characterised by high unemployment, partly attributable to the elevated cost of labour. As described in Lawson et al. (2023), the relatively high minimum wage contributed to a fragmented economic structure. Yet, the authors also highlight that in France, high labour costs in the 1990s were often accompanied by ambitious investment strategies. Firms generally avoided outsourcing or capital deepening and instead sought to maintain competitiveness by raising productivity. This suggests that lower labour costs—by easing minimum wage constraints—might lead to weaker productivity performance.

While the literature provides limited consensus on the productivity effects of labour cost reductions, two studies examine their implications at both micro and macro levels. At the micro level, Gilles et al. (2018) find that employer contribution reductions—especially the CICE—had a significant effect on employment for approximately one in eight recipient firms. At the macro level, Ducoudré et al. (2016) report a substantial impact on wages and estimate that the policy led to the creation of up to 200,000 jobs. Incorporating general equilibrium effects doubles that estimate, attributing up to 400,000 jobs to the measure. However, these macro-level figures are more uncertain. With regard to productivity and competitiveness, the literature offers no definitive conclusions. Nonetheless, both theory and available evidence suggest that these policies may have had a negative impact on productivity—at both the TFP and labour productivity level—by encouraging the hiring of workers with relatively low marginal productivity. This trade-off between job quantity and labour productivity remains a central tension in labour cost policies (Acemoglu, 2001). Carbonnier et al. (2022) further show that although the CICE generated substantial rent-sharing effects at the firm level—especially for high-skill incumbents—its benefits did not extend to low-skill workers, suggesting that the productivity effects of such tax incentives may be highly uneven across occupations.

The most recent official assessment of social contribution reductions attempts to address the considerable cost to public finances, which amounted to 78.4 billion euros in 2024 or about 2.5% of GDP, according to the law pertaining to the Social Security. This assessment reports that the regressive nature of the reductions—being more generous at the bottom of the wage distribution—has led to income compression. As a result, policymakers now face a collective trade-off between the fiscal burden of these measures, their effects on employment, and their impact on wage dynamics. One possible response would be to reduce social contribution cuts for higher wage brackets. Alternatively, raising contribution rates for certain categories could even support

employment if redirected toward targeted hiring subsidies.

In sum, social contribution reductions have achieved a long-term policy objective: to lower the cost of low-skilled labour in order to support employment. However, another avenue for addressing job creation has been the direct reform of labour market institutions—a subject to which we now turn.

2.3 Labour market flexibilisation

The second category of labour market reforms comprises all institutional changes that do not involve reductions in statutory working hours. These include the creation or modification of specific employment contracts, changes in collective bargaining procedures, and other measures intended to influence hiring, firing, or work conditions. From the *Auroux* laws of 1982 to the labour ordinances (*ordonnances travail*) of 2017, the overarching objective has been to shift the French labour market away from a rigid civil law framework and closer to a more flexible, common law logic. However, these reforms have often proceeded without clear empirical evidence of their effects on productivity.

The academic literature on employment protection legislation (EPL) is extensive. While the mainstream view holds that stricter EPL tends to hamper both employment, productivity and innovation (Acharya et al., 2013; Garicano et al., 2016; Aghion et al., 2023a), some studies present a more nuanced or even contrary perspective (OECD, 2013). Because the main EPL reforms in France have not been systematically evaluated, this section draws on selected international studies to explore the likely effects of EPL on productivity, employment, and growth.

A key contribution in this regard is the study by Cette et al. (2016a), which examines the impact of EPL across 14 OECD countries, including France. The authors distinguish between different types of capital—R&D vs. non-R&D, ICT vs. non-ICT—and find that tighter EPL is perceived by firms as equivalent to an increase in labour costs. This induces a capital-labour substitution effect, in which firms shift investment toward capital, particularly non-ICT capital. However, the gains from such substitution are uneven: it tends to benefit high-skilled workers while disadvantaging low-skilled labour. This is paradoxical, given that EPL is typically designed to protect the most vulnerable segments of the workforce.

These findings are reinforced in a later study by the same authors, Cette et al. (2024), which explores the impact of EPL reduction on intangible investment and labour market trust across 20 countries. They simulate a scenario in which France's EPL is brought in line with the United States and find that this would result in a 25% decline

in high-skilled employment, but a 15–20% increase in low-skilled employment. More strikingly, labour productivity would rise by an average of 8.5%, the highest gain observed across their sample. This effect could stem from two facts: either lower EPL boosts the use of more advanced technologies, explaining the boost in productivity, or having less barriers on the labour market helps labour reallocation, making for a more optimal repartition of workers. Although there is no formal ex-post evaluation of France's major flexibilisation episodes—such as the 2016 *El Khomri* law or the 2017 labour ordinances—these findings suggest that such reforms may have boosted both employment, particularly for the low-skilled, and productivity.

Indeed, these measures fit into a longer trajectory of gradual flexibilisation. Reforms such as the introduction of part-time contracts, the *Pacte National pour l'Emploi*, and the *loi de modernisation du marché du travail* all pursued similar goals: easing access to employment, especially for groups traditionally underrepresented in the labour market. For example, the national employment pact targeted youth unemployment (under age 26), while the expansion of part-time work was designed to help reconcile employment with family responsibilities, particularly for women.

In contrast, a dissenting view is offered by Storm and Naastepad (2007), who examines EPL across more than 20 OECD countries. Building on the findings of Auer et al. (2005), who showed a positive link between job tenure and productivity, Storm and Naastepad argue that rigid labour markets may in fact promote long-run productivity growth. Their hypothesis is that greater employment stability allows workers to accumulate firm- specific skills and contribute more meaningfully to organisational and technological innovation. They also link stronger EPL to lower income inequality. Storm and Naastepad's central claim is that excessive deregulation risks undermining productivity by neglecting the role that stable, experienced workforces play in sustaining innovation over time.

Taken together, these perspectives leave open the possibility that France's relatively strict EPL has played a role in maintaining high labour productivity levels. But, as shown in Cette et al. (2014), this boost in labour productivity levels is in part due to a negative impact on TFP leading to labour being substituted for capital. However, to confirm this empirically, targeted evaluations of recent French reforms would be necessary. This ambiguity is further reinforced by the dual nature of flexibility itself: while it may support short-run employment gains and adjustment capacity, it can also weaken long-run firm-worker relationships that are essential for knowledge transfer and innovation.

Concurrently with labour market reforms, the goods and services markets have also

been the focus of extensive structural policies since the 1960s—a subject we now turn to.

3 Goods and Services Market

France is a founding member of the European Union and has been deeply involved in the economic convergence of member states since the 1960s. This integration has shaped its domestic policy landscape, particularly in the regulation of goods and services markets. While European directives have pushed toward deregulation and increased competition, France has also implemented nationally specific reforms aimed at addressing its own structural challenges. One notable area of divergence is innovation policy, where national tools such as tax credits and targeted support measures reflect the importance of adapting to local industrial structures. More broadly, the guiding principles of recent reforms—including the *Macron* Law and the *PACTE* Law—have been to enhance competitiveness through simplification, flexibility, and productivity-oriented restructuring.

3.1 Product Markets

The regulation of France's goods and services market has evolved through major reforms since the 1960s. Two recent legislative packages have been particularly consequential: the *Macron* law (2015) and the *PACTE* law (2018, *Plan d'Action pour la Croissance et la Transformation des Entreprises*). These laws embody a wider policy thrust toward simplification, liberalisation, and domestic competitiveness.

The *Macron* Law introduced measures affecting labour law, transport, and retail, including deregulation of Sunday trading. This led to strong geographic disparities, particularly between Paris and other regions. For example, the share of stores open on Sundays increased by 62% in Paris's international tourism zones between September 2015 and February 2017, while remaining low elsewhere (Connil, 2023).

The *PACTE Law* sought to address four major structural bottlenecks: barriers to firm growth, limited access to finance, skewed wealth distribution, and underinvestment in sustainable practices. To meet these goals, the law simplified business creation, facilitated scale-up of small firms, and aimed to foster a more dynamic entrepreneurial ecosystem. One of its most significant provisions was the removal of certain regulatory thresholds linked to firm size.

Although no formal evaluation of the *PACTE Law* has yet been conducted, its design suggests likely long-run benefits for employment and competitiveness. The impact on

productivity, however, remains uncertain, depending on how expansion affects the average quality of labour and capital.

To better understand the productivity implications of goods market reforms, one can turn to the literature on product market regulation. Bourlès et al. (2013) examine how regulation in upstream sectors affects macroeconomic outcomes in downstream industries. They find that anti-competitive regulation in sectors supplying intermediate inputs lowers total factor productivity growth in client sectors. Accordingly, reducing barriers to entry and improving competition in upstream industries could yield large MFP gains and raise potential output.

4 Technological Change and Innovation

4.1 Innovation Policy

The *Crédit d'Impôt Recherche* (CIR, or Research Tax Credit) is France's flagship policy tool for supporting innovation. Representing nearly 60% of total public spending on innovation, the CIR's budget grew from a few dozen million euros annually between 1990 and 2004 to around seven billion euros by 2021 (MESRI, 2023). The credit is structured into three components: one targeting research expenses, one for innovation, and another for related collection activities. The CIR is particularly untargeted. Most private firms can claim it provided they declare eligible R&D expenditures, regardless of sector, innovation quality, or size. This broad eligibility has contributed to the measure's popularity but also raised concerns about efficiency and dead-weight loss and moral hazard. The lack of ex-ante project selection or ex-post conditionality contrasts with more selective innovation policies in other OECD countries, which often link funding to project evaluation or measurable outcomes, or favour young and small firms.

Introduced in 1983, the original CIR granted a 25% credit on increases in R&D spending, capped at 25 billion francs. Between 1983 and 2000, the scheme was renewed multiple times, and the rate was raised to 50%. A major reform in 2008 overhauled the structure, introducing a tiered credit rate: 30% for the first 100 million euros of eligible expenses and 5% beyond that. However, this threshold is very high and as a result, although small firms account for 84% of beneficiaries, they represent only 30% of declared R&D expenses; large firms, by contrast, claim 44% of expenses.

The Institut des Politiques Publiques (IPP) has published two empirical evaluations of the 2008 CIR reform (Bach et al., 2021; Bozio et al., 2019). They identify three potential

effects: an increase in participation, greater investment intensity among existing claimants, and triggering of R&D investment for marginal firms. While the third effect could not be assessed, the reform clearly raised take-up rates and reduced effective tax rates for participating firms. It also boosted high-skilled employment—particularly of engineers—and increased patenting activity.

The reform was associated with a rise in revenue and intangible investment, although it also coincided with a temporary decline in productivity. These effects were especially pronounced among small firms, where the CIR primarily eased financial constraints without necessarily inducing innovation-focused strategies. Complementary findings suggest that the CIR is mostly claimed by firms with an established R&D profile. Nonetheless, it effectively increases investment at the intensive margin (Bozio et al., 2019).

As for its impact on productivity, Lopez and Mairesse (2018) estimate that the lower user cost of R&D capital induced by the 2008 reform led to a 28.2% increase in R&D intensity and a 2.5% higher probability of innovating. They report average productivity gains of 1.7%, with small firms being more sensitive to lower R&D costs, and large firms deriving greater productivity benefits from innovation. The CIR primarily encourages product innovation, which is linked to employment gains, while process or organizational innovations—less incentivized by the credit—are not fully captured as R&D expenditures.

Definitional issues also affect measurement. When innovation is defined by R&D workforce or headcount, the CIR shows little effect. But when innovation is captured as a binary outcome (e.g., introduction of a new product), a 10% drop in R&D user cost increases R&D intensity by 12.9%, and short- and long-term productivity by 0.4% and 1.1%, respectively.

More broadly, the fact that the CIR is not targeted makes it an inefficient instrument for industrial policy and poorly suited to steering innovation toward specific, nascent technologies. As noted by Fuest et al. (2024) and Bergeaud (2024), Europe appears to be caught in a "mid-technology trap"—overrepresented in medium- tech sectors but largely absent from the technological frontier, particularly in digital innovation. While the design of the CIR, or other similar programs, cannot be solely blamed for this pattern, its horizontal structure and lack of strategic prioritization limit its capacity to correct such imbalances. In contrast, more targeted R&D policies—such as direct grants or mission-oriented programs—tend to channel resources toward different sectors and technologies than those benefiting from the CIR (see e.g. Bergeaud et al. 2025).

5 Education and skills

5.1 Human Capital Formation

The accumulation of human capital is a core driver of productivity growth. In the French case, a central policy tool to promote this accumulation—particularly since the 1970s—has been the development of apprenticeships as an alternative form of higher education and professional training. Originally restricted to lower qualification levels, apprenticeships have gradually been extended to a wide range of degrees and fields, thereby contributing to broader access to professionalizing education and a more skilled workforce.

The founding legislation was the *Delors* law of 1971, which established the legal framework for allowing employees to periodically leave their jobs for training purposes. It also introduced a mandatory training levy for firms with more than 10 employees. While this law laid the groundwork, it was primarily the *Seguin* reform of 1987 that opened apprenticeships to all levels of education, thereby initiating a rapid expansion in participation. Between 1992 and 2010, the number of apprentices in higher education increased more than thirtyfold. The most recent milestone was the 2018 *Loi Avenir professionnel*, which aimed to reinforce the quality and accessibility of apprenticeships through multiple measures: lifting contract limits, raising the maximum eligible age, strengthening certification processes, and increasing apprentice remuneration.

These successive reforms were intended both to ease young workers' entry into the labour market and to facilitate career transitions. In theory, apprentices benefit from better knowledge of the workplace and closer ties with potential employers, reducing the risk of post-education unemployment. Empirical evidence supports this view, albeit with caveats. According to Toutin and Cart (2018), five years after graduation, former apprentices are more likely to be employed than graduates from traditional academic tracks. Between 2010 and 2022, the number of apprenticeship contracts doubled, rising from 305,000 to 736,000, with higher education accounting for an increasing share—from 38% to 60%. This expansion has been driven by professional degrees that are difficult to replicate in standard university curricula and that typically lead to qualifications recognised by employers.

Nonetheless, important limitations persist. One of the main weaknesses of the apprenticeship model is its pro-cyclicality (Toutin and Cart, 2018). When the macroeconomic environment is favourable, apprentices are more likely to secure stable employment, particularly in lower-skilled occupations. However, during

downturns, firms—especially small ones—face greater financial constraints and may be less willing or able to offer apprenticeship contracts. As a result, trainees may struggle to find work, losing the supposed advantage of having followed a more practice-oriented path.

These constraints are compounded by the structure of apprenticeship provision. Approximately 70% of apprenticeship contracts are signed in small firms, and 80% are concentrated in high-turnover sectors such as construction, hospitality, and catering—sectors that are particularly vulnerable to economic fluctuations.

Apprenticeship expansion also affects productivity. As shown by Labau and Lagouge (2024), the rise in the share of apprentices among total employees has contributed to observed changes in labour productivity. By the end of 2022, labour productivity per capita in non-agricultural sectors was 6.4% below trend. While apprentices are generally younger, less experienced, and work fewer hours than standard employees—factors that tend to reduce apparent productivity—adjusting for these characteristics reveals a different picture. Once the "quality" of labour input is corrected to account for the nature of apprenticeship, productivity is estimated to be 1.3 percent- age points higher than raw measures suggest. In other words, compositional effects explain roughly 20% of the observed productivity deviation relative to the pre-COVID trend.

Still, education policies are double-edged. While they improve workforce qualifications in the long run, they also delay labour market entry, leading to a short-term de- cline in employment and aggregate productivity. To offset these effects, one might expect a symmetrical trend toward later retirement. Yet despite several reform attempts in the 1990s and 2000s, the alignment between extended education and delayed retirement has not materialised—creating a demographic imbalance with implications for both the labour force and overall productivity, as we will explore in the next section.

6 Institutions

6.1 Pension Scheme Reforms

Pension reform has been a recurring feature of French economic policy since the early 1990s, driven by both demographic pressures and the long-term sustainability of the pay-as-you-go system. The reforms have primarily sought to delay retirement, extend contribution periods, and reduce replacement rates, with the broader aim of alleviating

fiscal pressure and increasing labour force participation among older workers.

The first major reform, the *Balladur* law of 1993, marked a turning point. Until then, the legal retirement age had been set at 60 years by ordinance in 1982. The *Balladur* law did not alter the statutory retirement age but significantly changed how pensions were calculated. It increased the contribution period required to obtain a full pension by 2.5 years, extended the reference period for calculating pension benefits from the 10 best years of earnings to the best 25, and switched the indexation of pensions from average wages to the consumer price index. Although these measures applied only to private-sector employees, they set the precedent for future reforms (Bozio, 2005).

A second wave came with the *Fillon* reform of 2003, which extended the scope of the Balladur reform to public-sector employees and further increased the required contribution period. Finally, the *Woerth* law of 2010 raised the legal minimum retirement age from 60 to 62 years.

According to estimates by Bardaji et al. (2004), the 1993 reform alone reduced the number of pensioners by approximately 180,000 in 2010, and by 390,000 by 2040. However, because the reform was implemented alongside other policy changes—and because individuals could still retire early through alternative pathways—more precise estimates remain elusive.

Nonetheless, the impact on labour supply is significant. Bozio (2005) shows that each additional quarter of contributions to the pension scheme led to a 1.5-month increase in the effective retirement age. On average, reforms extending contribution requirements increased employment duration by 1.35 years. Assuming labour and capital are complementary and capital is elastically supplied, this increase in labour supply could raise GDP by around 0.5% for the 1993 reform alone and by up to 2.4% when combined with the 2003 reform, by 2020.

Despite the wealth of literature on pension systems, surprisingly little robust empirical work has been conducted on the productivity effects of extending contribution periods or delaying retirement in the French context. One exception is the study by Aubert and Crépon (2003), which examines how worker age composition affects productivity across three sectors: industry, trade, and services. Their findings challenge the common belief that older workers are necessarily less productive. In the industrial sector, only the youngest workers were significantly less productive than the reference group (aged 35–39). In trade, workers aged 40–60 were more productive than the reference group, and in services, productivity peaked among workers aged 45–54. In all sectors, the coefficient on the 50–54 age group was higher than for the 55–59 group, though statistical significance was often lacking. Interestingly, workers over 60 in industry

showed higher productivity, likely reflecting selection effects: older industrial workers tend to hold senior positions with greater responsibilities.

From a theoretical perspective, the impact of delaying retirement on productivity could operate through two competing channels. The first is a *horizon effect*: if older workers expect to remain in the labour force longer, they may be more inclined to invest in updating their skills, which would raise both labour and total factor productivity. The second is a *pure age effect*: workers approaching retirement may instead rely on existing skills, reducing their adaptability to technological change. Empirical studies often struggle to disentangle these effects, and are subject to important selection biases—making the net productivity impact of increasing the retirement age ambiguous.

Although pension reforms have succeeded in raising employment rates among older workers and likely contributed to GDP growth through labour supply expansion, their effect on productivity remains difficult to quantify. More research is needed to assess whether delayed retirement contributes to skill obsolescence or, conversely, incentivises lifelong learning and innovation at older ages.

7 Internationalisation

7.1 European integration

Most of the internationalisation policies implemented in France starting from the 1950s were directly linked to European developments. Indeed, France is one of the founders of the European dynamism which punctuated the 20th century, and as such is heavily implicated in every step of the process.

The French economy became more and more integrated with the Common European Economic area from the 1950s onwards. Some of the major steps of this increased integration are the creation of the European Coal and Steel Community (ECSC) in 1951, which pooled the production of coal and steel, the treaty of Rome which expanded the scope of cooperation between the member states beyond economic activity or the creation of the Schengen zone in the 1990. The gradual abolition of frontiers between European states helped boost exchanges, which benefitted France. The introduction of the common currency and the creation of an autonomous common bank also helped strengthen the economy.

7.2 Migration Policy

Since the beginning of the 1960s, the French migration policy took on different forms, especially to face the influx of people trying to reach the European Union and get French nationality. France's international appeal is partly rooted in the great need for workers at the end of the Second World War, which incentivized the successive governments to facilitate immigration through the creation of working visas. However, issuing working visa does not necessarily translate in obtaining the French nationality in the long run. As such, from 1968 to the end of the 1980s, the steady growth of immigrants on French territory did not lead to a sharp increase in naturalisation. From the 1980s, the trend reversed as conditions to enter France became more severe, notably with the end of working immigration in 1974 and the adoption of the Bonnet law in 1980, which aims at reducing clandestine immigration.

When it comes to productivity, the results found by Aleksynska and Tritah (2013) in their paper on immigration and productivity in OECD countries suggest positive complementarities between natives and immigrants at the macroeconomic level. Other authors show that the immigrant workforce has a positive impact on economic growth, especially thanks to their higher mobility, which boosts the efficiency of the geographic distribution of jobs (Borjas, 2001) or a complementarity of skills (Lazear, 1998). Lastly, Lewis (2005) and Dustmann et al. (2008) point towards an increase of productivity growth after a migration choc.

As for GDP per capita, a study done by Georgiou Nano and Lahdo (2019) on OECD countries show that immigration had a positive impact from 1985 to 2000 which turned insignificant afterwards.

7.3 Trade and FDI

Trade and FDI policies have never played an important role in the French policy debate. During most of the 20th century, the strategy France relied on was to adjust the exchange rate to make its exports more competitive. However, with the convergence requirements of EU membership and the later adoption of the euro, France cannot rely on this strategy anymore. But since the beginning of the 2000s, France has only experienced trade deficits, further showing how little trade and FDI are considered in France compared to other parts of the typology proposed by Van Ark et al. (2023).

In 1995, OECD countries made up 77% of French foreign direct investments, of which 46% was directed towards other European economies. However, despite multiple

attempts at boosting France's exports, there is no sign of the trade deficit going down (-74 billions € in 2011). This can be partially attributed to the fact that many small-scale measures to support exports exist, but these are rarely used and mostly concentrated towards a small fraction of firms. Overall, only 10% of exporting firms benefit from these measures.

According to Artus and Fontagné (2006), the poor performance in trade can be attributed to three factors, namely the increase in energy prices, the appreciation of the euro and the differential in economic performance, especially with regards to Germany. The goal for French policy makers is not to reach a trade equilibrium but rather to boost employment and growth.

Artus and Fontagné also try to pinpoint the drivers of the gap in the trade balance between France and Germany. They distinguish macro effects which do not explain much of the difference and micro effects. Between 1998 and 2003, most of the difference between France and Germany can be explained by the fact that German export growth towards France was higher than French export growth towards Germany. To understand this phenomenon, the authors turn to the characteristics of the exported goods. High-end products make up 48.9% of Germany's exports compared to 42.4% in France, most of which were directly linked to the aeronautical sector.

To conclude this section, France lacks clear long-term objectives when it comes to trade and FDI. This goes in hand with the deepening of the trade deficit over the last two decades. While some measures exist to help French firms gain competitiveness on the global market, they lack visibility thus limiting their reach. Moreover, France's trade partners benefit from a clear advantage in international exchanges, constraining further the space for efficient trade policies.

8 Summary Table

This section offers a summary of the main reforms studied in the previous sections. Overall, the main conclusions point towards an ambiguous effect of France's main policies on productivity. Essentially, the effects of most reforms could impact productivity levels positively or negatively. However, in most cases, there is no proper estimation available to settle on one effect. Labour market reforms tend to illustrate the trade-off between high levels of unemployment for a certain part of the population versus high levels of productivity and higher competitiveness. For example, the labour cost reduction, as embodied by the CICE or the Juppé law, improved employment levels of low-skilled workers but is likely to have had a negative impact on both TFP

and labour productivity. This is less the case for laws regulating working time. Regulations aimed at a more flexible labour market however should positively impact productivity. However, reforms affecting the goods and services market tend to promote higher productivity levels due to the explicit goal of improving competitiveness. Other reforms, like those linked to human capital formation typically have a deferred impact on productivity levels, that is, negative in the short term and positive in the long term. A last category of reforms, i.e. pension reforms, pertaining to a very specific group of the population also has ambiguous effects on productivity due to the interaction between two opposite effects, as explained above.

8.1 Explanation of the table

Table I provides is a summary of the policies discusses in the previous sections, including an indication of the expected impact. Results from the literature will only be briefly mentioned, while reafers are referred to the relevant sections for a more detailed explanation of the information provided in the table.

1. **Reduction of working time:** There can be two impacts of these measures on TFP. On the one hand, one can expect a positive impact because, in order to keep the same output levels, firms could substitute labour with capital, which would boost productivity in the long run. On the other hand, if the anticipated additional investment does not occur, less working hours could lead to smaller productivity gains. Moreover, labour-intensive sectors could suffer from a shorter work week. A reduction in average hours worked could have led to a 4% to 5% increase in hourly productivity (cf Bunel and Jugnot, 2003) but it can be harder to gain firm-specific skills for each worker in the long run, thus reducing productivity. However, regarding employment, in order to attain the 39- or 35-hour workweek, firms are incentivised to create more part-time employment.

2. **Labour cost reduction:** We expect a negative impact of these measures on TFP as well as labour productivity since it can lead to hiring more workers with relatively low marginal productivity. However, a positive impact on employment should be observed since the relative price of labour compared to capital decreases, encouraging employment.

3. **Labour market institutions:** The effect on TFP should be positive since most measures falling under this category aim at removing the structural rigidities of the labour market. This should lead to greater market dynamics, thus increasing

productivity over time. As for GDP, the effect should also be positive because of the positive impact on TFP. The effects on labour productivity are more ambivalent. On one hand, lower EPL is correlated with higher labour productivity. On the other hand, it could be negative since lower EPL could threaten employment stability, which has been shown to have positive effect on labour productivity.

4. **Goods and Services Markets:** The effect of these reforms are expected to be positive. Indeed, they essentially assure that competitiveness and labour productivity are boosted at the aggregate level, leading to an increase in output.

5. **Technological Change and Innovation:** The effect of the CIR should be positive on all macroeconomic variables reported. Apart from a small transitory decrease in TFP, boosting innovation bolsters output growth and employment of production teams. We also expect a positive impact on labour productivity since technological progress leads to more productive technologies, increase factor productivity.

6. **Education and skills:** Overall, these measures help increase the human capital stock, providing firms with a high-skilled labour force. Thus, the long term expected results are positive. However, this comes at a cost in the short-run, since it means accepting to hire workers in training, who have lower productivity by design. As for GDP per capita, since these measures increase labour productivity, they should lead to higher output levels.

7. **Institutions:** While the effects of pension scheme reforms on TFP and GDP per capita are undefined, we expect that they have adverse impact on labour productivity since it means keeping workers with obsolete skill sets in employment, in particular when little to no effort is made to keep those skill sets up to date. As for employment, the effect should be positive since pension reforms would mean longer job tenure.

8. **Internationalisation**: It is harder to draw a clear relation between internationalisation policies and the main variables of interest because there is no clear policy objective when it comes to trade and FDI in France, either related to productivity or any other outcome. Overall, these policies led to an increase of TFP and GDP per capita due to the complementarity in skills between native and migrant workers, though some adjustment could be necessary in the short term. In terms of labour productivity, the results are more ambiguous: migration accounts for better labour allocation across sectors and the attraction of high-skilled workers, but this could also result in higher unemployment rates for native workers.

TABLE I: Summary of the main results of the policies detailed in the paper

Name of the reform	Period	Impact on				Bibliography
		TFP	GDP/capita	Labour productivity	Employment	
2. Labour market						
2.1 Reduction of Working Time						
Official working time reduced to 39h/week Auroux Law	1982	+ -	Stable ceteris paribus	+ (hourly) - (per worker	+	Askenazy (2008)
Official working time reduced to 35h/week Aubry II Law	1998–2000	+ -	Stable ceteris paribus	+ (hourly) - (per worker	+	Husson (2002) Bunel and Jugnot (2003) Askenazy (2008) Clerc (2012)
2.2 Labour Cost Reduction						
Reduction of payroll taxes Loi Balladur	1993-1996	-	Stable ceteris paribus	(-)	+	Lawson et al. (2023)
Further reduction of social contributions Loi Juppé, Aubry, Fillon	1996–2012	-	Stable ceteris paribus	(-)	+	Bozio and Wasmer (2024)
Targeted reduction of social contributions CICE	2012	-	+ (expected)	(-)	+	Gilles et al. (2018) Ducoudré et al. (2016)
2.3 Labour Market Institutions						
Flexibility and security of working conditions Ordonnances Travail	2017–2020	+ (expected)	+ (expected)	Undefined	+	Cette et al. (2014) Storm and Naastepad (2007)
Modification of collective bargaining El Khomri Law	2016	+ (expected)	+ (expected)	Undefined	+ -	Cette et al. (2016a)
3. Goods and Services Market						
Deregulation of goods and service market Macron Law	2015	Undefined	Undefined	+	Undefined	Bourlès et al. (2013)

Strengthening of French competitiveness PACTE Law	2019	+	+	+	Undefined	De Williencourt et al. (2018) Stratégie (2020) Garicano et al. (2016)
Innovation Policy CIR	1983 reformed in 2008	- transitory + in the long run	Undefined	(+)	+	Bach et al. (2021) Bozio et al. (2019)

,j

5. Education and skills						
Founding law on professional training Delors Law	1971	- in the short run + in the long run	+ (expected)	- in the short run + in the long run [5]	+	Labau and Lagouge (2024) Toutin and Cart (2018)
Extension of apprenticeship to more than technical diplomas Séguin Reform	1987	- in the short run + in the long run	+ (expected)	- in the short run + in the long run	+	Toutin (2024)
Simplification of apprenticeship process Avenir Professionnel	2018	- in the short run + in the long run	+ (expected)	- in the short run + in the long run	+	Coquet (2023)
6. Institutions						
Lowering of retirement conditions for private sector workers Loi Balladur	1993	Undefined	Undefined	-	+	Bozio (2005) Bozio et al. (2018)
Extension of Balladur law to public sector Fillon Law	2003	Undefined	Undefined	-	+	Aubert and Crépon (2003)
7. Internationalisation						
European integration	1951 to today	+	+	Undefined	+	Bozio (2005) Bozio et al. (2018)
Migration Policy Bocquet law	1980	+	+	+	+ -	Aubert and Crépon (2003)
Trade and FDI	No clear policy	Undefined	+	+ -	+ -	Artus and Fontagné (2006)

Note: the numbering of each policy area refers to the section of the paper where the policies are discussed in more detail.

9 Perspectives on Productivity Dynamics

Having reviewed the major structural reforms undertaken in France and their consequences for productivity, we now turn to the most recent developments. In particular, the COVID-19 crisis marked a turning point that accentuated existing trends and introduced new sources of variability in productivity performance. The French economy has undergone significant changes in the labour market, energy costs, fiscal reporting structures, and environmental regulation—all of which are likely to shape productivity in the coming years.

9.1 Productivity in the Post-COVID Era

The COVID-19 pandemic introduced several disruptions to labour markets and production systems, many of which have had lingering effects on productivity. Although there were initially high short-term expectations of a productivity revival linked to digital acceleration, the data for the post-pandemic period paint a more complex picture (Fernald et al., 2025).

From a long-run perspective, France—like most advanced economies—has experienced a steady slowdown in labour productivity growth. Annual gains of 3–5% in the 1970s have fallen to around 1% today. A large part of this slowdown can be attributed to reduced gains in human capital accumulation and weaker technological diffusion. The COVID crisis, while unique in its nature, did not fundamentally alter this long-term trajectory but has exacerbated several underlying dynamics.

Labour Market Transformations. The pandemic coincided with significant shifts in the French labour market. In recent years, growth has become more labour-intensive, with falling unemployment and rising employment partially decoupled from output growth. The increase in jobs, while beneficial in social terms, has mechanically contributed to a slowdown in productivity per worker. According to Coquet and Heyer (2025), delayed adjustments in the labour market explain nearly 45% of the post-COVID productivity slowdown, notably in sectors such as aerospace and energy where workforce retention exceeded immediate production needs.

Teleworking, which became widespread during the pandemic, is another source of ambiguity. On one hand, it may foster productivity through enhanced flexibility,

reduced commuting time, and improved work-life balance. On the other hand, it introduces organisational challenges, coordination problems, and can undermine informal learning and team cohesion. The net impact remains uncertain and likely varies across sectors and occupations.

Another important transformation has been the sharp rise in apprenticeship contracts. As shown in Section 5.1, the expansion of apprenticeship programs has helped increase youth employment and improve the match between skills and labour market needs. However, apprentices are by construction less experienced, and typically work fewer hours, which lowers average productivity in the short run. Nevertheless, these investments in human capital are expected to yield positive effects in the medium to long term, provided that apprenticeships lead to durable skill acquisition and career progression.

Finally, the growth of non-salaried work and new forms of employment (such as platform work) further complicate the interpretation of productivity dynamics. These workers often fall outside traditional measurement frameworks, introducing statistical biases into labour input measures and potentially distorting productivity calculations.

Fiscal Optimisation and Measurement Issues. Another source of distortion in productivity measurement arises from fiscal optimisation practices. Differences in international tax regimes influence the geographic location of profits and intangible assets, decoupling the measurement of economic activity from its actual location. In France like in other advanced economies, this creates a bias in national accounts, especially as intangible assets become more prevalent and mobile (see Syverson, 2017, for a review on mismeasurement).

Climate Transition and Energy Prices. Climate change mitigation introduces another layer of complexity to productivity analysis. France's commitment to decarbonisation entails significant changes in the organisation of production and investment priorities. In the short term, higher energy prices—driven by geopolitical tensions and the carbon transition—have raised input costs for firms, with a direct negative impact on productivity growth. Recent studies suggest a negative relationship between energy prices and firms' investment capacities, especially in energy-intensive industries, thus reinforcing downward pressure on productivity.

The medium- to long-term effects of climate mitigation policies are more ambiguous. On the one hand, such policies require costly adjustments in production technologies and may reduce short-term efficiency. On the other hand, they offer potential long-run

gains through lower environmental degradation, improved health outcomes, and the development of new green industries. The net impact on productivity will largely depend on the pace of technological adoption and the degree to which clean investment can offset transitional costs.

More fundamentally, governments face a trade-off between two growth paths: one in which resource depletion leads to long-run output and productivity losses, and another in which strong mitigation policies ensure environmental sustainability and a more stable long-run productivity trajectory. In this context, productivity itself becomes endogenous to policy choices and societal preferences.

9.2 AI and the future of growth

The rise of artificial AI has rekindled hopes of a productivity revival, following two decades of sluggish growth. AI holds the potential to transform both the production and the organisation of work across a wide range of sectors. Generative AI in particular, could significantly affect high-skilled occupations by extending automation to cognitive and creative tasks that were previously considered sheltered from automation. In the short term, this may produce substitution effects in areas like document summarisation, programming, legal drafting or content generation. In the longer term, AI may act as a general-purpose technology capable of fostering new goods and services, transforming business processes, and enabling productivity gains via reorganisation and innovation.

As emphasized by Acemoglu (2025), the short-run effects stemming from automation are unlikely to be substantial. Even optimistic assessments such as Aghion and Bunel (2024) struggle to rationalize more than a 1 percentage point increase in annual productivity growth. While such an increase would be notable by today's standards, it remains modest compared to previous GPT waves. This limited impact is primarily due to the relatively small share of tasks for which AI is economically viable as a substitute for human labour. These tend to be narrowly defined functions, such as coding or drafting text. Even if AI adoption in these tasks results in significant cost savings—ranging from 30 to 40 % depending on the task, as evidenced by several randomized controlled trials (see Bergeaud, 2024 for a review)—the aggregate effect remains limited.

Over a longer horizon, however, the potential becomes far more significant. If AI succeeds in enhancing the productivity of researchers, accelerating idea generation, or enabling the creation of entirely new goods and services, then the effects on growth

could be substantial and, in theory, arbitrarily large (Aghion et al., 2017). Early empirical studies support this view: Toner-Rodgers (2024) show that integrating AI in the production of new ideas can produce highly positive outcomes.

Nevertheless, several obstacles must be addressed, especially in the European and French context. First, as David (1990) famously noted, historical experience with GPTs suggests a long delay between technological breakthroughs and measurable productivity gains. This time lag results from the need for complementary investments—in infrastructure, worker training, and organisational change—that are necessary to harness the technology's full potential. While generic AI models can be deployed at relatively low cost, tailoring AI systems to the specific needs of firms will demand substantial upfront investment and coordinated support.

Second, as highlighted by the experience of the third industrial revolution, GPTs do not automatically translate into faster growth. While early adopters may enjoy a productivity boost, they can also accumulate excessive market power, ultimately dragging down aggregate growth. This dynamic has been formalized in several recent contributions (Akcigit and Ates, 2023; De Ridder, 2024; Aghion et al., 2023b). Avoiding a repeat of this outcome will require proactive public policies, especially in competition and anti-trust enforcement.

Third, innovation diffusion depends on investment capacity. Europe currently lags behind the US in this respect. According to the 2025 Stanford AI Index, global private investment in AI reached 109.8 billion USD in the US, compared to only 19.42 billion in Europe—of which just 2.62 billion were in France and 1.97 billion in Germany. Such gaps signal the need for a more ambitious investment agenda if Europe is to remain competitive in AI-driven innovation.

Taken together, AI could significantly reshape productivity trends—but only if diffusion is broad-based, market structures remain competitive, and complementary capabilities are adequately developed.

References

Acemoglu, Daron, "Good jobs versus bad jobs," *Journal of labor Economics*, 2001, *19* (1), 1–21.

_ , "The simple macroeconomics of AI," *Economic Policy*, 2025, *40* (121), 13–58.

Acharya, Viral V, Ramin P Baghai, and Krishnamurthy V Subramanian, "Labor laws and innovation," *The Journal of Law and Economics*, 2013, *56* (4), 997–1037.

Aghion, Philippe and Simon Bunel, "AI and Growth: where do we stand," *Unpublished. Available at: https://www. frbsf. org/wp-content/uploads/AI-and-Growth-Aghion-Bunel. pdf*, 2024.

_ , Antonin Bergeaud, and John Van Reenen, "The impact of regulation on innovation," *American Economic Review*, 2023, *113* (11), 2894–2936.

_ , _ , Timo Boppart, Peter J Klenow, and Huiyu Li, "A theory of falling growth and rising rents," *Review of Economic Studies*, 2023, *90* (6), 2675–2702.

_ , Benjamin F Jones, and Charles I Jones, *Artificial intelligence and economic growth*, Vol. 23928 2017.

Akcigit, Ufuk and Sina T Ates, "What happened to US business dynamism?," *Journal of Political Economy*, 2023, *131* (8), 2059–2124.

Aleksynska, Mariya and Ahmed Tritah, "Occupation–education mismatch of immigrant workers in Europe: Context and policies," *Economics of Education Review*, 2013, *36*, 229–244.

Artus, Patrick and Lionel Fontagné, *Évolution récente du commerce extérieur français*, La Documentation Francaise, 2006.

Askenazy, Philippe, "A Primer on the 35-Hour in France, 1997-2007," Technical Report, IZA Discussion Papers 2008.

Aubert, Patrick and Bruno Crépon, "La productivité des salariés âgés: une tentative d'estimation," *Économie et statistique*, 2003, *368* (1), 95–119.

Auer, Peter, Janine Berg, and Ibrahim Coulibaly, "Is a stable workforce good for productivity," *Int'l Lab. Rev.*, 2005, *144*, 319.

Bach, Laurent, Antoine Bozio, Arthur Guillouzouic, Clément Malgouyres, and Nicolas Serrano-Velarde, "Les impacts du crédit impôt recherche sur la performance économique des entreprises." PhD dissertation, Institut des politiques publiques (IPP) 2021.

Bardaji, J, B Sédillot, and E Walraet, "Pensions in the French public sector: projections up to 2040 with the DESTINIE microsimulation model," Technical Report, Institut National de la Statistique et des Etudes Economiques 2004.

Bergeaud, Antonin, "The past, present and future of European productivity," in "ECB Forum on Central Banking" 2024, pp. 1–3.

_ , Arthur Guillouzouic, Emeric Henry, and Clément Malgouyres, "From public labs to private firms: magnitude and channels of local R&D spillovers," 2025. Quarterly Journal of Economics (forthcoming).

_ , Gilbert Cette, and Rémy Lecat, "Le produit intérieur brut par habitant sur longue période en France et dans les pays avancés: le rôle de la productivité et de l'emploi," *Économie et Statistique*, 2014, *474* (1), 5–34.

_ , _ , and _ , "Productivity trends in advanced countries between 1890 and 2012," *Review of Income and Wealth*, 2016, *62* (3), 420–444.

_ , _ , and Remy Lecat, "Total factor productivity in advanced countries: A long-term perspective," *International Productivity Monitor*, 2017, (32), 6.

_ , _ , and Rémy Lecat, "Long-term growth and productivity trends: Secular stagna- tion or temporary slowdown?," *Revue de l'OFCE*, 2018, *157* (3), 37–54.

Borjas, George J, "Does immigration grease the wheels of the labor market?," *Brookings papers on economic activity*, 2001, *2001* (1), 69–133.

Bourlès, Renaud and Gilbert Cette, "Trends in "structural" productivity levels in the major industrialized countries," *Economics Letters*, 2007, *95* (1), 151–156.

_ , _ , Jimmy Lopez, Jacques Mairesse, and Giuseppe Nicoletti, "Do product market regulations in upstream sectors curb productivity growth? Panel data evidence for OECD countries," *Review of Economics and Statistics*, 2013, *95* (5), 1750–1768.

Bouvier, Gérard and Fatoumata Diallo, "Soixante ans de réduction du temps de travail dans le monde," *Problèmes économiques (Paris)*, 2010, (2989), 33–36.

Bozio, Antoine, "Quel est l'impact de l'augmentation de la durée de cotisation lors de la réforme des retraites de 1993," *document de travail ENS-EHESS*, 2005.

_ and É Wasmer, "Les politiques d'exonérations de cotisations sociales: une inflexion nécessaire," *rapport final, octobre, France Stratégie*, 2024.

_ , Simon Rabaté, Audrey Rain, and Maxime Tô, "La réforme des retraites, un nouveau pilotage," *Risques*, 2018, p. 65.

_ , Sophie Cottet, and Loriane Py, "Évaluation d'impact de la réforme 2008 du crédit impôt recherche." PhD dissertation, Institut des politiques publiques (IPP) 2019.

Bunel, Mathieu and Stéphane Jugnot, "35 heures: évaluation de l'effet emploi," Technical Report 2003.

Carbonnier, Clément, Clément Malgouyres, Loriane Py, and Camille Urvoy, "Who benefits from tax incentives? The heterogeneous wage incidence of a tax credit," *Journal of Public Economics*, 2022, *206*, 104577.

Cette, Gilbert, Jimmy Lopez, and Jacques Mairesse, "Product and labor market regulations, production prices, wages and productivity," Technical Report, National Bureau of Economic Research 2014.

_ , _ , and _ , "Labour market regulations and capital intensity," Technical Report, National Bureau of Economic Research 2016.

_ , _ , _ , and Giuseppe Nicoletti, "Trust, Intangible Assets, and Productivity," Technical Report, National Bureau of Economic Research 2024.

_ , John Fernald, and Benoit Mojon, "The pre-Great Recession slowdown in productivity," *European Economic Review*, 2016, *88*, 3–20.

Clerc, Denis, "Les 35 heures: le bilan," *L'Économie politique*, 2012, (2), 55–62.

Connil, Damien, "Loi n° 2015-990 du 6 août 2015 pour la croissance, l'activité et l'égalité des chances. La procédure d'élaboration de la loi," *Les Grandes lois de la Ve République*, 2023, pp. 441–455.

Conseil national de productivité, "Troisième rapport annuel du Conseil national de productivité," Rapport officiel 2023.

_ , "Un monde en mutation – Productivité, compétitivité et transition numérique," 2025.

Consolo, Agostino, Gilbert Cette, Antonin Bergeaud, Vincent Labhard, Chiara Osbat, Stanimira Kosekova, Gaetano Basso, Henrique S Basso, Elena Bobeica, Emanuela Ciapanna et al., "Digitalisation: channels, impacts and implications for monetary policy in the euro area," 2021.

Coquet, Bruno, "Apprentissage: un bilan des années folles," *OFCE Policy brief*, 2023, (117), 1–18.

_ **and Eric Heyer**, "La productivité retrouve des couleurs," *OFCE Policy Brief*, 2025, (142), 1–16.

David, Paul A, "The dynamo and the computer: an historical perspective on the modern productivity paradox," *The American economic review*, 1990, *80* (2), 355–361.

De Ridder, Maarten, "Market power and innovation in the intangible economy," *American Economic Review*, 2024, *114* (1), 199–251.

Devulder, A, B Ducoudré, M Lemoigne, and T Zubert, "Comment expliquer les pertes de productivité observées en France depuis la période pré-Covid," *Bulletin de la Banque de France*, 2024, *251* (1).

Draghi, Mario, "The future of European competitiveness part A: A competitiveness strategy for Europe," 2024.

Ducoudré, Bruno, Éric Heyer, and Mathieu Plane, "CICE et Pacte de responsabilité: une évaluation selon la position dans le cycle 1: Simulations ex ante a partir d'un modele macroeconomique," *Revue de l'OFCE*, 2016, (2), 5–42.

Dustmann, Christian, Albrecht Glitz, and Tommaso Frattini, "The labour market impact of immigration," *Oxford Review of Economic Policy*, 2008, *24* (3), 477–494.

Fernald, John, Robert Inklaar, and Dimitrije Ruzic, "The productivity slowdown in advanced economies: common shocks or common trends?," *Review of Income and Wealth*, 2025, *71* (1), e12690.

Fuest, Clemens, Daniel Gros, Philipp-Leo Mengel, Giorgio Presidente, and Jean Jean Tirole, "EU innovation policy: How to escape the Middle Technology Trap," Technical Report, ifo Institute-Leibniz Institute for Economic Research at the University of . . . 2024.

Garicano, Luis, Claire Lelarge, and John Van Reenen, "Firm size distortions and the productivity distribution: Evidence from France," *American Economic Review*, 2016, *106* (11), 3439–3479.

Gilles, Fabrice, Yannick L'Horty, Ferhat Mihoubi, and Xi Yang, "Les effets du CICE: une évaluation ex post," *Économie & prévision*, 2018, *214* (2), 1–36.

Gordon, Robert J., *The Rise and Fall of American Growth*, Princeton University Press, 2021.

Husson, Michel, "Réduction du temps de travail et emploi: une nouvelle évaluation," *Revue de l'IRES*, 2002, *38* (2002), 1.

Labau, Fanny and Adrien Lagouge, "Quel impact de la hausse de l'alternance depuis 2019 sur la productivité moyenne du travail?" *Administration*, 2024, *281* (1), 35–36.

Lawson, Nicholas, Claire Lelarge, and Grigorios Spanos, "The Minimum Wage in Firms' Organizations: Productivity Implications," Technical Report, CEPR Discussion Papers 2023.

Lazear, Edward P, "Hiring risky workers," in "Internal labour markets, incentives and employment," Springer, 1998, pp. 143–158.

Lewis, Ethan G, "Immigration, skill mix, and the choice of technique," 2005.

Lopez, Jimmy and Jacques Mairesse, "Impact du CIR sur les principaux indicateurs d'innovation des enquêtes CIS et la productivité des entreprises," *Rapport pour France Stratégie*, 2018.

MESRI, "Le crédit d'impôt recherche (CIR) en 2021," 2023. Available Online at: https://www.enseignementsup-recherche.gouv.fr/sites/default/files/2023-11/le-cr-dit-d-imp-t-recherche-en-2021—provisoire-30075.pdf.

Nano, Angela Georgiou and Maria Lahdo, "The impact of immigration on unemployment and GDP per capita," 2019.

OECD, "Protecting jobs, enhancing flexibility: a new look at employment protection legislation," 2013.

OECD, "OECD Economic Surveys: France 2023," 2023.

Owen, Geoffrey, "Industrial policy in Europe since the Second World War: what has been learnt?" Technical Report, ECIPE occasional paper 2012.

Servan-Schreiber, Jean-Jacques, "Le défi americain (The American challenge)," *Paris: Denoel*, 1967.

Storm, Servaas and CWM Naastepad, *Why labour market regulation may pay off: Worker motivation, co-ordination and productivity growth*, Vol. 4, International Labour Office, 2007.

Stratégie, France, "Comité de suivi et d'évaluation de la loi PACTE-Premier rapport," 2020.

Syverson, Chad, "Challenges to mismeasurement explanations for the US productivity slowdown," *Journal of Economic Perspectives*, 2017, *31* (2), 165–186.

Toner-Rodgers, Aidan, "Artificial intelligence, scientific discovery, and product innovation," *arXiv preprint arXiv:2412.17866*, 2024.

Toutin, Marie-Hélène, "L'apprentissage après la réforme de 2018: nouveaux acteurs, nouveaux défis," *Céreq Bref*, 2024, *462* (13), 1–4.

Toutin, Marie-Helene and Benoit Cart, "À l'aube de la réforme de la formation professionnelle, retour sur 20 ans d'insertion des apprentis," *Céreq-bref*, 2018, *370*, 1–4.

Williencourt, C De, A Faci, and S Ray, "Quel effet macroéconomique du PACTE? Premiers éléments de réponse," 2018.