DISCUSSION PAPER SERIES

DP12615

DECLINING BUSINESS DYNAMISM

Gert Bijnens and Jozef Konings

INDUSTRIAL ORGANIZATION

ISSN 0265-8003

DECLINING BUSINESS DYNAMISM

Gert Bijnens and Jozef Konings

Discussion Paper DP12615
Published 18 January 2018
Submitted 18 January 2018

Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

DECLINING BUSINESS DYNAMISM

Abstract

We build on Decker et al. (2016) who show that business dynamism and entrepreneurship in the U.S. have declined over recent decades and that the characteristics of this decline changed around 2000. Since 2000 the U.S. decline in dynamism has been accompanied by a decline in high-growth, young firms. Using 30 years of data from all for-profit firms incorporated in Belgium, we now offer evidence that Belgium, a far more rigid economy than the U.S., experienced a similar decline in dynamism. Furthermore, the decline set in around 2000 as well. We attribute this not only to the declining share of young firms that become high-growth firms, but more importantly also to the declining propensity for small (not necessarily young) firms to experience fast growth. We do not yet know what caused this decline. Since there are remarkable similarities between Belgium and the U.S. with respect to the secular decline in business dynamism, global trends rather than country specific changes are most likely to be at the basis of this evolution. A possible global trend causing dynamism to decline, is the ICT revolution that started the second half of the ’90s. We find preliminary indications that industries with higher ICT intensity have experienced a dynamism trend change during that same period and show a steeper dynamism decline.

JEL Classification: N/A

Keywords: business dynamism, Entry, high-growth firms

Gert Bijnens - gert.bijnens@kuleuven.be
KU Leuven

Jozef Konings - joep.konings@kuleuven.be
KU Leuven; Nazarbayev University and Ljubljana University and CEPR

Acknowledgements
Funding from the Methusalem research grant, KU Leuven and the Econopolis Chair is gratefully acknowledged. We thank Cathy Lecocq, Jo Van Biesebroeck, Stijn Vanormelingen and participants at the VIVES seminar (KU Leuven) for comments.

Declining Business Dynamism*

Gert Bijnens Jozef Konings†

January 2018

Abstract

We build on Decker et al. (2016) who show that business dynamism and entrepreneurship in the U.S. have declined over recent decades and that the characteristics of this decline changed around 2000. Since 2000 the U.S. decline in dynamism has been accompanied by a decline in high-growth, young firms. Using 30 years of data from all for-profit firms incorporated in Belgium, we now offer evidence that Belgium, a far more rigid economy than the U.S., experienced a similar decline in dynamism. Furthermore, the decline set in around 2000 as well. We attribute this not only to the declining share of young firms that become high-growth firms, but more importantly also to the declining propensity for small (not necessarily young) firms to experience fast growth. We do not yet know what caused this decline. Since there are remarkable similarities between Belgium and the U.S. with respect to the secular decline in business dynamism, global trends rather than country specific changes are most likely to be at the basis of this evolution. A possible global trend causing dynamism to decline, is the ICT revolution that started the second half of the '90s. We find preliminary indications that industries with higher ICT intensity have experienced a dynamism trend change during that same period and show a steeper dynamism decline.

*This research is supported by grants from the Econopolis Chair on Firm Dynamics and the Methusalem Funding Scheme established by the Flemish government. The authors wish to thank Cathy Lecocq for her valuable input.

†Bijnens: VIVES, Department of Economics, University of Leuven (KU Leuven), gert.bijnens@kuleuven.be; Konings: Department of Economics, Nazarbayev University, VIVES, Department of Economics, University of Leuven (KU Leuven) and CEPR, joep.konings@kuleuven.be.

1 Introduction

Business dynamism or the fact that firms enter, exit, expand and contract, plays a key role in our economy. Schumpeter already understood in the 1940s that *creative destruction* is essential in an innovative economy. The Olley-Pakes decomposition of productivity growth showed that between firm reallocation of resources explains a substantial part of aggregate productivity growth. Traditional macroeconomic approaches to understand aggregate phenomena are driven by models that are based on average variables with little attention paid to understanding the dynamics under the hood. Yet, we know different groups of firms (young vs. old, small vs. large, incumbents vs. entrants, ...) play a different role in our economy. There seems to be a consensus that a small number of high-growth firms contribute disproportionately to aggregate employment growth. Recently, Haltiwanger et al. (2016) found high-growth firms also make a disproportionate contribution to U.S. productivity growth as resources are rapidly shifted towards these successful firms. Bravo-Biosca (2016) links a more dynamic growth distribution with faster productivity growth for the U.S. and a number of European countries. Young firms are a key component for our economy as well. Criscuolo et al. (2014) show that especially young firms play an outsized role in overall job creation in 18 studied OECD countries, but that there is also a great heterogeneity across countries in the extent to which young firms are job creators. In short, the underlying mechanics of business dynamism matter, but how it matters could differ between countries.

In this paper, we build on Decker, Haltiwanger, Jarmin, & Miranda's (2016) paper *"Where has all the skewness gone? The decline in high-growth young firms in the U.S.,"* and validate their findings for Belgium. They show that the level of business dynamism and entrepreneurship in the U.S. have declined over recent decades and that the characteristics of that decline have changed around 2000. The U.S. are widely acknowledged as having a flexible, innovative and

entrepreneurial economy and are consistently ranked amongst the top countries in competitiveness rankings. Business dynamism in the U.S. might be declining, but at least starting from a very high level.

The Belgian economy, on the contrary, is perceived to be significantly less dynamic and entrepreneurial than the U.S. Belgium scores mediocre at best at these same competitiveness rankings.[1] Furthermore, the OECD puts Belgium 3rd for protection of permanent workers against individual and collective dismissals behind Venezuela and China. The OECD puts the U.S. at place 69 out of 72 countries on this ranking. Zimmer (2012) shows Belgium has the highest mismatch between labour supply and labour demand in the EU-15. Belgium thus clearly has a more rigid labour market than the U.S. This hampers reallocation between firms. Belgium can be regarded as less dynamic in the business sense and one cannot state business dynamism started from a high level. We show that Belgium too experienced a decline in business dynamism and this decline set in around 2000.

Table 1: Summary of Main Differentials in the Employment Weighted Growth Rate Distribution

		1988	2000	2014
All Firms	P90-P10	34.76	37.04	29.08
	P90-P50	19.32	22.58	15.87
	P50-P10	15.44	14.45	13.21
Manufacturing Firms	P90-P10	27.62	25.87	19.10
	P90-P50	12.13	13.61	8.91
	P50-P10	15.49	12.26	10.18
Services Firms	P90-P10	38.03	45.90	32.23
	P90-P50	25.11	29.45	18.43
	P50-P10	12.92	16.45	13.80

Note: Figures are 3y moving averages and represent the percentage points differences between given percentiles of the employment weighted growth rate distribution. Author calculations from firm annual accounts.

[1] IMD's World Competitiveness Ranking (2015, 2016, 2017): U.S. (1st, 3rd, 4th) vs. Belgium (23rd, 22nd, 23rd); WEF's Global Competitiveness Report (2016-2017): U.S. (3rd) vs. Belgium (17th), World Bank's Ease of Doing Business (2017): U.S. (8th) vs. Belgium (42nd).

Table 1 summarises our main findings. We measure dispersion as the difference between the 90^{th} and the 10^{th} percentile of the employment weighted growth rate distribution of Belgian firms.[2] This P90-P10 differential initially increased slightly over 2 percentage points (pp) prior to 2000 and then drops with 8pp post-2000. Later we will clarify the decline in dispersion, in fact, set in before the 2000s. Post-2000, the decline in dispersion is also associated with a decline in skewness. The skewness, or the difference between the P90-P50 differentials and the P50-P10 differential goes up prior to 2000 to come down significantly post-2000. This decline of skewness is predominantly driven by a decline of the P90-P50 differential. Since the medium firm shows little to no growth, this differential is highly influenced by what happens to the fastest growing firms in our economy. Looking into the main sectors of our economy, we see an outspoken decline of high growth activity of services firms post-2000.

The literature on firm dynamics started in the 1990s where the underlying granularity of aggregate net job creation was studied (e.g. Boeri & Cramer 1992, Davis & Haltiwanger 1992, Konings 1995). Although aggregate net job creation is modest, there are large underlying flows of gross job creation and destruction, even within narrowly defined segments of the economy. Recently, taking a microeconomic firm level perspective to obtain a better understanding of aggregate movements has received renewed attention.[3] Next to Decker et al. (2016) who study firm dynamics based on a large dataset covering micro-data of U.S. firms between 1976 - 2011, there is a large literature on U.S. business dynamism. De Loecker & Eeckhout (2017) take a firm level perspective on the evolution of U.S. markups from 1950 and find, amongst others, that a decline in job flows is driven by the rise of market power. Their analysis is limited, however, to publicly listed firms.

[2]P90-P10 is the main dynamism measure used by Decker et al. (2016). In Appendix A we analyse other definitions as well. All measures come to the same conclusion of a decline in business dynamism.

[3]The role of firm heterogeneity has been exploited in recent work explaining fluctuations in GDP growth (Davis et al. 2007; Gabaix 2011; Acemoglu et al. 2012), unemployment (Moscarini & Postel-Vinay 2012, trade (Di Giovanni et al. 2014; Bernard et al. 2014) and aggregate (export) prices (Amiti et al. 2014).

European business dynamism only started to be documented. Recently Bravo-Biosca et al. (2016) look at drivers of cross-country differences in firm growth dynamics and link them with labour market regulation, bankruptcy legislation, financial market development and R&D support policies. Bravo-Biosca (2016) subsequently links a more dynamic firm growth distribution with faster productivity growth and also shows the U.S. performs better than most European countries for a wide set of metrics of business dynamism. Calvino et al. (2015) document cross country differences on start-up dynamics and find that most surviving start-ups do not grow. Andrews et al. (2015) find that some countries are more successful than others at channelling scarce resources to productive and innovative firms and show this partly reflects cross-country differences in the policy environment. Andrews et al. (2016) study the growing divergence between firms that operate at the frontier and "the rest". Recently, OECD (2017b) released its flagship report on business dynamics and productivity that discusses a wide set of topics based on a granular study of underlying business level data. Using Belgian data, Geurts & Van Biesebroeck (2016) have studied job creation in de novo or newly founded firms. They find that, once the data is corrected for spurious entrants, contribution from start-ups to overall job creation is relatively small and not very persistent.

Studies using European data, however, are generally based on the OECD's DynEmp project or Bureau Van Dijk's Orbis database and only cover a time-frame of up to 10 years and/or do not cover the full set of private enterprises. Using data only covering a limited timeframe, we would have no possibility to disentangle a secular trend from the impact of the business cycle. Orbis offers longer time series for some countries, but especially small firms are under represented in this database. Since younger firms are on average smaller than mature firms, young firms are under represented as well. We find this especially problematic to study business dynamism as dynamism is disproportionately driven by younger firms.

The contribution of this paper is that, contrary to other studies on European data, we cover

a 30 years time-frame for not only older and larger firms but also for *all* for profit enterprises similar to Decker et al. (2016). Our analysis now confirms that the decline in business dynamism is a secular trend spanning multiple business cycles and is not limited to economies that already were highly dynamic. We do not yet know what caused this decline. Since there are remarkable similarities between Belgium and the U.S. with respect to the secular decline in business dynamism, global trends rather than country specific changes are most likely to be at the basis of this evolution. An additional contribution of this paper is that we also find an outspoken decline of high growth activity with mature, smaller firms whereas the biggest mature firm show an increasing propensity to experience high growth episodes. The long term effects of this trends are yet unclear. The decline in business dynamism and reallocation of human resources between firms is also for Belgium a worrying evolution. Van Beveren & Vanormelingen (2014) estimate that reallocation accounts for approximately three quarters of aggregate productivity growth in Belgium.

This paper continues as follows. The next Section 2 explains how business dynamism can be linked with 2 key characteristics (dispersion and skewness) of the firm growth rate distribution. Section 3 discusses our primary data source from the National Bank of Belgium (NBB). Section 4 zooms into the decline in business dynamism measured via growth rate dispersion. Section 5 examines the skewness of this distribution and its link with high-growth firm activity. Section 6 explores ICT a cause of declining dynamism. Finally, Section 7 concludes.

2 Characteristics of Firm Growth Rate Distributions

We follow Decker et al. (2016) and capture business dynamism (firms entering, exiting, expanding and contracting) by the statistical distribution of firm employment growth rates. A high dispersion of the distribution indicates that successful firms grow fast and unsuccessful firms shrink fast. It can hence be regarded as a strong proxy for the level of reallocation of labour

between firms.

It has long been known that the distribution of firm growth rates is fat-tailed resembling a tent-shaped Laplace distribution. E.g., Bottazzi & Secchi (2006) and more recently Bravo-Biosca (2016) confirm empirically that the distribution has indeed fat tails, but it is also roughly symmetric. Both studies, however, are biased towards larger firms as they only include listed companies or companies with more than 10 employees. They hence do not capture the enormous skewness observed by Decker et al. (2014) of the growth rate distribution of younger (and hence smaller) firms. Reichstein & Jensen (2005) also found clear evidence of skewness in the Danish firm growth distribution, especially for the right tail, containing the fastest growing firms. Decker et al. (2016) find substantial, though declining, skewness in the U.S. firm growth rate distribution. A fatter right tail, especially in the growth rate distribution of young firms, is consistent with theoretical models on firm growth. The up-or-out mechanism described by the passive learning model of Jovanovic (1982) implies that young firms either realise they are productive and rapidly expand or realise they are not and disappear. Another source of skewness stems from the fact the vast majority of firms is simply static and shows near zero growth. Most firms are not willing or not able to achieve growth as shown by Schoar (2010). She differentiates between subsistence and transformational entrepreneurs, with the latter a small minority of firms. Transformational entrepreneurs invest in R&D, innovate and if successful rapidly expand. Next to modelling an economy consisting of 2 types of firms roughly similar to the subsistence vs. transformational firms, Acemoglu et al. (2013) find in U.S. data that small and young firms are both more R&D intensive and grow more. This is consistent with Hölzl (2009) who showed that for countries on the technological frontier (for which Belgium is used as an example) innovation becomes increasingly important for small and medium sized firms to grow rapidly. A skewed firm growth distribution is hence linked with the presence of young and/or innovative, transformational firms.

Another angle on the firm growth rate distribution is how it changes over time. Gibrat's law considers firm growth rates to be independently and identically distributed. This leads to a stable shape of the firm growth distribution over time. Higson et al. (2002) already showed this is not the case and claim macro-economic shocks are absorbed differently by firms in a different place of the growth rate distribution. A better understanding of the changing shape of the firm growth rate distribution, therefore, is an important factor for understanding the impact of shocks on the overall economy.

In this paper, we measure firm growth via employment growth as follows:

$$DHS_{it} = \frac{Emp_{it} - Emp_{it-1}}{\frac{Emp_{it}+Emp_{it-1}}{2}}$$

The growth rate (DHS) for firm i at time t compares the absolute growth between t and $t-1$ with the average employment of the two periods for firm i. This growth measure follows the definition of Davis, Haltiwanger, & Schuh (1998) and transforms the domain of growth rates from $[-100\%, +\infty]$ to $[-2, +2]$. This allows to account for firm entry ($+2$) and exit (-2). Figure 1 shows an example of the growth rate distribution. A significant number of firms (especially smaller firms) has indeed no or a limited number of employees and shows no growth at all. As a consequence there is a very large weight on the zero value of the employment growth rate distribution. We therefore use the employment weighted growth rate distribution as shown in the right hand side graphs of Figure 1. These figures clearly show the asymmetric nature of growth rates. By visually inspecting the growth rate distribution for 1986 (Figure 1b) with the one for 2000 1d), we already see the skewness and dispersion initially goes up. Subsequently comparing 2014 (Figure 1f) with 2000, we see skewness and dispersion coming down again.

[Figure 1 about here.]

3 Firm Level Data

We have constructed a database from data made publicly available by the National Bank of Belgium (NBB). The database contains the unconsolidated annual accounts of all for-profit enterprises incorporated under Belgian law[4] that are legally required to file their annual accounts with the NBB.[5] These annual accounts typically include the main figures of the profit and loss statement, balance sheet as well as figures on the number of employees, sector, activity and location. The dataset does not include data from self-employed workers that employ other people but do not operate via an incorporated legal entity.

Data is on legal entity level and does not split figures over multiple establishments of the same legal entity. This is different from Decker et al. (2016) who use establishment level data. We are therefore not able to distinguish between organic growth and M&A linked growth. We do not regard this, however, as an issue to study business dynamism. M&A is an essential part of dynamism. I many cases a company buying an establishment of another company feels it can improve something to the acquired establishment or itself. The acquiring company will insert knowledge and/or capital to evolve the joint company either from a marketing perspective or from an operational perspective. In other words, the buyer feels the acquisition can make the joint firm more productive. This process is hence an essential part of reallocation driven productivity gains.

We observe these firms during the 30-year period 1985-2014. From 1996 onwards the requirements for filing personnel information in Belgium were altered. For the period 1985-1995 we measure employment growth based on the reported variable *average number of employees* during the year, which includes own personnel as well as interim labour. After 1996, this variable is not available anymore and for the period 1996-2014, we use the growth in the reported *average*

[4]This includes both locally and foreign owned firms incorporated in Belgium.
[5]Banks are not included in the dataset as they do not file standard annual accounts.

full time equivalents (FTE) instead. FTE is arguably a better measure for the amount of labour within a firm as part-time work has become increasingly popular over the previous 2 decades.[6]

To map the sector the firm is active in, we use the NACE Rev. 2, 2008 4-digit classification. We assume the latest available classification for the whole company lifespan. For companies not active after 2008 we map the older versions of the classification into the current version. If a 1-on-1 mapping is not possible, the biggest companies are mapped via a manual lookup and the remainder is mapped to the 4-digit code via a closest match algorithm.

We do not clean the data as we believe what happens in the tails of the firm level distribution needs more scrutiny to better understand granular origins of aggregate movements.[7] Our database consists of 91,487 firms employing 1,501,988 people in 1985 and 409,091 firms employing 1,968,266 FTE in 2014. This covers almost the full Belgian private sector employment. It hence allows us to document a number of stylized facts characterizing Belgian business dynamism, such as entry/exit and growth rate dispersion which is explained in the next section.

4 The Decline in Business Dynamism

We study the evolution of business dynamism by studying the differential of firm employment growth rates between the 90^{th} and the 10^{th} percentile of the employment weighted growth rate distribution. The higher the difference, the more reallocation of human resources across different firms. Figure 2 shows the 90-10 differential for all firms (including entry and exit) as well as for

[6] To solve the 1996 change in definition, we calculate the 1995-1996 growth by comparing the average number of employees (which includes interim labour) in 1995 with the total number of employees at the end of 1996 (a reported variable) summed with the amount of interim labour in 1996 (reported separately). We annualise the growth rate as we assume this growth is over 1,5 years as it compares an average variable with an end-of-year variable. We come to an annualised growth rate of 0,64% for 1995-1996 aggregate employment in our dataset. This compares with a 0,69% growth rate for aggregate Belgian employment according to the Eurostat Labour Force Survey.

[7] We do, however, exclude Belgium's largest employer, the Belgian National Railway Company, from our data as, driven by EU regulation, it changes legal entity throughout the period. Since it represents approx. 4% of private sector employment, its observed entry and exit has a substantial impact on the employment weighted growth rate distribution.

continuing firms[8] only. As we focus on the long term trend, the Hodrick-Prescott (HP) trend is included[9] as well as the 3-year moving average. We initially see an uptake in business dynamism in the eighties. In the early eighties Belgium was regarded as the sick man of Europe: (very) high government deficits, spiralling public debt, high and increasing unemployment and ailing private firms. This led the then government to introduce a set of economic recovery policies of which a 8,5% devaluation of the Belgian franc in 1982 was the most remarkable measure. Potentially this led to the steep increase in growth rate dispersion during the 2nd half of the 80s. Depending on whether we include entry/exit activity, the decline in dispersion set in early 1990s (including exit/entry) or late 1990s (continuers only).

[Figure 2 about here.]

We can clearly confirm a continuing decline in growth rate dispersion over the past 2 decades. This is in line with Decker et al. (2016) who see a sharp decline from the late 1980s to the early 1990s, a more modest decline in the second half of the 1990s followed by a sharp decline again in the post-2000 period.

Recessions[10] are also marked in Figure 2. We see little to no correlation between a period of recession an a change in business dynamism. This confirms the decline in dynamism is a secular trend rather than a phenomenon linked with the business cycle.

Figure 3 shows the same 90-10 dispersion in growth rate, but now for the balanced panel of the 34,394 firms active throughout the 1985-2014 period.[11] The trends initially shows a modest decline which becomes more steep after 2000. A small decline is what can be expected as the cohort ages. Fizaine (1968) already discovered that age has a negative impact on both the growth

[8] Analysis of continuing firms disregards entry and exit.
[9] Given the use of annual data, the Hodrick-Prescott smoothing parameter used is 100.
[10] A recession is defined as 2 subsequent quarters of negative quarter-on-quarter real GDP growth. Real GDP growth figures from 1985 taken from the OECD.
[11] 34,394 out of 91,488 firms active in 1985. The balanced panel represents 809,313 employees out of the total of 1,559,952 in 1985 and 718,519 FTE out of the total of 1,984,434 in 2014.

and the variance of growth rates of French establishments. This has most recently been confirmed by Bravo-Biosca (2016) who estimates that young firms grow about 3.5 times faster than older firms based on data for several countries. Earlier, Haltiwanger et al. (2013) came to a similar conclusion for the U.S. Nevertheless, the pace at which incumbent firms are becoming similar growth-wise has increased throughout the period. This evolution cannot be seen independently from the fact that according to Autor et al. (2017) the importance of larger corporations or so called "superstar firms" for our economy has increased. More recently, De Loecker & Eeckhout (2017) see the decrease of labour flows as a secular trend in the U.S. driven by the rise of firm market power.[12]

[Figure 3 about here.]

In Figure 2 we saw a convergence in dispersion comparing all firms with continuing firms only. This implies the impact of entry/exit on dispersion in growth rate has declined. Clearly changes in entry/exit activity are not the sole drivers of the decline in dynamism. Both the evolution of the continuing firms (i.e. excluding entry/exit in Figure 2,) and of the balanced firm panel (Figure 3) confirm the secular trend of a decline in dynamism. Figure 4 now shows the evolution of the annual firm entry (or start-up) rate as well as the exit rate. Figure 4a gives the number of firms entering and exiting and Figure 4b shows these rates relative to the total number of firms. The start-up rate experiences a strong declining trend. The number of firms exiting goes up, though this changes looking at the employment destroyed by exiting firms (Figures 4c and 4d). Studying employment at start-ups, we again find the same trend.

[Figure 4 about here.]

Figure 4 includes so called spurious entrants and exits. A spurious entrant is a newly

[12] See Appendices A and B that show that labour flows (job reallocation, creation and destruction) exhibit a similar, declining trend as dispersion.

established legal entity receiving a new business number,[13] but which is not truly a new firm. A spurious entrant is the result of a relocation of existing production factors from an incumbent, either in total or partially, to a new business number. Geurts & Van Biesebroeck (2016) find, based on detailed Belgian data of employee movements from the Belgian National Social Security Office (NSSO), that more than one third of administrative start-ups with 5 to 9 employees and two thirds with 10 or more employees are in fact spurious entrants. True entrants with more than 50 employees are extremely rare. Unfortunately, detailed employee movements are not available for the long time-period we study. To correct for spurious entrants and as a close approximation of the underlying dynamics, we therefore remove all entrants with more than 10 employees.[14] Figure 5 compares entry rate with and without spurious entrants. Based on the numbers of firms entering (Figures 5a and 5b) there are only small changes as indeed few firms enter with more than 10 employees. Looking, however, at the employment associated with entry (Figures 5c and 5d) we see that entry is significantly reduced. Nevertheless; the overall trend of declining start-up rates still holds. After 2000, the employment generated by start-ups represents less than 0.5% of total employment and continues to decline.

[Figure 5 about here.]

The secular trend of declining Belgian business dynamism is not solely evident from the measures we use here (growth rate dispersion, start-up rates). Decker et al. (2016) point to numerous other studies based on U.S. data that find steady declines of other indicators as well.[15] Although not yet specifically studied, we have no reason to believe these trends for U.S. business dynamism are not valid for a more rigid business environment such as Belgium.

[13] In Belgium a new business number is only given to a newly incorporated legal entity, with new shareholder capital. A new business number is not given when there is a change of shareholder nor location.

[14] Geurts & Van Biesebroeck (2016) come to their findings based on entrants in the 2004-2012 period and we assume the proportion of spurious entrants they find also holds for our time period 1985-2014.

[15] See e.g., Davis et al. (2010) for a declining pace of job flows and inflow rate into unemployment, Davis et al. (2012) link this with a trend decline in excess worker reallocation. Hyatt & Spletzer (2013) find trend declines in hiring, separations, job creation and destruction.

Bellmann et al. (2017) find that the average level of hiring and separation indeed is much lower in Germany than in the U.S., but the link between employment growth and worker flows in Germany is very similar to the U.S.

Another interesting angle to look at the declining Belgian business dynamism is the presence of mismatch. Bachmann et al. (2017) claim theories that explain job-to-job transitions by productivity differences between firms are not fully consistent with the stylised facts they derive for the German labour market. They revive Barlevy's (2002) ideas that the level of mismatch plays a more important role in driving the level of job-to-job transitions. This cannot be seen independently of Zimmer (2012) who shows that Belgium has the highest level of job mismatch in the EU-15 and this level has increased during the decade before 2010. Zimmer (2012) sees the labour force's educational level and/or location as the main obstacles to efficiently match supply with demand.

Compositional shifts of the enterprise landscape can drive changes in dispersion. Geurts & Van Biesebroeck (2016) find empirically that conditional on size, the growth rate of start-up firms reduces with age and that, conditional on age, the growth rate increases with size. These effects, however, disappear if firms of different ages are combined as older firms dominate the larger size classes leading to negative growth-size relationship. This implies that the decline in start-up rates and the rise of incumbent, "superstar firms" that shifts the age distribution towards older firms, will have an impact on overall growth rate dispersion. Furthermore, Bijnens & Konings (2017) show that over the past decades, Belgium has moved a large amount of jobs from the capital intensive, goods producing manufacturing industry to more volatile distribution and support services. Decker et al. (2016), however, find that compositional shifts (size, age, industry) only account for a relatively small fraction of the overall decline in dispersion of U.S. firm growth rates. In Appendix B we analyse the effect on compositional shifts on the decline of Belgian job reallocation, creation and destruction rates and find that this only has a very

modest effect on the decline. Only 4% of the drop in job destruction rate can be attributed to the changing composition of the Belgian firm landscape. For the change in job reallocation and creation rate the changing composition actually has tempering effect of 2% to 9% of the rate. We can hence conclude the changing composition is not the driver for the loss of dynamism and this loss remains unexplained.

Figure 6a shows the trend in dispersion for different industries. The services industry represents approx. half of Belgian employment in the beginning of the period and gradually increases its employment share to approx. 2/3 towards the end of period. Services predominantly take share from the manufacturing industry. Dispersion in the manufacturing industry gradually decreases. Dispersion in the services industry rises towards the end of the 90s, before declining as well. While the Belgian services industry continues to grow in terms of value added and employment, Van Beveren & Vanormelingen (2014) find that it actually had a negative within firm productivity growth for the period 1998-2009 and that (very modest) productivity gains are purely driven by between firm reallocation. The decrease in service industry dynamism must hence be a source of concern. OECD (2017a) consistently urges Belgium to increase competition in the services industry to increase the potential for productivity growth. In Belgium, there still is regulation in place protecting existing firms in the retail trade and professional services. Although in the U.S. the services industry did contribute to aggregate productivity growth,[16] Decker et al. (2016) also find declining dispersion for the U.S. services industries, albeit starting from a significantly higher level compared to Belgium.

[Figure 6 about here.]

The high-tech sector is an important source of innovation and productivity growth. Figure 6b splits the manufacturing in high-tech and low-tech and the services industry in knowledge

[16] See e.g., Van Ark et al. (2008)

intensive (KIS) and less knowledge intensive services (LKIS).[17] Overall, there are only limited difference based on knowledge and technology intensity. High-tech manufacturing initially saw increased dispersion, but started to decline as well from 2000. Knowledge intensive services initially increased its dispersion vs. less knowledge intensive services, but towards the end of the time period comes back to the same level.

Figure 7a shows the share of employment active at young firms[18] and Figure 7b show this employment share split between high-tech and low-tech sectors. Without taking spurious entrants into account, we see a decline in young firm employment from the early 90s. For the high-tech manufacturing sector we see a steep drop already from the start of the studied period. Figure 7c shows the dynamism of young firms clearly is significantly higher compared to the dynamism of older firms. A remarkable finding is that dynamism at young firms has actually been rising, but doesn't result in an increase in aggregate dynamism since the share of young firms simply drops. A possible explanation could be that it is predominantly start-up activity from subsistence or lifestyle entrepreneurs that has been coming down.

[Figure 7 about here.]

Decker et al. (2016) come to the (preliminary) conclusion that the acceleration of the decline in U.S. growth dispersion is driven by changes in high-tech and technology related firms and potentially also by changes in publicly traded firms. We do not have specific data on Belgian publicly traded firms,[19] but we see a similar change in the pattern around the 2000. We do find, however, preliminary evidence that the decline is driven by ICT intensive industries.

[17] (Medium) High-Tech and (Medium) Low-Tech Manufacturing industries and Knowledge Intensive Services (KIS) and Less Knowledge Intensive Services (LKIS) as defined per 2-digit NACE code by Eurostat (2015) with the exception of Employment Activities (NACE 78) that we, unlike Eurostat (2015), categorise as LKIS for Belgium as the job creation is mainly driven by service voucher employment, a government scheme to subsidies household help.

[18] Young firms are defined as max. 5y old

[19] The dataset would be very small as currently approx. 150 firms are listed on the Brussels stock exchange coming down from approx. 400 publicly listed firms during the 1980s.

5 High Growth Firms and Skewness

In this section, we examine the changing characteristics of high-growth firms and the skewness of the growth size distribution in Belgium over the past 3 decades. Decker et al. (2016) describe the current consensus on cross sectional patterns of business dynamics and firm growth in the U.S.[20] Most findings have been confirmed for a broader set of OECD countries by Criscuolo et al. (2014) and Calvino et al. (2015) and specifically for Belgium by Geurts & Van Biesebroeck (2016) and emerge as stylised facts. Young firms disproportionately contribute to gross job creation and, conditional on survival, show much higher growth rates than older firms. Probability of exiting decreases linearly with age and the vast majority of start-ups do not grow at all. The positive job growth contribution of young firms is driven by a small number of high-growth firms. These patterns come together in the fact that young continuing firms show significantly higher skewness in firm growth rates. The skewness and a change in skewness of the overall employment growth distribution is hence closely linked with the activity of young, transformational entrepreneurs and *creative destruction*. We first study the changes of the skewness of the firm growth distribution is Subsection 5.1 and subsequently zoom into high-growth firms in Subsection 5.2.

5.1 The changing Nature of Skewness

We now examine the changing shape of distribution of firm growth rates over time. Figure 8 shows the difference between the 90^{th} and the 50^{th} percentile, the difference between the 50^{th} and the 10^{th} percentile as well as the difference between the two. We expect the growth rate distribution to be skewed to the right-hand side. This implies the 90-50 differential should be bigger than the 50-10 differential. Figure 8a shows these differences for all firms. The 90-50 differential is indeed larger than the 50-10 differential though the difference clearly is declining. This confirms Decker et al. (2016) finding for the U.S., though the differentials for the U.S.

[20] They base their findings predominantly on Haltiwanger et al. (2013) and Decker et al. (2016)

are about 10pp higher than those for Belgium. The 50-10 differential is, since it is linked with job destruction, counter-cyclical. The 90-50 differential is pro-cyclical implying job creation in Belgium is highly linked with the business cycle as well. These 2 findings combined lead to the fact that the difference between these 2 differentials is highly pro-cyclical. A striking finding is that the volatility of the difference clearly is reducing with each recession, including the great recession. The impact of a recession on the shape and skewness of the growth rate distribution declines. Together with a declining dispersion, we can conclude Belgian firms are becoming more homogenous with respect to employment growth rates. There is less reallocation and less creative destruction and the impact of a recession is softening. Whether or not this phenomenon is linked with the fact that there is a growing diversion between "superstar" or "frontier" and the "rest" as described by Autor et al. (2017) for sales and Andrews et al. (2016) for productivity remains to be investigated.

[Figure 8 about here.]

Figure 8b now shows the same differentials, but for continuing firms only (i.e. excluding entry and exit). We see similar patterns. This means the decline in skewness is not purely driven by an asymmetrical decline in entry and exit rates. The decline in the 90-50 differential now only sets in from the 2000 recession which can be explained by the large entry rates of the late 80s that are not taking into account anymore. This is the same finding as Decker et al. (2016) who see an acceleration in decline of the skewness of the U.S. firm growth since 2000.

Remarkably, skewness for young firms as shown in Figure 8c does not come down and both the 90-50 and the 50-10 differentials increase. This is contrary to the findings of Decker et al. (2016) where both differentials decline for young firms. Young Belgian firms are becoming less homogeneous from a growth point of view, but, as shown before, their share in the overall employment declines. Older firms (Figure 8d) show little to no skewness. Skewness of mature

firms remains fairly constant throughout the studied time period. The 90-50 differential is significantly lower for older firms than for young firms. A young firm is more likely to experience high growth than an older firm.

Combining the overall (declining) pattern for skewness with the (increasing) pattern for young firms and the (stable) pattern for old firms, we can conclude the changes in skewness of the firm growth rate distribution is driven by a shift of activity away from young to older firms.

[Figure 9 about here.]

Figure 9 shows the differentials for the 3 main broad sectors manufacturing, services and construction. The pattern is similar to what Decker et al. (2016) find for the U.S., i.e. convergence of the 90-50 and 50-10 differentials and an overall decline, especially since the end of the 90s. The main sectors increasingly resemble each other with both skewness and dispersion converging to each other.

[Figure 10 about here.]

Decker et al. (2016) find a change in the character of the changes in dispersion and skewness in the U.S. firm growth rate distribution around 2000. Prior to 2000 changes where predominantly driven by Retail Trade and Services (in our definition, these sectors are part of the less knowledge intensive services industry). In the post-2000 period, changes are predominantly driven by publicly traded firms and high-tech. Remarkably, we see a similar trend for Belgium. Figure 10 differentiates between high-tech manufacturing and knowledge intensive services on the one hand and low-tech manufacturing and less knowledge intensive services on the other hand. Since 2000 the dispersion in high-tech manufacturing and KIS came down. Figure 10a shows this is equally driven by a decline in the 90-50 differential and the 50-10 differential while for the low-tech manufacturing sector (figure 10b), we see a continuous decline and no change around 2000.

For KIS (figure 10c) we especially see a change in the 50-10 differential around 2000. Another strong finding is the clear decline in pro-cyclicality of the skewness for KIS, predominantly driven by the 90-50 differential. This is rather counterintuitive as in an advanced economy that continuously switches jobs from manufacturing to services, we would expect an increasing amount in dynamism for the knowledge intensive services industry. Although the overall pattern for less knowledge intensive services is similar (figure 10d), we do not observe this steep decline in pro-cyclicality.

5.2 The decline of High Growth Firms

We now turn to the evolution of high-growth firms (HGF). While it is often claimed that small, young firms account for the majority of job creation, this is rebuked by Henrekson & Johansson (2010). They analyse 20 empirical studies and find that a large share of net employment growth is generated by a few rapidly growing firms, so-called High Growth Firms (HGFs). These HGFs are not necessarily small and young, but it is predominantly young age more than small size that seems to be linked with rapid growth and job creation. Geurts & Van Biesebroeck (2016) find that firm size at start-up seems to have some predictive power for subsequent job creation.

HGFs thus play an important role in a dynamic economy as they represent a disproportionate share of job creation. The OECD defines HGFs as "All enterprises with average annualized growth greater than twenty percent per annum, over a three-year period, and with ten or more employees at the beginning of the observation period." Growth is measured by the number of employees and by turnover. We will use compound annual employment growth rather than average growth. This avoids a firm with yearly employee numbers of e.g., 10 (year 0), 5 (year 1), 10 (year 2) , 11 (year 3) is categorised as a HGF. Decker et al. (2016) follow the U.S. definition of high growth and define all companies above the 90^{th} percentile as HGF. As the median firm shows little to no growth, what happens to the 90^{th} percentile is closely linked with what happens

to the 90-50 differential in firm growth rates. We will analyse high-growth firm activity based on the European as well as the U.S. definition of high growth.

[Figure 11 about here.]

Figure 11 shows the growth rate of the 90$^{\text{th}}$ percentile of the employment growth rate distribution. We again observe a similar pattern studying all firms (Figure 11a), i.e. a change in trend around 2000. Whereas prior to 2000 the growth rate of the 90$^{\text{th}}$ percentile is highly volatile, in line with the business cycle and upward trending, post 2000 this volatility ebbs away. The growth rate of the fastest growing firms declines. The overall trend masks the fact that the growth rate of the fastest growing *young* firms is significantly higher and actually steadily going up as shown in Figure 11b. High growth clearly is associated with younger firms. The best young firms are actually doing well, but their impact on the overall trend completely fades away since there is simply less activity from young firms.

Figure 11c compares the growth rate of the 90$^{\text{th}}$ percentile for services with that of KIS and LKIS. We see the same pattern, an increase prior 2000 and a decrease post 2000. There is little difference between knowledge intensive and less knowledge intensive services. Figure 11d makes the distinction between high-tech and low-tech manufacturing. Low-tech manufacturing experiences a gradual decline, while high-tech manufacturing initially sees an increase. Post 2000 there is a decline independent of technology level.

[Figure 12 about here.]

Figure 12 looks at high growth based on the Eurostat definition. Not surprisingly, the same conclusion can be drawn. Figure 12a shows that he number of HGFs goes up until 2000 and comes down post-2000. If we look at the relative number of HGFs (Figure 12c), there is a downward trend from the start of the studied period. Looking at employment from HGFs (Figure

12b and Figure 12d), we come to a similar finding. Also for HGF employment, the volatility stemming from the business cycle has significantly come down, with the latest downturn having only a small impact on HGF activity.

Although HGFs play an important role in overall employment growth, the impact of the decline in HGFs remains yet unknown. There is a clear decline in HGF activity and HGF activity remains volatile, but we do not see a direct link with overall employment. Unemployment in Belgium has remained fairly stable over the past decades and only experience mild fluctuations in line with the business cycle. Possibly, HGF activity can be linked with the quality of employment. Bachmann et al. (2017) provide some intuition on this. They find in German data that fast growing firms fuel their growth by poaching workers from other firms (rather than hiring from unemployment). Most likely they need to offer better contract terms to do so. This fuels overall salary growth. The decline of fast growing firms could hence offer a part of the explanation that Belgian job creation at the higher paying levels is coming down as shown in Bijnens & Konings (2017).

[Figure 13 about here.]

We now know that the decline in skewness and dispersion of the firm growth rate distribution is driven to a large extend by what happens to the fastest growing firms.[21] Looking at continuers only, high growth firms increased their growth rates in the pre-2000 period. This drives the overall 90-50 differential upwards. This was accompanied by a smaller increase of the 50-10 differential leading to an increase in dispersion and a small increase in skewness. Post-2000, we see a drop in the 90-50 differential which brings down skewness and dispersion. It is hence interesting to have a closer look at the fastest growing companies. To get a broader sample as the approx. 1,000 companies p.a. that are categorised as high-growth firms according to

[21] Recall that this is also closely related to what happens to young firms as, conditional on size, young firms experience faster growth than older firms.

the Eurostat definition, we relax the requirements. We include companies with more than 10 employees experiencing 15% p.a.[22] growth over a 3 year time frame. We not only include the company at the 3rd year (when it reaches the high-growth status), but during the full 3 years leading to the high growth mark. Figure 13a shows the share of total employment these companies represent split by firm size. Not surprisingly the smallest firms (as there are many) and largest firms (as some are very large) represent the biggest share. The share of large firms is volatile as this is driven by whether or not a small number of very large firms grow fast. The share at the smallest fast growing firms is declining since 2000. If we now compare the largest companies (500+ employees) with "the rest" (Figure 13b), a remarkable trend emerges. Whilst post-2000 the largest fast growing companies are somewhat holding (and over the long term even increasing) their share in overall employment, the smaller companies see their share significantly drop. In other words, post-2000, sustained high growth is increasingly associated with the largest companies.

Decker et al. (2016) predominantly see a decline in high-growth *young* firms, whereas we find a decline in high-growth *small* firms. There is to a certain extend an overlap between these two statements as young firms on average are smaller than older firms. Nevertheless Figure 13c shows that the share of employment at young fast growing firms indeed declined since 2000. The overall effect of this decline remains small though compared to the decline of fast growing older small firms since 2000 pictured in Figure 13d. Furthermore, older, large firms seem to be the only category that is able to show a somewhat increasing trend in its ability to become a fast growing company.

[22] In stead of 20% p.a. as defined by Eurostat. 15% roughly corresponds with the 90th percentile of the firm growth rate distribution.

6 Business Dynamism and ICT Intensity

We have so far shown that, similar to the U.S., there is a clear decline in business dynamism and the trend changed towards the year 2000. The causes, however, remain yet unknown. Since Belgium and the U.S., two very different economies, exhibit similar trends with respect to dynamism, global changes affecting all countries are likely to have played a role. Possible causes are the increasing use of ICT or participation of emerging economies in global supply chains. In this chapter we briefly explore the impact of ICT.

Several authors already confirmed that a substantial part of the U.S. growth acceleration from 1995 to 2000 is driven by the adoption of ICT (Jorgenson et al., 2002; Daveri, 2003). Van Ark (2015) states this was also the case for Europe, though less outspoken compared to the U.S. Van Reenen et al. (2010) link ICT with reallocation of employment and find firms with higher levels of ICT are more likely to grow and less likely to exit.

The previous chapters already looked into potential differences driven by knowledge intensity for services and by technology level for manufacturing. The industries are split according to the definitions from Eurostat (2015) on the NACE 2-digit level. Figure 6b studied differences in dispersion and Figure 10 looked at skewness. This split, however, yielded little further insights on whether or not the knowledge or technology level of an industry has an impact on the evolution of dynamism.

We now take a different approach to classify the different industries of our economy. We base ourselves on the EU KLEMS Productivity and Growth Accounts on industry level for Belgium.[23] The dataset provides us with the change in contribution of ICT capital services to value added growth on an aggregation level between NACE 1-digit and 2-digit.[24] We assume the industries with the highest contribution between 2000 and 2014 are the ones that were most affected by the

[23] See Jäger (2017) for an explanation of the EU KLEMS project and its data sources.

[24] Several 2-digit industries are taken together resulting in 29 different industries in stead of the 88 NACE 2-digit industries.

ICT revolution that set in during the second half of the '90s.[25] Companies in these sectors who did not successfully invest in ICT, saw (compared to other industries) a disproportionate impact on their value added growth and were hence more likely to stagnate or disappear. As acquiring ICT knowledge and infrastructure is, to a certain extent, a fixed cost, smaller companies are more likely to miss out on the ICT revolution which could ultimately result in a loss in business dynamism as a limited number of successful companies become more dominant in an industry.

[Figure 14 about here.]

Figure 14a shows the evolution of dynamism (captured by the 90-10 differential of dispersion) for ICT intensive vs. non-intensive industries. Both see an initial uptake in dynamism linked with the increased start-up rate of the 2nd half of the 80s. Subsequently the non-ICT intensive industries experience a slow, continuous decline throughout the studied period. ICT intensive industries, however, show a strong increase in dynamism until the second half of the '90s followed by an even stronger decrease. The overall pattern of a change in dynamism in the late 90s is clearly driven by the ICT intensive industries. This is not contradictory to Van Reenen et al. (2010) who have shown that firms investing more in ICT grow more in employment. The initial uptake of ICT will cause increased reallocation from firms not investing in ICT to firms investing in ICT which initially leads to an increase of business dynamism. The ICT investing firms will become larger and more productive and push the smaller, less productive firms out of the market. The surviving firms become the "superstar firms" of their industries potentially causing a subsequent decline in business dynamism.

One could argue that in Figure 14a, we do not observe the difference in ICT intensiveness,

[25] Via this methodology we categorise the following NACE sections or industries as ICT intensive (all other industries, we regard as non-ICT intensive): IT and other information services (62-63), Telecommunications (61), Publishing, audiovisual and broadcasting activities (58-60), Professional, scientific, technical administratieve and support service activities (M-N), Financial and insurance activities (K), Wholesale and retail trade (G), Arts, entertainment and recreation (R), Machinery and equipment n.e.c. (28), Chemicals and chemical products (20-21), Coke and refined petroleum products (19), Electricity, gas and water supply (D-E).

but rather a difference services vs. manufacturing as services are over represented in the ICT intensive industries. Therefore, in Figure 14b we explicitly make the ICT intensiveness split for manufacturing and services. Even within the services and the manufacturing industries, there is a clear difference of the ICT intensive industries vis-a-vis the non-ICT intensive ones. For both services and manufacturing, the ICT intensive industries exhibit the overall pattern of a change in dynamism towards the end of the 90s, whilst the non-ICT intensive industries show a slower decline and do not experience a trend change in the years leading to 2000.

Figures 14c and 14d now look at skewness of the employment growth rate distribution. Here we come to a similar finding. The non-ICT intensive industries experience little to no change in skewness. The ICT intensive ones experience a continued decline in skewness, predominantly driven by a sharp decline of the 90-50 differential towards the end of the 90s.

We cannot claim (yet) the causes of the decline in business dynamism are linked with the increased use of complex ICT systems during the second half of the '90s. Nevertheless, we find some preliminary indications that whether or not an industry has a high ICT intensity is somehow linked with the decline in business dynamism. This topic needs further, more detailed research.

7 Concluding Remarks

We find clear evidence that the secular decline in business dynamism is not limited to the U.S., a highly entrepreneurial economy where dynamism started from a high base. Business dynamism is declining in Belgium as well, an economy with a rigid labour market and where the levels of entrepreneurship are significantly lower than in the U.S. We do not see a "revert to the mean" or convergence with respect to business dynamism where highly dynamic economies are hampered by increasing legislation and rigid economies become more entrepreneurial driven by structural reforms.

Similar to the U.S., we find a change in the characteristics of the evolution of business dynamism in the period leading to the year 2000. Whereas for the U.S. the decline accelerated, for Belgium the decline set in. These changes in Belgium and the U.S. happened around the same time. Also similar to the U.S., the Belgian trend reverse towards the second half of the '90s is predominantly driven by a sustained decrease of the 90-50 differential of the firm growth rate distribution. Although the causes of the change remain yet unknown, they are likely to be found in global trends affecting (developed) economies in a similar way. Potential candidates could be the increased use of ICT and its impact on productivity gains or the increased participation of emerging economies in global supply chains.

The steep increase in globalisation of the past decades had indeed substantial effects on the firm landscape. The Melitz (2003) model already implied only the best firms will participate in the export market and will become better. Whether or not the increase in international trade is related with the changes in dynamism is a topic for future research.

With respect to ICT as a cause for the decline in dynamism, we offer preliminary evidence that the ICT intensiveness of an industry is linked with the gravity of the decline in business dynamism. As our findings are based on a rather crude split of industries based on ICT intensiveness, this too, remains an area to further research.

We also see that the volatility of the 90-50 and 50-10 differentials is declining with each business cycle. Firms are becoming less and less diverse from a growth rate perspective. Firms increasingly resemble each other. Whether or not this goes hand in hand with decreasing diversity in productivity in Belgium remains to be investigated. Andrews et al. (2016) already showed dispersion in productivity within NACE 2-digit sectors is actually increasing.

One part of the explanation is that younger, more volatile, firms (although they show increased levels of dynamism) represent a smaller share of the economy. This is a result of the declining start-up rates. Another part of the explanation is the decline of high-growth firms.

This drives the decrease of the 90-50 differential. High-growth firms are responsible for a disproportionate share of overall job creation and productivity growth. While for the U.S., the decline in high-growth firms is especially evident for young firms, we claim that the decline in Belgian high-growth firms is predominantly driven by the decline of high-growth, small firms. The propensity for large, older firms to become a high-growth firm seems to be trending upwards while the propensity for a small firm to become a high-growth firm is rapidly declining since 2000.

Reallocation of (human) resources towards the most efficient and productive firms is an important driver for overall productivity growth. The fact that larger firms seem to become better at this compared to smaller firms might be due to the simple fact that they are more productive. If this is the case, this trend is positive for overall productivity growth. Other research indicates that younger firms on average invest more in innovation. If high growth is more and more associated with larger firms this might also mean that they are more and more able to shield themselves from creative destruction driven by younger and smaller firms. This implies a negative effect on aggregate productivity. An alternative and less worrying explanation could be that smaller, disruptive firms are more likely to be acquired by incumbent firms and they continue their innovation supported by the resources and the management knowledge of the incumbent. In any case, the research on the decline in business dynamism should not be seen independently from the recent studies on the increased performance and power of the so called "superstar firms".

Another angle on the decline of business dynamism, especially relevant for Belgium, is the increased presence of frictions. Frictions can slowdown the natural process of resources flowing to the best and most productive firms. Belgium performs notoriously bad with respect to the mismatch between labour supply and demand. Smaller firms might simply not have the knowledge nor resources to successfully attract the necessary personnel to fuel their growth

although they have an apparent demand for extra human resources. Understanding what caused the Belgian decline in business dynamism and high-growth firm activity is a topic for future research. This will be essential is also understanding their long term effects and mitigating a potential negative impact.

References

Acemoglu, D., Akcigit, U., Bloom, N., & Kerr, W. R. (2013). *Innovation, reallocation and growth* (Harvard Business School Working Paper No. 13-088). (NBER Working Paper Series, No. 18993).

Acemoglu, D., Carvalho, V. M., Ozdaglar, A., & Tahbaz-Salehi, A. (2012). The network origins of aggregate fluctuations. *Econometrica*, *80*(5), 1977–2016.

Amiti, M., Itskhoki, O., & Konings, J. (2014). Importers, exporters, and exchange rate disconnect. *The American Economic Review*, *104*(7), 1942–1978.

Andrews, D., Criscuolo, C., & Gal, P. N. (2016). *The best versus the rest: The global productivity slowdown, divergence across firms and the role of public policy* (Vol. 2016-5; OECD Productivity Working Papers). OECD Publishing, Paris.

Andrews, D., Criscuolo, C., Gal, P. N., & Menon, C. (2015). Firm dynamics and public policy: Evidence from OECD countries. In *RBA annual conference volume.* Reserve Bank of Australia.

Autor, D., Dorn, D., Katz, L. F., Patterson, C., & Van Reenen, J. (2017). *The fall of the labor share and the rise of superstar firms* (Discussion Paper No. 12041). Centre for Economic Policy Research.

Bachmann, R., Bayer, C., Merkl, C., Seth, S., Stüber, H., & Wellschmied, F. (2017). Job and worker flows: New stylized facts for Germany. *FAU Discussion Papers in Economics*, *2017*(2).

Barlevy, G. (2002). The sullying effect of recessions. *The Review of Economic Studies*, *69*(1), 65–96.

Bellmann, L., Gerner, H.-D., & Upward, R. (2017). Job and worker turnover in German establishments. *The Manchester School*.

Bernard, A. B., Van Beveren, I., & Vandenbussche, H. (2014). Multi-product exporters and the margins of trade. *The Japanese Economic Review*, *65*(2), 142–157.

Bijnens, G., & Konings, J. (2017). *An enterprise map of Belgium. A guide for industrial policy* (Vives Policy Paper No. April 2017). KU Leuven, Vives. Available from https://feb.kuleuven.be/VIVES/publicaties/beleidspapers/BP/bp2017/an-enterprise-map-of-belgium

Boeri, T., & Cramer, U. (1992). Employment growth, incumbents and entrants: evidence from germany. *International Journal of Industrial Organization*, *10*(4), 545–565.

Bottazzi, G., & Secchi, A. (2006). Explaining the distribution of firm growth rates. *The RAND Journal of Economics*, *37*(2), 235–256.

Bravo-Biosca, A. (2016). Firm growth dynamics across countries: Evidence from a new database. *FORA-NESTA Working Paper*.

Bravo-Biosca, A., Criscuolo, C., & Menon, C. (2016). What drives the dynamics of business growth? *Economic Policy*, *31*(88), 703-742.

Calvino, F., Criscuolo, C., & Menon, C. (2015). Cross-country evidence on start-up dynamics. *OECD Science, Technology and Industry Working Papers*, *2015*(6). Available from http://dx.doi.org/10.1787/5jrxtkb9mxtb-en

Criscuolo, C., Gal, P. N., & Menon, C. (2014). *The dynamics of employment growth: new evidence from 18 countries* (Vol. 1274; CEP Discussion Paper).

Daveri, F. (2003). *Information technology and productivity growth across countries and sectors* (Working paper). IGIER.

Davis, S. J., Faberman, R. J., & Haltiwanger, J. (2012). Labor market flows in the cross section and over time. *Journal of Monetary Economics*, *59*(1), 1–18.

Davis, S. J., Faberman, R. J., Haltiwanger, J., Jarmin, R., & Miranda, J. (2010). Business volatility, job destruction, and unemployment. *American Economic Journal: Macroeconomics*, *2*(2), 259–287.

Davis, S. J., & Haltiwanger, J. (1992). Gross job creation, gross job destruction, and employment reallocation. *The Quarterly Journal of Economics*, *107*(3), 819–863.

Davis, S. J., Haltiwanger, J., Jarmin, R., Miranda, J., Foote, C., & Nagypal, E. (2007). Volatility and dispersion in business growth rates: Publicly traded versus privately held firms. *NBER Macroeconomics Annual 2006*, *21*, 107–179.

Davis, S. J., Haltiwanger, J. C., & Schuh, S. (1998). Job creation and destruction. *MIT Press Books*, *1*.

Decker, R. A., Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2014). The role of entrepreneurship in us job creation and economic dynamism. *The Journal of Economic Perspectives*, *28*(3), 3–24.

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

De Loecker, J., & Eeckhout, J. (2017). *The rise of market power and the macroeconomic implications* (Working paper). National Bureau of Economic Research.

Di Giovanni, J., Levchenko, A. A., & Méjean, I. (2014). Firms, destinations, and aggregate fluctuations. *Econometrica*, *82*(4), 1303–1340.

Eurostat. (2015). *Eurostat indicators on high-tech industry and knowledge - intensive services* (Eurostat Glossary). Author. Available from http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf

Fizaine, F. (1968). Analyse statistique de la croissance des entreprises selon l'age et la taille. *Revue d'economie politique*, *78*(4), 606–620.

Gabaix, X. (2011). The granular origins of aggregate fluctuations. *Econometrica*, *79*(3), 733–772.

Geurts, K., & Van Biesebroeck, J. (2016). Firm creation and post-entry dynamics of de novo entrants. *International Journal of Industrial Organization*, *49*, 59–104.

Haltiwanger, J., Jarmin, R. S., Kulick, R., & Miranda, J. (2016). High growth young firms: contribution to job, output, and productivity growth. In *Measuring entrepreneurial businesses: Current knowledge and challenges.* University of Chicago Press.

Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2013). Who creates jobs? Small versus large versus young. *Review of Economics and Statistics*, *95*(2), 347–361.

Henrekson, M., & Johansson, D. (2010). Gazelles as job creators: a survey and interpretation of the evidence. *Small Business Economics*, *35*(2), 227–244.

Higson, C., Holly, S., & Kattuman, P. (2002). The cross-sectional dynamics of the us business cycle: 1950–1999. *Journal of Economic Dynamics and Control*, *26*(9), 1539–1555.

Hölzl, W. (2009). Is the R&D behaviour of fast-growing SMEs different? Evidence from CIS III data for 16 countries. *Small Business Economics*, *33*(1), 59–75.

Hyatt, H. R., & Spletzer, J. R. (2013). The recent decline in employment dynamics. *IZA Journal of Labor Economics*, *2*(1), 5.

Jäger, K. (2017). *EU KLEMS growth and productivity accounts 2016 release* (Description of Methodology and General Notes). EU KLEMS. Available from http://www.euklems.net/

Jorgenson, D. W., Ho, M. S., & Stiroh, K. J. (2002). Projecting productivity growth: lessons from the us growth resurgence. *Federal Reserve Bank of Atlanta Economic Review*, *3*, 1-13.

Jovanovic, B. (1982). Selection and the evolution of industry. *Econometrica: Journal of the Econometric Society*, 649–670.

Konings, J. (1995). Job creation and job destruction in the UK manufacturing sector. *Oxford Bulletin of Economics and Statistics*, *57*(1), 5–24.

Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*, *71*(6), 1695–1725.

Moscarini, G., & Postel-Vinay, F. (2012). The contribution of large and small employers to job creation in times of high and low unemployment. *The American Economic Review*, *102*(6), 2509–2539.

OECD. (2017a). *Belgium 2017* (OECD Economic Surveys). OECD Publishing, Paris. Available from http://www.oecd.org/eco/surveys/economic-survey-belgium.htm

OECD. (2017b). *Business dynamics and productivity*. OECD Publishing, Paris. Available from http://dx.doi.org/10.1787/9789264269231-en

Reichstein, T., & Jensen, M. B. (2005). Firm size and firm growth rate distributions. The case of Denmark. *Industrial and Corporate Change*, *14*(6), 1145–1166.

Schoar, A. (2010). The divide between subsistence and transformational entrepreneurship. *Innovation policy and the economy*, *10*(1), 57–81.

Van Ark, B. (2015). Productivity and digitilization in Europe: Paving the road to faster growth. *Digiworld Economic Journal*(100), 107. Available from https://ssrn.com/abstract=2845368

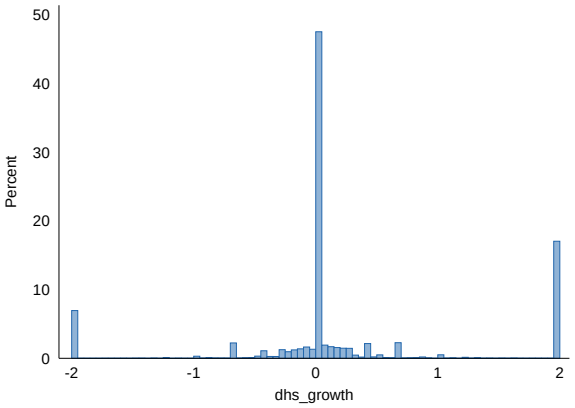
Van Ark, B., O'Mahony, M., & Timmer, M. P. (2008). The productivity gap between Europe and the United States: trends and causes. *The Journal of Economic Perspectives*, *22*(1), 25–44.

Van Beveren, I., & Vanormelingen, S. (2014). *Human capital, firm capabilities and productivity growth* (Working Paper Research No. 257). National Bank of Belgium.

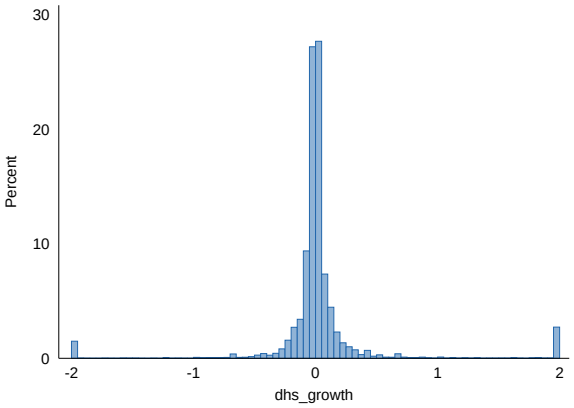
Van Reenen, J., Bloom, N., Draca, M., Kretschmer, T., Sadun, R., Overman, H., et al. (2010). *The economic impact of ICT* (Final Report). London School of Economics SMART N. 2007/0020.

Zimmer, H. (2012). Labour market mismatches. *National Bank of Belgium Economic Review*, *2012*(ii), 55-68.

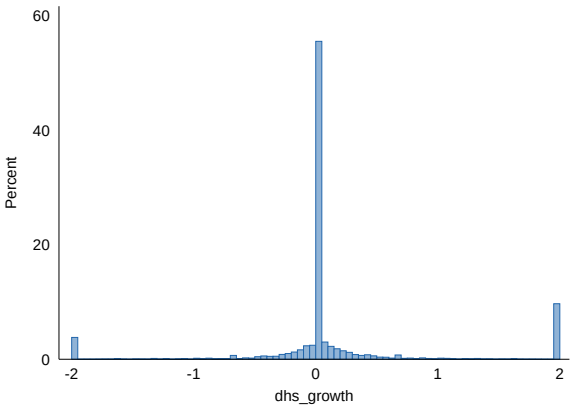
Figure 1: Examples of Employment Growth Rate Distributions



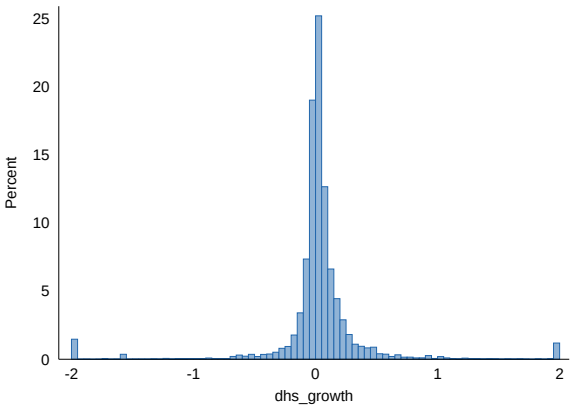
(a) 1986 (Unweighted)



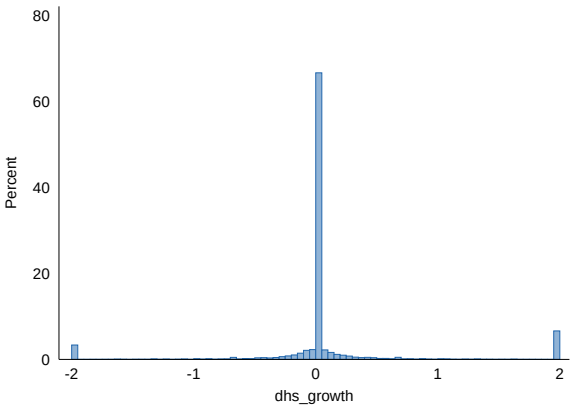
(b) 1986 (Employment Weighted)



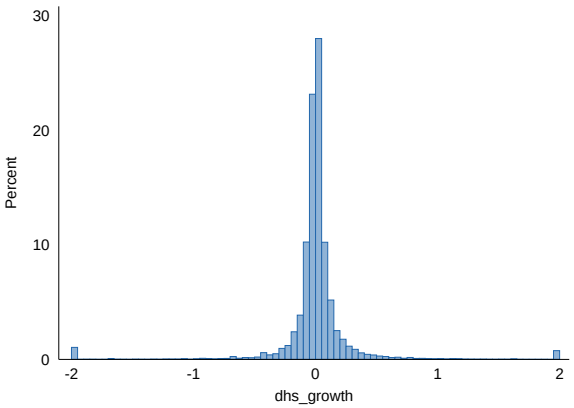
(c) 2000 (Unweighted)



(d) 2000 (Employment Weighted)



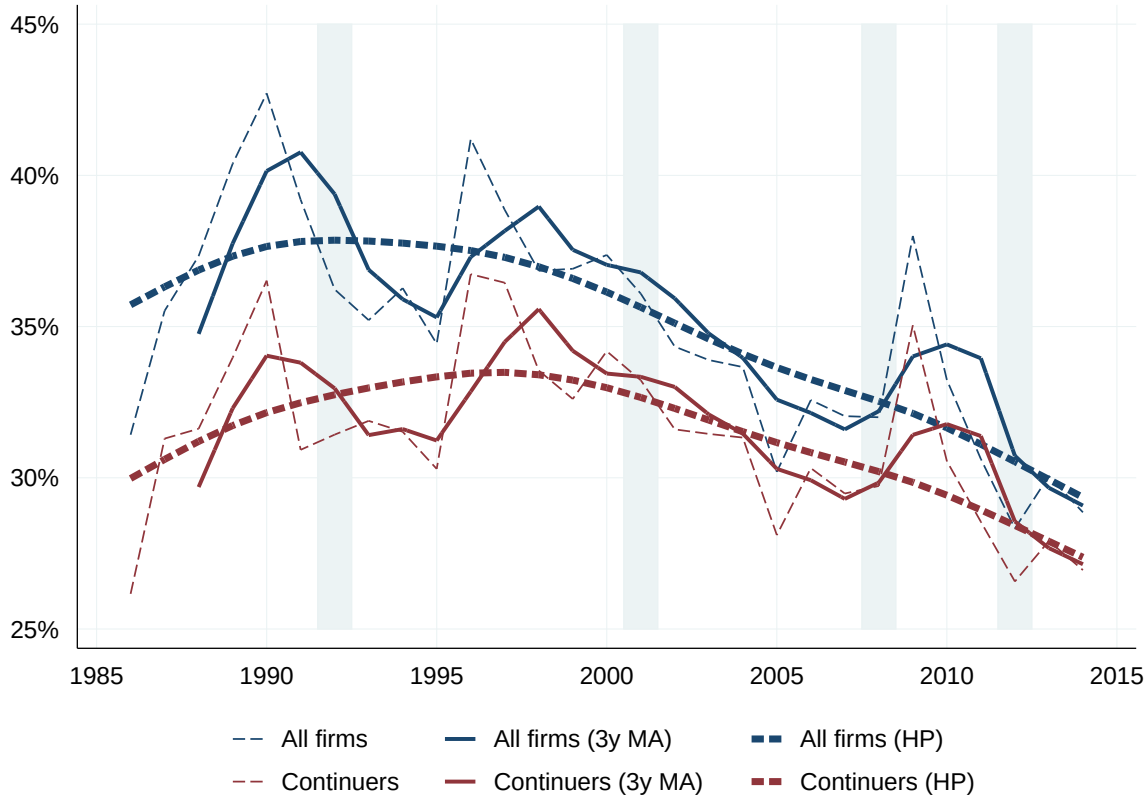
(e) 2014 (Unweighted)



(f) 2014 (Employment Weighted)

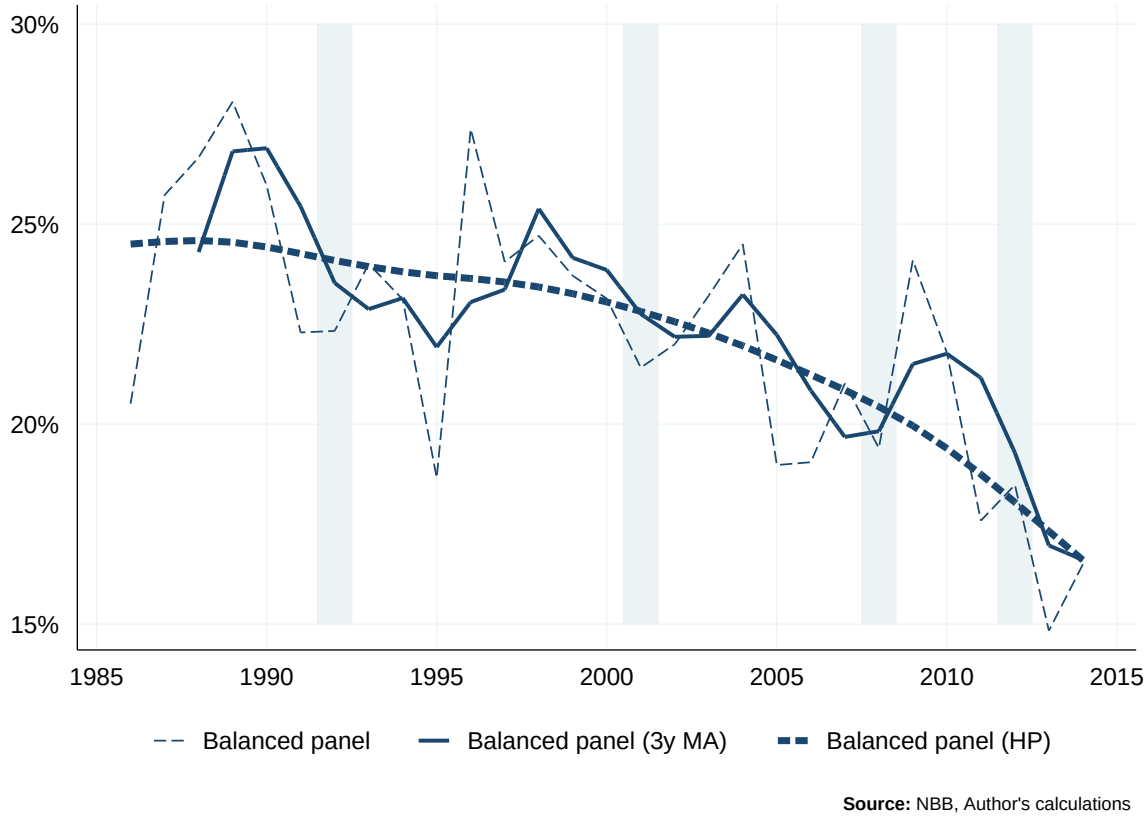
Note: DHS growth refers to the growth rate defined by Decker, Haltiwanger and Shuh (1996). Author calculations based on NBB database.

Figure 2: 90-10 Differential in Firm Growth Rates



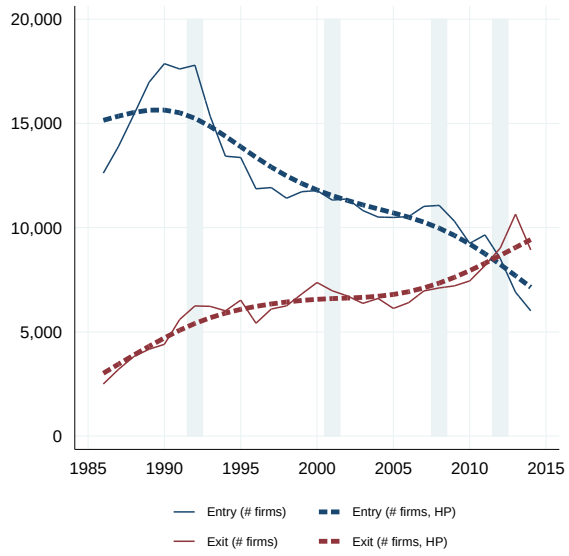
Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

Figure 3: 90-10 Differential in Firm Growth Rates for Firms active throughout 1985-2014

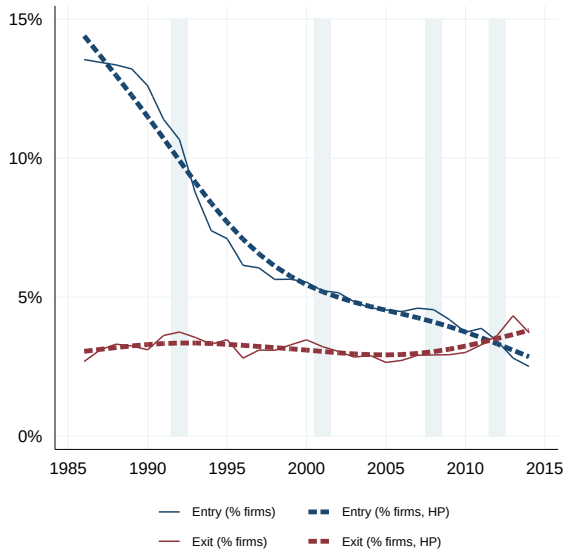


Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

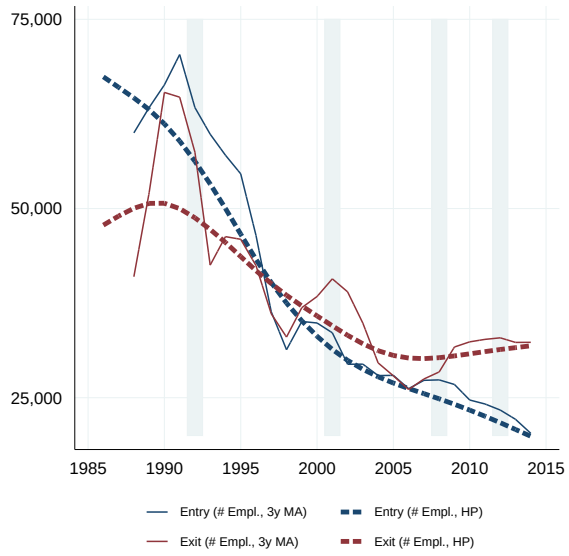
Figure 4: Evolution of annual Entry and Exit Rates



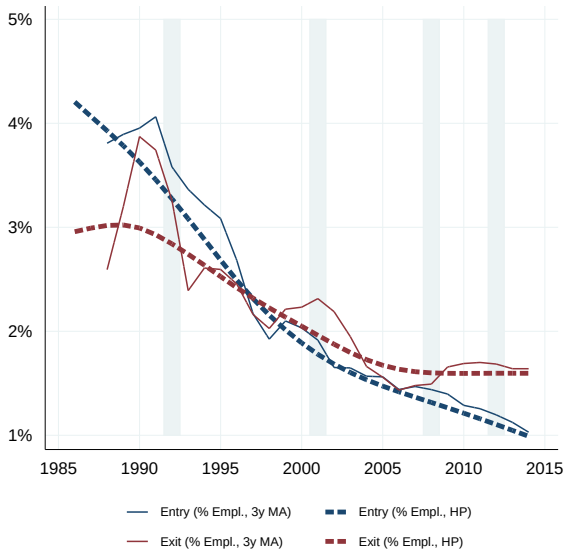
(a) Number of firms (absolute)



(b) Number of firms (relative, % of total firms)



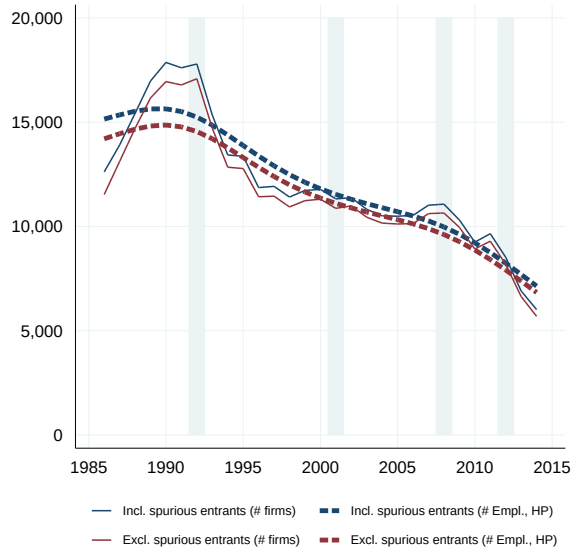
(c) Employment (absolute)



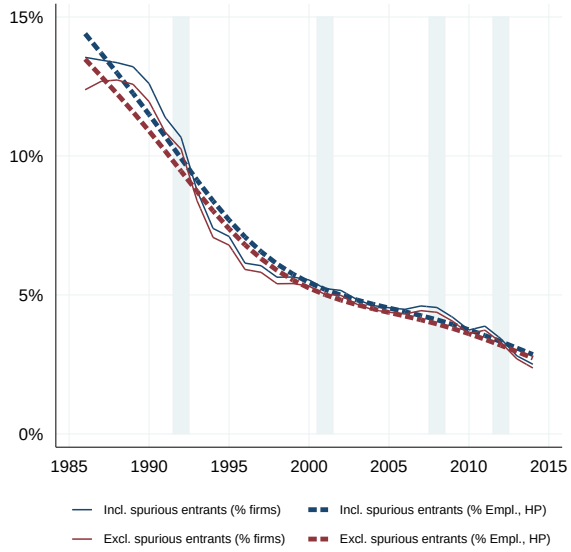
(d) Employment (relative, in % of total employment)

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

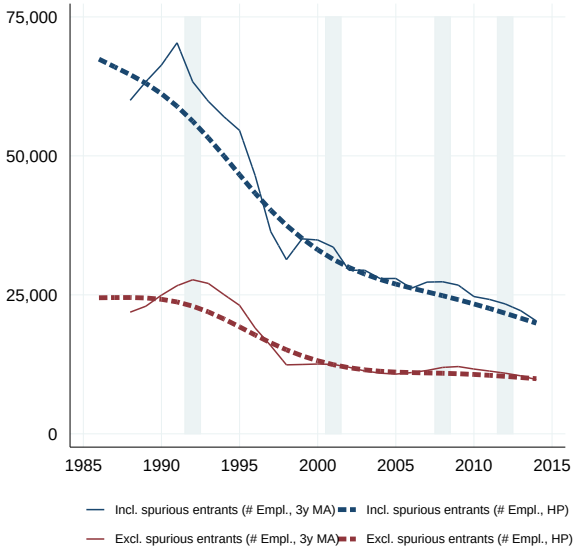
Figure 5: Firm Entry Rates with and without Spurious Entrants



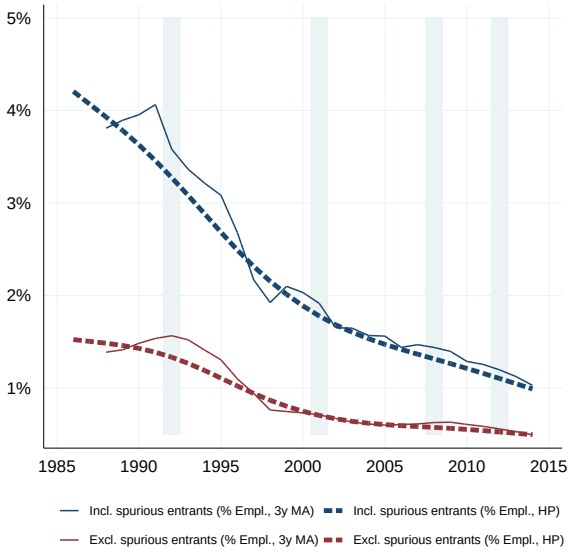
(a) Number of firms entering



(b) Number of firms entering (as % of all firms)



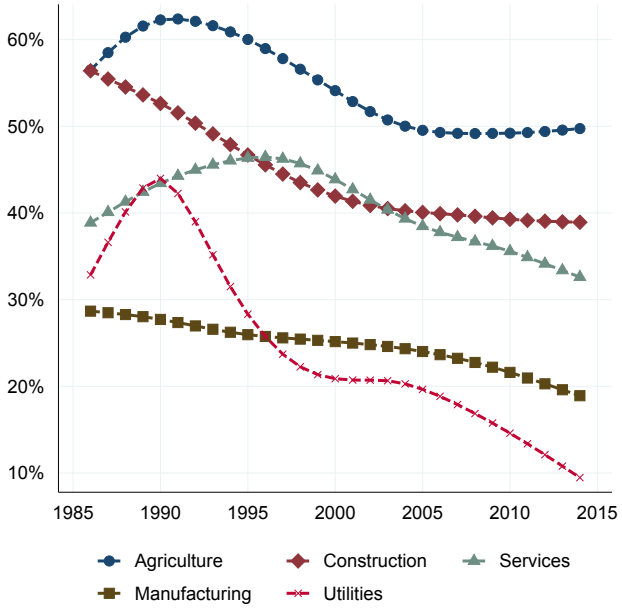
(c) Employment at entering firms



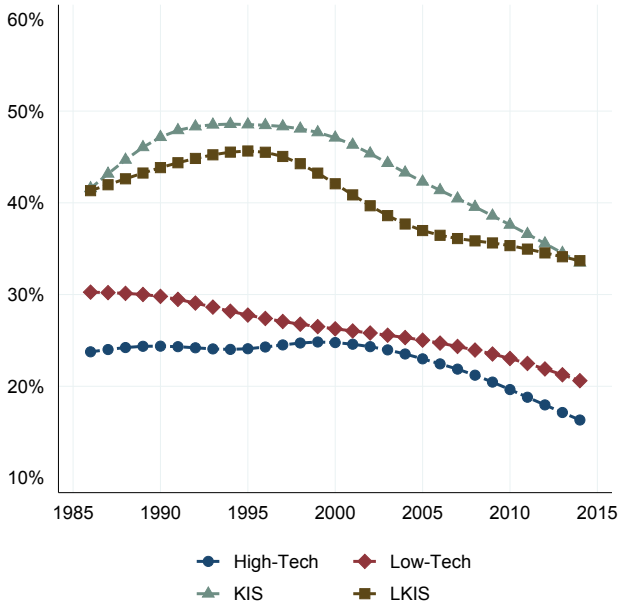
(d) Employment (as % of total employment)

Note: Spurious entrants defined as entrants with more than 10 employees. Author calculations from NBB database.

Figure 6: 90-10 Differential in Firm Growth Rates for selected Industries



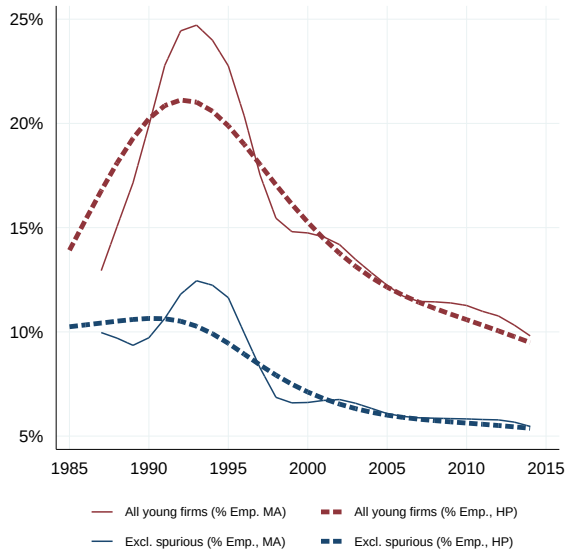
(a) Split between main sectors of the economy



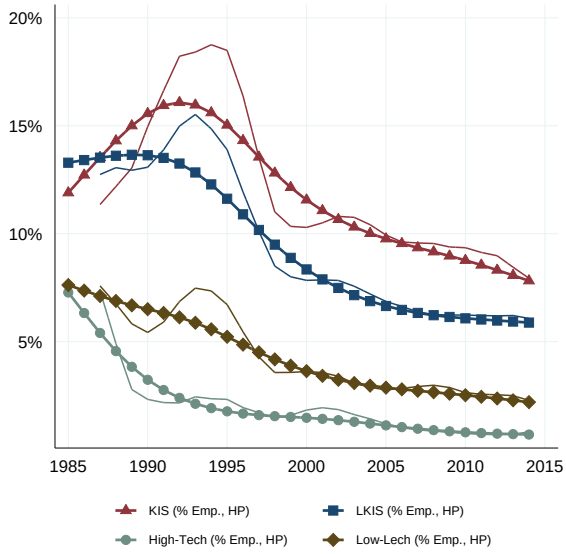
(b) Split based on technology level

Note: Dispersion figures based on HP filter. Sectors defined according to NACE Rev. 2 (2008). Technology level and knowledge intensity according to Eurostat. Author calculations based on NBB database.

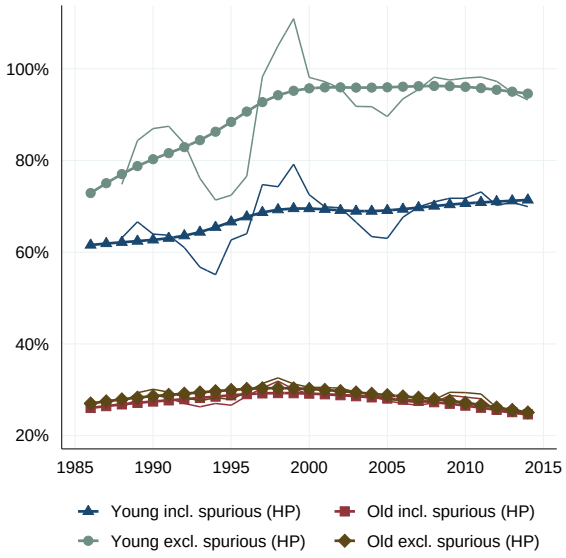
Figure 7: Share of Employment 90-10 Differentials at young Firms



(a) Share of employment at young firms



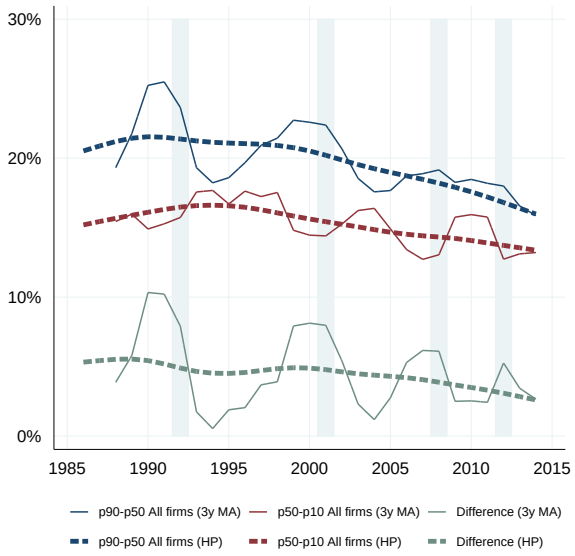
(b) Share of employment at young firms per industry (excl. spurious entrants)



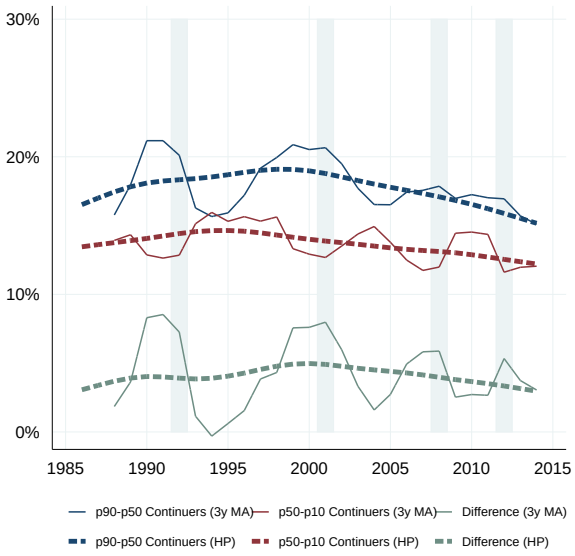
(c) 90-10 differentials young vs. old firms

Note: Young firms have aged 5 years or less. Author calculations based on NBB database.

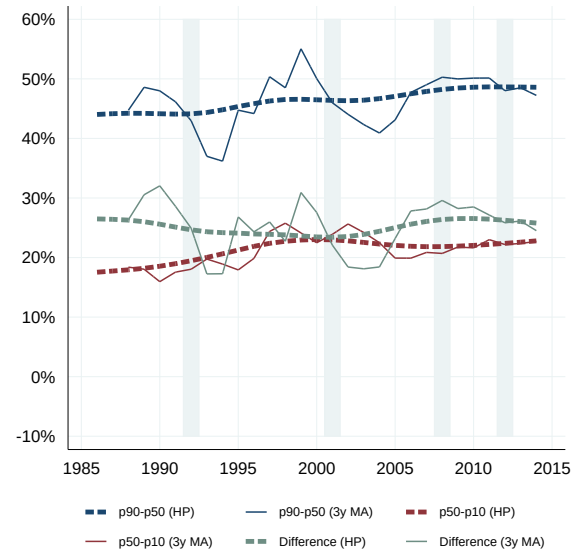
Figure 8: 90-50 and 50-10 Differentials



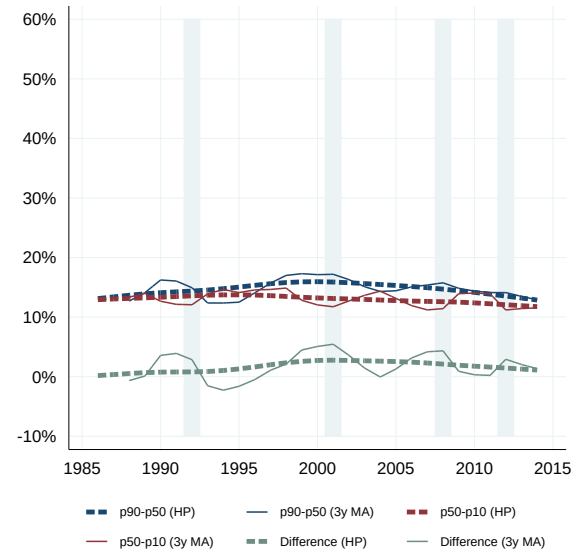
(a) All firms



(b) Continuers only



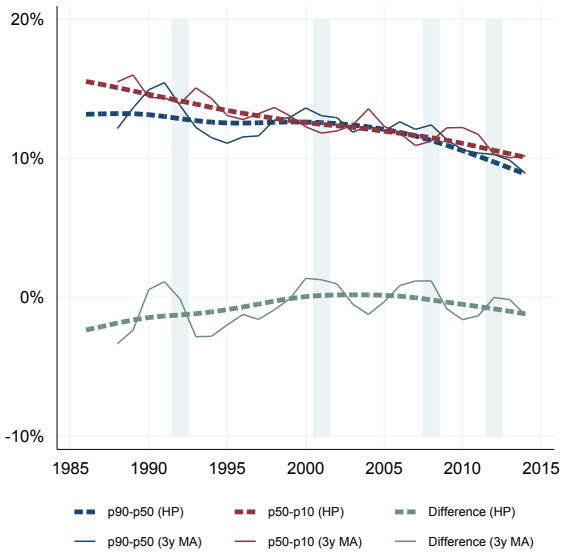
(c) Young firms only



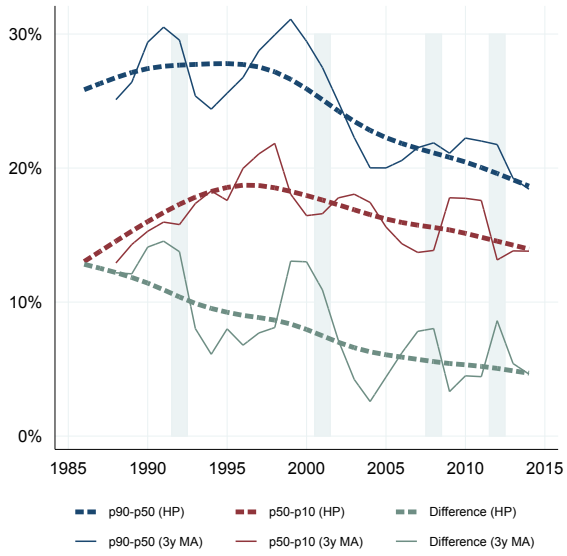
(d) Old firms only

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

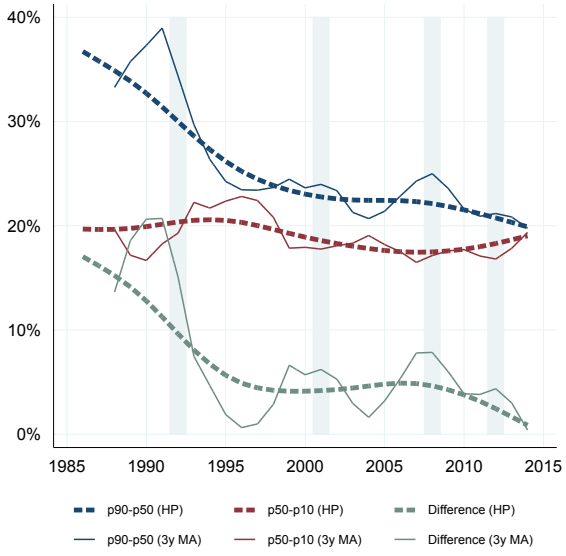
Figure 9: 90-50 and 50-10 Differentials per Sector



(a) Manufacturing



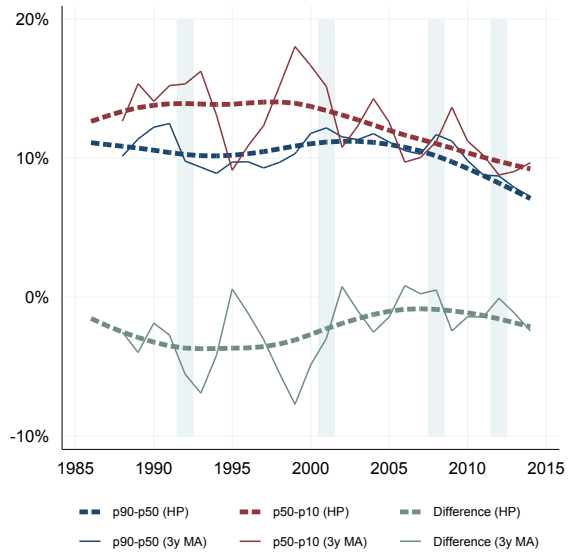
(b) Services



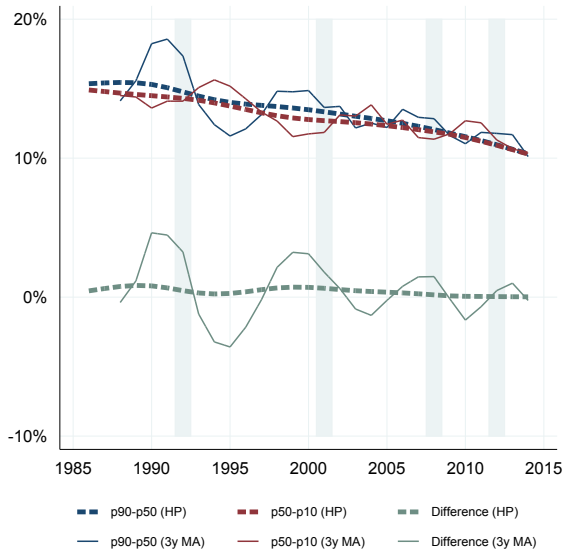
(c) Construction

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

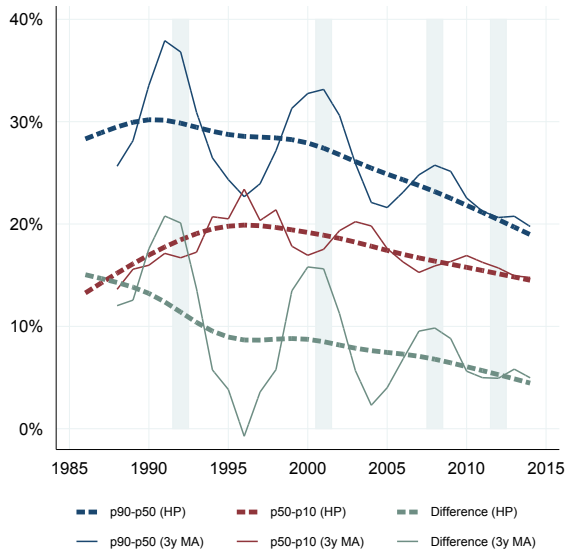
Figure 10: 90-50 and 50-10 Differentials, Technology and Knowledge Intensity



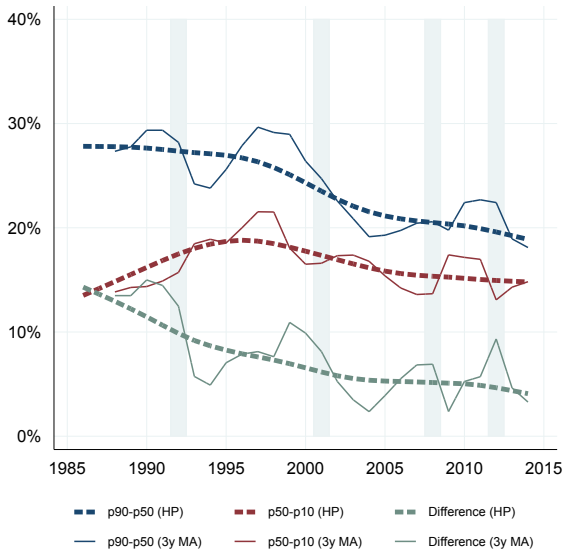
(a) (Medium) High-Tech



(b) (Medium) Low-Tech



(c) Knowledge Intensive Services (KIS)

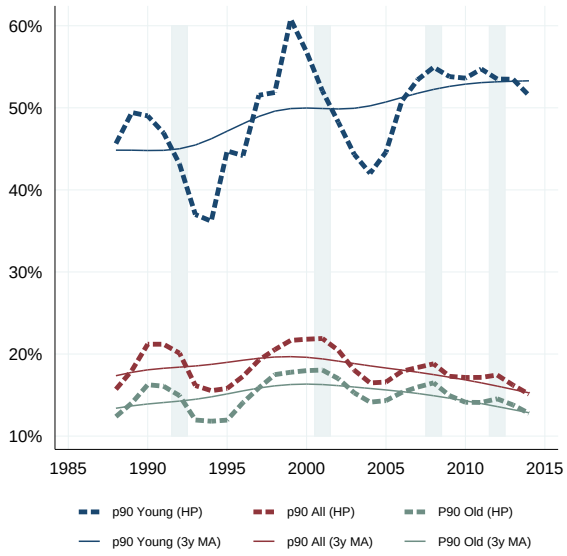


(d) Less Knowledge Intensive Services (LKIS)

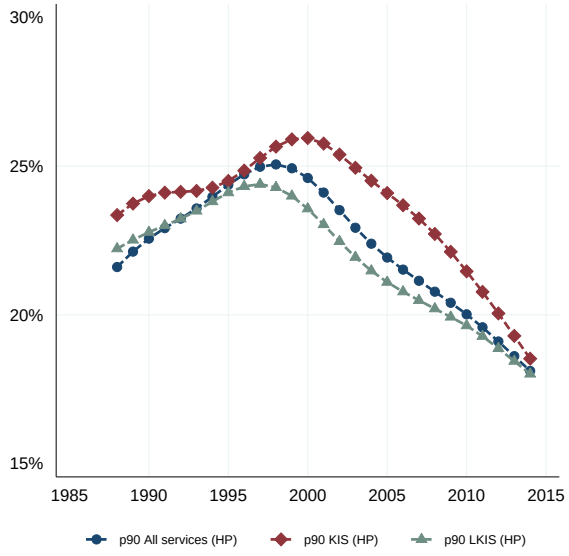
Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

Figure 11: P90, Overall, Services & Manufacturing (Continuing Firms only)

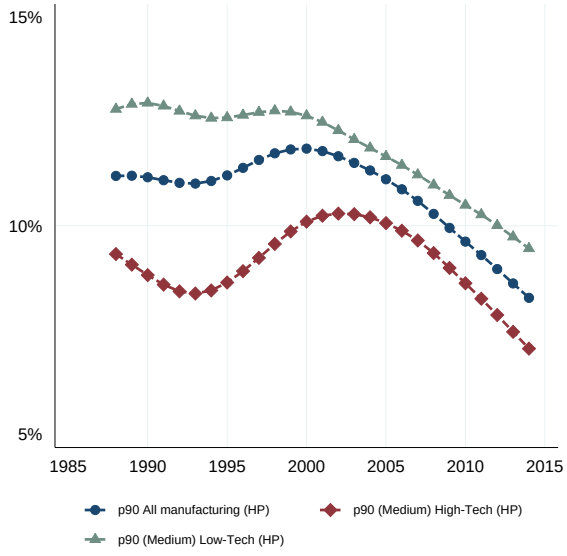
(a) All Continuing Firms



(b) Young & Old Firms vs. All Firms



(c) KIS & LKIS vs. All Services

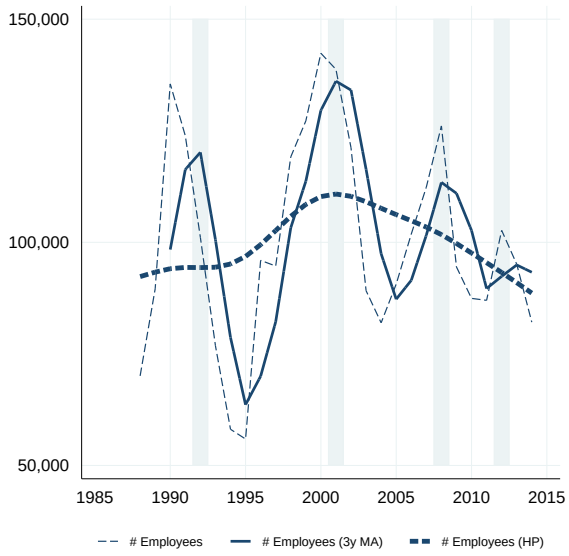


(d) High-Tech & Low-Tech vs. All Manufacturing

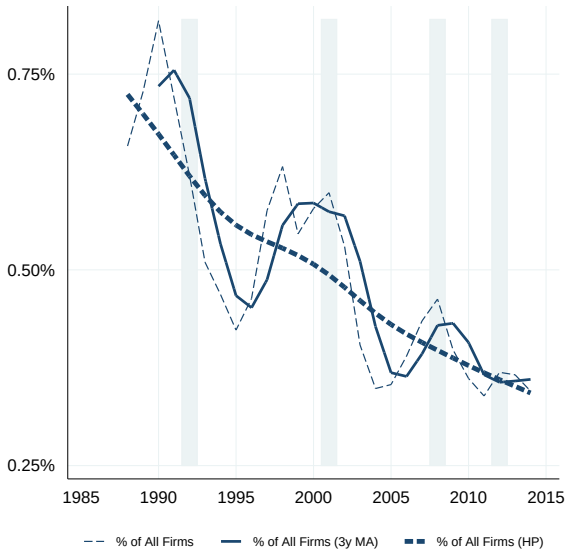
Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

Figure 12: High Growth Firms (Eurostat Definition)

(a) HGF Incidence



(b) HGF Employment

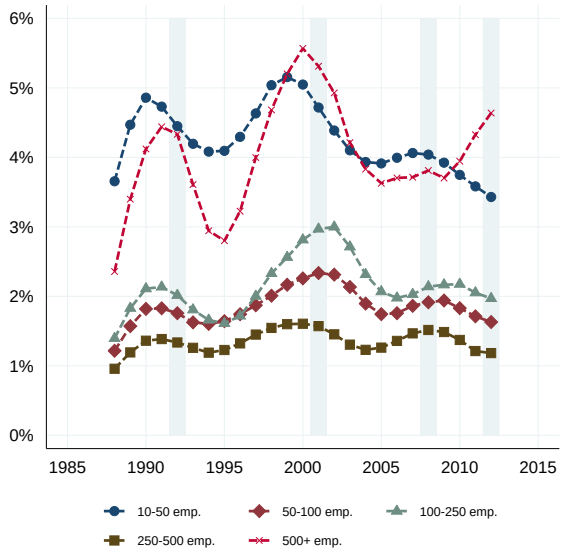


(c) Relative HGF Incidence

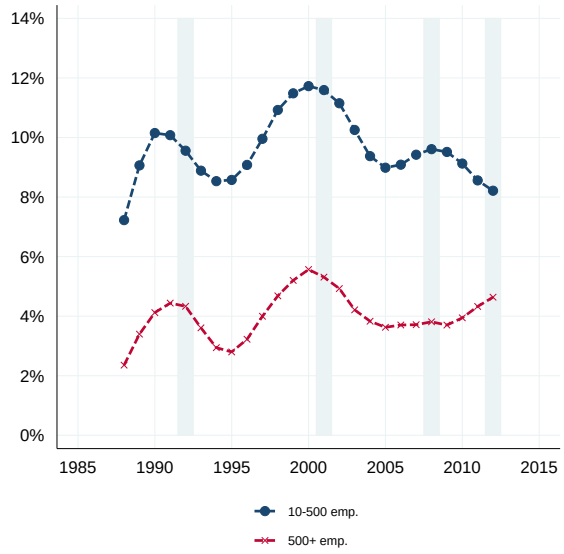
(d) Relative HGF Employment

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

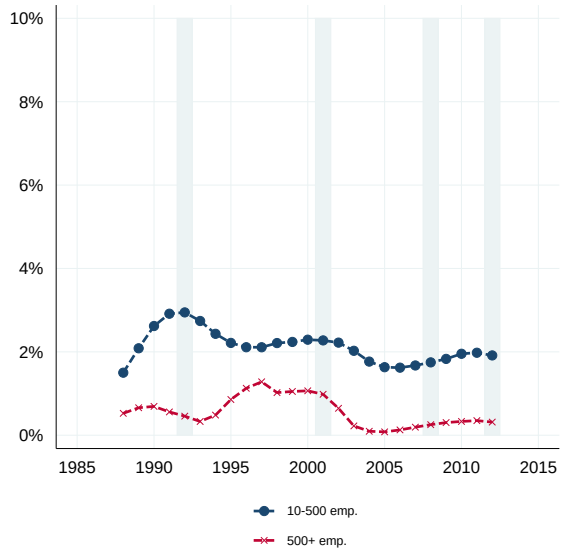
Figure 13: Share of Employment at Fast Growing Companies by Firm Size and Age



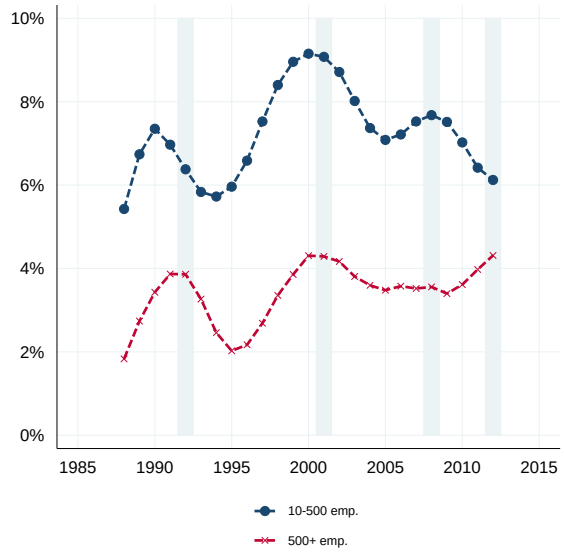
(a) All firms split by 5 different firm sizes



(b) All firms split by 2 different firm sizes



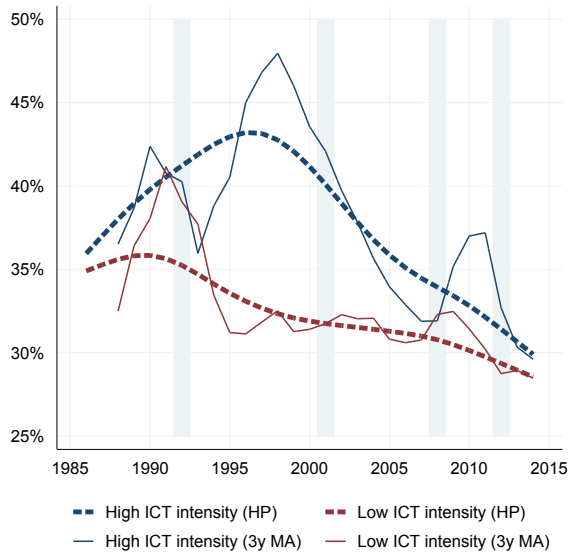
(c) Young firms only split by 2 sizes



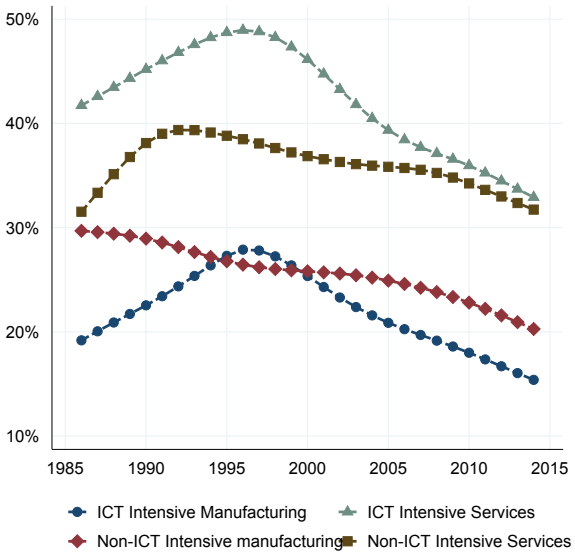
(d) Old firms only split by 2 sizes

Note: Fast growing companies defined as having more than 10 employees and 15% p.a. growth over 3 years. Companies are included during the 3y timespan. Young firms are 5y or less. Figures are 3y moving averages. Author calculations from NBB database.

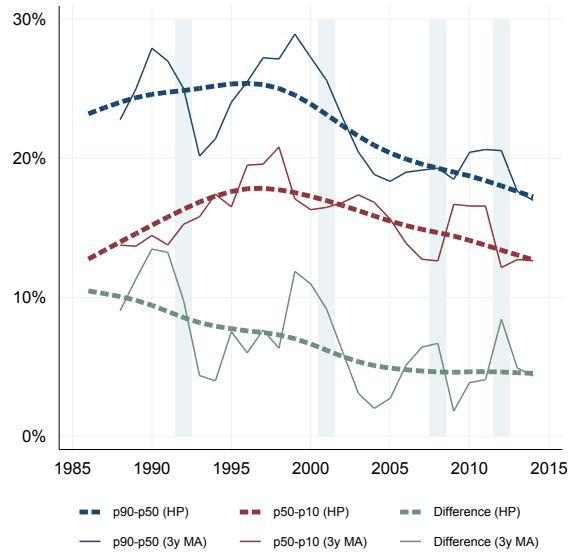
Figure 14: The Impact of ICT on Business Dynamism and Skewness



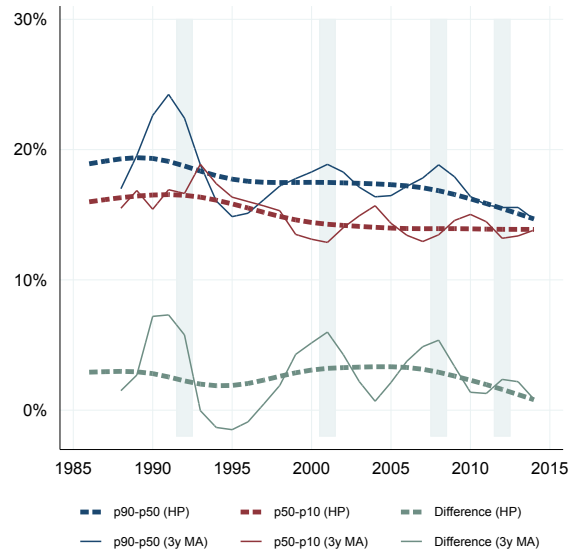
(a) 90-10 Differentials, high vs. low ICT intensity



(b) 90-10 Differentials, Services vs. Manufacturing



(c) 90-50 and 50-10 Differentials, High ICT Intensity



(d) 90-50 and 50-10 Differentials, Low ICT Intensity

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

A Alternative Measures of Business Dynamism

Similar to Decker et al. (2016) we conduct robustness analysis and calculate different measures of business dynamism. A first measure is the total job reallocation rate, i.e. the sum of job creation and destruction. This can be seen as an indication of the level of job reallocation between firms. A second measure is the cross sectional standard deviation of the firm employment growth rates[26] as an indicator for the dispersion of the distribution. Finally we also calculate the within-firm volatility of employment weighted growth rates within a 10 year horizon as developed in Davis et al. (2007).

[Figure A.1 about here.]

Figure A.1 shows the different measures. We clearly observe that also these measures point to a clear decline of business dynamism over the past decades. The job reallocation rate (A.1a) initially goes up and clearly comes down after the mid 90s. The standard deviation of the employment growth rate distribution (A.1b) continuously declines for both the unweighted and the employment weighted distribution. The within-firm volatility given in A.1c remarkable declines as well. Finally, A.1d also gives the within-firm volatility for the balanced panel of firms that are continuously active in the studied period. This measure is hence filtered of all entry and exit activity and shows a systematic decline as well.

B The Role of Compositional Shifts

In this Section we quantify the contribution of compositional shifts to the change in business dynamism.Bijnens & Konings (2017) described the significant shift in the structure of the Belgian firms landscape throughout the previous decades: jobs flow rom the manufacturing to the services industry, from smaller to larger and from younger to older firms. It could well be that

[26]Firm growth rate (DHS growth) as used in the main body of this paper and defined in Davis et al. (1998)

the change in overall dynamism is not driven by an intrinsic change in dynamism of a certain type of firms, but driven by the fact that jobs are shifted towards less dynamics parts of our economy without these parts becoming less dynamic per se.

In Figure A.2 we further clarify this concept. Figure A.2a shows the total job reallocation rate as well as this rate for the services and the manufacturing industry. Clearly the services industry's reallocation rate is significantly higher than the one for the manufacturing industry. A shift of jobs to the more dynamic services industry would hence increase the overall dynamism of the economy. This shift works in the opposite direction compared to the overall decline in dynamism our economy has experienced. Figure A.2b looks at the different reallocation rates of firms based on age. Here younger firms have a reallocation rate that lies substantially above the rate of older firms. As discussed in the main body of this paper, firm size is linked with firm age. Figure A.2c gives the job reallocation rate split by different size categories. Based on these graphs, we can easily conclude that a shift of jobs away from smaller, younger firms towards bigger and older firms will have a negative impact on the reallocation rate. The questions remains, however, how big this impact is.

[Figure A.2 about here.]

We again follow Decker et al. (2016) and conduct a simple shift share decomposition analysis of the job reallocation rate. We allocate all firms to different cells defined by 88 NACE 2-digit industries, 8 firm age groups (0y to 5y, 6y-10y, and 10+y) and 8 firm size groups based on number of employees (1-9, 10-19, 20-49, 50-99, 100-249, 250-499, 500-999 and 1000+). We focus on the change in job flows, more specifically the overall change and the within cell component of the decomposition. The within cell component yields the change in the overall flow rate if every cell would have kept the same level of employment. The difference between these 2 indicate to what extend compositional changes drive the overall change as opposed to the within cell

changes. We do this for the change in job reallocation, creation and destruction rates between the extreme values before the technology crisis of 2000 and the financial crisis of 2008. We use a 3 year moving average to minimise the impact of short term variations.

Table A.1: Role of Compositional Shifts on Change in Job Reallocation, Creation & Destruction Rate

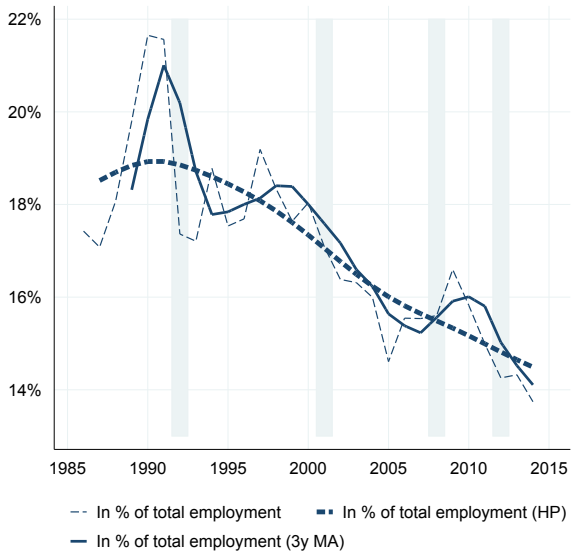
	Job Reallocation		Job Creation		Job Destruction	
Overall Δ 1998-2007	-2.66 pp		-1.25 pp		-1.41 pp	
Impact of changing composition of businesses:						
w Only Sector	0.48 pp	-18%	0.69 pp	-56%	-0.21 pp	15%
Only Age	-0.52 pp	19%	-0.41 pp	33%	-0.10 pp	7%
Only Size	0.23 pp	-9%	0.07 pp	-6%	0.16 pp	-11%
Sector, Age & Size Combined	0.05 pp	-2%	0.11 pp	-9%	-0.06 pp	4%

Note: Δ 1998-2010 represents the change in percentage points of the 3y moving average of the studied flow (job reallocation, creation and destruction rate) between 1998 and 2007. The impact of the changing composition is calculated as the difference between de actual change of the flow rate and the within cell component of this change. The cells are defined based on sector, age and size individually and sector, age and size combined. Author calculations from firm annual accounts.

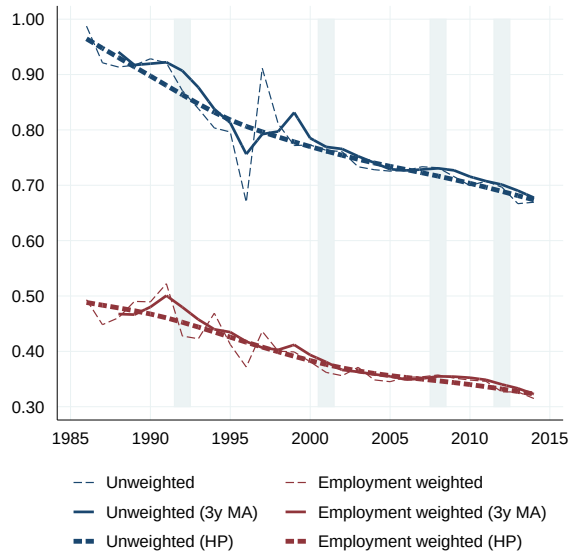
Table A.1 summarises the result. We see that the job reallocation rate dropped with 2.66 percentage points between its peak in 1998 and the bottom in 2007. The impact of the shift between sectors (i.e. mainly the shift from manufacturing to services industries) is 0.48 percentage points positive. This means that the drop in reallocation rate would have actually been 18% higher if jobs weren't shifted between sectors. This is in line with the intuition from the graphs from Figure A.2. Similarly, shifts between firm sizes have a positive, though smaller impact on the flow rates. Firm age is an important factor and actually the only factor that has a consistent negative impact on the studied flow rates. 19% of the drop in job reallocation rate and even 33% of the drop in job creation rate can be attributed to shift of jobs towards older, less dynamic firms. This is consistent with the findings in the main body of this paper, that the loss in business dynamism in linked with the decreased activity of younger firms.

The structural shifts in our economy actually work in opposite directions. Whilst shifts between sectors and firms sizes lower the drop in reallocation rate, shifts between firms with different ages increase the drop in reallocation rate. This leads to the fact that the combined effects cancel out and actually is very modest. Only 4% of the drop in job destruction rate can be attributed to the changing composition of the Belgian firm landscape. For the change in job reallocation and creation rate the changing composition in fact has a tempering effect of 2% to 9% of the rate. We can hence conclude the changing composition is not the driver for the loss of dynamism and this loss remains largely unexplained.

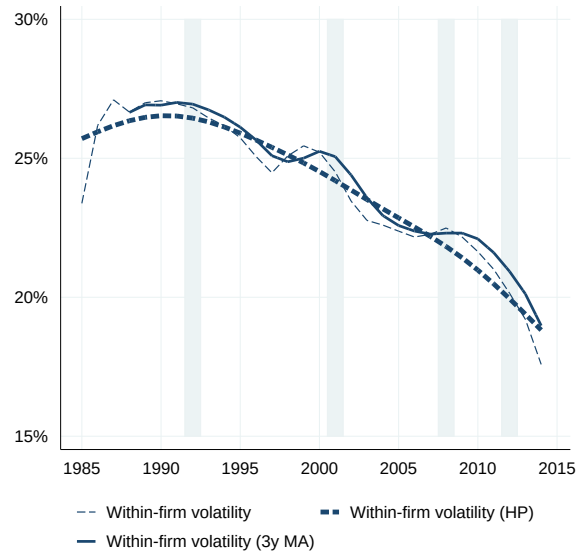
Figure A.1: Evolution of Different Measures for Business Dynamism



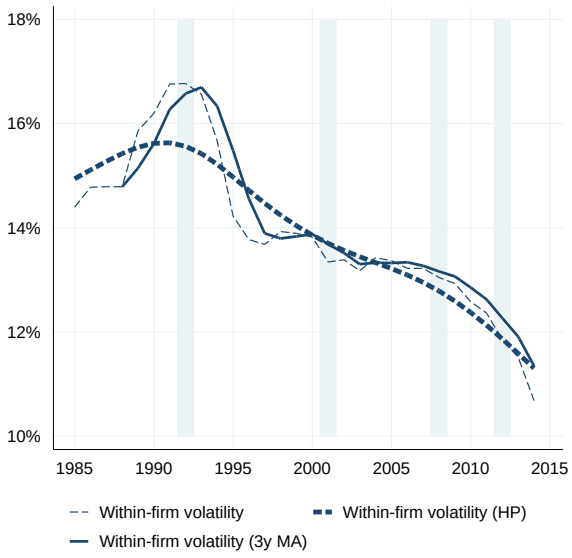
(a) Job reallocation rate



(b) Employment growth standard deviation



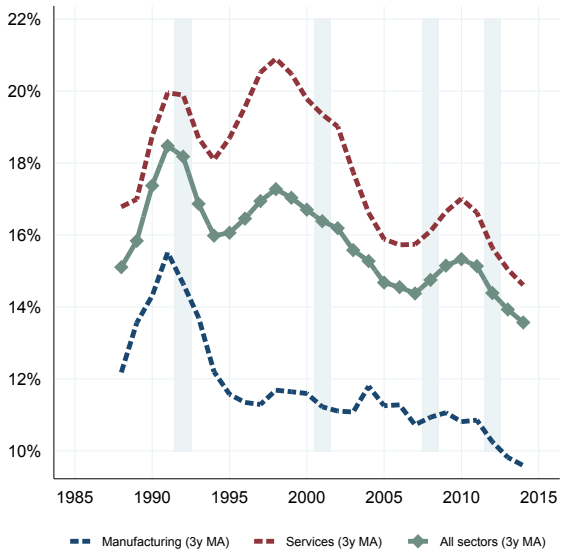
(c) Within-firm volatility (all firms)



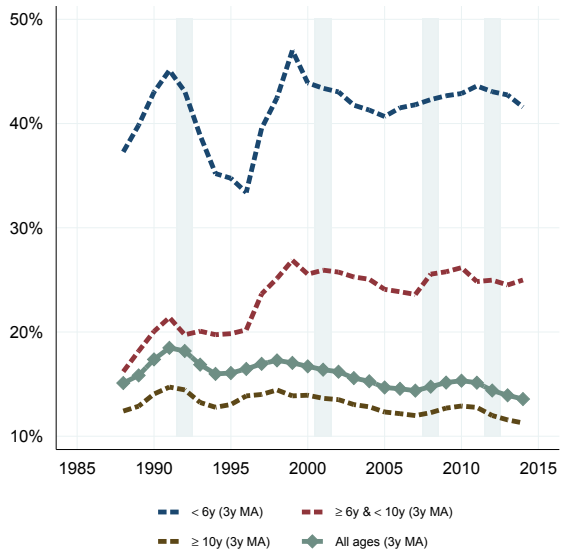
(d) Within-firm volatility (balanced panel)

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.

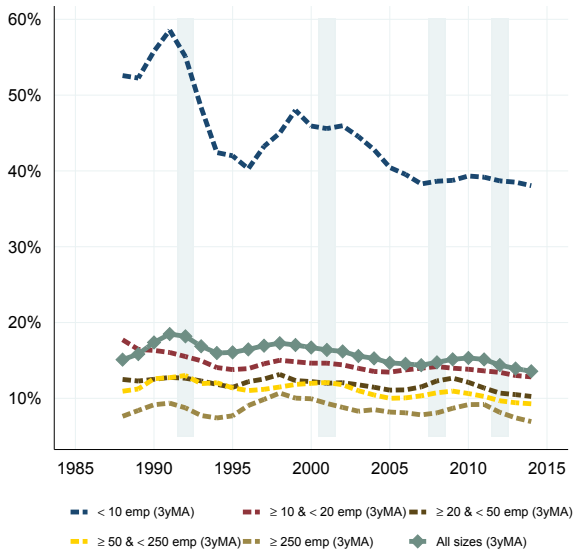
Figure A.2: Evolution of the Between Firm Job Reallocation Rate (as % of total employment)



(a) Split by different sectors



(b) Split by firm age



(c) Split by firm size

Note: Grey shaded areas mark Belgian recessions. Authors calculations based on NBB database.