OECD publishing

DECLINING BUSINESS DYNAMISM

STRUCTURAL AND POLICY DETERMINANTS

OECD SCIENCE, TECHNOLOGY AND INNOVATION
POLICY PAPERS
November 2020 **No. 94**

OECD
BETTER POLICIES FOR BETTER LIVES

This paper was approved and declassified by written procedure by the Committee on Industry, Innovation and Entrepreneurship (CIIE) on 17 September 2020 and prepared for publication by the OECD Secretariat.

Note to Delegations:
This document is also available on O.N.E. under the reference code:
DSTI/CIIE(2020)17/FINAL

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 811181. The European Commission is not responsible for any use that may be made of the information produced by the project.

Declining business dynamism: structural and policy determinants*

Flavio Calvino[1], Chiara Criscuolo[1], and Rudy Verlhac[1]

[1]OECD Directorate for Science, Technology and Innovation

Abstract

This paper analyses the trends in business dynamism across 18 countries and 22 industries over the last two decades, using highly representative comparable data. It highlights that declines in business dynamism have been pervasive in many countries and are driven by dynamics occurring at a disaggregated sectoral level, rather than reallocation across sectors. Focusing on average trends within sectors in each country, steady declines are evident over the last two decades even after accounting for the role of the business cycle. The paper explores the determinants of these declines, focusing on the role of structural and policy factors. A prominent role of market structure and firm heterogeneity emerges. Investments in intangibles and digital technologies, globalisation, and changes in demographics are also found to affect the trends. Policy can, however, help boost business dynamism, by reducing barriers to entry and to knowledge diffusion, favouring experimentation and creative destruction, while increasing absorptive capacity and the potential of firms to benefit from technological change.

Keywords: Business dynamism, Firm demography, Job reallocation, Employment dynamics.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 811181. The European Commission is not responsible for any use that may be made of the information produced by the project. This paper has benefited from helpful comments and suggestions by Sarah Box, Dirk Pilat, Andrew Wyckoff, and participants to the OECD WPIA and CIIE meetings. The authors would also like to thank members of the DynEmp network (reported in Table A1 in the Appendix) for their valuable contribution to the project and data collection, as well as Clara Kögel for excellent statistical assistance. Access to French data used in this work benefited from the use of Centre d'Accès Sécurisé aux Données (CASD), which is part of the "Investissements d'Avenir" program (reference: ANR-10-EQPX-17) and supported by a public grant overseen by the French National Research Agency (ANR). Access to the anonymised data used for New Zealand in this study was provided by Statistics New Zealand in accordance with security and confidentiality provisions of the Statistics Act 1975, and secrecy provisions of the Tax Administration Act 1994. The findings are not Official Statistics. The results in this paper are the work of the authors, not Statistics NZ, and have been confidentialised to protect businesses from identification. See Appendix A for the full disclaimer.

Table of contents

List of Figures

List of Tables

Executive summary

There is a growing concern that a "secular decline" in business dynamism – the process of firm entry, growth, and exit, and the simultaneous creation and destruction of jobs – is affecting advanced economies. However, cross-country evidence remains scarce and the drivers are still debated.

A better understanding of these trends is critical to promote policies that can help offset their persistent effects on innovation, employment and more generally economic growth. Recent OECD work has shown that declines in entry rates have persistent employment effects, with a drop of 20% in the number of entrants in a single year inducing a loss of about 0.7% of aggregate employment three years after the shock, and still of 0.5% 14 years after (OECD, 2020b).

This paper analyses the trends in business dynamism across 18 countries and 22 industries over the period 2000-2015 using novel data from the OECD DynEmp project, that collects statistics – computed from firm-level data – which are representative of aggregate dynamics and suitable for cross-country comparisons.

The analysis focuses mainly on two common indicators of business dynamism – entry rates and job reallocation rates – and uncovers key stylised facts about their trends.

- Declines in business dynamism have been pervasive in many countries and are driven by dynamics occurring at a disaggregated sectoral level rather than by a changing sectoral composition of economies.
- Focusing on average trends within sectors in each country, steady declines are evident over the last two decades even after accounting for the role of the business cycle. In particular, entry rates and job reallocation rates experienced an average decline of about three and five percentage points, respectively, between 2000 and 2015.
- Although declines have been pervasive – all countries display some signs of declining business dynamism – significant heterogeneity in their magnitude and speed across countries and sectors is also observed. For instance Telecommunications, IT, Scientific R&D and Media show clearly the sharpest decline and Food and Beverage and Textile the lowest.

The pervasiveness of the decline, which occurs in most industries (and also for manufacturing and services separately), also precludes explanations entirely based on the changing composition of economies (e.g. the growing importance of the services sector).

The paper therefore investigates possible drivers, and sheds lights on the structural and policy factors that contribute to (or mitigate) the decline in business dynamism. The analysis focuses on four groups of structural factors:

- Intangibles and digital technologies: countries and sectors with higher intangible and digital intensity, measured through ICT equipment intensity, software and database intensity, R&D intensity, and skill intensity, have experienced faster declines in entry rates and job reallocation rates.
- Market structure and firm heterogeneity: higher industry concentration and higher productivity dispersion between leaders and laggards in the sector are positively associated with the speed of the decline, while more mature industries (i.e. more advanced in their life cycle) tend to have experienced milder declines over the period.

- Globalisation and integration in Global Value Chains: while trade integration seem to be associated with faster decline in dynamism, forward integration in GVCs at the country level seem to mitigate the decline in entry rates and job reallocation rates.
- Demographic factors: ageing and declines in the labour force growth seem to contribute to the observed trends, but to a lower extent.

Analysing these groups of drivers simultaneously suggests that declines in business dynamism are more strongly associated with factors related to market structure and firm heterogeneity, which may be interlinked with the rising importance of intangibles and digital technologies

The rising importance of digital technologies and intangible assets (such as R&D, patents, software and databases, etc.), possible declines in knowledge diffusion (e.g. due to strategic behaviour reflected in patent thickets or to lack of capabilities such as skills or investment capacity) may indeed favour a polarisation of the economy that reduces the chances to leapfrog the leaders, potentially reducing incentives to enter, experiment and innovate.

Focusing on policies and framework conditions, the paper identifies five key areas that are related to the speed of the decline in business dynamism and that can be targeted to mitigate the trends and partially offset past declines. These are:

- Regulatory barriers and level playing field: high regulatory barriers and red tape amplify declines in entry rates.
- Judicial efficiency and bankruptcy regulations: efficient judicial and especially bankruptcy systems reduce those declines.
- Access to finance: access to finance plays an important role with more financially developed countries and lower gaps in interest rates between firms of different size being associated with lower declines in entry rates.
- Innovation support: policies enhancing innovation (government-financed GERD) are associated with a lower decline in entry rates while innovation support for large businesses seems rather associated with possible increases in entry barriers.
- Education: countries with higher levels of human capital (years of schooling) and with higher spending in education have experienced lower declines in dynamism.

Although the findings presented in this report are not causal relationships but rather robust correlations, they highlight key elements of a dynamic business environment.

The relevance of different policy variables for the trends in business dynamism suggests the need of a multi-pronged policy approach to address these trends.

Reforms in these areas may be beneficial not only for business dynamism, but can bring double dividends for other economic outcomes, such as productivity growth and inclusiveness.

1. Introduction

Business dynamism – the process of firm entry, growth, and exit, and the simultaneous creation and destruction of jobs – plays a crucial role in market economies. It provides an important contribution to creative destruction, which is key to ensuring innovation and ultimately aggregate economic growth.

But there is a growing concern that a "secular decline" in business dynamism is affecting advanced economies, with an extensive debate underway about the United States in particular. Given the primary role of dynamism for aggregate economic and social outcomes, a better understanding of these trends and their determinants is of first order importance for policy makers.

This paper analyses the trends in business dynamism across 18 countries and 22 industries over the last two decades, using novel data collected in the framework of the OECD DynEmp project. These statistics, computed from firm-level data, provide a representative picture of aggregate dynamics and have been extensively harmonised to be suitable for cross-country comparison.

The analysis uncovers two key stylised facts. First, declines in business dynamism have been pervasive in many countries and are driven by dynamics occurring at a more disaggregated level within sectors rather than reallocation across sectors. Second, focusing on average trends within sectors in each country, steady declines are evident over the last two decades even after accounting for the role of the business cycle. In particular, entry rates and job reallocation rates declined on average by about three and five percentage points, respectively. Although declines have been pervasive – all countries display some signs of declining business dynamism – there is significant heterogeneity in their magnitude and speed across countries and sectors.

The paper then explores the determinants of these declines in business dynamism, focusing on the role of structural and policy factors, accounting for the role of the business cycle. This is of primary importance in order to implement appropriate policy responses.

Structural characteristics – including intensity in the use of intangibles, market structure, globalisation, and demographic factors – are found to be significantly related to the observed trends. When combining structural factors together, a more prominent role of market structure and firm heterogeneity emerges, which may be linked to the presence of barriers to entry, growth, and barriers to knowledge diffusion.

That said, institutions and framework conditions are found to play an important role in explaining cross-country differences in the observed trends. Regulatory burdens and red tape, judicial and bankruptcy efficiency, access to finance, innovation, and skills importantly affect business dynamism, with more business friendly countries experiencing less prominent declines.

Thus, policy reforms can significantly help limit declines in business dynamism. Indeed, reforms reducing administrative requirements and barriers to entrepreneurship, improving the enforcement of contracts, and enhancing innovation potential and skills may boost business dynamism with positive longer-term effects. Focusing on these policy areas together may reduce barriers to entry and to knowledge diffusion, allow experimentation and favour creative destruction, while increasing absorptive capacity and the potential to benefit from technological change.

This work is particularly relevant because critical social and economic outcomes may be affected by declining trends in business dynamism, including job creation, inclusiveness, innovation and productivity growth.

Young firms, and more specifically a few high-growth firms, are the engine of job creation and are crucial for the introduction of new business models and the introduction and diffusion of innovation. Furthermore, young businesses can be a springboard for younger workers (Cockx and Picchio, 2012) and represent employment opportunities for women, immigrants and labour market outsiders, e.g. unemployed and entrants in the labour markets (Nyström et al., 2012; Ouimet and Zarutskie, 2014).

Business dynamism is also significantly related to aggregate productivity. Job reallocation and dynamism are key for an efficient allocation of resources, allowing successful firms to grow and the less productive ones to shrink. This allocation of resources importantly relies on both reallocation between incumbents, but also the extensive margins on firm dynamics, i.e. the continuous process of firm entry and exit. In addition, business dynamism may favour the introduction of radical innovation and the diffusion of technology and knowledge, the key drivers of within-firm productivity growth (Dent et al., 2016; Gourio et al., 2016).

In this context, understanding the structural and policy determinants of declining dynamism, and the role of government policies to limit this decline, is crucial for economic policy and future social and economic outcomes.

The paper is organised as follows. Section 2 provides an overview of the existing contributions to the literature related to this paper; Section 3 describes the data collected and used to analyse trends in business dynamism across countries and presents the key stylised facts; Section 4 analyses the determinants of declining business dynamism, focusing on structural and policy factors; Section 5 discusses the overall findings and policy implications, while Section 6 concludes.

2. An overview of the existing evidence

This section provides a review of the existing evidence on business dynamism, focusing mainly on abundant evidence from the United States and completing the picture with (more scarce) studies on other countries. Summary tables C15, C16 and C17 in Appendix C summarise the main results from these studies.

Business dynamism encompasses different aspects related to firm and employment dynamics. Therefore, there is not a unique measure of business dynamism and studies have focused on various facets of the phenomenon, including entry rates, job reallocation rates, and the role of high-growth firms.

Even though most of the evidence and the debate focused on the United States, a few country-specific studies (for example on Australia, Belgium, Canada, or Portugal) and cross-country evidence suggest that declining business dynamism may be a more widespread phenomenon. However, differences in the focus of these studies related both to the facets and measures of dynamism and periods analysed limit the possibility of cross-country comparisons. Limited conclusions can be therefore inferred on the structural nature and causes of these declines across countries and sectors. On the contrary, this paper studies the phenomenon from a wider cross-country and cross-industry perspective that allows a more comprehensive investigation of its drivers.

2.1. Entry and exit rates

Start-ups and young businesses play a key role for job creation and job destruction (see Haltiwanger et al., 2013 and Criscuolo et al., 2014) and for the process of productivity-enhancing reallocation. But numerous studies have highlighted declining trends in entry rates, and this is considered as one of the top signs of declining business dynamism (Haltiwanger et al., 2015).

Declines in entry rates have been prominent in the United States. This has been documented for instance by Decker et al. (2014b) (and by a number of subsequent publications) using the US Census Bureau's Longitudinal Business Database (LBD). Decker et al. (2014b) show a marked decline of entry rates over the period 1980-2012.[1] Exit rates, on the other hand, have remained quite stable in the United States over the period, so that net entry rates (the difference between entry and exit rates) have become negative since 2008.

Other economies, such as Australia, Canada, and Portugal, have experienced declines in entry rates. In particular, Bakhtiari (2017) reveals patterns of declining dynamism in Australia over the period 2002-2015, which entail a decline in entry rates. Focusing on entry and exit rates over almost 30 years (1984-2012), Macdonald (2014) reveals a downward trend in entry rates within industries in Canada, contrasting with the mixed evidence based on the post-2000 period. Sarmento and Nunes (2010) evaluate the entrepreneurship performance of Portugal, highlighting that the country has also experienced a relevant decline in dynamism.

In addition, lower entry rates also induce declines in other measures of business dynamism. The start-up deficit is associated with a lower share of employment accounted by young firms (Decker et al., 2014b). The shift of both the firm and employment distributions towards older firms changes the composition of the economy. Given that older firms are generally less dynamic (e.g., job reallocation rates are lower for older firms), their higher prevalence

and employment share generate a "composition effect" that reduces job reallocation at the aggregate level. Indeed Decker et al. (2014b) and Decker et al. (2016a) document that declining start-up rates and changes in the firm age distribution are important factors explaining declining business dynamism.[2]

2.2. Job reallocation and other indicators of declining dynamism

Declining entry rates are not the only feature and cannot entirely account for declining trends in business dynamism. Job reallocation, which represents simultaneous job creation and job destruction by business firms, is another key indicator of dynamism. Decker et al. (2014b) suggest that in the US most of the decline in job reallocation occurs within industry and firm age classes, and it is therefore not due to changes in relative weight of these firms and sectors, confirming the evidence shown in Figure 1.

More recent analysis by Decker et al. (2018) further examines the dynamics of job reallocation in the United States. Building upon a standard firm dynamics framework, they question whether the decline in job reallocation is related to a decline in the dispersion of business-level productivity shocks or to a decline in the businesses responsiveness to such shocks, i.e., the extent to which businesses adjust employment or other inputs in response to productivity shocks. By using different data sources, Decker et al. (2018) infer that the post-2000 decline in job reallocation reflects weaker responsiveness to shocks, and that this is consistent with rising adjustment frictions in the United States. They also suggest that weakening responsiveness accounts for a significant drag on aggregate productivity since 2000,[3] pointing to rising adjustment costs and other frictions as the key mechanisms consistent with observed trends.[4]

Overall, the decline in business dynamism appears to be a pervasive phenomenon that occurs within narrowly defined groups of firms. A major concern for the economy is that it has also occurred in the most dynamic segments of the economy.

Decker et al. (2014a) illustrate that a decline in high-growth young businesses together with a decline in high-growth firms in high-tech sectors has occurred after the year 2000 in the United States (see also Haltiwanger et al., 2014). As highlighted by Decker et al. (2016c), the post-2000 decline in business dynamics seems also accompanied by a substantial decline in the skewness of the business growth distributions in the United States.[5] In particular, the overall decline of business dynamism reflects a significant drop in the top 10% of the growth distribution, which is accounted for by the declining share of young businesses (see also Pugsley and Sahin, 2015) and by their declining propensity to be high-growth firms. Bijnens and Konings (2017) provide similar evidence for Belgium, suggesting that the decline in the difference in employment growth between the fastest and slowest growing firms is mainly driven by growth fading away at the top.

Changes in business dynamism are one piece of a more complex puzzle related to broader changes in the competitive environment that have been taking place in the last two decades. Other possibly related trends include increasing productivity dispersion, increasing market concentration, rising mark-ups, and declines in labour shares (see Akcigit and Ates, 2019a for extensive discussion, especially focusing on the United States).

Existing and ongoing OECD work has examined trends in mark-ups (Calligaris et al., 2018), concentration, M&A, productivity and diffusion (Andrews et al., 2016), and other measures of

the competitive environment (see also Bajgar et al., 2019 for further discussion), providing additional complementary insights.

Akcigit and Ates (2019b) focus on alternative margins affecting ten trends related to business dynamism in the US (including declining entry and job reallocation rates). The authors corroborate the declining dynamics in the United States and explore the role of corporate taxes, R&D support by governments for incumbents, entry costs and regulatory burdens, and knowledge diffusion by calibrating a theoretical model on moments from US data.

The analysis by Akcigit and Ates (2019b) suggests that reduction in knowledge diffusion (possibly driven for instance by the rising importance of tacit knowledge and intangibles assets, such as proprietary data, or the strategic behaviour of large firms building patent thickets) has been the most powerful force driving changes in all observed trends in the United States, which brings important policy implications, especially when related to the increased concentration of patenting, as well as the strategic use of patents (building thickets around firm core business).

2.3. Changes in business dynamism across sectors

A few studies discuss more in detail sectoral features of the observed declines in business dynamism. In particular, Decker et al. (2016c) emphasise a change in the nature of declining business dynamism in the US. On the one hand, the Information sector experienced an increase in dynamism (and in the employment growth differences between the fastest and slowest growing firms) until the year 2000, showing then a sharp decline afterwards. On the other hand, the Services and the Retail sectors experienced a relatively uniform decline in dynamism during this period. Finally, the dynamics in the Manufacturing sector seem generally less pronounced.

Sector-specific patterns might reflect, in some cases, wider transformations in the structure of an industry: for instance, declining dynamism in the US Retail sector might be a consequence of the shift from single-establishment stores to large national or international firms. They might also have different consequences for productivity growth as they reflect different structural transformations across sectors. Indeed, the decline in business dynamism in the retail sector over the 1990s reflected a productivity enhancing consolidation in the sector with the emergence of big “box stores” like Walmart and the exit of less efficient “mom and pop stores”. On the contrary, this is not necessarily the case for high-tech sectors.

Calvino and Criscuolo (2019), focusing on 15 OECD and non-OECD countries, highlight that digital intensive sectors, despite being more dynamic (both in terms of entry rates and job reallocation rates) have experienced faster declines in dynamism with respect to other sectors of the economy. This appears related, at least to a considerable extent, to technology. Indeed, the digital transformation has created new opportunities for entrants and stimulated dynamism in sectors using ICTs. As time went by, some firms have succeeded and gained market shares, and entry and dynamism have declined, as has been the case in the past for other innovative sectors. These dynamics may have been further reinforced by the general-purpose nature of digital technologies, as they do not appear limited to ICT-producing industries but seem to characterise also a broader number of digital intensive application sectors (for a taxonomy of these sectors see Calvino et al., 2018a).

Finally, considerable declines specifically related to ICT-intensive sectors have been also confirmed by Bijnens and Konings (2018) focusing on Belgium.

3. Data and stylised facts

This section first describes the data used to analyse the trends and drivers of business dynamism across countries. It focuses on the OECD DynEmp project and describes the DynEmp database, which includes harmonised indicators of business dynamism for 18 countries over the last two decades.

It then discusses two key stylised facts on the evolution of business dynamism that are uncovered using those data. First, aggregate declines in business dynamism have been pervasive in many countries and originate from dynamics occurring at a more disaggregated level, more specifically within 2-digit sectors in the countries considered (i.e., within detailed country-sector pairs). Second, focusing on average trends within sectors in each country, steady declines are evident over the last two decades even after accounting for the role of the business cycle. Although these declines have been pervasive and steady on average, there is significant heterogeneity in their magnitude and speed across countries and sectors.

3.1. Data: the OECD DynEmp project

The evidence on trends in business dynamism presented in this report is based on confidential, highly representative data, sourced mainly from business registers across a large set of countries. These data are aggregated in a harmonised way at a detailed level in the context of the OECD DynEmp project.[6]

The DynEmp project is a distributed micro-data project led by the OECD Directorate for Science, Technology and Innovation with the essential contribution of country delegates and national experts from OECD and non-OECD countries.

The distributed micro-data approach adopted in the DynEmp project is based on a common statistical code developed by the OECD DynEmp team and run in a decentralised manner by national experts from statistical agencies, academia, ministries or other institutions, who have access to the national micro-level data. The micro-aggregated data generated by the centrally designed but locally executed program codes are then sent back to the OECD for comparative cross-country analysis. The representativeness of the underlying data sources, the harmonisation of the variables computed, and the broad country coverage are key features that make the dataset used unique and particularly suitable for the present investigation. In particular, the analysis can investigate comprehensively the pervasive nature of the trends across a wide range of countries and sectors.

The first phase of the DynEmp project was implemented in the first half of 2013 and was called DynEmp Express. This first phase was based on a simplified statistical code which led to the collection of a database at national level covering 18 countries (see Criscuolo et al., 2014). The second phase of the project, called DynEmp v.2, aimed at building a database which contains more detailed data on the within-sector contribution of start-ups and young firms to employment growth, allows a detailed analysis of the role played by national policies and framework conditions for employment dynamics (see for instance Calvino et al., 2016; Calvino et al., 2018b). The current paper is based on the third wave of data collection, featuring a more sophisticated statistical routine called *DynEmp3*. Novelties include adjustments to the employment variables to proxy total employment in the calendar year, as well as additional aggregations, variables and distributed regressions.

Most of the evidence presented in this report is based on 18 countries: Austria, Belgium, Brazil, Canada, Costa Rica, Denmark, Finland, France, Hungary, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden and Turkey.[7] The time coverage of the current database varies from country to country, broadly covering the period between 1998 and 2015 (see Table A1 in the Appendix). The contribution of the members of the DynEmp network listed in Table A2 in the Appendix is gratefully acknowledged.

This paper provides evidence on changes in business dynamism over the period 2000-2015, based on key recently collected measures computed at the industry-level: i) job reallocation rates – a measure of the simultaneous job creation and job destruction occurring within an industry, ii) entry and exit rates (see also Decker et al., 2018), and iii) the share of employment in young firms. Technical definitions of the measures are detailed in the Appendix (A5 and A6). The evidence focuses on manufacturing and non-financial market services sectors.[8]

Analysing these indicators uncovers two key stylised facts, which are presented and discussed more in detail below.

3.2. Fact 1: declines in business dynamism are pervasive and originate within country-sectors

The data collected in the framework of the DynEmp project allow to analyse in detail the overall trends in business dynamism across a large number of countries over two decades.

Exploring the long-term changes in business dynamism for each country highlights a first key insight: declines in business dynamism are pervasive in many countries and originate within detailed country-sector pairs rather than from changes in the sectoral composition of economies over time.

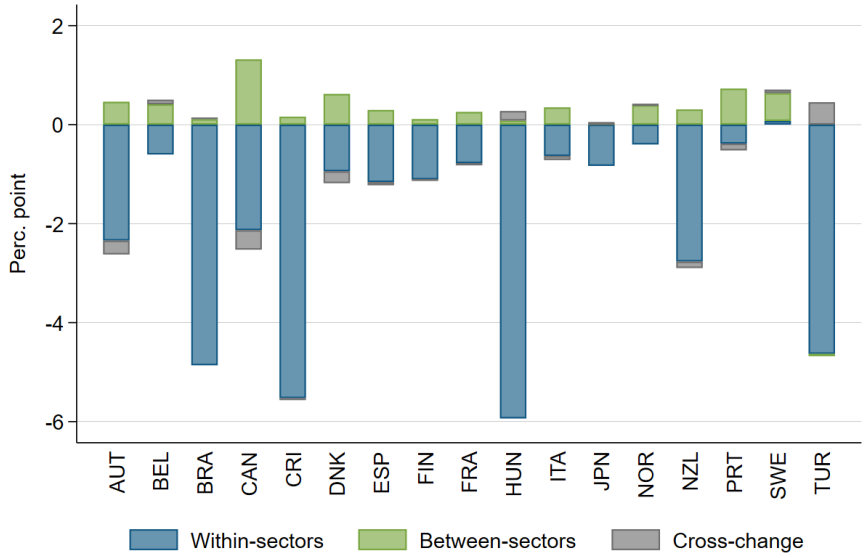
This is shown in Figure 1, which presents the long-term changes in business dynamism by country and decomposes them to account for changes in sectoral composition. The figure decomposes long-term changes in business dynamism (focusing on the first to the last available year within the period 2000-2015) into three components: a “within” component focusing on variation within industries, a “between” component reporting changes in the share of industries with different levels of dynamism, and a “cross-change” component, highlighting the simultaneous changes in a sector weight and its dynamism (see Appendix A8 for additional details on the methodology and interpretation of this “shift-share analysis”, and Table A3 for further details about the industries analysed).

Figure 1 highlights cross-country differences in business dynamism trends, suggesting that in countries such as Brazil, Costa Rica, Hungary, New Zealand and Turkey, declines tend to be generally more pronounced than in many European countries, such as Belgium, Spain or Finland. In two Nordic countries, Norway and Sweden, declines in dynamism seem less evident.[9]

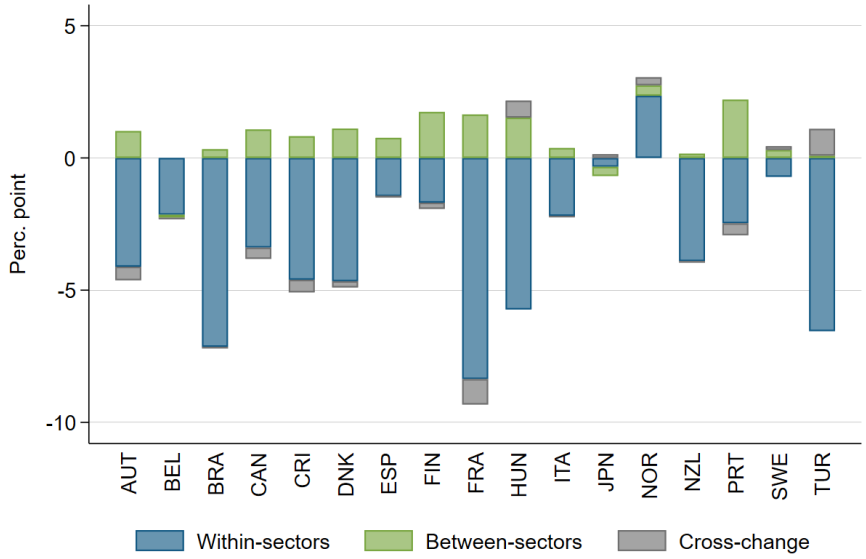
Importantly, the figure already suggests that most of the aggregate decline in entry and job reallocation rates originates from trends within 2-digit industries. Differences in aggregate declines observed in Figure 1 therefore mostly reflect the combination of the strength of the decline within detailed industries, which are further explored below, and the (initial) employment weight of these industries. This evidence precludes explanations entirely based on the changing composition of economies. In particular, the growing importance of the service sector, related to deindustrialisation and the emergence of a service economy, does not seem to be

Figure 1. Contributions to changes in entry rates and job reallocation rates

(a) Entry rates



(b) Job reallocation rates



Note: This figure reports, for each country, changes in entry rates and job reallocation rates between 2000-2015 due to variations within sectors ("within sector" component), due to changes in the share of industries with different levels of dynamism ("between-sectors" component), and due to the covariance between changes in a sector weight and its level of dynamism ("cross-change" term). For each country, the figure covers the period from the first to the last available year within the period 2000-2015. Data for some countries are preliminary.
Source: OECD DynEmp3 database, June 2020.

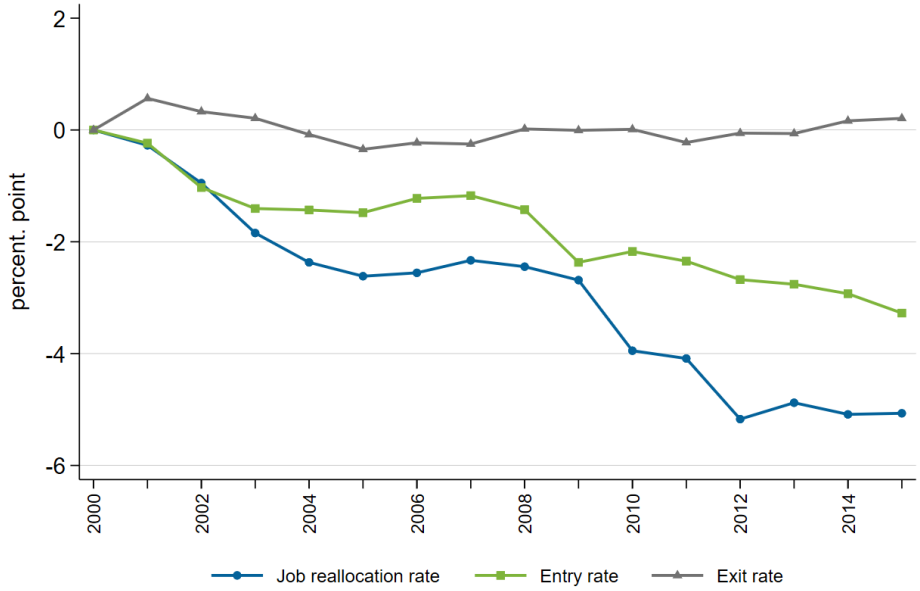
a key driver of declining dynamism. Indeed, signs of declining business dynamism are also evident when looking at manufacturing and services separately (see Figure B1 and B2 in the Appendix).

3.3. Fact 2: business dynamism has been steadily declining within country-sector pairs, with some heterogeneity across countries and sectors

Building upon the first stylised fact, further analysis of the DynEmp data highlights that on average business dynamism has been steadily declining within country-sector pairs over the last two decades.[10]

This is shown in Figure 2, which is based on an econometric framework that allows to abstract from composition effects (see Section A7 in Appendix for further details), and depicts a marked decline in entry rates and job reallocation rates on average within country-sector pairs. This Figure indeed shows that, on average across country-sector pairs, job reallocation rates and entry rates have decreased by about five and three percentage points respectively, from 2000 to 2015. These trends are confirmed when using alternative measures of dynamism such as the share of employment in young firms, and focusing on entry rates in selected European countries and the US (Figure B3 and Figure B4 in the Appendix), or in different parts of the economy, e.g., analysing manufacturing and services separately (see Figure B5 in the Appendix). Exit rates, on the contrary have remained on average stable over the period, in line with existing evidence for the United States.

Figure 2. Average within country-sector trends in job reallocation, entry and exit rates



Note: This figure reports average within-country-sector trends of job reallocation, entry and exit rates, based on the year coefficients of regressions within country-sector, for the period 2000-2015, including 18 countries: AUT, BEL, BRA, CAN, CRI, DNK, ESP, FIN, FRA, HUN, ITA, JPN, NLD, NOR, NZL, PRT, SWE and TUR. Each point represents average cumulative change in percentage points since 2000.
Source: OECD DynEmp3 database, June 2020.

A simple econometric exercise can help further quantify the magnitude of the yearly average declines in business dynamism observed within countries and sectors as time goes by, taking into account the role of the business cycle. This is done by estimating the following model (Equation 1), where subscripts c, j, and t indicate countries, sectors, and time respectively, y

is the business dynamism variable, t is a linear trend, and $z_{c,j}$ are country-sector fixed effects that allows focusing on changes in indicators of business dynamism within country-sector pairs.

$$y_{c,j,t} = \alpha + \beta\ t_t + \gamma\ cycle\_dummy_{c,t} + z_{c,j} + \varepsilon_{c,j,t} \quad (1)$$

Given the importance of cyclical dynamics in influencing entry and job reallocation, Equation 1 controls for the state of the business cycles by taking into account differences in the level of dynamism in expansionary and recessionary phases of the cycle. More specifically a (country-time varying) dummy variable, $cycle\_dummy_{c,t}$, is included in the regressions, equal to 0 in expansionary phases and to 1 in recessionary phases, based on the Turning Points from the OECD Composite Leading Indicators.

The coefficient β associated with the time trend indicates by how many percentage points the particular measure of business dynamism considered (entry and job reallocation rates) declines (given the estimated negative sign) as one additional year goes by, on average within country-sectors, accounting for the role of the business cycle. Results are presented in Table 1 below and confirm that – on average across country-sector pairs – entry rates decreased by 0.2 percentage points each year and job reallocation rates by about 0.35 percentage points p.a., even after accounting for the role of the business cycle. Cumulated over 15 years, these estimates imply economically significant declines of around 3 percentage points in entry rates and around 5 percentage points in job reallocation rates, consistently with the results reported in Figure 2.

Although this specification imposes a certain structure on the shape of the trend, the linearity assumption appears to be reasonable, especially for job reallocation rates and entry rates. This is already evident in Figure 2 above, which adopts a more flexible approach, and it is also confirmed when estimating a simple model with a squared, or a squared and a cubic trends.[11]

Furthermore, the results suggest that during recessionary phases – on average within countries and sectors and after accounting for an average trend – dynamism is lower than in expansionary phases, which adds to the effect of the secular decline. Interestingly, this appears mainly related to decreasing entry rates as, when focusing on job reallocation rates the cycle phase dummy is not significantly different from zero (Table 1). This results from opposite effects of recessionary phases on the two components of job reallocation rates: an increase in job destruction rates and a decrease in job creation rates (see Table C1 in the Appendix).[12]

Considering alternative indicators of the business cycle corroborates the main findings. Additional regressions have included, instead of the $cycle\_dummy_{c,t}$ as defined above, GDP growth, changes in unemployment rates or growth in house prices, controlling more flexibly for business cycles, the state of labour markets, liquidity and collateral effects on start-ups and growth of new firms (Davis and Haltiwanger, 2019). Results displayed in Table C2 in the Appendix indicate that robust secular declines within country-sector pairs are evident for entry rates and job reallocation rates, even after controlling for these alternative cyclical influences. This confirms that declines in business dynamism are not solely driven by the cycle and do not reflect only a slowdown in aggregate activity.

The same econometric setting described above can be applied to estimate country-specific or sector-specific trends, highlighting that declines in business dynamism are yes pervasive but very heterogeneous in their magnitude and speed across sectors and countries.

Table 1. Regressions within country-sector with a linear trend and a cycle dummy

	Job reallocation	Entry rate
year	-0.337***	-0.194***
	(0.023)	(0.012)
recessionary phase	-0.159	-0.240***
	(0.107)	(0.044)
Adj. R2	0.787	0.827
Observations	4752	5268
Nb countries	17	18
CS fe	yes	yes

Note: The table reports the results of the regression of job reallocation rates and entry rates on a year trend, a business cycle phase dummy and country-sector fixed effects, as detailed in Equation 1. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).
Source: OECD DynEmp3 database, June 2020.

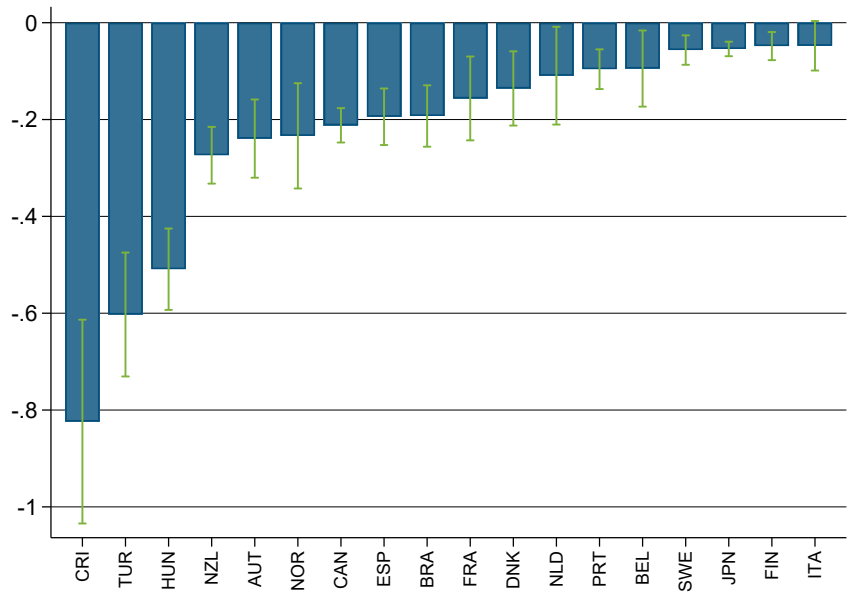
Country-specific estimates are represented in Figure 3 and reported in Table C3 in the Appendix. Contrary to country-specific results presented in Figure 1, changes displayed in Figure 3 abstract from the sectoral composition of economies and rather reflect (unweighted) average declines in job reallocation and entry rates within country-sector pairs, focusing on all available years.[13]

These estimates confirm with some confidence (delimited by the green bands in the figure) that declines in business dynamism have been a pervasive phenomenon, with all countries displaying some signs of downward trends in dynamism, either on entry rates, job reallocation rates, or both. Importantly, country-specific estimates also highlight a certain degree of heterogeneity in the extent to which entry rates and job reallocation have been declining over time in different countries.

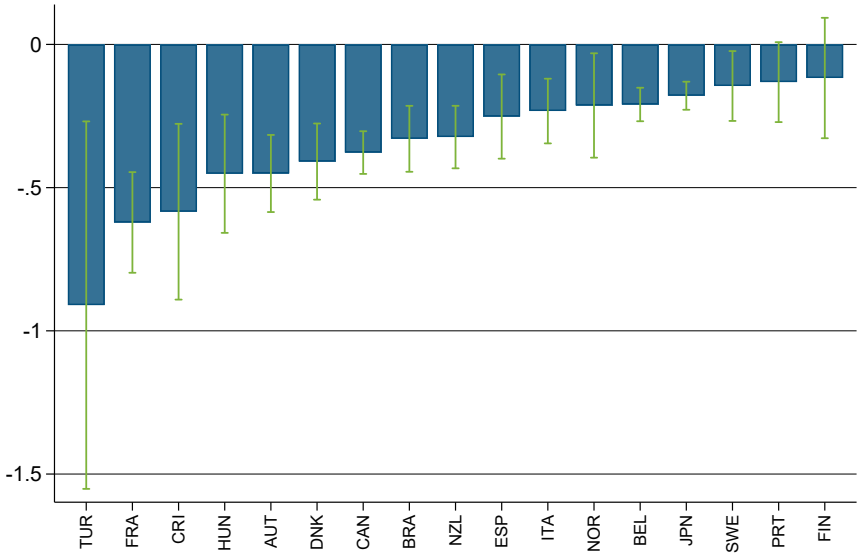
Sector-specific estimates, reported instead in Figure B6 in the Appendix further confirm the pervasiveness of the decline across sectors but also the relevant sectoral heterogeneity, with Telecommunications, IT, Scientific R&D and Media showing clearly the sharpest decline and Food and Beverage and Textile the lowest. The sources and mechanisms associated with the heterogeneity in speed and magnitude of declines in dynamism across countries and sectors are explored in the following section, focusing on structural and policy determinants.

Figure 3. Average within country-sector declines in business dynamism across countries

(a) Entry rates



(b) Job reallocation rates



Note: This figure reports, for each country, average yearly within-country-sector changes in job reallocation and entry rates, based on the trend coefficient of regressions within country-sector, for available years over the period 2000-2015 (see Equation 1). Contrary to Figure 1, this figure reports yearly average changes within industry and also abstracts from the sectoral compositions of economies.
Source: OECD DynEmp3 database, June 2020.

4. Structural and policy determinants

The reasons why business dynamism has been declining remained largely undetermined in the academic and policy debate, as discussed earlier in the paper in Section 2.

This section presents novel econometric evidence about the role of a broad set of structural and policy factors that may be associated with declines in business dynamism across countries and sectors, using harmonised data over the last two decades.

The main focus of this analysis is on two key business dynamism variables, entry rates and job reallocation rates, that exhibit clear declining trends within country-sectors (Figure 2). This analysis is complementary to other OECD contributions focused on different aspects of business dynamism, including mark-ups (Calligaris et al., 2018), industry concentration (Bajgar et al., 2019) and the catch-up of laggards (Berlingieri et al., 2020).

Entry rates and job reallocation rates are sourced from the DynEmp3 database (see Section 3), focusing on 18 countries over the period between 2000 and 2015, conditional on the availability of data. Their definition has been discussed in Section 3 and additional details are available in Appendix A6 and A5.

4.1. Framework of analysis

The main analysis of the role of structural and policy factors related to declines in business dynamism is carried out building upon and enriching the analytical framework described in Equation 1 that quantifies the average yearly decline in business dynamism after accounting for the role of the business cycle.

In particular, in order to examine the relationship with structural and policy factors, Equation 1 is augmented with different proxies accounting for a wide range of structural and policy factors interacted with the time trend. The model estimated allows quantifying the association between the strength of the decline and potential drivers, controlling for a wide range of other possible contributing factors. The estimating equation takes the general form:

$$y_{c,j,t} = \alpha + \beta\ t_t + \delta\ driver_q \times t_t + \gamma\ cycle\_dummy_{c,t} + z_{c,j} + f_w + \varepsilon_{c,j,t} \quad (2)$$

where the term $driver$ corresponds to the (standardised) structural or policy factor considered at the beginning of the sample period (see Section A9 in the Appendix), interacted with the linear trend t, the subscript q corresponds either to c, j, or c,j.[14] f_w corresponds to either country-year or sector-year fixed effects, depending on the specific driver considered and its level of variation (as specified in the discussion below and in Section A9). This allows to flexibly control for structural changes common to all sectors in a country or to all countries for a specific sector, and to capture business cycles effects as well as common shocks. As in Equation 1, the cycle dummy also cancels out the effect of the cycle. The specification including country-year fixed effects accounts more flexibly for the state of the country-specific business cycle and other macroeconomic drivers of entry and job reallocation, and in this case the cycle dummy is not estimated due to collinearity.

4.2. Structural factors

The analysis of the most recent academic literature and of the policy debate around the drivers of declining business dynamism motivates the choice of four groups of structural factors, whose association with business dynamism is comprehensively assessed using different proxies.

These factors are related to i) the intensity in the use of intangibles and the extent of the digital transformation; ii) market structure and firm heterogeneity; iii) globalisation and integration in global value chains; and iv) demographic factors. These are described in detail in the following sections (additional details on the variables are provided in Section A9 in Appendix) and combined together in a final exercise.

4.2.1 Intangibles and the digital transformation

One of the key changes that market economies experienced over the last two decades has been their digital transformation. Digital technologies have diffused widely, becoming ever more important for businesses and generating a range of business opportunities for new firms and workers. This is especially the case at the beginning of their diffusion phase (Calvino and Criscuolo, 2019), but differently across sectors (Calvino et al., 2018a).

The digital transformation has gone hand in hand with the rising importance of intangible assets (Haskel and Westlake, 2018), such as the inputs and outputs of innovative activity (e.g., scientific R&D, patents), trademarks, software and databases, or economic competencies (e.g., brand capital, organisational capital) which, in combination with network effects associated with complementary Information and Communications Technologies (ICTs), may generate winner-takes-most dynamics with relevant implications for business dynamism (Autor et al., 2017).[15]

Digital technologies and intangible assets require absorptive capacity to be effectively adopted and used (Cohen and Levinthal, 1989). Hurdles to the accumulation and combination of tangible and intangible assets necessary to compete with incumbents in the digital era may reduce the value of experimentation and discourage entry, while also increasing adjustment frictions. Such hurdles may be related, for instance, to costs of investment in complementary assets, or to intellectual property barriers. Given that financial frictions are exacerbated for the funding of investment in intangible assets (Demmou et al., 2019), this may disproportionately penalise young firms which are usually more financially constrained. In addition skills are particularly critical to fully benefit from these transformations, which may favour some groups of workers more than others (Autor et al., 2003) and lead to a competition to attract talents and preserve firms' human capital, in which global incumbents may be more likely to win.

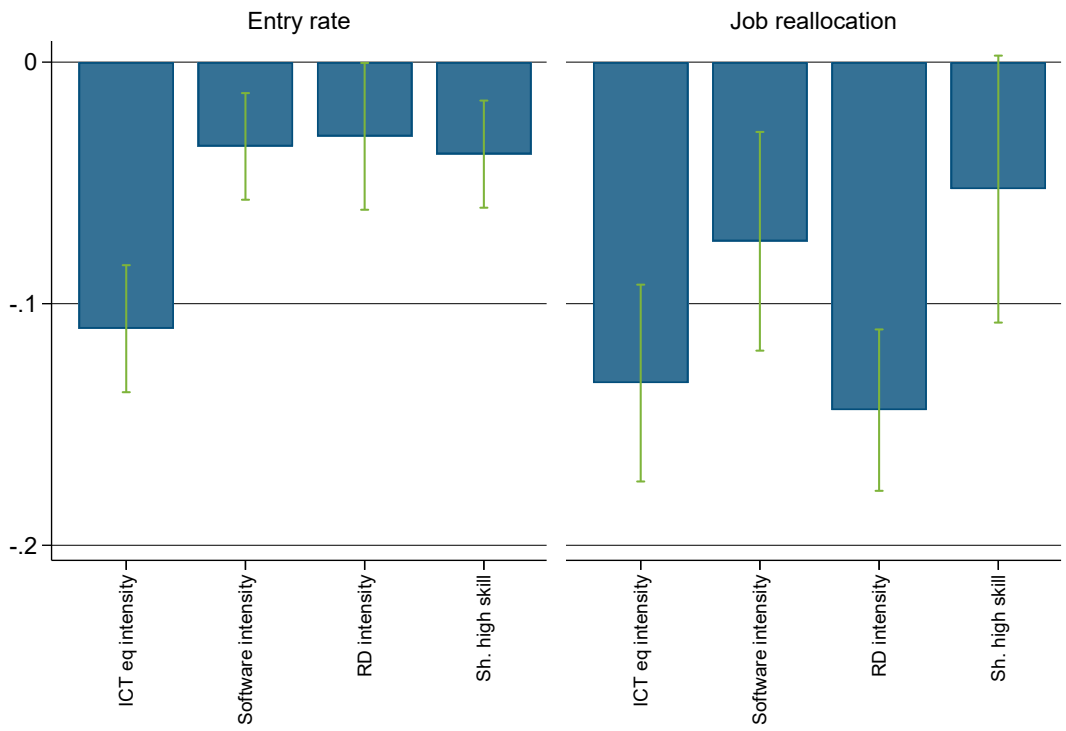
More specifically, skill-biased technological change may be associated with a higher demand for skilled workers and higher job training requirements, which can contribute to changes in the firm-worker relationship (Molloy et al., 2016; Cairó, 2013). These trends may increase the value of a match between employers and employees associated with a skill wage premium, inducing lower reallocation (Cairó, 2013). This may be further reinforced by improvements in the matching process, also possibly enhanced by ICTs.

The role of these factors is assessed using four different measures at the country-sector level that cover complementary dimensions of the digital and knowledge based economy.[16] Two variables are first used to proxy the role of the digital intensity, the share of investments in

tangible ICT equipment and the share of investments in software and databases. A third variable measures R&D intensity (combining OECD ANBERD and STAN data) and proxies more generally for the intensity of different countries and sectors in their business investments in Research and Development. Finally, the share of hours worked by high-skilled workers is used as a proxy to investigate the extent to which country-sectors with different skills composition may have experienced a different pace in the decline in business dynamism.

The estimation of the model described in Equation 2 includes country-year fixed effects to control for business cycles effects as well as trends common to all sectors within a country.

Figure 4. Intangibles and the digital transformation



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band). It corresponds to the difference in the average yearly decline between a country-sector with a higher value (one standard deviation above average) of the factor considered and a country-sector with an average value. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

Results are reported in Figure 4 (and in Tables C4 and C5 in the Appendix) and highlight that in general intangible intensive and digital intensive countries and sectors – proxied in different ways – have experienced more pronounced declines, extending previous findings by Calvino and Criscuolo (2019) based on a simpler sectoral proxy of digital intensity. This is particularly evident when focusing on the share of investments in tangible ICT equipment and share of investments in software and databases.[17] Similarly, more pronounced declines are evident for country-sector pairs with higher R&D intensity, although the results are significant at the 5% level only for job reallocation. Third, declines in entry rates have been faster in countries and sectors that have a higher share of high-skilled workers. These more pronounced declines could be related to the complementarity with some forms of capital and technologies favouring

winner-takes-most dynamics or to increases in the value of job matches that might limit the attractiveness of starting a new firm.

A significant number of robustness checks have been carried out, including i) measuring structural variables at the sectoral level (common to all countries), which is the level of aggregation where most of the observed variation comes from; ii) using different measures of business dynamism, namely the job reallocation rates of incumbents only and the employment share of young firms; iii) imputing missing values of the structural factors to get to a larger estimation sample. iv) using an alternative model to estimate the correlation between the structural factors and the magnitude of the decline.[18] These checks qualitatively confirm the main results presented, and in some cases also improve the level of significance of the estimates. The figures reported in the main text should be therefore considered as conservative and the findings they display robust.[19]

4.2.2 Market structure and firm heterogeneity

The digital transformation and the rising importance of intangibles are further associated with changes in market structures and firm heterogeneity, which may directly affect measures of business dynamism. Recent evidence shows that higher digital and intangible intensities may contribute to a slowdown in the diffusion of knowledge, a rise in firm heterogeneity and increases in the market shares and market power of the best performing firms, due to possible barriers to diffusion and heterogeneous returns to adoption (Calligaris et al., 2018; Gal et al., 2019; Berlingieri et al., 2020). This may in turn affect firm entry and job reallocation.

In light of these recent findings, the knowledge gap between best performers and the rest of firms within sectors is an important driver of business dynamics. In each country-sector, a large productivity gap between frontier firms and laggards may indicate significant barriers to technology and knowledge diffusion that may in turn be associated with lower dynamism. This is also supported by the analyses by Andrews et al. (2016) and Berlingieri et al. (2017) who suggest that productivity gaps between the best performers in terms of productivity and the rest have increased over time.

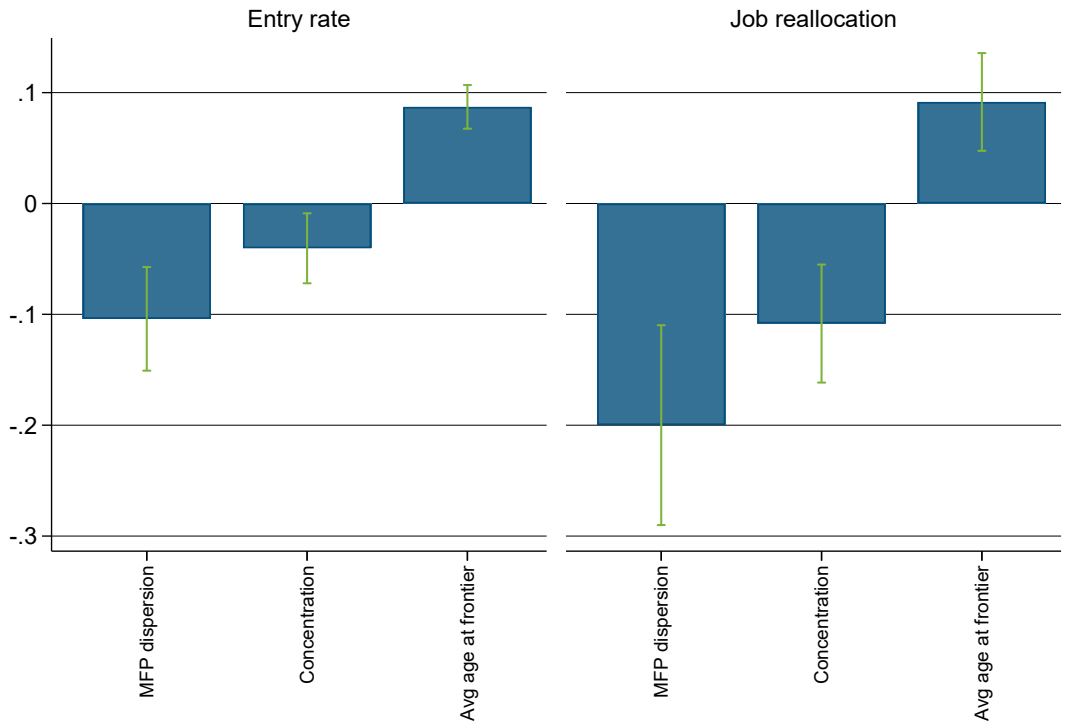
A second related structural characteristic relevant for business dynamism is the degree of maturity of a sector. Klepper (1996) highlights that at the beginning of the industry life-cycle entry is high, the number of producers grows, market shares change rapidly and significant product innovations occur, disproportionately accounted for by new entrants, with firms offering many competing versions of the industry product. As the industry evolves, entry declines, there is a shakeout in the number of producers while output will continue to grow, the industry leadership stabilises, product innovation and the diversity of varieties decline with firms devoting increasing efforts to process innovation. Assessing the role of sectoral maturity can help understand whether declining dynamism comes mainly from younger sectors that may be consolidating.

Relatedly, industry concentration is a third key factor related to market structure that can importantly affect business dynamism (Siegfried and Evans, 1994). More concentrated sectors may be characterised by barriers to entry and by more stable job flows possibly linked to lower creative destruction.

The link between declining dynamism and these factors is assessed using two key measures at the country-sector level (dispersion and concentration) and one at the sector level (maturity). Knowledge gaps are proxied by the productivity dispersion between firms at the top and at

the bottom of the productivity distribution in each country-sector. The degrees of a sector's maturity is proxied by the average age of firms at the global multifactor productivity frontier. Concentration is measured as the share of gross output for firms at the top 10% of the output distribution.

Figure 5. Market structure and firm heterogeneity



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band). It corresponds to the difference in the average yearly decline between a country-sector or sector with a higher value (one standard deviation above) of the factor considered and a country-sector or sector with an average value, depending on the level of variation of the structural factor. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

Estimation follows the model described in Equation 2 (with country-year fixed effects) and estimates are reported in Figure 5 (and in Tables C6 and C7 in the Appendix). Results highlight that country-sector pairs that exhibit higher productivity gaps between the best performers and the rest experience faster declines in business dynamism, both in terms of entry rates and job reallocation rates. Similar findings hold when focusing on highly concentrated country-sector pairs, which exhibit faster declines in business dynamism, especially in terms of job reallocation. Furthermore, sectors still in the early phase of their life-cycle, i.e. where average age of frontier firms is lower, have experienced faster declines in business dynamism. These may be sectors that are moving into a consolidation phase. Overall, these findings appear in line with an interpretation in which barriers to entry, to knowledge diffusion or obstacles that prevent firms from seizing new opportunities may limit experimentation and job reallocation (see also the discussion in Akcigit and Ates, 2019b).

An extensive number of robustness tests qualitatively confirms the findings reported above. These include using different measures for these structural factors, including a) labour productivity sourced from MultiProd to measure productivity dispersion, b) concentration

sourced from Orbis following Bajgar et al. (2019), and c) net entry rates in the United States sourced from the DynEmp v.2 database to proxy for maturity. Measuring structural variables at sectoral level, imputing missing values to get to a larger estimation sample, using job reallocation rates of incumbents only and the employment share of young firms as dependent variables also qualitatively confirm the results. Results are also confirmed with an alternative model specification with the left-hand side in differences to measure changes in dynamism (see note 18).

4.2.3 Globalisation and integration in Global Value Chains

Countries and sectors importantly differ in their exposure to globalisation, their integration in international trade and Global Value Chains (GVCs). These may be important factors related to changes in business dynamism at a global level. Several mechanisms may relate globalisation to job reallocation and firm dynamics.

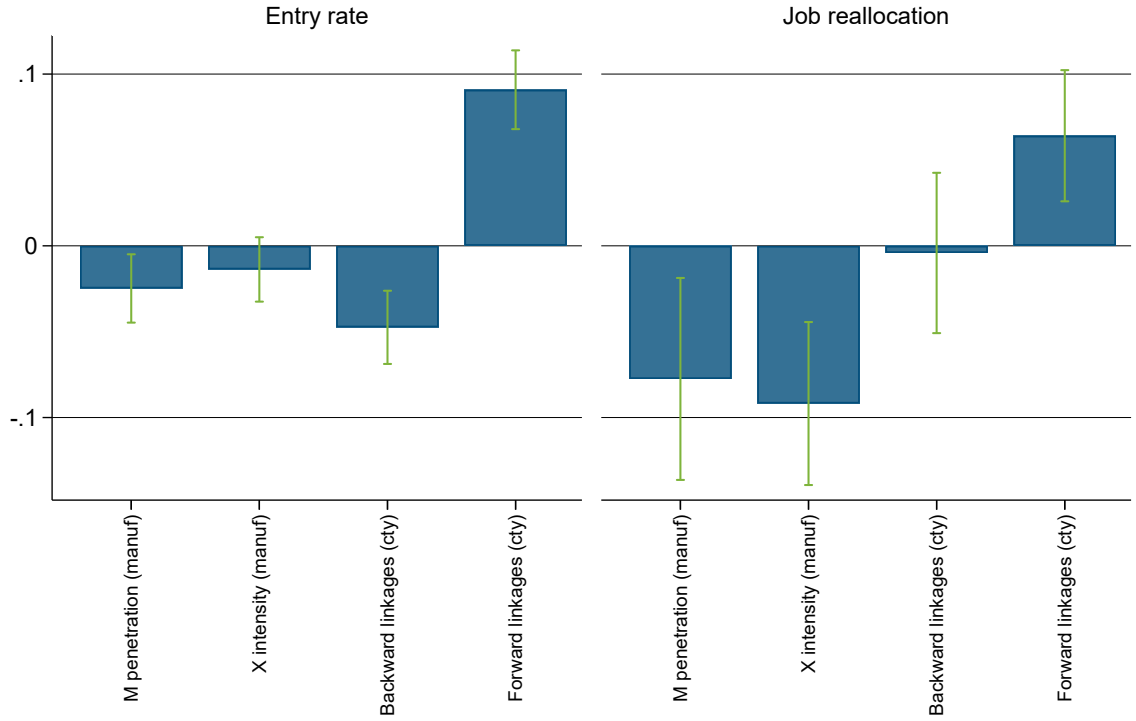
Firstly, trade integration may have an effect on firm dynamics through an import channel: higher import penetration is associated with higher competition on the domestic market, increasing the probability of failure and exit of firms (Bernard et al., 2006) and possibly discouraging entry. Decker et al. (2016a) find that the decrease in firms' responsiveness to productivity shocks is more pronounced in industries with larger increases in import penetration, and that this explains 16% of the total decrease in responsiveness from the 1990s to the 2000s in the United States. Higher trade openness can also be associated with lower entry through an export channel.[20] Davis and Haltiwanger (2014) suggest that globalisation can also reinforce the market power of incumbents and create additional barriers to entry, with large and mature firms possibly able to better respond to these changes, inducing a shift of activity towards firms with lower levels of job reallocation. Globalisation – combined with the rise in intangibles and the associated network externalities – may reinforce winner-takes-most-dynamics, contributing to the change in market structures that affect business dynamism, as previously discussed.

Second, integration in Global Value Chains has significantly transformed production processes in the last decades. In particular, two key margins of integration in GVCs are related to backward and forward linkages. Backward integration refers to sourcing inputs from abroad, which might decrease to some extent demand for domestic inputs and therefore possibly have negative implications for business dynamism. Forward integration instead refers to domestic industries providing intermediate inputs for exports of domestic partner. Therefore, the forward integration of the domestic economy can support business dynamism by stimulating activity and competition in the most integrated industries but also indirectly through domestic inter-industry linkages. Such indirect GVC linkages can further contribute to increase knowledge spillovers from GVCs which benefits particularly the least productive firms (Criscuolo and Timmis, 2018), providing opportunities for young firms to learn from the frontier and scale up.

This analysis uses the OECD Trade in Value Added (TiVA) database to construct measure of trade and Global Value Chain integration. Focusing on trade integration, indicators of import penetration and export intensity are used to shed light on the importance of the import and export channels. The former is defined as imports over domestic demand (in turn defined as domestic production plus imports minus exports), while export intensity is computed as exports over domestic production. The analysis of trade integration at the country-sector level focuses on the manufacturing sector that display higher levels of trade openness as well as more significant heterogeneity across sectors.[21]

Integration in Global Value Chains is instead measured at the country level through both backward and forward linkages from the TiVA principal indicators. Backward linkages are measured as foreign value added embodied in gross exports and forward linkages correspond to domestic VA in foreign exports. Backward and forward participation in GVCs are measured at the country level to account for their possible effects through indirect linkages rather than only direct effects on the most integrated industries only.

Figure 6. Globalisation and integration in Global Value Chains



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band). It corresponds to the difference in the average yearly decline between a country-sector or country with a higher value (one standard deviation above average) of the factor considered and a country-sector or country with an average value, depending on the level of variation of the structural factor. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

The results of estimating Equation 2 (including country-year fixed for the analysis of trade integration and sector-year fixed effects when the analysis focuses on country-level indicators of GVC integration) are reported in Figure 6 (and in Tables C8 and C9 in the Appendix) and highlight that trade and integration in global value chains significantly contribute to the decline in business dynamism.

Overall, the estimates highlight the relevance of international trade for changes in business dynamism in the manufacturing sector, despite a differential impact on entry rates and job reallocation rates. Higher import penetration is associated with a faster decline in both entry rates (although with a very small coefficient) and job reallocation rates within the same country-sector, consistently with a mechanism whereby domestic firms face higher competition on the domestic market, which can be to some extent related to lower entry favouring greater advantage for larger and older firms that are more able to compete but also feature lower levels of job reallocation.

Higher levels of export intensity are also associated with a more rapid decline in job reallocation within manufacturing, but do not seem to significantly affect the decline in entry rates. The significant and robust impact on job reallocation could suggest that firms' responsiveness to productivity shocks has decreased more dramatically in more open country-sector pairs, as suggested by Decker et al. (2016a).

Focusing on broader measures of the role of integration in global value chains at the country level and analysing also changes in dynamism across non-financial market services provide additional interesting insights. Backward integration appears to be significantly related to faster declines in entry rates, possibly reflecting the competition from foreign industries in supplying intermediate inputs. Higher forward integration instead reduces significantly the speed of decline in business dynamism, both when considering entry rates and job reallocation rates. This is in line with the idea that forward integration in GVCs, while potentially driven by some industries and firms, can benefit the whole economy through positive spillovers. The extent to which countries benefit from GVC integration may in turn depend on firms' absorptive capacity, a key determinant of the ability of small and young firms to learn from the domestic frontier (Berlingieri et al., 2020).

A number of additional exercises have been carried out to check the robustness of the findings reported above. These include, among others, using different measures of business dynamism (namely job reallocation rates of incumbents only or the share of employment in young firms), or using different trade integration variables (import penetration or export intensity) computed at the sectoral level or imputing missing values in country-sector pairs. These checks qualitatively confirm the main findings reported.[22]

4.2.4 Demographic factors

A final set of factors considered in this section is related to the observed megatrends of population ageing and decline in labour force participation, which are likely to affect business dynamism.

Ageing may be linked with shifts towards a population with lower fluidity (e.g. due to lower mobility or to better matching between firms and workers if the quality of matches improves with workers' age), or lower entrepreneurial propensity, even though this type of mechanism seems to some extent to influence more directly worker flows than dynamism on the firm side. Analysis of the relationship between demography and labour market fluidity has been carried out by Molloy et al. (2016) focusing on the United States and on several measures of dynamism. These include job destruction and job creation as well as job-to-job transitions and interstate migration. Their results suggest that demographic shifts can explain only part of the U.S. declining trends in labour market fluidity, including interstate migration, and that there is considerable room for other explanations. Engbom (2018) also discusses the role of ageing highlighting that this can explain part of the declines in job and worker reallocation in U.S. labour markets.

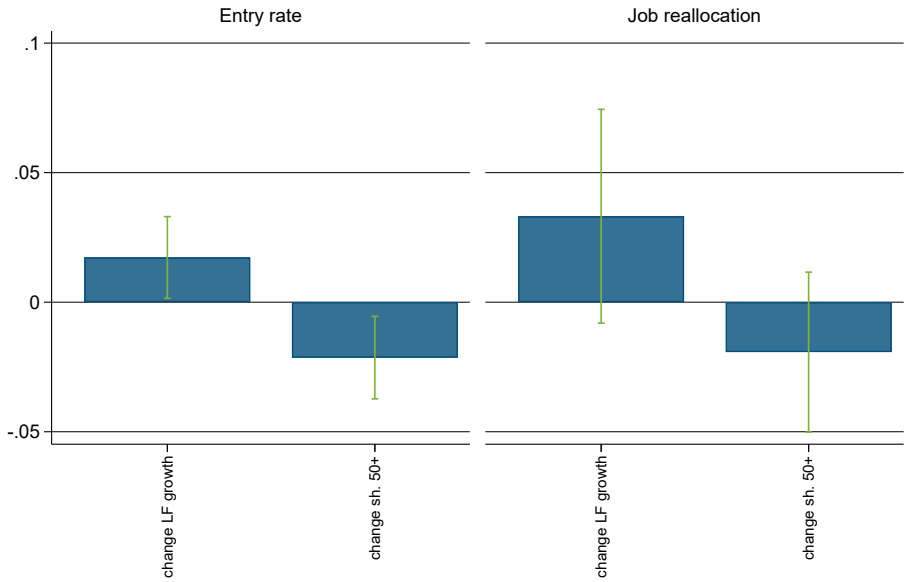
Furthermore, demographic patterns and ageing are linked to declining trends in labour force participation, which may have important feedback effects on entrepreneurship and the creation of new firms, given that entrepreneurs often do not have significant labour market experience under their belt (Azoulay et al., 2018). In this context, as previously mentioned, Karahan et al. (2019) argue (both theoretically and empirically) that shifts in labour supply due to changes in the growth rate of the working age population importantly affect firm entry.[23] They suggest that

this type of labour supply effect can explain a significant fraction of the declines in entry rates observed in the United States. Hopenhayn et al. (2018) further highlight the relevance of labour force growth in explaining the long-run dynamics of entry rates in the United States.

Two proxies of labour force and demographics dynamics measured at the country-year level are used, namely the growth rate of the labour force and the employment share of workers older than 49 years.

The role of the long-term change of these variables, reflecting the process of ageing and changes in the growth rate of the labour force, is related to trends in business dynamism following the model described in Equation 2, including sector-year fixed effects to partial out the effect of other structural factors related to sectoral dynamics as well as global trends.

Figure 7. Demographic factors



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band). It corresponds to the difference in the average yearly decline between a country with a higher value (one standard deviation above average) of the factor considered and a country with an average value, depending on the level of variation of the structural factor. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

Results are reported in Figure 7 (and in Table C10 and C11 in the Appendix), in the spirit of what was reported in the previous sub-sections. They highlight that demographic factors may play a role for business dynamism, but more specifically for entry rates. A negative and significant role of change in the share of old workers suggests that more significant population ageing may be related to stronger declines in entry rates, possibly related to lower entrepreneurial propensity of older workers (at least after a certain age) or to their lower geographical mobility. A small effect is also evident for the changes in the growth rate of the labour force, suggesting similarly that a decline in labour force participation may affect entry rates.[24] The effects seem small and the role of demographics on job reallocation is even less evident, with estimates not being statistically significant.

4.2.5 Combining structural factors

The previous sub-sections have explored the role of four groups of structural factors that have a relevant relationship with the magnitude and speed of decline in business dynamism: i) intangibles and the digital transformation, ii) market structure and firm heterogeneity, iii) globalisation and integration in Global Value Chains, iv) demographic factors.

A final exercise investigates the combined role of the main factors together to provide some insights on their respective contribution, and control for potential omitted variable bias, although this involves some important challenges.[25] This subsection provides suggestive evidence in this direction, using a combination of the most relevant structural factors examined in the previous subsections.

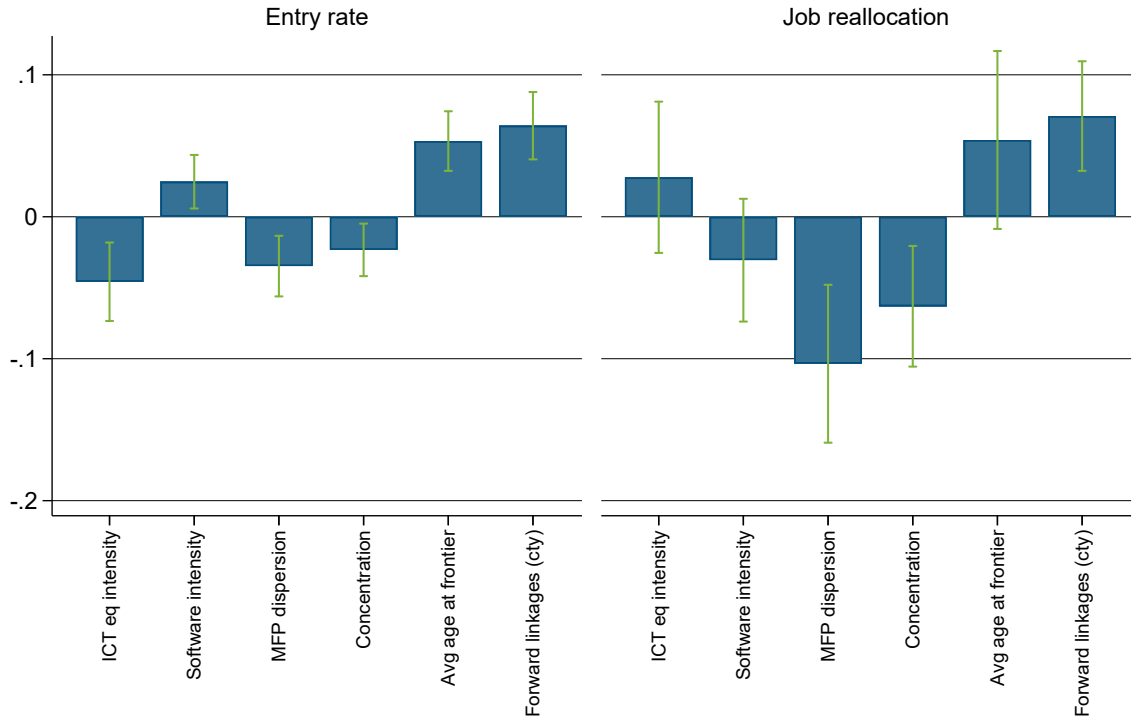
In particular, the exercise focuses on structural factors that were significantly (in a statistical sense) associated with stronger declines in both entry and churning rates, as discussed above, and whose availability is not limited to certain sectors only.[26] These factors are more likely to have a widespread association with business dynamism, as opposed to factors that seem to contribute only to specific dimensions of the phenomenon. These are in particular related to the share of investments in tangible ICT equipment, the share of investments in software and databases, the productivity dispersion between the top and the bottom of the productivity distribution, the concentration proxy, the average age of frontier firms (i.e. maturity), and the measure of forward linkages in GVCs. These have been combined together in the spirit of the previous econometric exercises.[27]

Results are reported in Figure 8 (and in Table C12 in the Appendix). Focusing on entry rates, one can see that the share of investments in ICT equipment remains statistically significant, together with all the variables related to market structure and firm heterogeneity (productivity dispersion, concentration and average age of frontier firms). Focusing on job reallocation, most measures related to market structure and firm heterogeneity remain statistically significant, together with the forward linkages proxy.[28]

This seems to suggest that the role of intangibles and digital intensity may be closely related to market structure, and in particular to the extent to which the digital transformation allows only few firms to thrive. In other words, the digital transformation and the rising importance of intangibles may affect business dynamism indirectly, as these trends may favour increasing concentration and market power with some firms successfully combining intangibles and digital technologies and benefiting from network effects, but also raise barriers to technology and knowledge diffusion.

Indeed, the relevance of factors related to market structure and firm heterogeneity for both entry rates and job reallocation rates, even after accounting for other relevant structural factors, suggests that barriers to entry and diffusion may be important drivers of the observed trends. This is consistent with the analysis by Akcigit and Ates (2019b), which suggests that barriers to knowledge diffusion may discourage entry and limit experimentation and job reallocation, and may be a key driver of declines in business dynamism in the United States, as well as a driver of other related trends in productivity, market power, or labour share.[29] Consistently with the findings of this paper, Akcigit and Ates (2019a) suggest that the decline in knowledge diffusion that triggers declines in business dynamism may be related to various driving forces, including the rising importance of tacit knowledge and intangibles assets (such as proprietary data) or the strategic behaviour of large firms, for instance through the creation of patent thickets to prevent technologies to be easily copied and challenged.

Figure 8. Combining structural factors



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band), when several factors are interacted with the time trend at the same time. It corresponds to the difference in the average yearly decline between a country-sector or sector with a higher value (one standard deviation above) of the factor considered and a country-sector or sector with an average value, depending on the level of variation of the structural factor. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

This is also consistent with previous OECD work, including Calvino and Criscuolo, 2019 who further discuss the role of the industry life cycle and the associated change in market structure as a potential explanation for the more pronounced decline in business dynamism in digital intensive industries. In addition, recent findings from Gal et al. (2019) and Berlingieri et al. (2020) suggest that digital technologies and intangible assets, while beneficial for productivity, may be associated with additional barriers to adoption.

Understanding the role of structural factors brings important policy implications. These will be discussed in the following sections, after exploring the role of institutions and framework conditions.

4.3. Policy and framework conditions

Framework conditions and institutional factors are likely to significantly affect the speed and magnitude of the decline in business dynamism across countries (see also previous OECD work including Bravo-Biosca et al., 2016; Calvino et al., 2016; Calvino and Criscuolo, 2019; Berlingieri et al., 2020).

Building upon the academic and policy debate, the analysis considers relevant sets of institutional characteristics and framework conditions that are likely to affect business dynamism and contribute to explain differences in the extent to which countries have experienced changes in dynamism. These include five categories related to: i) the strength of regulatory barriers, red tape and policies levelling the playing field, ii) the efficiency of bankruptcy procedures and contract enforcement, iii) access to finance, iv) innovation, and v) human capital. These areas constitute the elements of a business friendly environment that can support entrepreneurship and the reallocation of resources, favouring the process of creative destruction. Existing evidence indeed highlights the importance of these framework conditions for business dynamism, pointing to the key role of these policy levers for a comprehensive policy mix.

These five policy areas and the variables included in the analysis are further discussed below (with additional details also in Appendix A9). This analysis has benefited from the data collection effort resulting in the OECD SPIDER database, which collects different policy variables from different sources (see Égert et al., 2017).

First, these include measures of regulatory barriers and red tape, including an indicator of overall efficiency in business regulations (from the Fraser institute EFW database) and an indicator of barriers to entrepreneurship, sourced from the OECD Product Market Regulation (PMR) database. Both measures are summary indicators and encompass a broad range of sub-indicators aimed at measuring the extent to which regulations and bureaucratic procedures restrain entry and reduce competition. These allow evaluating the cost and complexity of regulations, as well as the burden they represent for businesses, and the extent to which they favour incumbents.

Second, the measures considered include indicators of bankruptcy and judicial efficiency. The efficiency of bankruptcy regulations is proxied by an index for “resolving insolvency” that summarises the time, cost, and outcome of insolvency proceedings involving domestic entities. Judicial efficiency is instead evaluated through the number of procedures necessary to enforce contracts.

The efficiency in the resolution of insolvency proceedings can affect business dynamism in different ways. First, evidence shows a positive effect on entrepreneurship, employment, and productivity growth through a credit supply effect. Helping creditors achieve maximum value of assets may facilitate risky investments and contribute to reduce uncertainty. Secondly, allowing to restructure viable businesses and have efficient closure of failed businesses may contribute to a timely reallocation of resources across firms.

The degree of efficiency of judicial systems, in particular contract enforcement and resolution of disputes in a timely and transparent way, are key features of well-functioning economies. Indeed, efficient judicial systems are intrinsically related to firm size and growth potential, reduce ambiguity and improve the predictability of commercial relationships, making them less dependent on relational contracting (Calvino et al., 2016).

Third, the role of access to finance for trends in business dynamism is explored using two main proxies. The first one is a broad measure of domestic credit provided by the financial sector, as a share of GDP. This indicator, which encompasses credit granted to the economy by banks and other financial institutions, can be considered as a broad measure of financial development, focusing on particularly relevant sources of funding for young and small firms.

A second measure focuses on financial constraints, proxied by the interest rate spread between large and small firms.

Indeed, the difference in the cost of credit between large and small firms may reflect the fact that imperfections and asymmetries of information between lenders and borrowers are more pronounced for small firms (Gertler and Gilchrist, 1994, Whited and Wu, 2006, Hadlock and Pierce, 2010). Recent findings (Holton and McCann, 2020) suggest that the funding gap between small and large firms importantly depends on structural characteristics of the banking system (banks' market power notably) as well as indicators of the strength of the banking system (measured through bank's balance sheets and the stability of their funding base).

The ability of the financial system to provide affordable credit to small and young firms and to absorb economic shocks is key to entrepreneurship and firm scale-up, especially in industries that are more financially dependent or that are characterised by higher levels of risk (Calvino et al., 2016). Banks, through their ability to monitor and screen information, can also contribute to more efficient market selection and resource (re)allocation. However, differences in the access and cost of finance across firm types may further increase investments gaps in digital technologies and intangible assets, leading to a larger polarisation of markets. These gaps may also be addressed directly through innovation policies, the role of which is investigated next.

Fourth, the role of innovation policy is explored, by including two different variables. The first one measures government-financed general expenditures in research and development (GERD, as a share of GDP) and aims at providing a cross-country comparison of the general development of innovation policies through funding of R&D by the government. Government expenditures in R&D may fund basic research or more risky projects, which can possibly uncover new business opportunities, they may increase firm absorptive capacities, and boost the catch-up of innovative firms, ultimately favouring resource reallocation. The second one is a measure of tax incentives for innovation for large firms, based on the B-index (for large firms).[30] Large incumbents are in general more intensive in R&D, and R&D tax incentives may further indirectly favour large firms over small ones, possibly increasing barriers to entry also reinforced by possible strategic behaviours from dominant players.

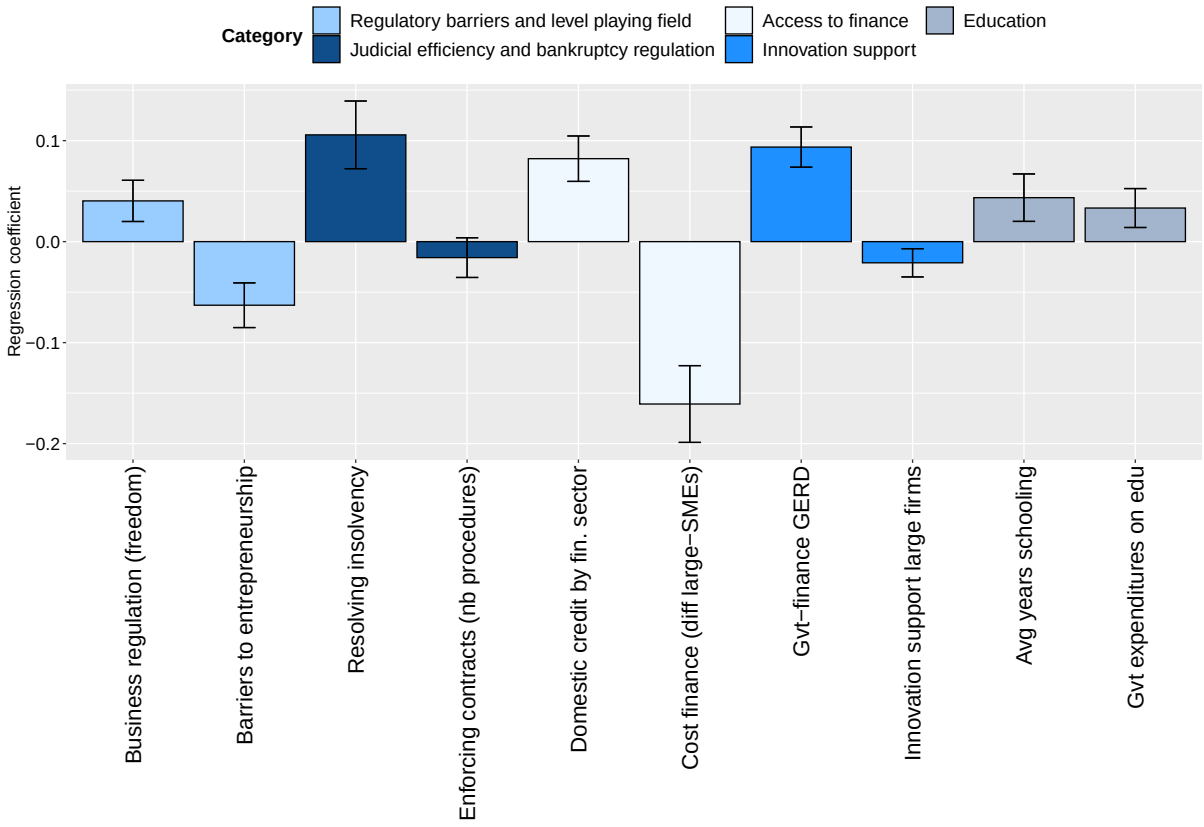
Fifth, the last set of indicators focuses on the role of human capital and skills. They measure the average years of schooling and the government expenditures in education, as a share of GDP. Levels of education are part of the determinants of the entrepreneurship propensity, as they may contribute to grasp business opportunities and improve managerial capabilities (Le, 1999). Education could also affect entrepreneurship indirectly through its potential effects on risk attitude, outside options available on the labour market, with uncertain net effects. Importantly, skills are becoming increasingly valuable in the digital era and the knowledge-based economy, and the initial levels of human capital may have been crucial in the ability of economies to adapt to this transition and maintain high levels of dynamism. Education attainments and sustained levels of investment in human capital at the country level may also contribute to develop the capabilities of firms and workers, possibly dampening the decline in dynamism.

This section focuses primarily on institutional or policy factors measured at the beginning of the sample period, conditional on data availability. Indeed, many of these factors do not exhibit considerable time variation and this first analysis is aimed at capturing the role of differences in institutions or framework conditions in affecting the magnitude of long-term declines in business dynamism.

Results of the estimation of the model described in Equation 2, including sector-year fixed effects which controls for dynamics driven by sectoral structural factors as well as sector-specific shocks and dynamics common to all countries, are reported in Figure 9 (and

Table C13 in the Appendix) focusing on entry rates (Figure B7 in the Appendix rather focuses on job reallocation rates).

Figure 9. Institutions and framework conditions – Entry rates



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band). It corresponds to the difference in the average yearly decline between a country with a higher value (one standard deviation above) of the factor considered and a country with an average value. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

The estimates suggest that high regulatory barriers and red tape amplify declines in entry rates, while efficient judicial and especially bankruptcy systems reduce those declines.[31] Furthermore, access to finance plays an important role with more financially developed countries and lower gaps in interest rates between firms of different size being associated with lower declines in entry rates.

Importantly, policies enhancing innovation and human capital appear all associated with lower declines in entry rates, while innovation support for large businesses seem rather associated with possible increases in entry barriers.

Results for job reallocation rates (Figure B7 in the Appendix) appear to some extent less clear-cut, but never contrast the evidence presented above on entry rates. They confirm that high barriers to entrepreneurship, inefficient bankruptcy procedures, and R&D tax incentives for large firms appear to be significantly associated with stronger declines in job reallocation, while financial development seems to reduce those declines.

A significant number of robustness tests have been carried out. First, additional alternative policy proxies have been explored. These include focusing on administrative requirements (one of the components more directly linked to red tape of the more general business regulations

index) and on the sub-components of the more general PMR barriers to entrepreneurship proxy (namely, regulatory procedures, administrative burdens on start-ups, and regulatory protection of incumbents); using an alternative proxy for access to finance, namely the number of commercial bank branches per 100.000s adults; using alternative proxies for efficiency of bankruptcy procedures, namely the time and recovery rate rather than the distance to frontier. These checks qualitatively confirm the robustness of the main results presented in the Figure above.

Second, alternative business dynamism variables have been tested. The share of employment in young firms provides results qualitatively similar to those obtained using entry rates, while estimates using job reallocation rates of incumbents only are qualitatively similar to those for job reallocation rates reported in the Appendix.

Alternative econometric specifications have also been estimated. These include using the average value of the relevant policy indices over the observed time period as main explanatory variable interacted with the trend, conditional on data availability, and estimating a model where the left-hand side variables are in differences.

A key question for policy makers is related to which policy actions may favour business dynamism. Additional analysis has therefore explored the extent to which reforms at the country level may help boost business dynamism, based on what happened in countries where relevant changes in institutions occurred during the observed period.

This is done by estimating Equation 3, which focuses on the association between changes within country-sector in entry rates – where stronger effects of the institutional environment are evident – and changes in framework conditions:

$$y_{c,j,t} = \alpha + \delta policy_{c,t} + \gamma\, cycle\_dummy_{c,t} + z_{c,j} + f_t + \varepsilon_{c,j,t} \tag{3}$$

where policy $policy_{c,t}$ indicates different proxies of framework conditions or regulations measured at the country-year level.

Given that country-sector fixed effects are included, the identification of the role of policy in this model is based on the time variation of these variables. This is different from the previous analysis and from existing work analysing the role of policies for business dynamism (such as Calvino et al., 2016 or Calvino and Criscuolo, 2019). This however involves some challenges given the somewhat limited degree of time variation of some policy variables over time. Results should be therefore considered as suggestive evidence and not as causal effects, and must be interpreted with caution.

However, the specification presented in Equation 3 relaxes the linearity assumption by replacing the linear trend with time dummies (f_t) and is more suited to accounts for changes in policy settings and the business environment that have occurred during the period considered.

The results (Table C14) corroborate the findings presented in Figure 9 and highlight that reducing barriers to entry and competition tend to increase entry rates, improving the efficiency of the judicial system, enhancing firm's access to finance and fostering the absorptive capacity through higher level of education tend to support a more dynamic environment though increases in entrepreneurship.[32] These results, while pointing to correlations rather than causal linkages, call for further evaluations of the business environment to undertake reforms in the relevant areas.

A final exercise is carried out to help quantify the magnitude of the estimated effects and the potential outcome of policy reforms in reducing the speed of declines in business dynamism. The exercise focuses on two key policy variables where important reforms have been observed over the sample period: business regulations and PMR (barriers to entrepreneurship).

It consists of a simulation that quantifies the potential change in entry rates if the country with the most restrictive regulation and strongest barriers to entrepreneurship (at the end of the period) were to achieve reforms allowing to bring the country to the lowest level of regulation restrictions. Using the indicators of business regulation and barriers to entrepreneurship to quantify the change necessary to achieve best practices, combined with the estimated effects of reforms reported in Table C14, allows estimating the average increase in dynamism that could be observed on average within sectors in the country undertaking such reforms. This exercise should be interpreted with caution given that estimates in Table C14 are just robust associations, not causal effects.[33]

In the last year of the sample, Brazil had the lowest value for the index of business regulation while Finland had the highest value, indicating less business-friendly regulations in Brazil. Given the estimated effect of changes in regulation, closing this policy gap between Brazil and Finland would allow the former to increase its entry rate by 1.4 percentage points. Given the strength of the decline in dynamism in Brazil (Table C3) such an increase would offset seven years of steady decline in entry rates. In Spain, which displays a decline in entry rates per annum similar to Brazil (Table C3) but a lower scope for improvements in business regulations, reforms would allow to increase entry rates by almost 0.5 percentage points, which would offset around 2.5 years of steady decline in entry rates.

Similarly, Brazil has the most restrictive product market regulations of the countries considered in this paper. If it were to achieve the same level as the country with the best practices (New Zealand), this would allow the country to increase entry rates by 1.5 percentage points on average within industries, which would also offset declines observed over eight years. In Spain, a reform to product market regulations to reduce barriers to entrepreneurship to the level of the best country would allow it to increase entry rates by 0.8 percentage points, offsetting more than four years of steady decline in entry rates. These are likely to be lower bounds of the effects of such reforms as this exercise quantifies only short-term direct effects on entry rates. Such reforms could also entail longer-term gains as they may have the potential to weaken the strength of the secular decline in dynamism related to ongoing transformations of the economy.

The implications of these analyses, also in the light of the role of structural factors presented in the previous sub-section, are further discussed below.

5. Discussion

The previous sections have analysed trends in business dynamism across 18 countries and more than 20 manufacturing and non-financial market services industries over the last two decades. The analysis has highlighted the presence of a pervasive decline in business dynamism, driven by steady changes on average within country-sector pairs, even after accounting for cyclical dynamics.

These findings reveal salient characteristics of the changing economic landscape in the last two decades – also marked by possibly related increases in concentration and markups, rising productivity dispersion and sluggish productivity growth – and are particularly relevant for economic policy. Declines in business dynamism may indeed have a significant impact on different economic outcomes, notably job creation, inclusiveness, and productivity growth.

Young firms are the engine of job creation and are crucial for the introduction of new business models and the diffusion of innovation, with often few high-growth firms having a crucial role for the economy. Indeed, on average young firms account for about 20% of employment but create about half of new jobs across OECD countries (Calvino et al., 2016). Recent OECD work has shown that declines in entry rates have permanent employment effects. For example, a drop of 20% in the number of entrants – similar in magnitude to the one occurred during the recent COVID-19 crisis – induces a persistent loss of about 0.7% of aggregate employment three years after the shock, and still of 0.5% 14 years after (OECD, 2020b).

Furthermore, young businesses can be a springboard for younger workers (Cockx and Picchio, 2012) and represent employment opportunities for women, immigrants and labour market outsiders, e.g unemployed and entrants in the labour markets (Nyström et al., 2012; Ouimet and Zarutskie, 2014). Ongoing OECD work is further investigating the role quality and inclusiveness of jobs created by young firms.

Business dynamism has also important effects on productivity, with declines in dynamism possibly hindering productivity-enhancing resource reallocation. On the one hand, job reallocation and dynamism enhance the productivity of incumbent firms. On the other hand, the extensive margin has also an important role because new firms often experience a process of productivity catch-up and exiting firms are often less productive (Berlingieri et al., 2020). Both of these margins may be affected by declines in business dynamism.

Investigating the role of structural factors associated with the speed of decline in business dynamism suggests that firm heterogeneity and market structure play important roles. In particular, the analysis has highlighted that digital intensity and intangibles are positively related to the speed of decline, but this role appears – at least in part – transmitted through factors such as productivity dispersion and concentration (which are positively associated with the speed of the decline) or technological maturity (negatively associated with the decline in entry rates). This is consistent with previous OECD work that suggests that the rising importance of digital technologies and intangible assets may favour a polarisation of the economy. This polarisation, reflected in increasing heterogeneity of firms (e.g., in terms of market shares, productivity, mark-ups), may reduce the chances to leapfrog the leaders, potentially raising barriers to entry and growth and reducing incentives to experiment and innovate.

Productivity dispersion is one of the key structural factors examined and is always significantly related to declines in entry and job reallocation rates, also when other drivers are taken into account. While the relationship may cut both ways, this suggests that barriers to knowledge

diffusion and differences in returns to adoption may amplify declines in business dynamism. These may prevent laggard firms or potential entrants to take advantage of existing knowledge or learn from the best performers. This is consistent with barriers to knowledge diffusion – such as patent thickets preventing innovation – discouraging entry and limiting experimentation and reallocation, which are key drivers of declines in business dynamism in the United States (see Akcigit and Ates, 2019b).

Digital technologies and intangible assets have become decisive for the success of firms that are able to exploit synergies, increasing returns to scale and network externalities. However, leveraging these complementarities between technologies and intangibles may be costly and complex. Ex-ante firm heterogeneity regarding their capabilities may delay diffusion and reinforce ex-post differences in the returns to adoption if relevant investments (at the firm level but also through appropriate policies) are not undertaken. This has the potential to discourage entry and limit experimentation. These mechanisms related to the digital era and the knowledge-based economy seem to have also transformed the structure of markets.

Therefore, an important and complementary role is likely played by industry concentration. Although the analysis does not allow an untangling of the different causes of higher concentration – which may range from productivity-enhancing consolidations to possibly lower competition – winner-takes-most dynamics associated with the digital transformation may play a role in driving the observed trends, increasing barriers to entry and reallocation, in particular in industries in which firms may benefit from network effects. This mechanism tends to be confirmed by the correlation between the strength of the decline in entry rates and the maturity of the frontier. To some extent, winner-takes-most dynamics favoured by the digital transformation may reflect and exacerbate dynamics of consolidation that are inherent to the industry life-cycle.

Analysing the structural factors associated with the speed of the decline in business dynamism already suggests that policy responses should be oriented at reducing barriers to technology and knowledge diffusion, boosting capabilities (in particular related to skills and the acquisition of tacit knowledge), lifting barriers to entry and favouring experimentation. Maintaining a competitive environment and a level playing field for all firms may indeed be crucial to dampen the declines in business dynamism and possible harmful effects of ongoing trends.

A comprehensive and more direct analysis of the role of policy and institutions has been carried out in this work, especially focusing on entry rates. This has covered five key areas characterising a business-friendly environment that can favour entrepreneurship, experimentation, and creative destruction. They include i) the strength of barriers to entry, red tape and policies levelling the playing field, ii) the efficiency of bankruptcy procedures and contract enforcement, iii) access to finance, iv) innovation, and v) human capital development.

Results have highlighted an important role of all these five key areas, especially for entry rates. Several robustness tests have also confirmed these findings under different econometric specifications or using different proxies for business dynamism and policy variables.

On the one hand, the analysis has corroborated in a dynamic perspective findings from previous OECD research, which had focused – in a static cross-sectional framework – on the importance of access to finance, bankruptcy regulation and contract enforcement to foster entry and post-entry growth of young firms (Calvino et al., 2016) or on the policy levers boosting business entry in the digital era (Calvino and Criscuolo, 2019).

Regulatory barriers and administrative burdens, weak contract enforcement, financing constraints or inefficient bankruptcy procedures may increase barriers to entry and limit resource reallocation, possibly reinforcing winner-takes-most dynamics and the more structural effects previously discussed.

On the other hand, the findings importantly suggest that policies related to increasing capabilities and absorptive capacity, such as those related to innovation, especially when not focused only on large firms, skills and human capital, are key for a dynamic business environment. Sectors in countries well-positioned along those indicators indeed experience a lower decline in business dynamism on average.

Although the findings presented in this report are not causal relationships but rather robust correlations, they highlight key elements of a dynamic business environment. The relevance of different policy variables for the trends in business dynamism suggests the need of considering several policy aspects together.

Indeed, complementarities are likely to emerge across different policy areas, consistently with previous OECD work (see for instance Calvino et al., 2016). Policies aiming at stimulating dynamism through a wider and faster diffusion of technology and knowledge need to target the different mechanisms underlying the process of diffusion, e.g., investment in physical and human capital and experimentation. These policies therefore include ensuring that investment can be financed, boosting capabilities through education and training and improving insolvency regimes to favour experimentation, consistently with the analysis by Berlingieri et al. (2020). While an analysis of the design, implementation and enforcement of these policies goes beyond the scope of this paper, they may affect the effectiveness of policies boosting business dynamism. Relevant examples include the design of R&D policies (Appelt et al., 2016), the design of insolvency regimes (McGowan et al., 2017) or the enforcement of pro-competition policies (Gutiérrez and Philippon, 2018).

A joint policy action on the different areas discussed and analysed in the report may therefore allow to reduce barriers to entry and to knowledge diffusion, boost experimentation and favour creative destruction, while increasing absorptive capacity and the potential of firms to benefit from technological change.

6. Conclusions

This paper has analysed the trends in business dynamism across 18 countries over the last two decades, using highly representative comparable data collected in the framework of the OECD DynEmp project.

The work has mainly focused on entry rates and job reallocation rates, two key indicators of business dynamism. It is highly complementary to existing single-country studies that use similar indicators and to cross-country studies that focus on different measures of business dynamism.

The analysis has highlighted two key stylised facts. First, declines in business dynamism have been pervasive in many countries and originate within detailed country-sector pairs. Second, focusing on average trends within sectors in each country, steady declines are evident over the last two decades even after accounting for the role of the business cycle. Although declines have been pervasive and steady on average, there is significant heterogeneity in their magnitude and speed across countries and sectors.

The paper then explored a comprehensive set of determinants of the decline in business dynamism, focusing on the role of structural and policy factors, after accounting for the role of the business cycle.

First, structural characteristics – including intangible and digital intensity, market structure and firm heterogeneity, globalisation, and demographic factors – are found to be significantly related to the observed trends. When combining more structural factors together, a prominent role of market structure and firm heterogeneity emerges, which may be linked to the presence of barriers to entry and knowledge diffusion.

Second, institutions and framework conditions play an important role in explaining cross-country differences in the observed trends. Regulatory burdens and red tape, judicial and bankruptcy efficiency, access to finance, innovation, and skills importantly affect business dynamism, with more business friendly countries experiencing less prominent declines.

Policy reforms can help limit declines in business dynamism. Indeed, reforms reducing administrative requirements and barriers to entrepreneurship, improving the enforcement of contracts, and enhancing innovation potential and skills have the potential to boost business dynamism with positive longer-term effects. Focusing on these policy areas together may reduce barriers to entry and knowledge diffusion, allow experimentation and favour creative destruction, while increasing absorptive capacity and the potential to benefit from technological change.

This work is particularly relevant as declining trends in business dynamism may have relevant implications for different social and economic outcomes, given the primary role of business dynamism for aggregate productivity, job creation, and social inclusion.

Although the set of drivers examined in this report has aimed at being as comprehensive as possible, additional analysis may shed further light on the role of specific factors on business dynamism trends. Future work may explore the links between decline in business dynamism and policy in a causal way, possibly with a more limited set of countries where more detailed data and policy experiments or other causal identification strategies may be exploited.

This work could also be extended to other measures of dynamism, e.g., focusing more specifically for instance on scale-up dynamics and high growth firms. Future analysis may

also attempt to link trends in business dynamism with trends in productivity in a cross-country perspective. This would allow a better understanding of the interdependencies between business dynamism and productivity dynamics, and on the complementary role of structural and policy factors on different economic outcomes.

Notes

[1] The evidence of declining business dynamism in the United States has also been corroborated by Davis et al. (2012) and Hyatt and Spletzer (2013), using worker flow data and data on hires and separations. Davis et al. (2012) combine Business Employment Dynamics data with Job Openings and Labor Turnover data on hires and separations; Hyatt and Spletzer (2013) use data on worker and job flows from the Quarterly Workforce Indicators (combining them with other US data sources).

[2] Few studies challenge this view, a relevant one is by Guzman and Stern (2016) who analyse business registration data in 15 US states between 1988 and 2014, matching them with information on growth outcomes (i.e., acquisitions at a meaningful price and IPOs) and with patents and trademarks data. In a first step, the authors relate firm growth outcomes to a number of firm characteristics observable at or near the time of a business registration. By using the estimated relationship between start-up characteristics and growth outcomes, Guzman and Stern (2016) are able to derive entrepreneurial quality measures for each business registrant. Their main conclusion is that – once a quality-based approach is taken – the expected number of growth outcomes (i.e., start-ups that are likely to experience an acquisition or IPO) in the United States follows a cyclical pattern, with no significant evidence of a steady decline in the potential for high-growth entrepreneurship. The main findings might, however, depend on the particular proxy for growth outcome used, i.e. a dummy variable that records only meaningful acquisitions or IPOs rather than more traditional indicators of employment or sales growth.

[3] The analysis by Decker et al. (2018) focuses on changes within firm age groups, also in order to mitigate the fact that it does not focus directly on the role of declining entry rates for job reallocation.

[4] The authors also explore alternative potential explanations that may be related to changes in responsiveness to shocks, including globalisation and industry composition shifts within high-tech manufacturing.

[5] In statistics, the skewness is a measure of the asymmetry of a distribution. In this context it refers to the comparison of the differentials between high growth firms and median growth firms on one hand and median growth firms and low growth firms on the other hand.

[6] The main figures presented in this paper are based on the *DynEmp3* data collection. Data for some countries are still preliminary. Owing to methodological differences figures may deviate from officially published national statistics.

[7] Information for most countries is aggregated from firm-level data, while for Austria and Japan information is based on plant-level data. For Japan, only the manufacturing sector is available. For the Netherlands, only results for entry rates are included. For this country, a redesign in the businees register can be accounted for in a corrected series for entry rates but not for other variables. Self-employment is excluded from the analysis due to the challenges in measuring it consistently across countries. Additional methodological information is available in the Appendix and in Desnoyers-James et al. (2019).

[8] The industry aggregation used in the *DynEmp3* database follows the SNA A38 industry classification. Coke and refined petroleum products and Real estate activities are excluded from all figures. The rest of the report refers to manufacturing and services in the sense discussed here.

[9] The magnitude of the aggregate decline may vary depending on the first and last year used for the decomposition, but unreported robustness checks provide qualitatively similar results for most countries especially regarding the relative importance of different components. Some exceptions include the within component for Norway (job reallocation) which becomes negative and the between component for Canada (entry rates) which is less pronounced when using a different final year. The size of the components for Italy and Portugal may be less pronounced when using different initial years, but the overall magnitude of the sum of the components is generally comparable to what reported in Figure 1.

[10] Related work based on previous versions of the DynEmp database, while highlighting the important role of young firms, has already shown some signs of declining dynamism (see Criscuolo et al., 2014, Calvino et al., 2015 and Blanchenay et al., 2016). This paper, however, provides more systematic and comprehensive evidence using a larger set of measures, focusing on trends within country-sector pairs, and analysing in detail the potential mechanisms driving the trends.

[11] In the case of job reallocation rates the additional terms are not significant, while in the case of entry rates they become significant only when the cubic trend is added.

[12] Focusing on incumbents only the high job destruction rate during recessions makes the net coefficient positive (see Table C1 in the Appendix).

[13] Employment-weighted regressions have also been estimated as a robustness check to account for the (initial) sectoral composition in different economies. Results are qualitatively similar, with declines of the same order of magnitude observed in most countries. A slower decline in churning rates are observed for instance in Austalia, Denmark, Hungary Italy and Spain, while a slower decline in entry rates is observed in Austria, Norway, Turkey for entry rates.

[14] This model allows to flexibly consider drivers measured at different levels of aggregation. The level of aggregation of structural and policy factors will be commented in detail below, with most structural factors observed at the country-sector level (c, j), and institutional factors and framework conditions country-specific (c).

[15] See also Decker et al. (2018) for comparative analysis of business dynamism trends in high-tech and low-tech sectors in the United States, Bijnens and Konings (2018) focusing on the role of the digital transformation in Belgium, and Calvino and Criscuolo (2019) using the DynEmp database in combination with a single categorical indicator used as a proxy of the digital transformation.

[16] All measures are assessed for country-sector pairs at the beginning of the period, i.e. 1997-1999 or the first three available years over the sample period covered by business dynamism data to (partially) address endogeneity issues.

[17] The magnitude of the coefficients reported in the Figure suggests that a country-pair with a value of ICT equipment intensity one standard deviation above the mean experiences a faster decline in business dynamism than a country-sector pair with an average value of ICT equipment intensity, with an additional 0.11 percentage points decline in entry rate each year. Cumulated over 15 years, this suggests that a country-sector with high (one standard deviation above mean) ICT equipment intensity experiences a 2 percentage point additional decline in entry rates compared to an average country-sector (a decline of around 4.8 pp instead of an average 2.8 pp decline). Note that in the case of ICT equipment intensity, 10% of country-sector pairs display a value of ICT intensity one standard deviation above the average.

[18] Results have been tested using an alternative model with the left-hand side in difference: $\Delta^3 y_{c,j,t} = \delta\ driver_q + cycle\_dummy_{c,t} + f_w + \varepsilon_{c,j,t}$, where $\Delta^3 y_{c,j,t} = y_{c,j,t} - y_{c,j,t-3}$. A similar model is estimated to evaluate the robustness of the results focusing on the role of other structural factors, policies and framework conditions.

[19] Unreported regressions also estimate the effects of the interaction between different structural factors. Results suggest some complementarity in the effects of some factors, such as ICT intensity and R&D intensity.

[20] Rising export intensity results in more productive firms becoming exporters and crowding out the less productive ones on the input factors market, by inducing upward pressures on the price of intermediate inputs, labour and physical capital. Exporters may also benefit from a process of learning by exporting, reinforcing their productivity advantage. Higher competition for input factors and increased productivity of exporters lower the expected profitability of potential entrants and raise the productivity threshold for entering the market, leading to rising export intensity being associated with declining entry rates (Colantone and Sleuwaegen, 2010).

[21] Unreported results focusing on manufacturing and services show an ambiguous role of globalisation. This is consistent with the stronger decline in business dynamism in services (see Figure B5), that also display low levels of openness and limited variation across industries. International trade is therefore unlikely to be the main driving force behind declining entry and job reallocation rates, but can still play a role within manufacturing that is investigated in this section.

[22] Results are also generally confirmed when estimating a different model with the left-hand side in differences, as described at the end of the intangibles and the digital transformation sub-section.

[23] Other margins of firm dynamics (size of entrants, growth and survival of incumbents) are likely to be less affected in the long run (conditional on size and age).

[24] This is also confirmed when focusing on alternative proxies of business dynamism, including the share of employment in young firms.

[25] In particular some of the indicators exhibit a certain degree of correlation, which is however always lower than 0.5.

[26] The combination focuses on factors that were significant at the 5% level for both entry and job reallocation rates.

[27] Estimates of Equation 2 controlling for year fixed effects. Estimates for a significant number of additional combinations of factors has been also carried out, qualitatively confirming the reported patterns. In order to

maximise the size of the estimation sample, missing values in country-sector-varying structural variables have been replaced with sectoral averages. Qualitatively similar results also hold without this correction.

[28] Unreported results focusing on the job reallocation rate of incumbents and the share of employment in young firms also confirm the findings of a robust association with market structure and the forward linkages proxy.

[29] According Akcigit and Ates, 2019b the decline in knowledge diffusion between leaders and laggards is responsible for ten observed empirical regularities. 1) Market concentration has risen. 2) Average mark-ups have increased. 3) Average profits have increased. 4) The labour share of output has gone down. 5) The rise in market concentration and the fall in the labour share are positively associated. 6) The labour productivity gap between frontier firms (defined as the top five percent of firms with the highest productivity level) and to the rest (laggard firms) has widened. 7) The firm entry rate has declined. 8) The share of young firms in economic activity has declined. 9) Job reallocation has slowed down. 10) The dispersion of firm growth has decreased.

[30] See Appendix A.8 for further details on the definition.

[31] In alternative specifications, also the enforcing contract variable becomes significant. Lack of significance of this variable depends on the inclusion of the Netherlands, for which there are more significant measurement challenges for entry rates.

[32] Statistical significance of the average years of schooling is higher when excluding the Netherlands, for which there are more significant measurement challenges for entry rates.

[33] This exercise also considers direct effects only, but not how such reforms would affect the long-term trends in entry rates. This exercise also does not take into account possible synergies between different policies or cumulative effects.

References

Akcigit, U. and S. T. Ates (2019a), "Ten Facts on Declining Business Dynamism and Lessons from Endogenous Growth Theory", *NBER Working Papers* No. 25755, National Bureau of Economic Research.

Akcigit, U. and S. T. Ates (2019b), "What Happened to US Business Dynamism?", *NBER Working Papers* No. 25756, National Bureau of Economic Research.

Andrews, D., C. Criscuolo, and P. N. Gal (2016), "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy", *OECD Productivity Working Paper* No. 5, OECD Publishing, DOI: https://doi.org/10.1787/63629cc9-en.

Appelt, S., M. Bajgar, C. Criscuolo, and F. Galindo-Rueda (2016), "R&D Tax Incentives: Evidence on design, incidence and impacts", *OECD Science, Technology and Industry Policy Papers* No. 32, OECD Publishing, DOI: https://doi.org/10.1787/5jlr8fldqk7j-en.

Autor, D., D. Dorn, L. F. Katz, C. Patterson, and J. Van Reenen (2017), "The fall of the labor share and the rise of superstar firms", *NBER Working Paper* No. 23396, National Bureau of Economic Research.

Autor, D. H., F. Levy, and R. J. Murnane (2003), "The skill content of recent technological change: an empirical exploration", *The Quarterly Journal of Economics*, Vol. 118, No. 4, pp. 1279–1333.

Azoulay, P., B. J. Jones, D. Kim, and J. Miranda (2018), "Age and High-Growth Entrepreneurship", *NBER Working Papers* No. 24489, National Bureau of Economic Research.

Bajgar, M., G. Berlingieri, S. Calligaris, C. Criscuolo, and J. Timmis (2019), "Industry concentration in Europe and North America", *OECD Productivity Working Paper* No. 18, OECD Publishing, DOI: https://doi.org/10.1787/24139424.

Bakhtiari, S. (2017), "Entrepreneurship Dynamics in Australia: Lessons from Micro-Data", *Research Paper* No. 5/2017, Commonwealth of Australia.

Berlingieri, G., P. Blanchenay, and C. Criscuolo (2017), "The Great Divergence(s)", *OECD Science, Technology and Industry Policy Papers* No. 39, OECD Publishing, Paris, DOI: https://doi.org/10.1787/953f3853-en.

Berlingieri, G., S. Calligaris, C. Criscuolo, and R. Verlhac (2020), "Laggard firms, technology diffusion and its structural and policy determinants", *OECD Science, Technology and Industry Policy Papers* No. 86, OECD Publishing, DOI: https://doi.org/10.1787/281bd7a9-en.

Bernard, A. B., J. B. Jensen, and P. K. Schott (2006), "Survival of the best fit: Exposure to low-wage countries and the (uneven) growth of US manufacturing plants", *Journal of International Economics*, Vol. 68, No. 1, pp. 219–237.

Bijnens, G. and J. Konings (2017), "Where has the Belgian Business Dynamism Gone?", *Vives Discussion Paper* No. 59, KU Leuven.

Bijnens, G. and J. Konings (2018), "Declining Business Dynamism", *CEPR Discussion Paper* No. DP12615, Centre for Economic Policy Research.

Blanchenay, P., F. Calvino, and C. Criscuolo (2016), "Business dynamics and public policies: Cross-country evidence from new data", in: *Kauffman Foundation New Entrepreneurial Growth Conference*, Citeseer.

Bravo-Biosca, A., C. Criscuolo, and C. Menon (2016), "What drives the dynamics of business growth?", *Economic Policy*, Vol. 31, No. 88, pp. 703–742, DOI: https://doi.org/10.1093/epolic/eiw013.

Cairó, I. (2013), "The slowdown in business employment dynamics: The role of changing skill demands", *Working Paper*, Universitat Pompeu Fabra.

Calligaris, S., C. Criscuolo, and L. Marcolin (2018), "Mark-ups in the digital era", *OECD Science, Technology and Industry Working Paper* No. 2018/10, OECD Publishing, DOI: https://doi.org/10.1787/4efe2d25-en.

Calvino, F. and C. Criscuolo (2019), "Business Dynamics and Digitalisation", *OECD Science, Technology and Industry Policy Paper* No. 62, OECD Publishing, DOI: https://doi.org/10.1787/6e0b011a-en.

Calvino, F., C. Criscuolo, L. Marcolin, and M. Squicciarini (2018a), "A taxonomy of digital intensive sectors", *OECD Science, Technology and Industry Working Paper* No. 2018/14, OECD Publishing, Paris, DOI: https://doi.org/10.1787/f404736a-en.

Calvino, F., C. Criscuolo, and C. Menon (2015), "Cross-country evidence on start-up dynamics", *OECD Science, Technology and Industry Working Papers* No. 2015/06, OECD Publishing, Paris, DOI: https://doi.org/10.1787/5jrxtkb9mxtb-en.

Calvino, F., C. Criscuolo, and C. Menon (2016), "No country for young firms? Start-up dynamics and national policies." *OECD Science, Technology and Industry Policy Papers* No. 29, OECD Publishing, Paris, DOI: https://doi.org/10.1787/5jm22p40c8mw-en.

Calvino, F., C. Criscuolo, and C. Menon (2018b), "A cross-country analysis of start-up employment dynamics", *Industrial and Corporate Change*, Vol. 27, No. 4, pp. 677–698, DOI: https://doi.org/10.1093/icc/dty006.

Cockx, B. and M. Picchio (2012), "Are short-lived jobs stepping stones to long-lasting jobs?", *Oxford Bulletin of Economics and Statistics*, Vol. 74, No. 5, pp. 646–675.

Cohen, W. M. and D. A. Levinthal (1989), "Innovation and learning: The two faces of R&D", *The economic journal*, Vol. 99, No. 397, pp. 569–596.

Colantone, I. and L. Sleuwaegen (2010), "International trade, exit and entry: A cross-country and industry analysis", *Journal of International Business Studies*, Vol. 41, No. 7, pp. 1240–1257, DOI: https://doi.org/10.1057/jibs.2009.105.

Criscuolo, C., P. N. Gal, and C. Menon (2014), "The Dynamics of Employment Growth", *OECD Science, Technology and Industry Policy Papers* No. 14, OECD Publishing, Paris, DOI: https://doi.org/10.1787/5jz417hj6hg6-en.

Criscuolo, C. and J. Timmis (2018), "GVC centrality and productivity: Are hubs key to firm performance?", *OECD Productivity Working Papers* No. 14, OECD Publishing, DOI: https://doi.org/10.1787/56453da1-en.

Davis, S. J., R. J. Faberman, and J. Haltiwanger (2012), "Labor market flows in the cross section and over time", *Journal of Monetary Economics*, Vol. 59, No. 1, pp. 1–18.

Davis, S. J. and J. Haltiwanger (2014), "Labor market fluidity and economic performance", *NBER Working Paper* No. 20479, National Bureau of Economic Research.

Davis, S. J. and J. C. Haltiwanger (2019), "Dynamism Diminished: The Role of Housing Markets and Credit Conditions", *NBER Working Papers* No. 25466, National Bureau of Economic Research, Inc.

Decker, R., J. Haltiwanger, R. Jarmin, and J. Miranda (2014a), "The role of entrepreneurship in US job creation and economic dynamism", *The Journal of Economic Perspectives*, Vol. 28, No. 3, pp. 3–24.

Decker, R., J. Haltiwanger, R. Jarmin, and J. Miranda (2014b), "The secular decline of business dynamism in the United States", *mimeo*.

Decker, R., J. Haltiwanger, R. Jarmin, and J. Miranda (2016a), "Changing Business Dynamism: Volatility of Shocks vs. Responsiveness to Shocks?", *mimeo*.

Decker, R., J. Haltiwanger, R. Jarmin, and J. Miranda (2018), "Changing Business Dynamism and Productivity: Shocks vs. Responsiveness", *NBER Working Paper* No. 24236, National Bureau of Economic Research.

Decker, R. A., J. Haltiwanger, R. S. Jarmin, and J. Miranda (2016b), "Declining Business Dynamism: What We Know and the Way Forward", *American Economic Review*, Vol. 106, No. 5, pp. 203–07, DOI: https://doi.org/10.1257/aer.p20161050.

Decker, R. A., J. Haltiwanger, R. S. Jarmin, and J. Miranda (2016c), "Where has all the skewness gone? The decline in high-growth (young) firms in the US", *European Economic Review*, Vol. 86, pp. 4–23.

Demmou, L., I. Stefanescu, and A. Arquie (2019), "Productivity growth and finance: The role of intangible assets - a sector level analysis", *OECD Economics Department Working Papers* No. 1547, OECD Publishing, DOI: https://doi.org/10.1787/e26cae57-en.

Dent, R. C., F. Karahan, B. Pugsley, and A. Şahin (2016), "The Role of Startups in Structural Transformation", *The American Economic Review*, Vol. 106, No. 5, pp. 219–223.

Desnoyers-James, I., S. Calligaris, and F. Calvino (2019), "DynEmp and MultiProd: Metadata", *OECD Science, Technology and Industry Working Papers* No. 2019/03, OECD Publishing, DOI: https://doi.org/10.1787/3dcde184-en.

Égert, B., P. Gal, and I. Wanner (2017), "Structural policy indicators database for economic research (SPIDER)", *OECD Economics Department Working Papers* No. 1429, DOI: https://doi.org/10.1787/39d69dff-en.

Engbom, N. (2018), "Firm and Worker Dynamics in an Aging Labor Market", *2018 Meeting Papers* No. 1009, Society for Economic Dynamics.

Gal, P., G. Nicoletti, T. Renault, S. Sorbe, and C. Timiliotis (2019), "Digitalisation and productivity: In search of the holy grail – Firm-level empirical evidence from EU countries", *OECD Economics Department Working Papers* No. 1533, OECD Publishing, DOI: https://doi.org/10.1787/5080f4b6-en.

Gertler, M. and S. Gilchrist (1994), "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms", *The Quarterly Journal of Economics*, Vol. 109, No. 2, pp. 309–340.

Gourio, F., T. Messer, and M. Siemer (2016), "Firm Entry and Macroeconomic Dynamics: A State-Level Analysis", *The American Economic Review*, Vol. 106, No. 5, pp. 214–218.

Gutiérrez, G. and T. Philippon (2018), "How EU Markets Became More Competitive Than US Markets: A Study of Institutional Drift", *NBER Working Papers* No. 24700, National Bureau of Economic Research, Inc.

Guzman, J. and S. Stern (2016), "The State of American Entrepreneurship: New Estimates of the Quantity and Quality of Entrepreneurship for 15 US States, 1988-2014", *NBER Working Paper* No. 22095, National Bureau of Economic Research.

Hadlock, C. J. and J. R. Pierce (2010), "New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index", *The Review of Financial Studies*, Vol. 23, No. 5, pp. 1909–1940.

Haltiwanger, J., R. Decker, and R. Jarmin (2015), "Top ten signs of declining business dynamism and entrepreneurship in the US", in: *Kauffman Foundation New Entrepreneurial Growth Conference*, Citeseer.

Haltiwanger, J., I. Hathaway, and J. Miranda (2014), "Declining business dynamism in the US high-technology sector", *Ewing Marion Kauffman Foundation*.

Haltiwanger, J., R. S. Jarmin, and J. Miranda (2013), "Who creates jobs? Small versus large versus young", *Review of Economics and Statistics*, Vol. 95, No. 2, pp. 347–361.

Haskel, J. and S. Westlake (2018), *Capitalism without capital: The rise of the intangible economy*, Princeton University Press.

Holton, S. and F. McCann (2020), "Sources of the small firm financing premium: Evidence from Euro Area banks", *International Journal of Finance & Economics*, DOI: https://doi.org/10.1002/ijfe.1789.

Hopenhayn, H., J. Neira, and R. Singhania (2018), "From Population Growth to Firm Demographics: Implications for Concentration, Entrepreneurship and the Labor Share", *NBER Working Papers* No. 25382, National Bureau of Economic Research.

Hyatt, H. R. and J. R. Spletzer (2013), "The recent decline in employment dynamics", *IZA Journal of Labor Economics*, Vol. 2, No. 1, p. 5.

Karahan, F., B. Pugsley, and A. Sahin (2019), "Demographic origins of the startup deficit", *Staff Reports* No. 888, Federal Reserve Bank of New York.

Klepper, S. (1996), "Entry, exit, growth, and innovation over the product life cycle", *The American Economic Review*, Vol. 86, No. 3, pp. 562–583.

Le, A. T. (1999), "Empirical Studies of Self-Employment", *Journal of Economic Surveys*, Vol. 13, No. 4, pp. 381–416, DOI: https://doi.org/10.1111/1467-6419.00088.

Macdonald, R. (2014), "Business Entry and Exit Rates in Canada: A 30-year Perspective", *Economic Insights* No. 38, Statistics Canada.

McGowan, M. A., D. Andrews, and V. Millot (2017), "Insolvency regimes, zombie firms and capital reallocation", *OECD Economics Department Working Papers* No. 1399, OECD Publishing, DOI: https://doi.org/10.1787/5a16beda-en.

Molloy, R., C. L. Smith, R. Trezzi, and A. Wozniak (2016), "Understanding Declining Fluidity in the US Labor Market", *Brookings Papers on Economic Activity*, pp. 183–237.

Morrisson, C. and F. Murtin (2009), "The century of education", *Journal of Human capital*, Vol. 3, No. 1, pp. 1–42.

Nyström, K. et al. (2012), "Labor mobility and entrepreneurship: Who do new firms employ?", *Entrepreneurship, Social Capital and Governance: Directions for the Sustainable Development and Competitiveness of Regions*, pp. 102–14.

OECD (2020a), *Financing SMEs and Entrepreneurs 2020: An OECD Scoreboard*, OECD Publishing, DOI: https://doi.org/10.1787/061fe03d-en.

OECD (2020b), *Start-ups in the time of COVID-19: facing the challenges, seizing the opportunities*, OECD Publishing.

Ouimet, P. and R. Zarutskie (2014), "Who works for startups? The relation between firm age, employee age, and growth", *Journal of financial Economics*, Vol. 112, No. 3, pp. 386–407.

Pugsley, B. W. and A. Sahin (2015), "Grown-up business cycles", *US Census Bureau Center for Economic Studies Paper* No. CES-WP-15-33, US Census Bureau Center for Economic Studies.

Saia, A., D. Andrews, and S. Albrizio (2015), "Productivity Spillovers from the Global Frontier and Public Policy: Industry-Level Evidence", *OECD Economics Department Working Papers* No. 1238, OECD Publishing, DOI: https://doi.org/10.1787/5js03hkvxhmr-en.

Sarmento, E. and A. Nunes (2010), "Entrepreneurship performance indicators for employer enterprises in Portugal", *Temas Económicos*.

Siegfried, J. J. and L. B. Evans (1994), "Empirical studies of entry and exit: a survey of the evidence", *Review of Industrial Organization*, Vol. 9, No. 2, pp. 121–155.

Timmer, M. P., E. Dietzenbacher, B. Los, R. Stehrer, and G. J. De Vries (2015), "An illustrated user guide to the world input–output database: the case of global automotive production", *Review of International Economics*, Vol. 23, No. 3, pp. 575–605.

Tukey, J. W. (1977), *Exploratory data analysis*, Addison-Wesley, Reading, MA.

Whited, T. M. and G. Wu (2006), "Financial Constraints Risk", *The Review of Financial Studies*, Vol. 19, No. 2, pp. 531–559, DOI: https://doi.org/10.1093/rfs/hhj012.

Appendix

A. Data

A1. Data disclaimers

The New Zealand results in this report are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI), managed by Statistics New Zealand.

The opinions, findings, recommendations, and conclusions expressed in this report are those of the author(s), not Statistics NZ.

Access to the anonymised data used in this study was provided by Statistics NZ under the security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation, and the results in this report have been confidentialised to protect these groups from identification and to keep their data safe.

Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes.

Any person who has had access to the unit record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

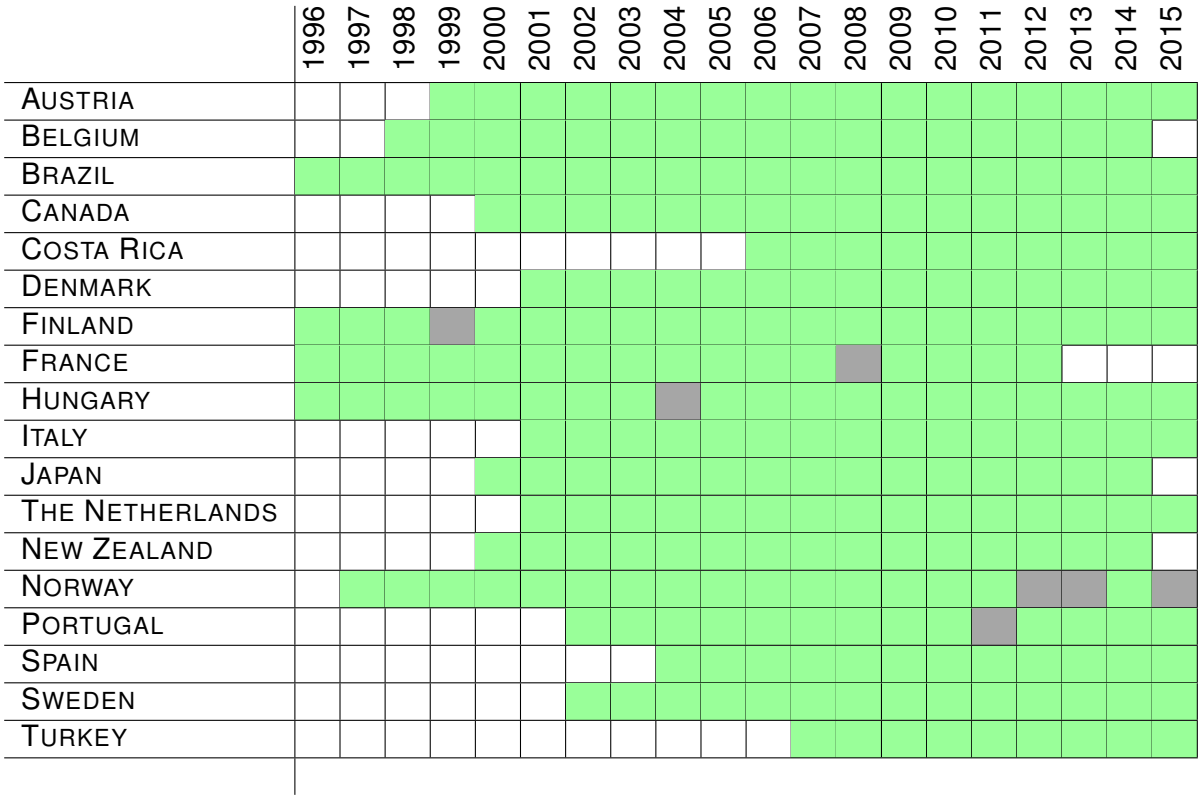
A2. Contributors to the DynEmp project (countries included in the analysis)

Table A1. Contributors to the DynEmp project

Country	National representative	Institution
Austria	Werner Hölzl	WIFO - Austrian Institute of Economic Research
Belgium	Michel Dumont, Chantal Kegels	Federal Planning Bureau
Brazil	Carlos Henrique Leite Corseuil	Instituto de Pesquisa Economica Aplicada (IPEA)
Canada	Jay Dixon[1], Danny Leung[1], Pierre Therrien[2]	[1]Statistics Canada, [2]Innovation, Science and Economic Development Canada
Costa Rica	Cristian Álvarez Corrales	Central Bank of Costa Rica
Denmark	Dorte Hoeg Koch	Ministry of Industry, Business and Financial Affairs
Finland	Mika Maliranta	The Research Institute of the Finnish Economy (ETLA)
France	DynEmp and MultiProd team	OECD
Hungary	Mihály Szoboszlai	Central Bank of Hungary
Italy	Stefano Costa	ISTAT
Japan	Kenta Ikeuchi	Research Institute of Economy, Trade and Industry (RIETI)
Netherlands	Michael Polder	Statistics Netherlands
New Zealand	Lynda Sanderson	Ministry of Business, Innovation and Employment
Norway	Arvid Raknerud, Diana-Cristina Iancu	Statistics Norway
Portugal	Paulo Dias	Min. of Labour, Solidarity, and Social Security (GEP)
Spain	Valentin Llorente Garcia	Spanish Statistical Office (INE)
Sweden	Fredrik Andersson	Statistics Sweden
Turkey	Faik Yücel Günaydın	Min. of Science, Industry and Technology

A3. Country and time coverage

Table A2. Coverage of the DynEmp3 database by country over time



Note: Temporal coverage by country of current version of the *DynEmp3* database. Years 1996 to 1999 are currently excluded from the analysis due to limited cross-country coverage. Grey boxes correspond to years that have been excluded from the analysis due to ongoing checks on the output or substantial changes in the series. Data for some countries are still preliminary.

A4. Industry classification

Table A3. Industry classification table

SNA A38 based on ISIC v.4 classification		STAN A7
01 to 03	Agriculture, forestry and fishing	**Agriculture**
05 to 09	Mining and quarrying	**Mining**
10 to 12	Food products, beverages and tobacco	**Manufacturing**
13 to 15	Textiles, wearing apparel, leather and related products	
16 to 18	Wood and paper products, and printing	
19	Coke and refined petroleum products	
20	Chemicals and chemical products	
21	Basic pharmaceutical products and pharmaceutical preparations	
22 to 23	Rubber and plastics products, and other non-metallic mineral products	
24 to 25	Basic metals and fabricated metal products, except machinery and equipment	
26	Computer, electronic and optical products	
27	Electrical equipment	
28	Machinery and equipment n.e.c.	
29 to 30	Transport equipment	
31 to 33	Furniture; other manufacturing; repair and installation of machinery and equipment	
35	Electricity, gas, steam and air conditioning supply	**Utilities**
36 to 39	Water supply; sewerage, waste management and remediation activities	

(continued)

41 to 43	Construction	**Construction**
45 to 47	Wholesale and retail trade, repair of motor vehicles and motorcycles	**Market services**
49 to 53	Transportation and storage	
55 to 56	Accommodation and food service activities	
58 to 60	Publishing, audiovisual and broadcasting activities	
61	Telecommunications	
62 to 63	IT and other information service	
64 to 66	Financial and Insurance activities	Excluded
68	Real Estate activities	**Market services**
69 to 71	Legal and accounting activities; activities of head offices; management consultancy activities; architecture and engineering activities; technical testing and analysis	
72	Scientific research and development	
73 to 75	Advertising and market research; other professional, scientific and technical activities; veterinary activities	
77 to 82	Administrative and support service activities	
84	Public administration and defence	Excluded
85	Education	**Other services**
86 to 88	Human health and social work activities	
90 to 93	Arts, entertainment and recreation	
94 to 96	Other service activities	

A5. Dimensions of analysis

Unit(i): The unit of analysis in the DynEmp data collection is the firm. Due to the challenges in measuring self-employment in a consistent way and for harmonisation purposes, the analysis excludes self-employment.

Cell(c): The measures collected in the DynEmp database are computed at different breakdowns. These breakdowns include: age class, size class, industry, country. These dimensions allow to define cells at different levels of aggregation. This paper uses cells defined at the $country \times industry$ level.

Time(t): Each cell is computed at different points in time. The time reference unit is the year. Measures are computed yearly taking advantage of the underlying longitudinal structure of input microdata.

Accordingly $X_{c,t}$ denotes the value of variable X for cell c at time t. For instance $I_{c,t}$ is the number of firms in cell c at time t.

Status: Within each cell, the DynEmp database separates units of different status (entering units, incumbent units or exiting units). While the status of the unit could enter the definition of a cell, we generally consider it as a partition within the cell.

- **Entering unit**: a unit is an entrant in t if it is not present in the micro data in year $t-1$ but is present in t with positive employment.[34]
- **Exiting unit**: a unit is an exit in t if it is not present in t and is there in $t-1$ with positive employment.
- **Incumbent unit**: an incumbent unit is present both in $t-1$ and in t with positive employment.

We denote by Xc,t^{sub} the value of variable X for a partition of a cell c at time t. For instance, $I_{c,t}^{entry}$ is the number of entrants in cell c at time t.

X^{incb} refers instead to variable X computed for the group of incumbents only. This implies using only incumbents for all the variables entering the definition of X. Thus, if $X = \frac{U}{Y+Z}$, then $X^{incb} = \frac{U^{incb}}{Y^{incb}+Z^{incb}}$.

A6. Main variables collected

Number of units (I) : Total number of units i (having at least one person engaged) in a cell c at time t.

Total employment (E) : The sum of employment across all units i in a cell c.

$$E_{c,t} = \sum_{i \in c} E_{i,t}$$

Gross Job Creation (JC) : Sum of all positive unit-level job variations between t-1 and t in cell c:

$$JC_{c,t} = \sum_{i \in c} \Delta^{+} E_{i,t}$$

with $\Delta^{+}E_{i,t} = \mathbb{1}_{(E_{i,t}-E_{i,t-1})>0}.(E_{i,t}-E_{i,t-1})$, where $\mathbb{1}_{(E_{i,t}-E_{i,t-1})>0}$ is a dummy variable equal to one when the firm level change in employment is positive, and 0 otherwise.

Gross Job Destruction (JD): Absolute value of the sum of all negative unit-level job variations between t-1 and t in cell c:

$$JD_{c,t} = \left| \sum_{i \in c} \Delta^{-} E_{i,t} \right|$$

with $\Delta^{-}E_{i,t} = \mathbb{1}_{(E_{i,t}-E_{i,t-1})<0}.(E_{i,t}-E_{i,t-1})$, where $\mathbb{1}_{(E_{i,t}-E_{i,t-1})<0}$ is a dummy variable equal to one when the firm level change in employment is negative, and 0 otherwise.

Net Job Creation (NJC): the difference between total employment in cell c at time t t and total employment in cell c at time $t-1$. It is also equal to the difference between gross job creation and gross job destruction:

$$NJC_{c,t} = E_{c,t} - E_{c,t-1} = JC_{c,t} - JD_{c,t}$$

Job creation rate (JCR): Ratio of gross job creation over average employment in the 2-years period, times 100:

$$JCR_{c,t} = \frac{JC_{c,t}}{\frac{1}{2}(E_{c,t} + E_{c,t-1})} \times 100$$

Job destruction rate (JDR): Ratio of gross job destruction over average employment in the 2-years period, times 100:

$$JDR_{c,t} = \frac{JD_{c,t}}{\frac{1}{2}(E_{c,t} + E_{c,t-1})} \times 100$$

Job reallocation rate (Job_realloc_rate): job creation in cell c plus job destruction in the cell, over average of total employment in the cell in period t and total employment in period $t-1$.

$$Job\_realloc\_rate_{c,t} = \frac{JC_{c,t} + JD_{c,t}}{\frac{1}{2}(E_{c,t} + E_{c,t-1})} \times 100$$

Entry rate ($nrunit\_p\_ent\_rate$): Number of entering units in cell *c* over number of entering and incumbent units in cell *c*.

$$nrunit\_p\_ent\_rate_{c,t} = \frac{I_{c,t}^{ent}}{I_{c,t}^{ent} + I_{c,t}^{incb}} \times 100$$

Exit rate ($nrunit\_p\_exit\_rate$): Number of exiting units in cell *c* over number of exiting and incumbent units in cell *c*.

$$nrunit\_p\_exit\_rate_{c,t} = \frac{I_{c,t}^{exit}}{I_{c,t}^{exit} + I_{c,t}^{incb}} \times 100$$

Share of employment in young firms (sh_totemp_young): Total employment in young firms (<6 years) over total employment.

$$sh\_totemp\_young_{c,t} = \frac{E_{c,t}^{young}}{E_{c,t}} \times 100$$

Outliers in the key outcome variables used for the descriptive and econometric analysis – calculated within country-sector exploiting the time variation and defined following Tukey, 1977 – are replaced to missing to make sure that results are not driven by unusual jumps.

A7. Average cumulative changes within country-sector in a regression framework

This paper adopts an econometric approach that allows presenting average cumulative changes within country-sector pairs. Industries are defined at the 2-digit level, following the SNA A38 aggregation reported in Table A3. These trends accurately capture the average evolution of business dynamism within each 2-digit industry in each country. In particular, they abstract from changes due to compositional effects, which is suitable to analyse the micro-economic drivers of business dynamism.

This econometric estimation of trends relies on the coefficients of year dummies estimates, controlling for country-sector fixed effects. More formally, to analyse the evolution over time of a variable, say entry rate E, we estimate the following regression:

$$E_{c,j,t} = \alpha + \beta y_t + z_{c,j} + \varepsilon_{c,j,t}$$

where $z_{c,j}$ corresponds to country-sector fixed effects. Thus, the coefficients β_t associated with the year dummies y_t capture the average entry rate in a given year controlling for country-sector specificities.

In addition, the first year is taken as a baseline and normalised to zero, so that the coefficients can be interpreted as the average change within country-sector of the variable E, relative to the first year. In other words, the year dummy estimate indicates the average within country-sector cumulative change of E since the baseline year.

A8. Shift-share analysis

Following Decker et al. (2014b) and Blanchenay et al. (2016) we implement a "shift-share analysis", decomposing the change in business dynamism (as measured by change in entry rates and change in job reallocation rates) in a given country, from the first to last year available over the period 2000-2015. The decomposition is applied as follows to the different measures of business dynamism (BD):

$$BD_T - BD_{t_0} = \sum_j s_{t_0}^j . \Delta BD^j + \sum_j BD_{t_0}^j . \Delta s^j + \sum_j \Delta s^j . \Delta BD^j$$

where where j represent sectors, $s^j_{t_0}$ represent the (employment or unit) share of sector j in the economy in the initial year t_0, and ΔBD^j and Δs^j are respectively the change in business dynamism and change in sector weitgh of sector j, between the first and last year t_0 and T, conditional on data availability.

The first term, the "within-sector" component, represents the total change of business dynamism within sectors holding their shares in the economy constant. It captures how much of the change in business dynamism is due to certain sectors becoming more or less dynamic. A negative term indicates that measures of dynamism have declined in a number of sectors that together represent a significant share of the economy, as measured at the beginning of the period.

The second term, "between-sector", represents the change in sectors' weights holding their business dynamism indicator to the initial value. This component captures how much of the change in business dynamism is due to the more dynamic sectors accounting for a larger or smaller share of the economy. A positive terms indicates that resources (as measured by the share of employment or unit represented by the sector) have been reallocated to sectors with higher initial level of dynamism.

The last term, the "cross-change" component, is a covariance term that represents the joint change of weights and business dynamism. A positive term means that sectors that increased their business dynamism also became more important in the economy.

A9. Data used in regressions

This sub-section provides complementary information about the definition and sources of the variables used to measure structural and policy drivers in the regressions presented in the paper.

Business cycle

Cycle dummy: this variable is equal to 0 in expansionary phases and to 1 in recessionary phases, based on the OECD reference series on Turning Points and Component Series from the Composite Leading Indicators. These data are not available for Costa Rica, where the dummy is set to 1 in 2009 and 0 between 2006 and 2008, and after 2009. Additional information on the methodology are available here.

Structural variables

In the main regressions, ICT equipment intensity, software intensity, R&D intensity, share of high-skilled workers, productivity dispersion, concentration, import penetration and export intensity are measured at the country-sector level based on averages over the period 1997-1999 or the first three years for which information on the variable is available. Maturity is defined at the sector level, and corresponds to an average over the period 1998-2000. Backward and forward participation to GVCs are defined at the country level and correspond to the average at the beginning of the period (1998-2000 or first three available years). Change in labour force growth and share of older workers are defined at the country level and correspond to the change between the periods 2001-2002 and 2014-2015 (or closest intervals depending on the availability of data).

ICT equipment intensity: investment in ICT equipment as a percentage of non-residential GFCF, based on the methodology presented by Calvino et al. (2018a).

Software intensity: investment in software and databases as a percentage of non-residential GFCF, based on the methodology presented by Calvino et al. (2018a).

R&D intensity: real business expenditures in R&D over real value added. The OECD Analytical Business Enterprise Research and Development (ANBERD) database is used to collect information on business expenditures on Research and Development, while the OECD Structural Analysis (STAN) database is used to retrieve real value added.

Share of high-skilled workers: hours worked by high-skilled persons engaged as a share of total hours. Skills are measured based on educational attainment levels. Data are ISIC Revision 4 estimates based on the ISIC 3 original data from the World Input Output Database (WIOD), Socio Economic Accounts, July 2014 (see Timmer et al., 2015 for additional details).

MFP dispersion: (log-) ratio of multifactor productivity of firms at the 90^{th} percentile and the 10^{th} percentile in the multifactor productivity log-distribution. This variable is sourced from the OECD MultiProd database. See Berlingieri et al. (2017) for further detail on the data and the construction of the measure.

Maturity (average age at frontier): average age of firms at the global productivity frontier, defined as the 5% top labour productivity firms in each sector year, using ORBIS data.

Concentration: share of gross output of firms at 90^{th} percentile in the gross output distribution (i.e. share of gross output for firms at the top 10% of the gross output distribution). The variable is sourced from the OECD MultiProd database.

Import penetration: imports over domestic demand (domestic production plus imports minus exports). For each country, the variable is an estimate at the A38 industry level based on the industry aggregates from TiVA 2016.

Export intensity: exports over domestic production. For each country, the variable is an estimate at the A38 industry level based on the industry aggregates from TiVA 2016.

Backward linkages: foreign value added embodied in gross exports. See additional details in the Guide to TiVA indicators, available here. Note that the data from TiVA 2018, available from 2005 to 2015, are retropolated using the growth rate of the TiVA 2016 indicators. See the discussion of the differences between TiVA versions available here.

Forward linkages: domestic value added in foreign exports. See backward linkages for additional details.

Labour force growth (long-term change): country-level changes in growth rate of the labour force. The variable is calculated on the bases of the World Bank development indicators. See this link for additional information.

Share of old workers (long-term change): country-level changes in the employment share of workers older than 49 years. The variable is computed based on information from Labour Force Surveys, labour force statistics by age and sex. See this link for additional information.

Policies and framework conditions

In the main regressions, indicators of policies and framework conditions are obtained as country average over the period 1998-2000 or first three available years, except for PMRs which are measured in 2003.

Business regulations: this indicator summarises six dimensions related to i) Administrative requirements, ii) Bureaucracy costs, iii) Starting a business, iv) Extra payments / bribes /

favouritism, v) Licensing restrictions, vi) Cost of tax compliance. The variable is sourced from the Fraser institute EFW database (retrieved from OECD SPIDER database). This variable is the average of sub-components measured on a scale from 0 to 10, and a high value indicates good practices. Additional details are available at this link.

Barriers to entrepreneurship: this indicator summarises three sub-dimensions related to i) Complexity of regulatory procedures, ii) Administrative burdens on start-ups, ii) Regulatory protection of incumbents. A high value of the index indicates stronger barriers to entrepreneurship. The variable is sourced from the OECD PMR database, 2013 vintage (retrieved from OECD SPIDER database).

Resolving insolvency: this indicator evaluates the time, cost and outcome of an insolvency proceeding, and provides a score based on the distance to the frontier, i.e. the distance to best practices. A high score indicates that the country is closer to the frontier. It is based on questionnaires filled in by insolvency practitioners and relates to an identical insolvency case (a limited liability company running a hotel) in different countries. The variable is sourced from the World Bank, World Development Indicators, Doing Business section (retrieved from OECD SPIDER database).

Enforcing contracts: this variable measures the number of procedures necessary to resolve a commercial dispute through the courts. The variable is sourced from the World Bank, World Development Indicators, Doing Business section (retrieved from OECD SPIDER database).

Domestic credit by the financial sector: total domestic credit provided by the financial sector (% of GDP). The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange. The variable is sourced from World Bank World Development Indicators (retrieved from OECD SPIDER database).

Interest rate spread between large and small firms: spread between interest rates charged to SMEs and to large enterprises, sourced from OECD (2020a).

Government-financed GERD: Government-financed GERD (Gross domestic expenditure on R&D) as a percentage of GDP, sourced from the OECD Main Science and Technology indicators (retrieved from the OECD SPIDER database).

R&D tax incentives for large firms: The index is computed as 1- B-index of large firms. The B-index is a measure of the level of pre-tax profit a representative company needs to generate to break even on a marginal, unitary outlay on R&D (Warda, 2001), taking into account provisions in the tax system that allow for special treatment of R&D expenditures. In the paper the index is presented in the form of an implied subsidy rate, namely one minus the B index (a higher values is therefore interpreted as higher support to large firms). This is the same variable as in Saia et al. (2015). See also additional details here and here.

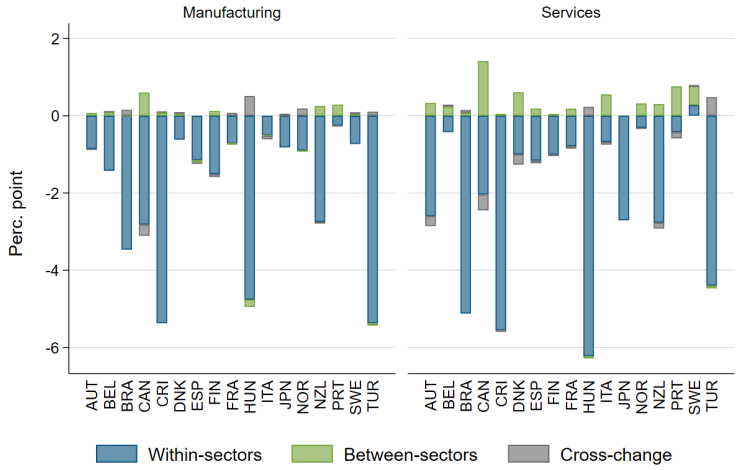
Average years of schooling: average years of schooling, sourced from Morrisson and Murtin (2009) (retrieved from OECD SPIDER database).

Government expenditures in education: general government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. General government usually refers to

local, regional and central governments. This variable originates from the World Bank World Development indicators (retrieved from OECD SPIDER database).

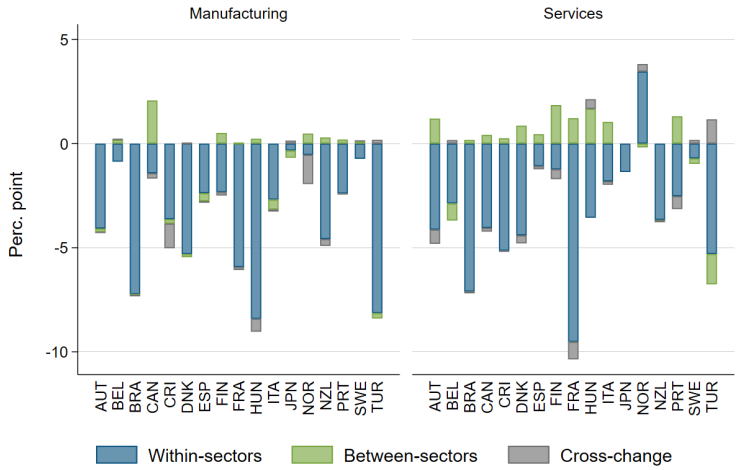
B. Additional Figures

Figure B1. Contribution to changes in entry rates, shift share analysis, by sector



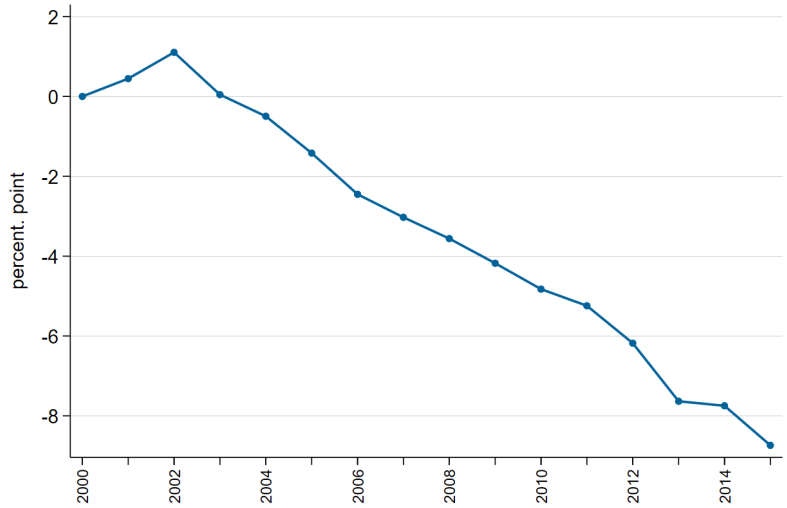
Note: This figure reports, for each country and for manufacturing and services separately, changes in entry rates due to variations within sectors ("within sector" component), due to changes in the employment share of industries with different job reallocation rates ("between-sectors" component), and due to the covariance between changes in a sector weight and its job reallocation rate ("cross-change" term). For each country, the figure covers the period from the first to the last available year within the period 2000-2015.
Source: OECD DynEmp3 database, June 2020.

Figure B2. Contribution to changes in job reallocation rates, by sector



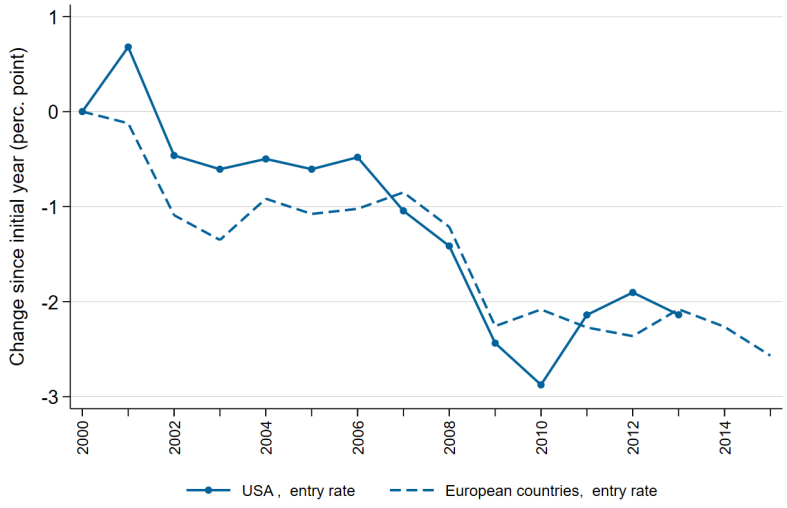
Note: This figure reports, for each country and for manufacturing and services separately, changes in job reallocation rates due to variations within sectors ("within sector" component), due to changes in the employment share of industries with different job reallocation rates ("between-sectors" component), and due to the covariance between changes in a sector weight and its job reallocation rate ("cross-change" term). For each country, the figure covers the period from the first to the last available year within the period 2000-2015.
Source: OECD DynEmp3 database, June 2020.

Figure B3. Average cumulative changes in the share of employment in young firms



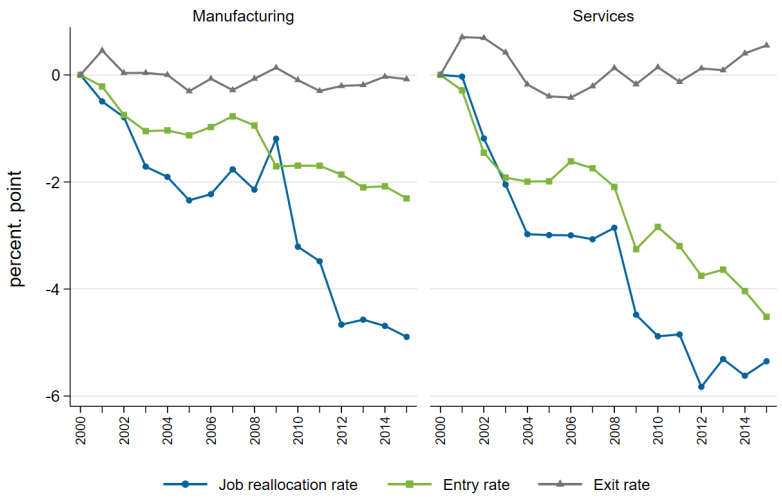
Note: This figure reports, average within-country-sector trends the share of employment in young firms (<6 years) based on the year coefficients of regressions within country-sector, for the period 2000-2015, including 17 countries: AUT, BEL, BRA, CAN, CRI, DNK, ESP, FIN, FRA, HUN, ITA, JPN, NOR, NZL, PRT, SWE and TUR. Each point represents cumulative change in percentage points since 2000.
Source: OECD DynEmp3 database, June 2020.

Figure B4. Average cumulative changes in entry rates, selected European countries vs. USA



Note: This figure reports average within-country-sector trends of entry rates, based on the year coefficients of regressions within country-sector, for the period 2000-2015, conditional on data availability. European countries included are: AUT, BEL, ESP, FIN, FRA, GBR, ITA, NLD, NOR, PRT, SWE. Each point represents cumulative change in percentage points since 2000.
Sources: OECD DynEmp v.2 database (GBR and USA) and DynEmp3 database (other countries), June 2020.

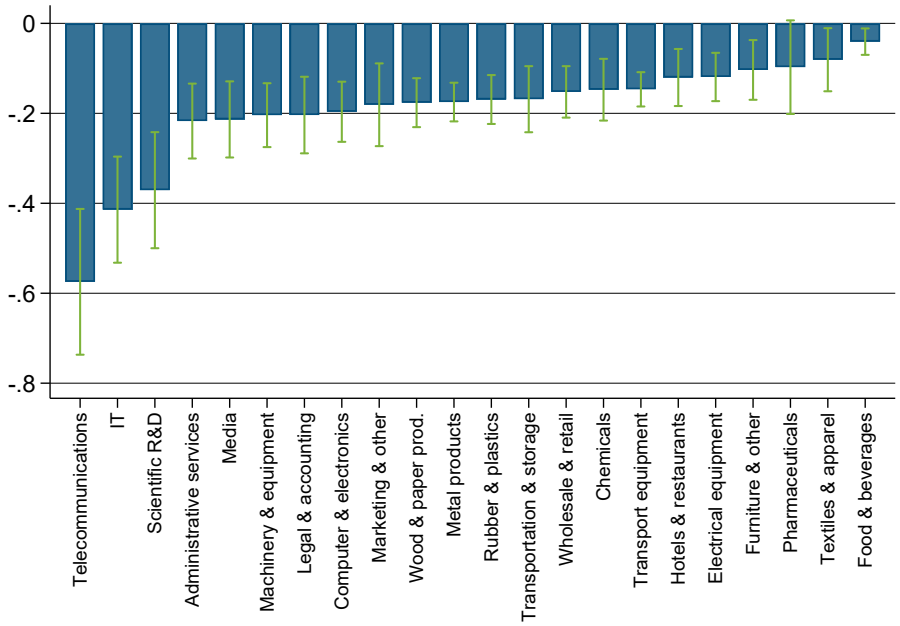
Figure B5. Average cumulative changes in job reallocation, entry and exit rates, by macrosector



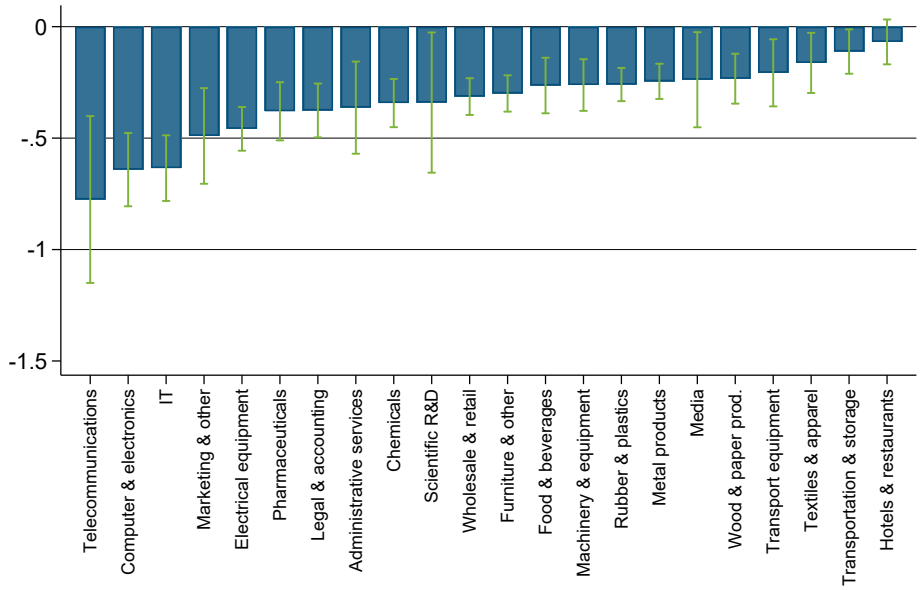
Note: This figure reports, for manufacturing and services separately, average within-country-sector trends of job reallocation, entry and exit rates, based on the year coefficients of regressions within country-sector, for the period 2000-2015, including 16 countries: AUT, BEL, BRA, CAN, CRI, ESP, FIN, FRA, HUN, ITA, JPN, NLD, NOR, NZL, PRT, SWE and TUR. Each point represents cumulative change in percentage points since 2000.
Source: OECD DynEmp3 database, June 2020.

Figure B6. Average within country-sector declines in business dynamism across industries

(a) Entry rates

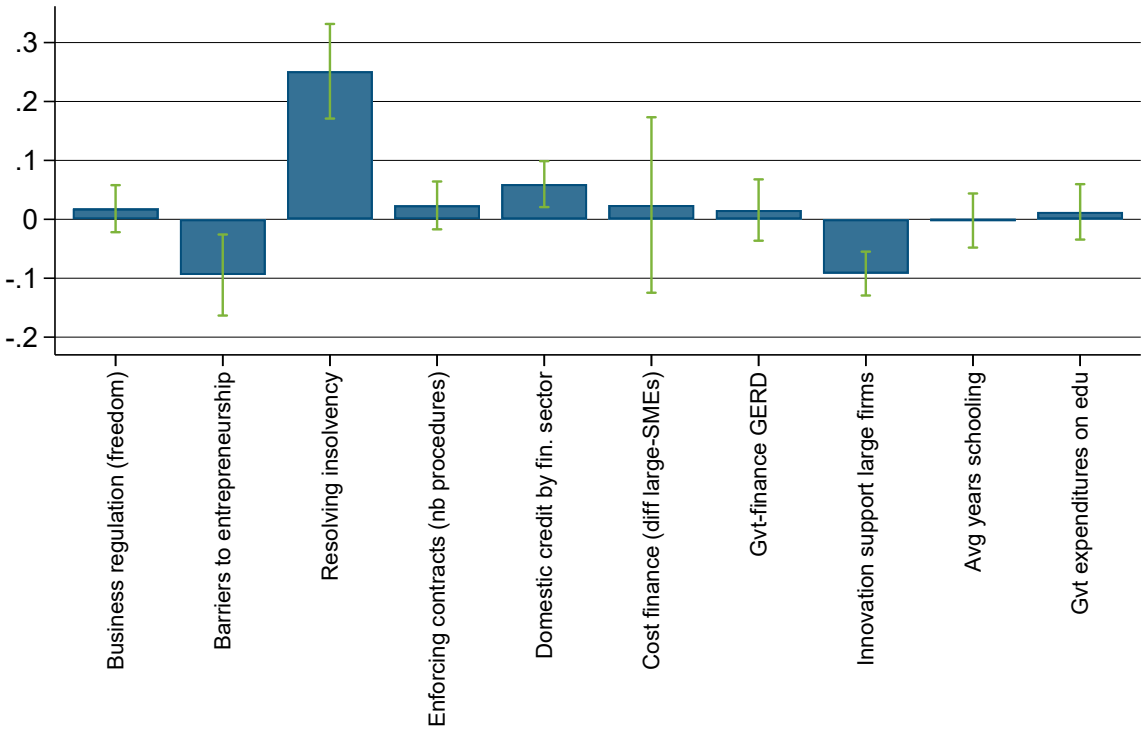


(b) Job reallocation rates



Note: This figure reports, for each industry, average yearly within-country-sector changes in job reallocation and entry rates, based on the trend coefficient of regressions within country-sector, for available years over the period 2000-2015 (see Equation 1).
Source: OECD DynEmp3 database, June 2020.

Figure B7. Institutions and framework conditions – Job reallocation rates



Note: This figure reports the estimated coefficients β from Equation 2 (blue bar) and 90% confidence interval (green band). It corresponds to the difference in the average yearly decline between a country with a higher value (one standard deviation above) of the factor considered and a country with an average value. A negative (positive) coefficient indicates that the decline is faster (slower) where the relevant factor is high.

C. Additional Tables

Table C1. Regressions within country-sector with a linear trend and a cycle dummy

	Job reallocation incb	JCR incb.	JDR incb.	Sh. of empl. in young firms
year	-0.201***	-0.145***	-0.072***	-0.672***
	(0.016)	(0.016)	(0.015)	(0.050)
recessionary phase	0.161**	-0.632***	0.947***	-0.037
	(0.080)	(0.118)	(0.107)	(0.160)
Adj. R2	0.760	0.473	0.294	0.789
Observations	4947	4816	4816	4789

Note: The table reports the results of the regression of job reallocation rates of incumbents, job creation and destruction rates of incumbents, and the share of employment in young firms (< 6 years) on a year trend, as detailed in Equation 1. Regressions include a business cycle phase dummy and country-sector fixed effects. The regression constant is not reported. Robust standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).
Source: OECD DynEmp3 database, June 2020.

Table C2. Regressions within country-sector with a linear trend and business cycle indicators

	JR rate	JR rate	JR rate	Entry rate	Entry rate	Entry rate
year	-0.352***	-0.334***	-0.330***	-0.181***	-0.179***	-0.142***
	(0.024)	(0.025)	(0.024)	(0.012)	(0.013)	(0.011)
GDP growth	-0.128***			0.079***		
	(0.042)			(0.012)		
Change Unemp.		0.236***			-0.173***	
		(0.076)			(0.019)	
HP growth			-0.027**			0.016***
			(0.013)			(0.005)
Adj. R2	0.788	0.779	0.766	0.828	0.827	0.840
Observations	4731	4236	4143	5247	4734	4626
Nb countries	17	15	16	18	16	17
CS fe	yes	yes	yes	yes	yes	yes

Note: The table reports the results of the regression of job reallocation (JR) rates and entry rates using alternative business cycle indicators in the spirit of Equation 1. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C3. Country specific regressions within industry with a linear trend

country	JR rate	Entry rate
AUT	-0.45***	-0.24***
BEL	-0.21***	-0.09*
BRA	-0.33***	-0.19***
CAN	-0.38***	-0.21***
CRI	-0.58***	-0.82***
DNK	-0.41***	-0.14***
ESP	-0.25***	-0.19***
FIN	-0.12	-0.05***
FRA	-0.62***	-0.16***
HUN	-0.45***	-0.51***
ITA	-0.23***	-0.05
JPN	-0.18***	-0.05***
NLD		-0.11*
NOR	-0.21*	-0.23***
NZL	-0.32***	-0.27***
PRT	-0.13	-0.10***
SWE	-0.15*	-0.06***
TUR	-0.91**	-0.60***

Note: This table presents the coefficient associated with a time trend, within industry. The coefficient are estimated from individual regressions for each country. Significance levels are based on robust standard errors (*** $p<0.01$, ** $p<0.05$, * $p<0.1$)

Table C4. Intangibles and the digital transformation – Entry rates

	(1)	(2)	(3)	(4)
year × ICT eq intensity	-0.110***			
	(0.016)			
year × Software intensity		-0.035***		
		(0.013)		
year × RD intensity			-0.031*	
			(0.018)	
year × Sh. high skill				-0.038***
				(0.013)
Observations	4082	4046	2744	4489
Nb country	15	14	15	15
CS fe	yes	yes	yes	yes
CY fe	yes	yes	yes	yes
SY fe	no	no	no	no
recess. dummy	no	no	no	no
R2	0.872	0.856	0.867	0.885

Note: The table reports the results of the regression of entry rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C5. Intangibles and the digital transformation – Job reallocation rates

	(1)	(2)	(3)	(4)
year × ICT eq intensity	-0.133***			
	(0.025)			
year × Software intensity		-0.074***		
		(0.027)		
year × RD intensity			-0.144***	
			(0.020)	
year × Sh. high skill				-0.053
				(0.033)
Observations	3659	3562	2469	4000
Nb country	14	13	14	14
CS fe	yes	yes	yes	yes
CY fe	yes	yes	yes	yes
SY fe	no	no	no	no
recess. dummy	no	no	no	no
R2	0.737	0.746	0.801	0.834

Note: The table reports the results of the regression of job reallocation rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C6. Market structure and firm heterogeneity – Entry rates

	(1)	(2)	(3)
year × MFP dispersion	-0.104***		
	(0.028)		
year × Concentration		-0.040**	
		(0.019)	
year × Avg age at frontier			0.087***
			(0.012)
Observations	3959	3120	5268
Nb country	14	11	18
CS fe	yes	yes	yes
CY fe	yes	yes	yes
SY fe	no	no	no
recess. dummy	no	no	no
R2	0.852	0.845	0.885

Note: The table reports the results of the regression of entry rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C7. Market structure and firm heterogeneity – Job reallocation rates

	(1)	(2)	(3)
year × MFP dispersion	-0.200***		
	(0.055)		
year × Concentration		-0.108***	
		(0.032)	
year × Avg age at frontier			0.092***
			(0.027)
Observations	3481	2669	4752
Nb country	13	10	17
CS fe	yes	yes	yes
CY fe	yes	yes	yes
SY fe	no	no	no
recess. dummy	no	no	no
R2	0.740	0.746	0.815

Note: The table reports the results of the regression of job reallocation rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C8. Globalisation and integration in Global Value Chains – Entry rates

	(1)	(2)	(3)	(4)
year × M penetration (manuf)	-0.025**			
	(0.012)			
year × X intensity (manuf)		-0.014		
		(0.011)		
year × Backward linkages (cty)			-0.047***	
			(0.013)	
year × Forward linkages (cty)				0.091***
				(0.014)
Observations	2881	2881	5268	5268
Nb country	18	18	18	18
CS fe	yes	yes	yes	yes
CY fe	yes	yes	no	no
SY fe	no	no	yes	yes
recess. dummy	no	no	yes	yes
R2	0.854	0.854	0.851	0.856

Note: The table reports the results of the regression of entry rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C9. Globalisation and integration in Global Value Chains – Job reallocation rates

	(1)	(2)	(3)	(4)
year × M penetration (manuf)	-0.078**			
	(0.036)			
year × X intensity (manuf)		-0.092***		
		(0.029)		
year × Backward linkages (cty)			-0.004	
			(0.028)	
year × Forward linkages (cty)				0.064***
				(0.023)
Observations	2581	2581	4752	4752
Nb country	17	17	17	17
CS fe	yes	yes	yes	yes
CY fe	yes	yes	no	no
SY fe	no	no	yes	yes
recess. dummy	no	no	yes	yes
R2	0.784	0.785	0.797	0.798

Note: The table reports the results of the regression of job reallocation rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C10. Demographic factors – Entry rates

	(1)	(2)
year × change LF growth	0.017*	
	(0.010)	
year × change sh. 50+		-0.021**
		(0.010)
Observations	5268	5268
Nb country	18	18
CS fe	yes	yes
CY fe	no	no
SY fe	yes	yes
recess. dummy	yes	yes
R2	0.849	0.849

Note: The table reports the results of the regression of entry rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C11. Demographic factors – Job reallocation rates

	(1)	(2)
year × change LF growth	0.033	
	(0.025)	
year × change sh. 50+		-0.019
		(0.019)
Observations	4752	4752
Nb country	17	17
CS fe	yes	yes
CY fe	no	no
SY fe	yes	yes
recess. dummy	yes	yes
R2	0.798	0.797

Note: The table reports the results of the regression of job reallocation rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C12. Combining structural factors

	(1) Job reallocation	(2) Entry rate
year × ICT eq intensity	0.028	-0.046***
	(0.032)	(0.017)
year × Software intensity	-0.031	0.025**
	(0.026)	(0.011)
year × MFP dispersion	-0.104***	-0.035***
	(0.034)	(0.013)
year × Concentration	-0.063**	-0.023**
	(0.026)	(0.011)
year × Avg age at frontier	0.054	0.053***
	(0.038)	(0.013)
year × Forward linkages (cty)	0.071***	0.064***
	(0.023)	(0.014)
Observations	4084	4517
Nb country	17	18
CS fe	yes	yes
Y fe	yes	yes
recess. dummy	yes	yes
R2	0.818	0.874

Note: The table reports the results of the regression of job reallocation and entry rates on structural factors interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table C13. Institutions and framework conditions – Entry rates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
year × Business regulation (freedom)	0.040***									
	(0.012)									
year × Barriers to entrepreneurship		-0.063***								
		(0.013)								
year × Resolving insolvency			0.106***							
			(0.020)							
year × Enforcing contracts (nb procedures)				-0.016						
				(0.012)						
year × Domestic credit by fin. sector					0.082***					
					(0.014)					
year × Cost finance (diff large-SMEs)						-0.161***				
						(0.023)				
year × Gvt-finance GERD							0.094***			
							(0.012)			
year × Innovation support large firms								-0.021**		
								(0.008)		
year × Avg years schooling									0.044***	
									(0.014)	
year × Gvt expenditures on edu										0.033***
										(0.012)
Observations	5071	4041	3861	4201	5164	2527	4410	4453	5268	4946
Nb country	18	16	17	18	18	14	15	15	18	17
CS fe	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
SY fe	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
recess. dummy	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
R2	0.842	0.866	0.866	0.866	0.847	0.869	0.852	0.852	0.845	0.843

Note: The table reports the results of the regression of entry rates on institutional factors and framework conditions interacted with a time trend, as detailed in Equation 2. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table C14. Regressions within country-sector focusing on changes in framework conditions – Entry rates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Business regulation (freedom)	0.303***									
	(0.115)									
Barriers to entrepreneurship		-0.399**								
		(0.166)								
Resolving insolvency			0.001							
			(0.133)							
Enforcing contracts (nb procedures)				-0.278***						
				(0.070)						
Domestic credit by fin. sector					0.488***					
					(0.156)					
Cost finance (diff large-SMEs)						-0.279***				
						(0.069)				
Gvt-finance GERD							0.268			
							(0.185)			
Innovation support large firms								-0.001		
								(0.092)		
Avg years schooling									2.005	
									(1.370)	
Gvt expenditures on edu										0.030
										(0.157)
Observations	5072	4265	3878	4202	4938	2465	3870	3321	3531	4505
Nb country	18	17	18	18	18	14	16	15	18	18
CS fe	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Y fe	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
recess. dummy	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
R2	0.223	0.218	0.213	0.215	0.212	0.249	0.246	0.194	0.186	0.224

Note: The table reports the results of the regression of entry rates on institutional factors and framework conditions, as detailed in Equation 3. Identification is based on changes over time. The regression constant is not reported. Clustered (country-sector) standard errors are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table C15. Summary Table of results in the literature

Author	Country	Data	Coverage	Main variable	Main findings
Akcigit and Ates (2019a, 2019b)	USA	Business Dynamic Statistics (BDS) ; Decker et al. (2016b)	1980-2011	Entry rates, job reallocation rates, share of young firms in economic activity	(-) Decline in business dynamism, driven by decline in knowledge diffusion
Bakhtiari (2017)	AUS	Business Longitudinal Analysis Data Environment (BLADE) from the Australian Bureau of Statistics (ABS)	2002-2015	Entry rates and net job creation rates	(-) Decline in business dynamism.
Bijnens and Konings (2017)	BEL	Database from National Bank of Belgium (NBB)	1985-2014	Job reallocation	(-) Decline in business dynamism.
Cao et al. (2015)	CAN	Canada's Labour Force Survey data, Business Development Bank of Canada	1984-2012	Entry rates	(-) Decline in dynamism on firm side, and on worker side.
Decker et al. (2014a)	USA	U.S. Census Bureau Longitudinal Business Database (LBD) and Business Dynamic Statistics (BDS)	1976-2011	Job reallocation rate	(-) Decline in job reallocation rates, decline in high-growth young businesses together with decline in high-growth firms in high-tech sectors.
Decker et al. (2014b)	USA	U.S. Census Bureau LBD	1976-2011	Start-up rates and firm age distribution	(-) Decline within industry and firm age classes, rather than due to changes in relative weight of these firms and sectors.

Table C16. Summary Table of results in the literature (cont.)

Author	Country	Data	Coverage	Main variable	Main findings
Decker et al. (2016a)	USA	U.S. Census Bureau LBD	1976-2011	Business growth	(-) Decline also accompanied by substantial decline in skewness of business growth distributions in the US.
Decker et al. (2018)	USA	U.S. Census Bureau LBD and Business Register (BR)	1979-2013	Job reallocation rate	(-) Weaker responsiveness to shock, consistent with rising adjustment frictions, accounting for a significant drag on aggregate productivity.
Dent et al. (2016)	USA	U.S. Census Bureau LBD and BDS	1977-2013	Employment reallocation	(-) Changes in employment distribution of entrants are able to explain about one third of the increase in the services employment share in the U.S. over time. Three decades decline in entry (”startup deficit”) growing effects.
Gourio et al. (2016)	USA	U.S. Census Bureau BDS	1982-2014	Entry rates, GDP and productivity	(-) Entry shocks have long lasting effects on macro-economic variables.
Guzman and Stern (2016)	USA	Business registration data in 15 U.S states matched with growth outcomes	1988-2014	Entre- preneurial potential and performance	(+) Growth outcomes follows a cyclical pattern, with no decline in potential for high-growth entrepreneurship.

Table C17. Summary Table of results in the literature (cont. 2)

Author	Country	Data	Coverage	Main variable	Main findings
Haltiwanger et al. (2014)	US	U.S. Census Bureau LBD and BR	1976-2013	High-growth firms in high-tech sectors	(-) Decline in high-growth young businesses together with decline in high-growth firms in high-tech sectors.
Karahan et al. (2018)	USA	U.S. Census Bureau BDS and LBD	1972-2012	Labour supply growth, Entry rate	(-) Decline in growth rate of labour force explain important share of the decline in entry rates.
Macdonald (2014)	CAN	Statistics Canada's Longitudinal Employment Analysis Program (LEAP)	1984-2012	Entry and exit rates	(-) Decline in both entry and exit.
Pugsley and Sahin (2015)	USA	U.S. Census Bureau BDS and LBD	1976-2012	Start up rate	(-) Decline in business dynamism reflects a drop of 10 percent of the growth distribution, accounted for by declining share of young businesses.
Sarmento and Nunes (2010)	PRT	Employment Administrative Records	1985-2007	Entry rates	(-) Decline in business dynamism.