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MINIMUM WAGES AND LOW-WAGE WORK IN BELGIUM: AN EXPLORATION OF EMPLOYMENT EFFECTS AND DISTRIBUTIONAL EFFECTS

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Abstract

Minimum wages are an instrument to overcome market failures in wage setting as well as to foster equality, alleviate poverty, and increase worker supply. Literature suggest that the direct effect of minimum wages is often not very strong in either aspect. In Belgium, however, minimum wages are the cornerstone of the system of institutional wage setting. In this paper, we evaluate the effects of minimum wages on employment and the share of low-wage work using an IV-approach at the sectoral level, as well as using an individual job flows approach. Furthermore, we estimate the impact of minimum wages on the wage distribution, and simulate the impact of changes in either the sectoral wages floors or the national minimum wage. We use a large sample of administrative data for a period of 20 years between 1996 and 2015 and the Belgian sectoral minimum wage index for 44 joint committees. The results suggest that minimum wages positively affect both the number and the pay level of low-paid workers, yet are neutral to overall employment due to compression effects in upper tail of the wage distribution.

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Introduction

Income inequality and poverty are social outcomes that relate to both the market and net distribution of incomes. The market distribution of incomes is a combination of the factor distribution of income between labour and capital, and the distribution of wages from the labour share. The net distribution, on the other hand, is the income distribution after taxes and subsidies, so after *redistribution*. To prevent inequality and poverty, three main strategies can be followed: the first strategy is to focus on labour market institutions such as collective bargaining on minimum wages and wage floors. The second strategy is to focus on social policy and state intervention, involving tax redistribution and benefits such as replacement incomes, child benefits, free services and utilities. A third strategy is to aim for a competitive equilibrium, optimal allocation, and maximum welfare. Politically, these choices are related to Christian-democratic, social-democratic, and liberal welfare states respectively, although countries in practice apply a policy mix of the three approaches, yet with different emphases. Belgium fits well in the Christian-democratic tradition, underscoring the importance of work as a way out of poverty. At the same time, however, there is a strong argument to trade-off some of the benefits of workers in favour of job creation. Minimum wages play a pivotal role in this debate (Dolado, Felgueroso, & Jimeno, 2000), and, in Belgium, this has led to the imposed skipping of the indexation of wages to the cost of living (Konings, Van Aarle, & Vandeweyer, 2012).

Minimum wages are presumed to have an effect on both the distribution of wages and the employment rate. As a policy intervention, minimum wages could prevent in-work poverty by lifting up low wages above a certain poverty threshold, as long as the measure does not lead to a reduction in labour demand and, therefore, unemployment. In the latter case, one would instead consider lowering minimum wages in order to reduce jobless poverty. In this paper, we examine the effect of minimum wages on wage dispersion and on employment levels, and simulate the impact of policy changes affecting the level of the minimum wage.

We focus on the relation between sectoral wage floors and low-wage work in Belgium, an economy characterized by a strong institutionalization of the labour market. After the second world war, at the end of a period of economic growth during the 1960s, the legal framework for politically independent social dialogue was established.[1] The main pillars are the 1) National Labour Council that imposes working hour regulations and a *national* minimum wage for the private sector, 2) the Central Economic Council that supports social partners in collective bargaining, and 3) the legal extension of sectoral collective bargaining agreements. From this follows the legal hierarchy, which gives collective bargaining agreements (CBAs) judicial power. Starting from national collective bargaining agreements, lower-level agreements at the sectoral level or for specific companies need to be compliant with the higher-level agreements and should also be more favourable to the employee. Until the 1980s, similar frameworks were common in Europe, but with the exception of Belgium, there has either been institutional decay or drops in unionisation levels, so that today there is arguably no country where collective bargaining has the same universal scope as in Belgium (Antonczyk, Fitzenberger, & Sommerfeld, 2010; Fitzenberger, Kohn, & Wang, 2011; Visser, 2012). This mainly leads to an equal market distribution of income, both in terms of wage inequality and in terms of the labour share. As in the Rehn-Meidner model, the high labour standard force 'creative destruction' and promote high productivity levels (Aghion & Howitt, 1990; Erixon, 2007, 2010). However, contrary to the Nordic countries where this strategy aims for high labour mobility and full employment, the rate of job changes in Belgium is stable at a moderate annual rate of around 20%, and employment levels are lagging

[1] See, for an overview of the legislative framework: Vandekerckhove (2018).

behind: while the Europe 2020 target employment rate is 75%, the country-specific target for Belgium is 73.2%, and the employment rate in 2017 is 68.5%.

Because across the board, wages are high, the level of employees that are at-risk for poverty, the *working poor*, is correspondingly low in Belgium but, due to the low overall employment rate, poverty risks are similar to surrounding countries. This leads to a number of claims on the effect of minimum wages on poverty. The first claim, represented by the Iversen-Wren (1998) model presented in the introduction and some early accounts (Brown, 1999; Stigler, 1946), is that higher wages lead to less in-work poverty, but also to less labour demand and hence jobless poverty. The second claim is that higher wages do not lead to less in-work poverty, because wage earners are already not at-risk of poverty (Dube, 2018; Marx, Vanhille, & Verbist, 2012; Nolan & Marx, 2000). The third claim is that work prevents poverty, so that the creation of jobs, through more flexibility or through a lowering of wage costs (i.e. through lower minimum wages or through lower social security contributions), should be the primary policy to fight poverty. This claim reflects the dominant political view in Belgium.

From the claims, we derive two questions: first, what is the effect of minimum wages on employment, and second, what is the effect on the wage distribution. Both questions have received much attention in labour economics as, empirically, there is often no perfect competition on the labour market, and hence wages are not in the neoclassical equilibrium. In IPSWICH working paper 5 (Vandekerckhove, Van Gyes, & Goos, 2018) we have expanded on the estimation of minimum wage effects on wage levels and spill-overs, motivating the approach that will be used in this paper. The main finding of that paper is that not only do minimum wages push low wages towards the median - an effect that is strongest at the lowest percentiles of the wage distribution - but simultaneously high wages are pulled down relative to the median, leading to a two-sided wage compression and hence some compensation for the increasing wage costs of low-wage workers. We have also shown that the spill-over effects to percentiles where the minimum wage is not binding are not artificial due to disemployment effects.

The neo-classical supply and demand model, however, predicts that wage increases should result in employment losses, as the labour demand curve is downward sloping. A series of studies by Card & Krueger in the 1990s empirically refuted this (Card & Krueger, 1994, 1995, 2000), and today, there is no unambiguous proof of the size or even the sign of the minimum wage effect, nor an agreement on the most suitable measurement method (Allegretto, Dube, Reich, & Zipperer, 2013; Neumark, 2017). The safe conclusion is that there is no discernible employment effect of moderate minimum wage increases for regular workers (Schmitt, 2013). Schmitt summarizes possible channels of adjustment that compensate for the wage cost of higher minimum wages: a) reductions in the number of hours worked, b) reductions in non-wage benefits, c) reductions in training, d) changes in employment composition, e) higher prices, f) improvements in efficiency, g) efficiency wage responses from workers, h) wage compression, i) reduction in profits, j) increases in product demand, k) reduced turnover. The overview of the literature learns that channels (a) to (e) have received little or mixed evidence, while (f) to (k) have been demonstrated, albeit some effects, like efficiency increases and increased product demand, play out in the longer run (Neumark & Nizalova, 2007; Betcherman, 2012).

The compensation effect (h) mentioned above is one of the explanations for the attenuated employment effect, but by itself would lead to a substitution of low-paid by high-paid work, as the latter has become relatively cheaper. Another explanation why the demand for low-paid work would not drop is the monopsony model (Brown, Gilroy, & Kohen, 1982; Manning, 2006). In a monopsony labour market model, a profit maximizing company will have a labour demand that is below equilibrium, so that when minimum wages increase, they bring labour supply closer to equilibrium and hence create the positive correlation between employment levels and minimum wages. In this case, profits will be lower, giving indirect support to channels (i).

In this paper, we specifically address the effects of minimum wages on the share of *low-wage workers*, receiving less than two thirds of the national median wage. We use administrative data from a 20-year representative panel of workers from the private sector, and minimum wage information from collective bargaining agreements in 35 sectoral joint committees. Our results support the general belief that employment effects are moderate but, if anything, positive for the low-wage segment. Earlier findings suggesting the existence of negative spill-over effect on the upper-tail inequalities are also confirmed. This suggests that minimum wages would be adequate in limiting poverty risks. However, relatively large minimum wage increases would be necessary to further reduce the share of low-wage workers. Moreover, the wage dispersion differs significantly between industries, indicating that minimum wages in Belgium are not determined by an exogenous process, but intimately linked to the labour demand and occupational heterogeneity of sectors.

The structure of this paper is as follows: section 1 deals with the method and data; section 2 discusses some descriptive information on the incidence of low-wage work in Belgium in the different industries; in section 3 the effects of minimum wages on employment are investigated, and in section 4 the effects of minimum wages on the wage distribution are modelled and policy changes are simulated. Section 5 concludes the paper.

1 Data

We use administrative data provided by the National Social Security Office (NSSO). The total sample includes 20% of all employees in Belgium between 1996 and 2015, registered on a quarterly basis. The sampling algorithm ensures that the panel structure is maintained while also being cross-sectionally representative: all workers have a single chance (of 1 in 5) to be selected for the panel, in the last quarter they appear in the population. In practice, therefore, a random sample of 20% of the population (excluding students and apprentices) is drawn in the final quarter of the final year (2015), and then every worker that has been selected is traced back up to the first year (1996). For all new workers in the third quarter of 2015, i.e. the workers leaving employment in the next quarter, another selection of 20% is made, and so on. The data was compared to the Structure of Earnings Survey data for Belgium to check the representativeness.

The data encompass wages and working time, including the basic quarterly wage, the daily wage rate, bonuses, payments for waiting time, severance payments for dismissals, the percentage part-time work, the relative working volume excluding and including equivalent days (illness, pregnancy, military duty), and the number of paid working days. The basic wage for blue-collar workers does not include the holiday allowance of around 8% of the annual wage, as it does for white-collar workers. Hence, this allowance had to be estimated based on the distribution of equivalent days over the four quarters. Although this procedure smooths out wage evolutions at the aggregate level, there is additional error on the wage variable which concentrates in the third quarter when blue collar worker register fewer working hours due to the take up of holiday leave. Other information on the employee and the employer includes: gender, birth year, statute (blue collar, white collar, civil servant), residence (district level), sector (three digit NACE 88 up to 2007 and NACE 08 from 2008 onwards), joint commission (2003 onwards), company seat (district level) and site location (district level), company id, social fund id, and company size. Because the identifier for the joint committee was not a mandatory field in the social security registration until 2003, we used information on sector, social fund, and the worker statute, as well as future information on the employer, to determine the joint commission before this date. The employment evolutions shown in the appendix show that this approach was successful.

Sectoral minimum wages come from our Belgian minimum wage database (BMW-database), which covers 44 of the largest joint committees from 2000 onwards. It holds information on 1370 wage changes, of which

77% includes wage indexations, 23% includes real wage increases, 15% are real wages increases, and 85% are percentage wage changes. For the period from 1996 to 1999, the times series are extended using the ICL index of collectively agreed wage changes that is provided by the Ministry of Labour. To build a longitudinal index of collectively agreed sectoral minimum wage floors, the same job category had to be traced over time. As European legislation on labour market discrimination, implemented in national legislation in 2007 and effective from 2009, requires seniority wages to be based on competence or tenure and not on age (OECD, 2013), there have been changes in the wage scales in all joint committees affected by the law. In many cases, the minimum wage was defined at 21 years, and younger workers received a percentage of this minimum wage, which was then unlevelled after the change. Although this is interesting variation, the uplevelling is more likely to match the age profile of entrants, so the minimum wage in our database is always measured at age 21 in such sectors.

For computational and statistical reasons, a subset of 4% of the total population is taken from the sample and for most purposes, only the main job in a quarter is considered. Around 3% of workers holds more than one jobs in a quarter, but this includes workers that transition between two jobs, and the number is constant. Because minimum wages are not applicable to the public sector, only the private-sector workforce falls within the scope of this study. Also, as temporary agency workers are subjected to the same minimum wages as regular workers in the sectors where they are employed, but as there is no registration of this link, temporary agency workers are not included here. Furthermore, for any analysis that involves minimum wages, the sample is restricted to the 44 joint committees for which minimum wage information is available. A further correction is used to exclude time periods where the indicator is unreliable (see appendix, Source: National Social Security Office

Figure 15 and Figure 16).[2]

Finally, the subsample selects workers between 21 and 64 years old, excluding teenagers for whom many apprentice statutes exist, affecting the social security administration, and whose minimum wage rates have been adjusted separately from other minimum wages. For instance, in 2015, the national minimum wage for all workers over 18 years old became 100% of the national minimum wage, but most sectors had already equalized minimum wages within the sector in anticipation of this change. Moreover, the relationship between minimum wages and employment for young workers is a topic that is often discussed separately from overall employment effects (Dolado et al., 1996). Finally, as the age when leaving formal education is on average 21.5 years of age and 45% of the age group between 20 and 24 is in education (Eurostat figures for 2009), including the youngest employees would change the sectoral distribution of the sample.

This brings the total number of data point to 7 507 071. The panel size includes 433 995 workers, meaning that the one worker remains on average for 17 quarters in the sample. The minimum sample size is 83 100 in the first quarter of 1996, and the maximum is 101 136 workers in the third quarter of 2012, reflecting an annual average growth of the workforce by 1.2%. as well as the enlargement of the population of civil servants covered by the NSSO.

2 Descriptive statistics

2.1 The incidence of low-wage work

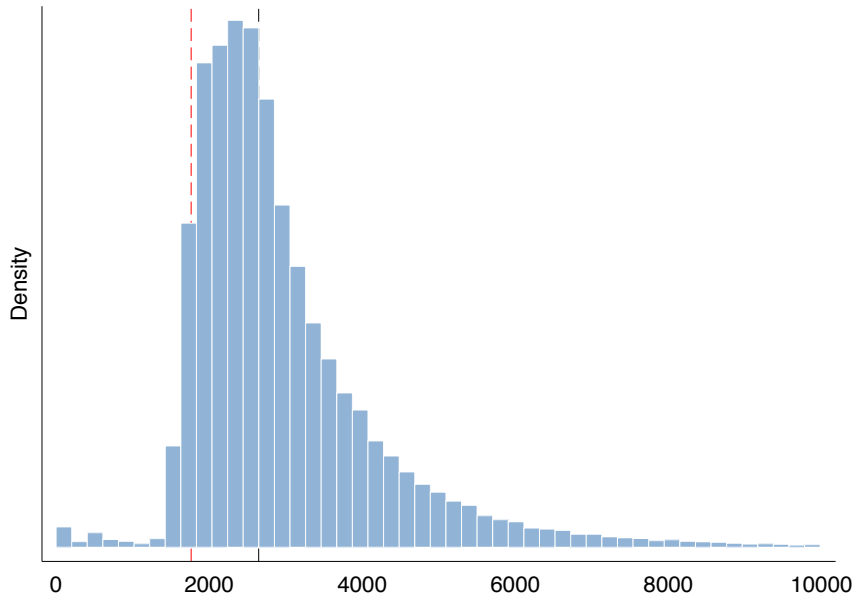
The threshold for low-wage work is commonly defined as earning less than two thirds of the median full-time equivalent wage (Gutiérrez Palacios, Guillén Rodríguez, & Peña-Casas, 2009). In Belgium, in the first

[2] We discard sector no. 327 before 2003, nos. 312, 313, 211, 329 before 1998, no. 152 before 2001.

quarter of 2015, the median wage was €2646, so the low-wage threshold is put at €1764 in this period. Figure 1 shows the full wage distribution for all workers in the sample, which reveals that the threshold of two thirds indeed marks a steep drop in the wage distribution, supporting its use as a threshold.

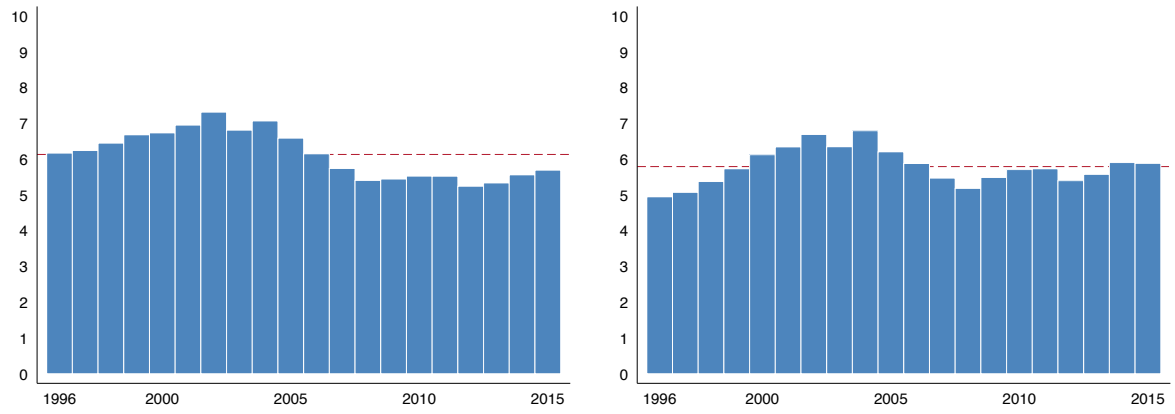
In Figure 2, we see the evolution over time of the share of low-wage work in the total economy (left) and in the joint committees of the selection of 44 joint committees. On average, the rate of low-wage work in the selected sectors is slightly lower, at 5.79%, while the rate of low-wage work in the full population equals 6.13%. Although the shares in the 1990s differed, we see a similar pattern of growth in the share of low-wage work, peaking in 2002, and decreasing after 2004. The last decade, including the Great Recession, was more stable, with a rate of 5.69% in 2015 in the total workforce, and 5.88% in the selected sectors. Note that the negative impact of a recession may change the share of low-wage workers upward or downward, depending on whether the crisis puts affects wages or, more commonly, employment.

Figure 1. The wage distribution and the low-wage work threshold in Belgium (2015Q1)



Source: National Social Security Office

Figure 2. The share of low-wage work in Belgium between 1996 and 2015: all sectors (left) and selected joint committees (right)

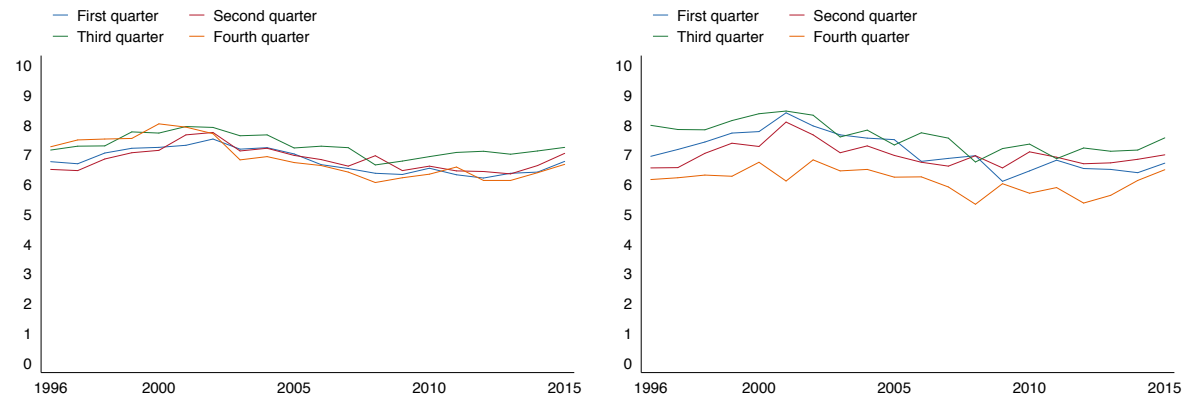


Source: National Social Security Office

The data at hand also provide quarterly information. In Figure 3, we show the evolution of the rate of low-wage work in the selected joint committees for the main job only. In the left panel, the evolution of low-wage work at a quarterly basis, relative to the quarterly median, is shown with separate lines for every quarter.

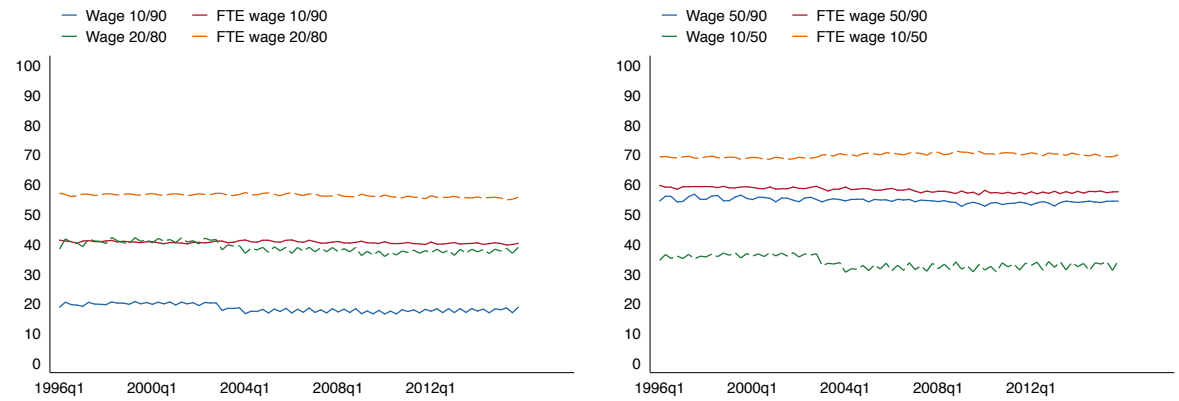
The average rate for the first quarter is 6.8%, which is above the rate including second jobs shown above. This could be due to the dominant pattern in job changes, driven by better wages in the second job, or it could be an artefact, because the full-time equivalent wage of low-wage earners may be inflated due to measurement errors in the working time registration. The full-time equivalent wage data for the main job, similar to hourly wages, are, therefore, more reliable. The evolution of the four trends for each quarter is comparable and follows the overall trend discussed above. In the right-hand panel, the low-wage work threshold is defined based on annual medians. This shows that the wage rates in some quarters are lower than in others, which can be due to variable payment (e.g. based on sales or changing duties, but not bonuses which are not part of the basic wage), or to the different composition of the workforce (e.g. seasonal work). Although it is clear that the different quarters are not equal, it is a sensible choice to set one threshold per year, as we will do in the remainder.

Figure 3. The quarterly share of low-wage work in Belgium based on quarterly medians (left) and yearly medians (right)



Source: National Social Security Office

Figure 4. The evolution of wage inequality in the private sector in Belgium between 1996 and 2015: full distribution (left) and tails (right)



Source: National Social Security Office

The share of low-wage work is the lowest part of the wage distribution. Figure 4 adds trends on other measures of wage inequality, based on quantile rations. The left graph shows the overall evolution of the decile ratio (p10/p90) and the quintile ratio (p20/p80) in the private sector in Belgium for effective wages and full-time equivalent wages.

It is immediately apparent from the figure that there has been almost no change in this long period of time, spanning over the 80 quarters between 1996 and 2015. The decile ratio p10/p90 is about 40% throughout the time period in full-time equivalents, and 20% in wages. This means that the worker at the 10th percentile

of the wage distribution earns 1/5th of the worker at the 90th percentile, and has a wage that is 60% lower. The p20/p80 ratio is slightly under 60% in full-time equivalents, and 40% in wages. Although low-wage work is a full-time equivalent concept, these figures show that not only there has not been an increase in wage inequality, but there is also no change in the number of working hours, as this would be visible in inequalities of the effective wages. There could be, however, inequality in the distribution of work over households (Corluy & Vandenbroucke, 2015, 2017).

2.2 Low-wage industries

Table 1 summarizes the data, showing the average values (in prices of 2010 where applicable) over the full time period of the main variables by sector, denoted by the code of the joint committee. There are 21 blue-collar sectors (with codes in the 100's), 11 white-collar sectors (with codes in the 200's), and 12 mixed sectors (with codes in the 300's). Some industries, such as the food industry (no. 118, no. 220) and the textile industry (120, 214) consist of a blue-collar as well as a white-collar sector. Both job categories may also be present in the mixed joint committees, where blue-collar workers are typically paid by the hour, while white-collar workers receive a monthly salary.

The sectors selected represent the main industries and cover 70% of total employment in the private sector. By far the largest, and growing, sector is the mixed white-collar sector, which consists of joint committee 200 (73 889 employees) and joint committee 218 (362 903 employees, merged into no. 200 in 2015). Despite the non-specific description, this is a high-paying sector, although with low minimum wages due to the variety of companies that fall under it. Other major sectors are construction (on average 145 812 employees), accommodation (100 019 employees), and independent retail (80 905 employees). The trade industry has a number of different joint committees that define a sector based on the kind of products sold (e.g. 119 food trade, 202 food retail) or the size of the firms (e.g. 201 independent retail, 311 large retailers, 312 department stores). Finally, some newer, mixed joint committees, such as no. 319 educational institutions, no. 327 sheltered workshops, and no. 329 social & cultural work, have strong ties to the State through subsidies and framework agreements on wages.

Although there is a national minimum wage for the private sector, which sets the lower bound for sectoral minimum wages (e.g. no. 200 mixed white collar), most sectors have significantly higher wage floors, which are often defined for 'normal entrants' at age 21 (post-tertiary education) and was later changed into 'three years of experience'. In fact, the highest minimum wages are concentrated in the blue-collar sectors (e.g. concrete (no. 106), stone (no. 114), woodworking (no. 126). In contrast, median wage levels are higher in the white collar sectors, with an average real salary of €5045 in the petrol industry (no. 211), €3902 in the chemistry industry (np. 207) and €3845 in the banking sector (no. 310).

The ratio of the minimum wage and the median wage is known as the Kaitz index (Brown, 1999; Kaitz, 1970)[3], which is a sensible normalization of the minimum wage, as it indicates the 'bite' or bindingness of the minimum wage. In sectors with a wide wage distribution, the impact of minimum wage changes will be less important than in sectors where the minimum wage is closer to the median. In some sectors under scope, the wage distribution is so narrow that the minimum wage is almost equal or equal to median wages. Note that it is possible that for specific groups of workers, e.g. cleaners in manufacturing, the conditions of the cleaning sector and not of the manufacturing sector apply, so that some wages may go under the registered minimum wage. Sectors with such narrow distribution in the lower tail (measured by the difference between the log median and the log tenth percentile (p50-p10) are textile care (no. 110),

[3] The Kaitz index is weighted by the coverage of the minimum wage agreement, which in Belgium can be assumed to be 100% in every sector. There are a few cases where specific firms or groups of workers are excluded from an agreement (e.g. a hardship clause), but this is very rare.

woodworking (no. 126), stone (no. 104), accommodation (no. 302). We also calculated the upper-tail inequality (p90-p50), which correlates strongly with the lower-tail inequality (r = .800).

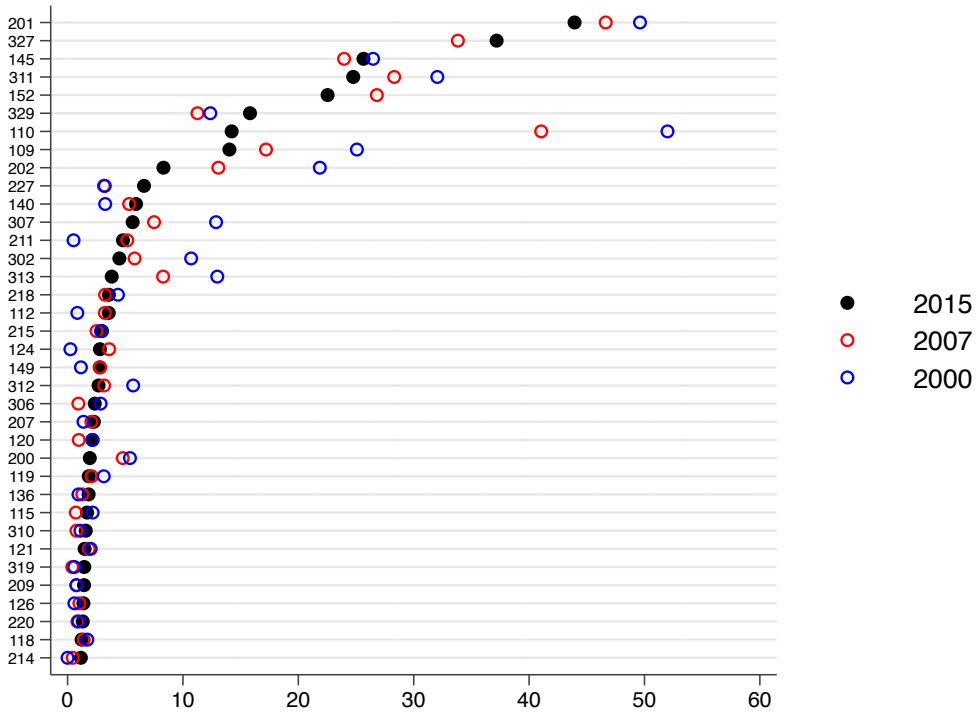
Table 1. Description of the main variables, by sector (average of real values, 1996-2015)

	Sector	Empl.	MW	Median	P50-p10	p90-p50	LW share	Kaitz
104	Iron	12 091	1858	3444	26.1	19.7	0.8	54.1
105	Non-ferro	5 115	1838	3205	17.6	25.2	0.2	57.4
106	Concrete	6 674	2309	2636	13.8	25.4	0.5	87.6
109	Clothing	12 154	1681	1828	11.8	28.3	23.0	92.0
110	Textile care	6 907	1662	1759	7.6	20.3	32.4	94.6
112	Garages	26 304	1886	2398	21.3	20.0	2.4	78.6
114	Stone	1 326	2274	2597	9.8	24.6	0.3	87.6
115	Glass	7 430	1638	2720	29.7	29.9	1.6	60.3
116	Chemistry	46 304	1756	2894	33.9	46.8	0.9	60.6
118	Food	56 917	1778	2344	16.2	26.5	1.7	75.9
119	Food trade	33 195	1802	2104	12.6	19.5	3.1	85.7
120	Textile	24 885	1662	2249	21.0	22.4	4.0	73.9
121	Cleaning	35 601	1888	2006	10.3	22.6	4.3	94.1
124	Construction	145 812	2180	2509	14.9	14.1	2.5	87.0
126	Woodworking	18 995	2227	2218	11.4	17.5	1.6	100.4
130	Print	12 683	1873	2798	24.3	32.0	0.5	67.0
136	Paper processing	7 494	1712	2560	29.3	26.3	1.6	66.9
140	Transport	69 392	1682	2393	25.6	26.4	4.5	70.3
145	Horticulture	12 850	1512	1926	22.1	19.0	27.0	78.6
149	Metal related	43 479	1873	2376	18.7	20.1	2.0	78.8
152	Private education	9 702	1743	1861	15.2	16.9	26.2	94.1
200	Mixed white collar	73 889	1492	3072	45.0	50.8	4.5	48.9
201	Independent retail	80 905	1400	1744	19.2	38.5	45.1	80.3
202	Food retail	46 028	1442	2130	26.2	35.4	14.3	67.8
207	Chemistry	69 512	1618	3902	47.3	55.3	2.0	41.5
209	Metal	66 744	1516	3582	38.4	50.2	1.1	42.3
211	Petrol	4 953	2491	5045	48.8	47.7	3.3	50.5
214	Textile	5 746	1789	3247	33.4	47.6	0.8	55.2
215	Clothing	5 368	1693	2939	37.4	58.6	2.4	57.7
218	Mixed white collar	362 903	1578	2935	41.3	59.5	4.0	53.8
220	Food	23 222	1619	3305	37.3	57.7	1.2	49.1
227	Media	2 659	1946	2939	41.3	59.6	4.2	66.5
302	Accommodation	100 019	1741	1977	11.8	24.1	7.9	88.3
306	Insurances	25 198	1699	3501	40.3	55.6	1.7	48.6
307	Insurance brokers	11 234	1459	2452	33.5	49.4	8.8	59.6
308	Savings banks	3 710	1703	3181	35.3	47.9	1.0	53.7
310	Banks	62 538	1798	3845	37.2	44.8	1.0	46.9
311	Large retailers	36 869	1505	1913	21.1	41.8	27.2	78.7
312	Department stores	14 503	1543	2368	24.6	38.4	4.1	65.2
313	Pharmacies	11 503	1567	2624	41.4	41.4	9.1	60.3
319	Educational institutions	47 158	1594	2801	29.1	35.1	1.1	57.1
321	Wholesale of drugs	2 940	1602	2326	21.6	43.5	3.0	68.9
327	Sheltered workshops	11 779	1701	1852	23.4	50.3	44.7	93.6
329	Social & cultural work	22 368	1593	2468	50.3	45.5	15.6	64.8

Our main focus here is on the share of low-wage work. Only a few sectors have a high average share of low-wage work in the period considered, notably independent retail (no. 201, 45.1%), sheltered workshops (no. 327, 44.7%), textile care (no. 110, 32.4%), large retailers (no. 311, 27.2%), horticulture (no. 145, 27%), blue-collar workers in private education (no. 152, 26.2%), clothing (no. 109, 23%), social & cultural work (no. 329, 15.6%), and food retail (no. 202, 14.3%). Other sectors have rates below 10%, and eight sectors out of 44 have just 1% or less low-wage workers.

Figure 5 below ranks the sectors according to the rate of low-wage work in the first quarter of 2015 and shows the evolution since 2000 and since 2007. In general, the rate of low-wage work is decreasing, and the increases that did occur mainly took place between 2000 and 2007, not after. Exceptions are the social & cultural sector (no. 329), horticulture (no. 145), media (no. 227) and sheltered workshops (no. 327). Sharp drops are found in clothing (no. 109) and textile care (no. 110).

Figure 5. The share of low-wage work in Belgium (selected sectors, 2000Q1, 2007Q1, 2015Q1)



Source: National Social Security Office

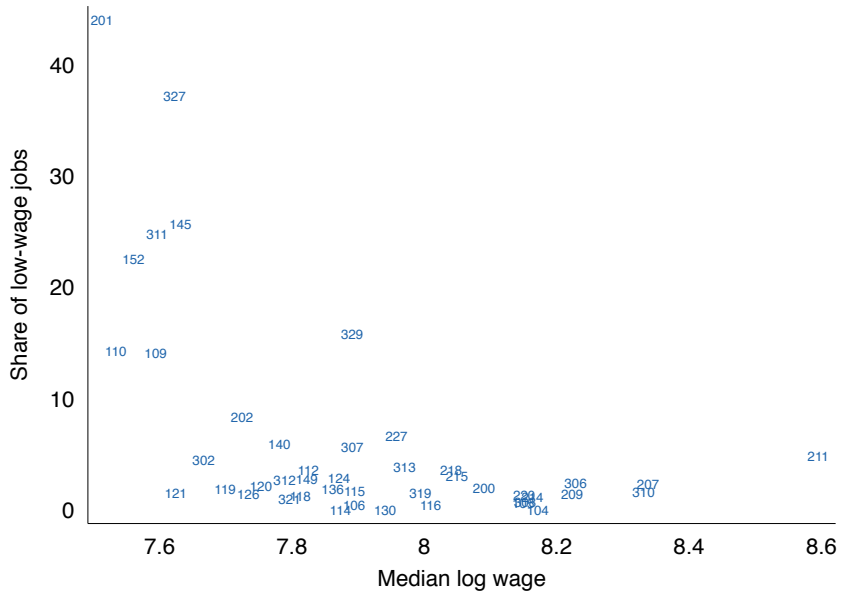
2.3 Bivariate statistics

Table 1 suggests a number of relations between minimum wages, employment levels, wage rates, the low-wage share and pay levels. These relations are also explored in the figures below. In Figure 6, the relation between median wages and the share of low-wage workers in the first quarter of 2015 is shown. Perhaps unsurprisingly, the sectors with the highest share of low-wage workers also have low median wages overall. However, in this group there is still some variation: the sectors of clothing (no. 109) and textile care (no. 110) have low wages overall, but relative to the retail sectors, horticulture, private education, the share of low-wage workers is less. According to Table 1, the differences in minimum wage levels might explain this variation. Figure 7 adds some evidence to this hypothesis. Comparing the share of workers and (log) minimum wages, the retail sectors maintain their position, while the clothing and textile cleaning sector are situated around the mean of the minimum wage distribution. In the sector of sheltered workshops (no. 327), however, a high share of low-wage work goes together with an above-average minimum wage. This may be related to the widespread usage of special labour contracts and subsidies for target groups.

While Figure 7 illustrates the (negative) relation between minimum wages and low-wage work across sectors, Figure 8 shows the correlation within sectors, plotting the trends in the low-wage share and the trends in the minimum wage. Not taking into account the outliers with strong decreases in the share of low-wage work and average minimum wage evolutions (nos. 152, 109, 110), or a strong increase in the share of low-wage work and a strong minimum wage change (no. 327), there is no visible relationship over time within sectors.

Finally, Table 2 shows the correlations between all variables of Table 1 over all sectors and quarters. We should note that the same correlations appear when using the 20-year averages from Table 1. Most differences are therefore differences *between* sectors. We find a negative correlation between minimum wages and the low-wage share as well as median wages, and a strong negative correlation between the Kaitz-index and the median wage and lower-tail inequality. There is also a negative correlation between the Kaitz-index and upper-tail wage inequality, which cannot be due to lower medians, as this would lead to increased inequality. Finally, a higher Kaitz index correlates with a high share of low wage work, whereas higher minimum wages correlate with a *lower* share of low-wage work. Nevertheless, minimum wages also correlate with less wage inequality in both tails.

Figure 6. The relation between the share of low-wage work and median wage levels in 44 industries in Belgium (2015Q1)

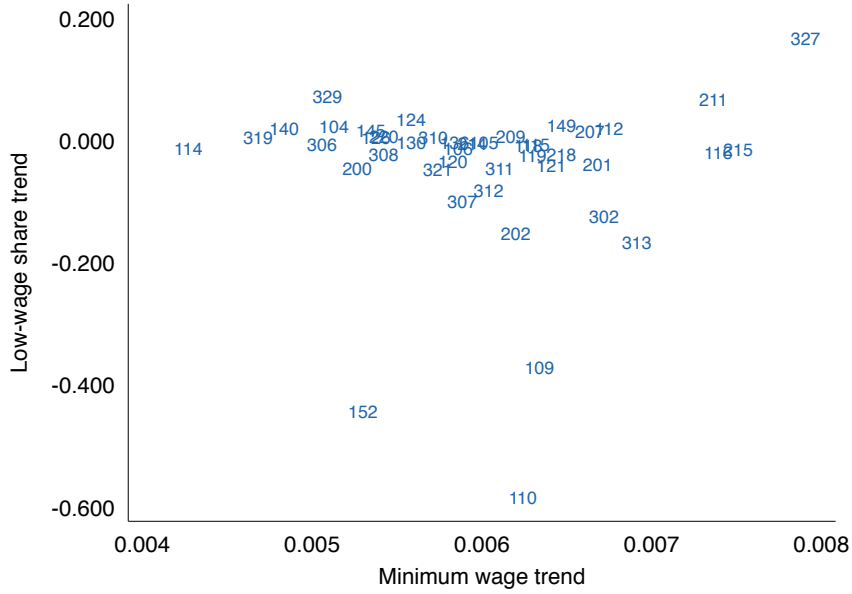


Source: National Social Security Office

Figure 7. The relation between the share of low-wage work and minimum wage levels in 44 industries in Belgium (2015Q1)

Source: National Social Security Office

Figure 8. The relation between the share of low-wage work and minimum wage trends in 44 industries in Belgium (2015Q1)



Source: National Social Security Office

Table 2. Correlations between the main values

	Employment	MW	p50	p50-p10	p90-p50	LW pct.
MW	-0.147					
p50	0.031	0.299				
p50-p10	0.135	-0.240	0.702			
p90-p50	0.164	-0.325	0.509	0.810		
Low-wage share	-0.048	-0.366	-0.572	-0.245	-0.056	
Kaitz	-0.121	0.287	-0.803	-0.849	-0.688	0.467

3 The effect of minimum wages on employment levels

The purpose of minimum wages in light of the fight against in-work poverty is to increase wages in low-wage sectors, without driving out workers because of falling demand. We will analyse both questions in two separate steps. This section will deal with the employment effects, while section 4 addresses distributional effects. We will first test the effects of relative minimum wage changes on employment levels within sectors (section 3.1), followed by an analyses of the effect of changes in the level of the minimum wage on job transition between sectors and in and out of the workforce for individual workers (section 3.2).

3.1 Effects at the sectoral level

To test effects at the sectoral level, we use linear regression techniques. In the first model (1), we specify the apparent correlation between employment levels, as the variable that needs to be explained, and the relative minimum wage or Kaitz index, as the explanatory variable. Defining the minimum wage relative to the median wage level of sectors means that the actual bite of the minimum wage is measured.

$$\ln\left(L_{st}^{p}\right) = \beta_0 + \beta_m \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \varepsilon_{st} \quad (1)$$

Where L_{st}^{p} is the employment rate for population p in sector s in quarter t, which is either the full workforce (Table 3) or the number of low-wage workers (Table 4). The relative minimum wage or Kaitz index is expressed as the log of the minimum wage over the sectoral median, $\frac{W_{st}^{min}}{W_{st}(50)}$. β_m is the estimate for the minimum wage effect, β_0 is the intercept, and ε_{st} is the residual.

Models (2) to (5) introduce additional explanatory variables. The specification of model (2) introduces a quarterly fixed effects $\ddot{Q}$ to account for non-linear time effects (the double accent is used to indicate factor variables).

$$\ln\left(L_{st}^{p}\right) = \beta_0 + \beta_m \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \ddot{Q} + \varepsilon_{st} \quad (2)$$

Model (3) adds a lagged dependent variable:

$$\ln\left(L_{st}^{p}\right) = \beta_0 + \beta_1 \ln\left(L_{st-1}^{p}\right) + \beta_m \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \ddot{Q} + \varepsilon_{st} \quad (3)$$

Model (4) is the *within*-specification with sector fixed effects $\ddot{S}$. This implies a de-meaning of the relative minimum wage, to only take into account changes over time in the level of the relative minimum wage

within a sector. It also absorbs the correlation between time-invariant median wage levels and employment levels.

$$\ln(L_{st}^{p}) = \beta_0 + \beta_1 \ln(L_{st-1}^{p}) + \beta_m \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \ddot{Q} + \ddot{S} + \varepsilon_{st} \quad (4)$$

Finally, model (5) adds includes sectoral time trends using the continuous quarterly time Q:

$$\ln(L_{st}^{p}) = \beta_0 + \beta_m \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \ddot{Q} + \ln(L_{st-1}^{p}) + \ddot{S} + \gamma Q\ddot{S} + \varepsilon_{st} \quad (5)$$

β_{OLS} is the OLS estimation of β_m. We can easily see that there could be an issue with endogeneity when the minimum wage not only determines the employment level, but the causality also runs the other way around and employment levels are taken into account when setting minimum wages. To solve this issue, we test three instruments, two natural instruments (β_{IV1} and β_{IV2}) using the 2SLS estimator, and the Arellano-Bond estimator β_{AB} (Arellano & Bond, 1991).

The first natural instrument makes use of additional information from the wage agreements, notably whether collectively agreed wage changes are due to the indexation mechanism. The idea is that such adjustments are not deliberately made by decisions at the time, but rather by a historical decision to apply the rule, and hence are really exogenous. We construct the first stage as follows:

$$\ln\frac{W_{st}^{min}}{w(50)_{st}} = \alpha_0 + \alpha_1 \ln W_{st}^{min}\frac{I_{st}}{A_{st}} + \nu_{st} \quad (6)$$

Where the α's are the first stage coefficients, $\frac{I_{st}}{A_{st}}$ is the number of indexations I over the total number of agreements A in the period t for sector s, and ν_{st} is the error term. In other words, the sectoral minimum wage is only used in so far it is due to indexation.

One problem with the first IV is that the level over the sectoral minimum wage, even if weighted by the indexation intensity, still includes wage raises from past agreements. The second natural IV, therefore, uses *only* variation in the price level to which wages are indexed, interacted by the joint committee to account for the overall level. The specification is as follows:

$$\ln\frac{W_{st}^{min}}{w(50)_{st}} = \alpha_0 + \alpha_1 CPI_{st} \cdot \ddot{S} + \nu_{st} \quad (7)$$

Where CPI is the consumer price index with base year 2005.

Finally, we exploit the panel structure of the data, consisting of 44 joint committees and 80 quarters (the minimum number of quarters used is 41, the maximum is 74, and the average is 71), to perform an Arellano-Bond estimation. This model is based on first differencing the specification of model (4) above, and further instrumenting the demeaned lagged dependent variable and the demeaned relative minimum wage by 20 lags of the levels of those variables. This strategy ensures that there is no relation between the instruments and the dependent variable, although naturally there is a relation between the demeaned variable $X - \bar{X}$ and the level X.

Table 3 shows the results for the regression of the employment level. The OLS estimation for baseline model (1) gives an elasticity of -1, and the IV estimations are similar. Controlling for time in model (2) does not change the estimations. However, entering a lagged dependent variable removes the negative elasticity entirely. The introduction of lags and sector fixed effects drives up the R^2, reported for the OLS model. β_{IV1} returns a significant positive effects, which we also find in models (4) and (5). β_{IV2} returns a significant positive effect in specification (5) and is insignificant in model (5), likely because of the large number of variables in the regression due to the sector-time trends. Finally, the Arellano-Bond estimator, which is our

preferred estimate, finds no significant effect, although the effect size of β_{AB} is similar to β_{IV1}.

Table 3. the effect of relative minimum wages (Kaitz) on employment

	(1)	(2)	(3)	(4)	(5)
$\boldsymbol{\beta_{OLS}}$	-1.022	-1.008	0.002	0.033	-0.025
	(0.000)	(0.000)	(0.348)	(0.098)	(0.397)
$\boldsymbol{\beta_{IV1}}$	-0.686	2.101	0.184	0.165	0.176
	(0.875)	(0.631)	(0.001)	(0.013)	(0.008)
$\boldsymbol{\beta_{IV2}}$	-1.028	-1.013	0.002	0.095	0.821
	(0.000)	(0.000)	(0.297)	(0.004)	(0.165)
$\boldsymbol{\beta_{AB}}$				-0.032	
				(0.138)	
$\boldsymbol{R^2_{OLS}}$	5.37%	5.71%	99.95%	99.95%	99.96%
$\boldsymbol{n}$	3232	3232	3188	3188	3188

Table 4 follows the same structure as above, but now regressing the number of low-wage workers on the five specifications. The effect sizes are noticeably larger than in the estimation of the effects on the total population, and generally positive and significant. Model (5) returns very large elasticities, indicating that the inclusion of sector-time trends may lead to strong correlations between the explanatory variables. The preferred Arellano-Bond panel IV estimation, however, turns out a somewhat lower, but substantial and significant positive effect of 0.891, meaning that – keeping time effects out and sector characteristics constant – a 10% increase of the minimum wage would make the number of low-wage workers grow by around 9%. In model (4), β_{IV2} supports a similar conclusion.

Table 4. the effect of relative minimum wages (Kaitz) on low-wage employment

	(1)	(2)	(3)	(4)	(5)
$\boldsymbol{\beta_{OLS}}$	0.463	0.485	0.067	3.624	6.294
	(0.007)	(0.004)	(0.268)	(0.000)	(0.000)
$\boldsymbol{\beta_{IV1}}$	10.315	18.259	0.999	-0.215	3.233
	(0.063)	(0.001)	(0.576)	(0.898)	(0.025)
$\boldsymbol{\beta_{IV2}}$	0.432	0.458	0.034	1.442	-2.419
	(0.012)	(0.007)	(0.568)	(0.018)	(0.629)
$\boldsymbol{\beta_{AB}}$				0.896	
				(0.001)	
$\boldsymbol{R^2_{OLS}}$	0.49%	1.91%	91.34%	93.68%	95.16%
$\boldsymbol{n}$	3232	3232	3188	3188	3188

3.2 Effects on individual worker flows

The estimations above rely on net changes in the employment rate over time. As we have obtained panel data at the individual level, we can use this to estimate the effect of minimum wages on worker flows, separating the effect of minimum wages on the number of entrants and quits at the sectoral level and the probabilities at the individual level. This follows:

$$\Delta E\left(W^{min}\right) = \Delta E_{it}^{IN}\left(W^{min}\right) - \Delta E_{it}^{OUT}\left(W^{min}\right) \quad (8)$$

In line with the approach of Brochu and Green (2013), the employment effect is naturally positive if the minimum wage (i.e. sectoral wage floors) correlates stronger with inflows than with outflows, and negative

in the reverse case, at least when entrance and quit rates are not substantially different or in the long run, so:

$$\varepsilon_{MW}^{E} = \varepsilon_{W^{min}}^{IN} - \varepsilon_{W^{min}}^{OUT} \; if \; IN \approx OUT \tag{9}$$

We distinguish between the flows in and out of the private sector, and in and out of the joint committees that define the CBAs with the wage scales that include the sectoral wage floor.

The probit estimation model is given by:

$$\begin{aligned} T_{it} = \; & \beta_0 \; + \beta_1 \; \ln W_{st} \; + \beta_2 \; A_{it} + \beta_3 \; A_{it}^2 \\ & + \beta_4 \; G_i + \beta_5 \; A_{it} G_i + W_i^o + \ddot{S} + \beta_6 \; Q + \ddot{K} + \nu_{it} \end{aligned} \tag{10}$$

Where T_{it} represents the transition probability, which cannot directly be observed. Rather, we observe an actual inflow $\tilde{T}_{it}^{IN}$ or outflow $\tilde{T}_{it}^{OUT}$ of worker i at time t. β_1 is the effect of the natural log of the minimum wage $\ln W_{st}$ of sector s. A and G are age and gender, which are also interacted. W_i^o is the detrended starting wage, which is a proxy for the individual worker's ability. $\ddot{S}$ are sector fixed effects, and Q is (continuous) quarterly time, while $\ddot{K}$ is the quarter within the year. ν_{it} is the residual term.

Because of the non-linearity, we cannot directly interpret the β's in a probit model, but have to calculate the marginal effects. In this case, the marginal effect returns a semi-elasticity, indicating the percentage point difference in the probability of a transition for a relative change in the minimum wage, given by:

$$\frac{\partial P(\tilde{T}_{it} \; = 1)}{\partial \ln W_{st}^{min}} = \phi(\boldsymbol{X\beta})\beta_1 \tag{11}$$

Where $\boldsymbol{X}$ and $\boldsymbol{\beta}$ are the data matrix and the coefficient vector of specification (10), and $\phi(\bullet)$ is the normal density function.

Table 5. Results of the probit regression of quarterly and yearly transitions in and out of the working population and in and out of sector, for total employment and low-wage employment.

Total workforce (n = 3 853 548)

Quarterly	mfx	b	p	R_{adj}^2	Yearly	mfx	β	p	R_{adj}^2
Population					**Population**				
Inflow	-0.016	-0.199	0.000	0.054	**Inflow**	-0.028	-0.175	0.000	0.076
Outflow	-0.001	-0.018	0.729	0.039	**Outflow**	0.015	0.091	0.023	0.039
Sector					**Sector**				
Inflow	-0.017	-0.166	0.000	0.045	**Inflow**	-0.014	-0.065	0.068	0.063
Outflow	-0.015	-0.140	0.003	0.035	**Outflow**	-0.374	-1.639	0.000	0.039

Low-wage workers (n = 211 546)

Quarterly	mfx	β	p	R_{adj}^2	Yearly	mfx	β	p	R_{adj}^2
Population					**Population**				
Inflow	0.111	0.693	0.000	0.026	**Inflow**	0.120	0.420	0.000	0.040
Outflow	0.047	0.347	0.021	0.049	**Outflow**	0.185	0.692	0.000	0.026
Sector					**Sector**				
Inflow	0.139	0.728	0.000	0.026	**Inflow**	0.219	0.661	0.000	0.046
Outflow	0.066	0.399	0.004	0.042	**Outflow**	0.025	0.076	0.497	0.027

Table 5 reports the margins (semi-elasticities), β's, and adjusted R^2 from the regression. We distinguish between transitions that take place between consecutive quarters $[t, t \pm 1]$ and yearly transitions $[t, t \pm 4]$ from and to the working population, and from and to the sector that sets the minimum wages, and transitions of low-wage workers or of all workers. Net effects are positive if the marginal effects for the inflows are larger than the marginal effects of outflows.

The results for the total workforce are very moderate, but significantly negative both in the quarterly and yearly estimations. The strongest effect is on the outflow probability, which decreases by 3.74 percentage points for a ten percent increase in the minimum wage. However, all other effects at this level are rather small, and this has to do with the small probability of job mobility in Belgium of around 5% of workers per quarter and 20% of workers per year changing jobs.

In contrast, the effects for low-wage workers only are more substantial, and are positive for both inflow and outflow rates. Hence, minimum wages seem to increase job dynamics among low-wage workers. All regressions point to a positive net effect of minimum wage on flows of migrant workers, except for the yearly population flows. This may reveal that many low-wage jobs are often short-lived, and careers are increasingly discontinuous (Horemans, 2017). Overall, the semi-elasticities point to a 1 to 2 percentage point increase in inflows relative to outflows for a 10% increase in the sectoral minimum wage.

We may, however, assume that sectors do not respond to minimum wages in the same way. To map the differences, we estimated the marginal effects, as above in equation (10), for each sector separately (naturally without sector fixed effects). In Figure 9 and Figure 10, the sectoral differences are shown on multiple axes in the field drawn by outflows and inflows. Marginal effects that are not significantly different from zero (if $p > 0.1$) have been set to zero (with some jitter to reduce overlapping labels), and marginal effects that are larger than 1 or smaller than -1 are truncated to those values (also with some jitter). On the upward sloping line, we mark the division between net positive and net negative effects on employment. Above the line, the change in the probability of a transition into the population or sector is larger than the change in the probability of a transition out of the population or sector, therefore the employment effect is positive. So even in the case both marginal effects are negative, employment may grow, as it depends on the difference and the in- and outflow rates are always positive in $[0,1]$. Also, recall that the condition is that the rates are comparable in order for this effect to hold in the short run, because if the outflow rate is very high and the inflow rate is very low, a reduction in outflows and an increases in inflows may still result in net employment losses. Secondly, the downward sloping line divides sectors with increasing labour market dynamics (above the line) and decreasing labour market dynamics (below).

In Figure 9, we see that the marginal effects on quarterly population flows (upper left) are small and show little variation. Only sectors no. 220 (food), no. 124 (construction), and no. 106 (concrete) show moderate positive net effects. Inflows and dynamics are negatively affected in sector no. 145 (horticulture), and in sectors no. 104 (iron) and no. 140 (transport) the dynamics shift to net outflow. However, single effects should not be overemphasized, as effects are reported with an accepted type I error of 10%, so out of 700 estimations, around 70 should be false positives.

At the population level, the variation is wider and, according to Table 5, on average slightly negative. The sectors mentioned above are mostly in the extended position relative to the quarterly trends. On the whole, it seems that labour market flow dynamics increase in the majority of sector, often driven by increased outflows due to minimum wage changes. The large sectors that stand out are no. 124 (construction) with a positive net effect, and no. 218 (mixed white collar) on the negative side.

The lower panels show the sectoral flows, of which the population flows above are a subset, meaning that inflows into sectors can come from other sectors, or from outside the workforce, while the reverse holds for outflows. Overall, the sectors are more evenly spread into sectors who are net receivers and net losers, indicating that worker flows within the workforce dominate population flows. In the low-wage sector no.

327 (sheltered workshops) and no. 145 (horticulture) on the one hand, and in the high-wage sectors no. 218 (mixed white collar) and no. 310 (banking) on the other hand, the dynamics are attenuated due to minimum wage changes, while in a low-wage sectors no. 121 (cleaning) and no. 124 (construction), and in high-wage sectors no. 211 (petrol) and no. 207 (chemistry), the dynamics increase, with a positive net effect to those sectors. This suggests that minimum wages attract outsiders and push out insiders, depending on the sector.

Figure 10 zooms in on low-wage work only, which has larger effects on average as reported in Table 4. Note that estimates for sectors with under 100 units in the sample (e.g. sector with very low shares of low-wage work) are not shown. Here, we see that on the whole, minimum wage marginal effects either divide sectors in terms of inflow changes or in terms of outflow changes, but not both as generally the other effect is not significantly different from zero. In the quarterly figures at the population level (upper left), we see that a range of sectors (nos. 218, 110, 120, 121, 140118, 227, 329) show negative net effects due to increased outflow only. On the other hand, sectors no. 312 (department stores) and no. 116 (chemistry) show strong positive effects due to increased inflows only. In sector no. 124 (construction), the net effect is zero, but the dynamics of low-wage workers are highly reduced, while in sector no. 104 (iron), the net effect is strongly negative, and the dynamics shift to outflows only.

The same unidimensional effects are found in the yearly figures (upper right panel). Here, some sectors have only negative marginal effects on outflows (nos. 115, 327, 311), only positive marginal effects on inflows (nos. 215, 312, 306), only positive marginal effects on outflows (nos. 302, 218, 104, 110, 227, 118, 319), or only negative effects on inflows (nos. 145, 321). The only exception, with strong increases in both dynamics, is no. 116 (chemistry). Note that low-wage workers in the largest low-wage sector, no. 201 (independent retail) are positively impacted by minimum wage changes.

The dispersion along the guidelines is even more apparent in the sectoral figures (lower panels in Figure 10). Noteworthy here is the increased dynamic in sectors no. 302 (accommodation) and no. 312 (department stores), and reduced dynamics in no. 124 (construction) by quarter and in no. 327 (sheltered workshops) at a yearly basis. Again, the largest low-wage sector, no. 201 (independent retail) probably drives the positive quarterly net effect.

Figure 9. Marginal effects of minimum wage changes on worker flows in the total workforce

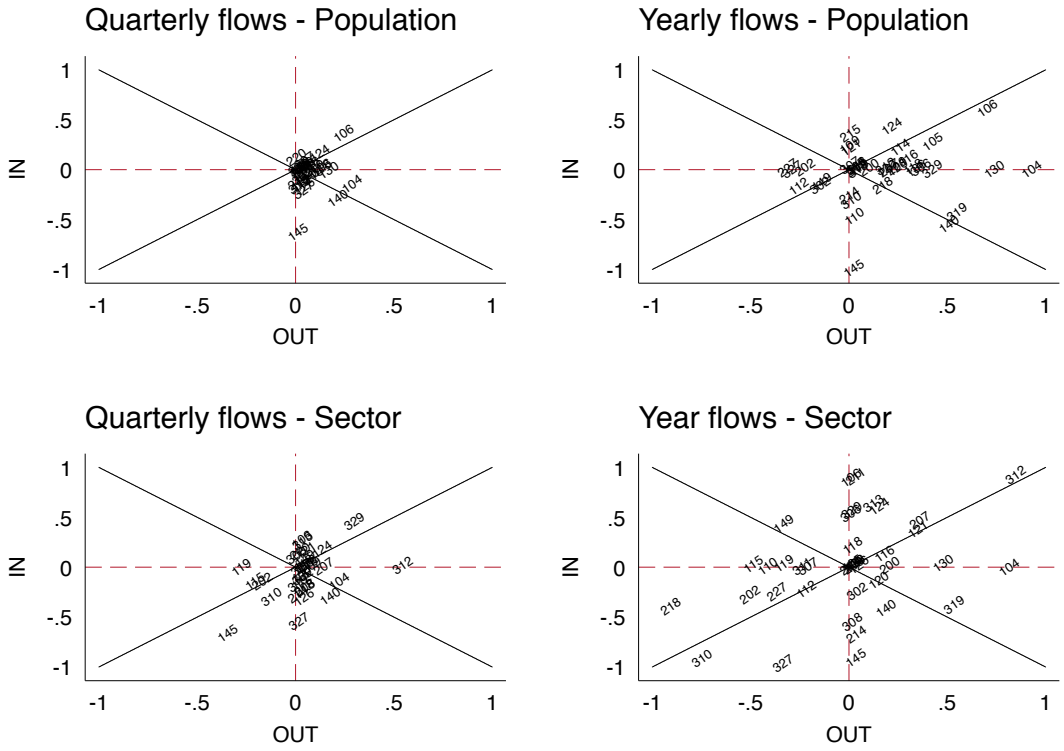
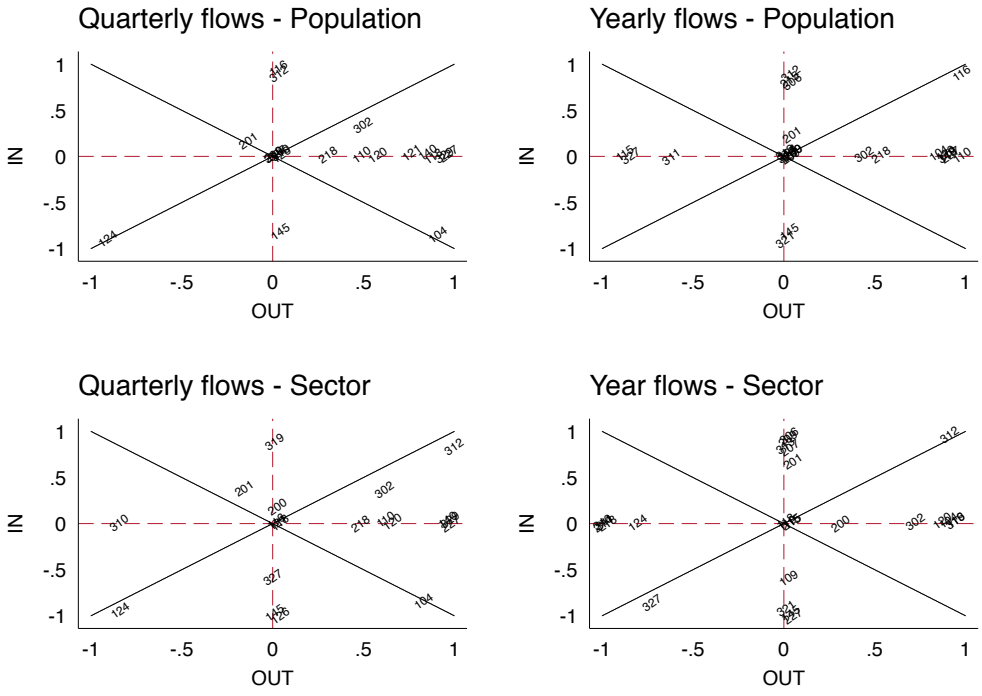


Figure 10. Marginal effects of minimum wage changes on worker flows for low-wage workers



4 The effect of minimum wages on the wage distribution

In this section, we deal with the distributional effect of minimum wage changes. Do minimum wages effectively lift up low wages? This would require minimum wages should to not only be binding, but to also affect the wages up to the target wage level of two thirds of the national median wage. Therefore, we need to investigate on which percentiles of the wage distribution minimum wages exert an effect.

In a separate working paper, we have discussed the application of the method of Lee (1999) and Autor, Manning and Smith (2014) in the Belgian context of minimum wages set in joint committees. Lee used the differences in median wages to create variation in the relative minimum wages by state. The Lee equation to test minimum wage effect for each percentile p is then:

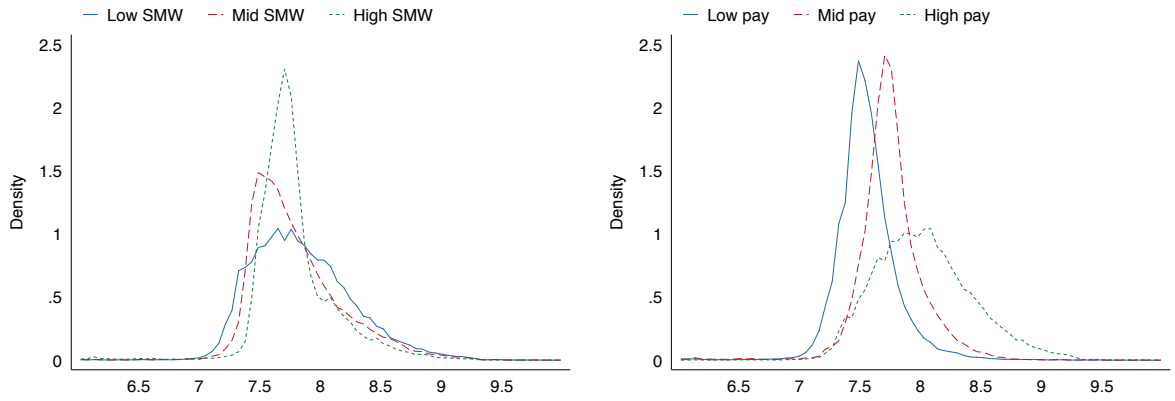
$$\ln\left(\frac{W_{st}(p)}{W_{st}(50)}\right) = \beta_0 + \beta_1 \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \varepsilon_{st} \qquad (12)$$

Where $\ln\left(\frac{W_{st}(p)}{W_{st}(50)}\right) \equiv \ln W_{st}(p) - \ln W_{st}(50)$ and $\ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) \equiv \ln W_{st}^{min} - \ln W_{st}(50)$ can be read as the percentage difference (for small differences) between wages at a given quantile p, or the minimum wage, on the one hand, and the median wage level, on the other hand. Autor, Manning, and Smith point out that this specification leads to two types of errors: first, there is division bias, as the minimum wage appears on both sides of the equation simultaneously. Sampling error around the median would then create an upward bias in the estimate. Secondly, a correlation between the median pay levels and the wage distribution within states would violate the identifying assumption of Lee's equation. The solution to the first issue is to instrument the relative minimum wage by the effective minimum wage. The second issue can be tackled by including fixed effects for the states. We then obtain the following regression model:

$$\ln\left(\frac{W_{st}(p)}{W_{st}(50)}\right) = \beta_0 + \beta_1 \ln\left(\frac{W_{st}^{min}}{W_{st}(50)}\right) + \ddot{S} + \ddot{Q} + \ddot{S}\ddot{K} + \varepsilon_{st} \qquad (13)$$

Where $\ddot{S}$ are sector fixed effects (instead of regional fixed effect as in the literature), $\ddot{Q}$ is a quarterly time indicator, and $\ddot{S}\ddot{K}$ is the seasonal effect by sector. We thus take advantage of the observation that in Belgium, there is ample variation in the minimum wages over sectors. However, the issue of endogenous wage setting must be larger for sectors than for states or regions. Indeed, Figure 11 shows that sectors with high minimum wages have a narrower distribution and lower average wages than sectors with low sectoral minimum wages (left panel), and that low-pay and mid-pay sectors have comparable distributions, but high pay sectors have a much wider distribution (right panel).

Figure 11. Kernel density estimation of the FTE wage distribution in Belgium in 2008: grouped by minimum wage level (left) and median wage level (right).

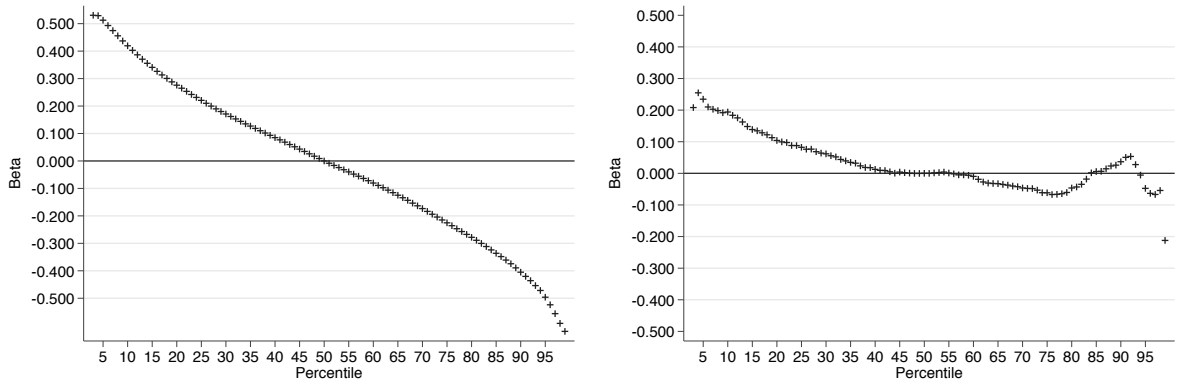


4.1 Regression results

Figure 12 shows the results of the OLS and IV estimations for each percentile of the wage distribution. A positive beta below the median means that for a relative increase of the minimum wage towards the median, that percentile is moving closer to the median as well. Above the median, the interpretation changes, as a negative beta implies a relative downward adjustment.

The OLS estimates (left panel) follow a linear negative path, which is caused by the violation of the assumption that wage levels and the variance of the sectoral wage distribution are correlated as suggested above. We, therefore, need to add fixed effects and use the 2SLS IV estimator. In this final model, we find an elasticity of around .25 at the 5th percentile, meaning that a 10 percent increase in the minimum wage leads to a 2.5 percent increase of the 5th percentile relative to the median. Negative betas above the median between the 65th and 80th percentile mean that upper tail is compressed as the minimum wage increases.

Figure 12. Spill-over effects of minimum wages across the wage distribution: OLS (left) and IV estimates (right)



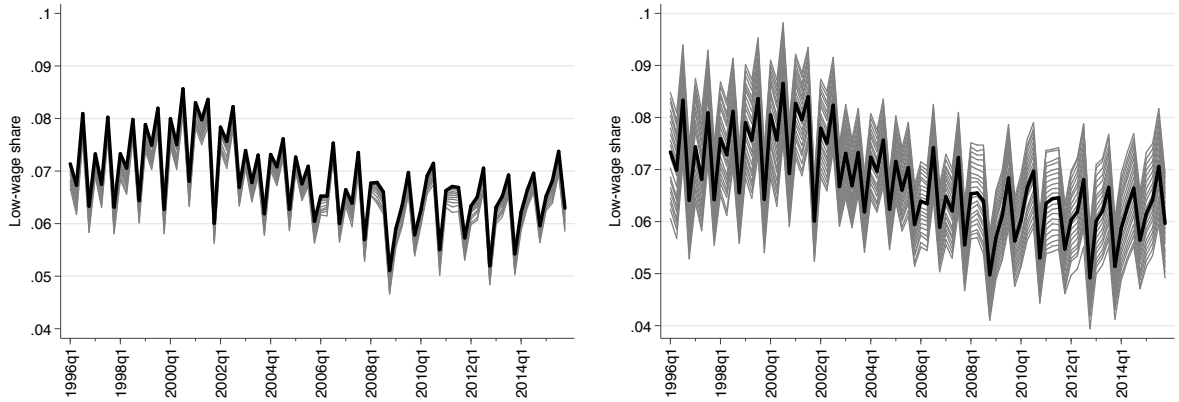
4.2 Application

We can use the effects found in the regression above to simulate what would happen in different scenarios where the minimum wages change. The first scenario (left panel in Figure 13) is the case where the national minimum wage is adjusted, so that only the minimum wages that are surpassed by the level of the national minimum wage are incremented (as the law would require). Effects of a decrease are irrelevant, as any sectoral wage floor is at least at the level of the national minimum. The effect of this measure is rather small, because few workers are paid at the national minimum wage and sectoral wage floors are higher. In 2015, just 2.6% of workers were paid within 5% of the national minimum wage, and over the last 20 years, this share averaged 3.19%. Therefore, fairly large national minimum wage increases are needed to obtain any effect: on average, a 10% increase in the national minimum wage results in a decrease in the rate of low-wage work of less than half a percent.

The second scenario simulates the distributional effects of a 1 to 10 percent change in the sectoral wage floors. Here, we can derive the changing wage levels due to increases as well as decreases in the minimum wage. The effects here are more noticeable. On average, a 10% increase in the wage floors in *all* sectors would reduce the rate of low-wage work by about one percentage point, and 5% increase leads to a reduction of slightly under one percentage point in the rate of low-wage work. On the other hand, a 10% decrease in the level of the wage floors results in a one percentage point increase in the rate of low-wage work, and a 5% decrease leads to half a percent additional low-wage workers.

Adding up the effects on employment and on the wage distribution, the former seems to be clearly stronger than the latter when going by the sector-level regression, but the difference must be much smaller when going by the individual flows regression, and will certainly be sector-specific.

Figure 13. The effect of a 1% minimum wage change on the share of low-wage work: national minimum wages (left) and sectoral wage floors (right)



5 Discussion and limitations

Because minimum wages are a fundamental part of wage setting in Belgium, debates on poverty often gravitate around the questions of whether minimum wage changes have positive or negative employment effect, and whether or not they are targeting that part of the wage and income distribution that is most in need of an earnings increase. The literature has not settled those questions either, but suggests that employment effects are limited, and distributional effects are contained in the lower part of the wage distribution.

In this paper, we have used a large administrative data set with panel data on wages, linked to sectoral information on minimum wages. We use the term sector to refer to segments of an industry, often defined by job category and organized in joint committees that settle wage floors above the national minimum wage. Our data are representative for a large majority of workers in Belgium.

In the long run, inequalities in Belgium have not changed noticeably, and the relation between minimum wages and employment levels is typically found cross-sectionally and is much less clear in a longitudinal perspective, if it is not absent. We find that low-wage sectors have narrow wage distributions, but not necessarily low minimum wages. As a result, many workers in blue-collar industries do not face strong income inequality within the sector, and increases in the relative minimum wage (the ratio of the minimum wage over the median wage in a sector) rather increase the rate of low-wage work then lead to job losses. However, looking closer into the job flows, we find that the effect of minimum wage levels on job dynamics varies strongly. It is mostly affecting low-wage workers and increasing job dynamics, with an average positive effect on employment levels, but wide variation among sectors.

The distributional effects of minimum wages lead to a number of additional conclusions. First, minimum wage increases lead to wage compression in the lower tail, suggesting a mechanical raise in the minimum wages as a part of a negotiated pay scale. Secondly, there are negative effects in the upper tail, suggesting compensation in the wage claims for well-paid workers in the upper tail, but not for the highest percentiles. This could be the result of negotiations distributing the wages for the employees represented by the trade union, implicitly organizing a form of solidarity. A direct way to accomplish this is to negotiate absolute and

not relative wage increases. Thirdly, this internal distribution mechanism, which is even stronger in the uncontrolled figures, suggests that wage settlements are not exogenous, but result from a judicious deliberation based on the productive structure, the occupational heterogeneity, and the market context of sectors. This would also explain the difficulty in existing research to reach a conclusive statement on the effects of minimum wages: this depends on the factors named, but also on the inclusion of a larger group of workers into the negotiating process, so that universalistic goals, such as a reduction of unemployment or fostering wage equality, are internalized in the wage setting process.

As a result, the findings do not recommend raising or lowering minimum wages in order to decrease the share of low-wage work or to increase employment levels, but rather strongly advocate maintaining the Belgian system of collective bargaining, which has managed to control wage inequality in the course of the last 20 years, whereas in other countries, increases have been reported, mainly in the upper tail.

This paper has focused on basic wage levels, not on total remuneration including or labour income, taking into account working hours, mainly for methodological reasons. Nevertheless, an exploration of these additional dimensions has not revealed a pattern that is different from the findings presented. However, there is certainly a need to further clarify whether collective bargaining also plays a role in ensuring sufficient working hours and fair variable payments. Another limitation is the restriction to adults and regular workers, since stronger minimum wage effect are expected for young workers or agency workers. In this respect the complexity of labour legislation in Belgium is a matter of concern, not only for businesses, but also for research. Studies of this kind should single out particular measures to validate their effectiveness (e.g. subsidies for the long term unemployed, training programs with internships or 'dual learning'), as those measures are difficult to include in a general account.

As we conclude that minimum wages are endogenous to the labour market, we should try to obtain more insights into the considerations of sectors when setting minimum wages, in order to explain the sectoral diversity and clarify why minimum wages in some cases increase labour market dynamics, and in other cases attenuate it. Finally, in light of the debate on the distributional effects of minimum wages in the income distribution, we suggest to use these data to analyze the effect of minimum wages and wage stability in preventing household poverty throughout the worker's career.

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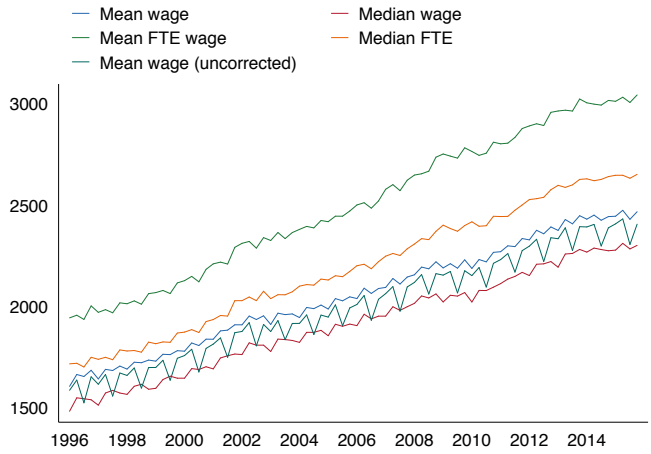
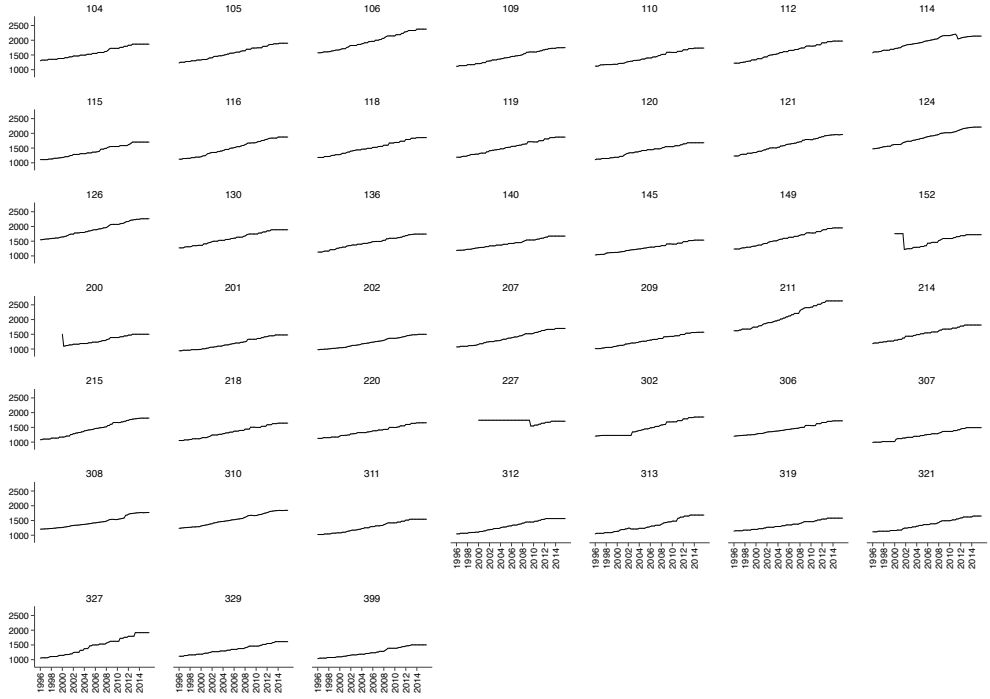
Appendix

Figure 14. Quarterly evolution of mean and median wages in Belgium, 1996-2015



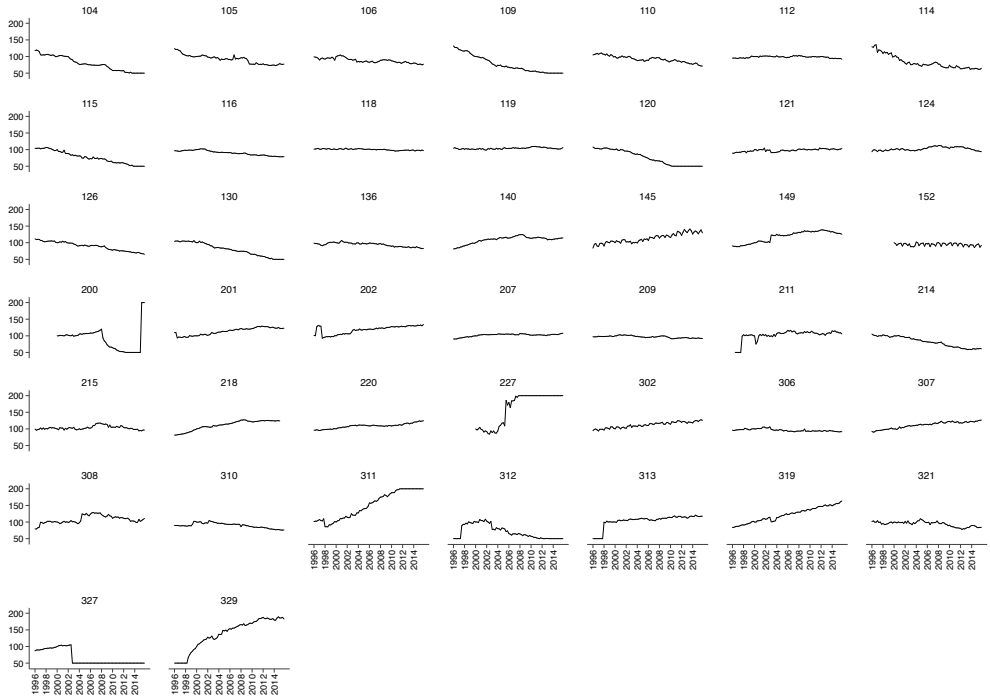
Source: National Social Security Office

Figure 15. Evolution of minimum wages by joint committee in Belgium, 1996-2015



Source: Baremawijzer (Acerta), Minimumlonen.be, Indexcijfer van de Conventionele Lonen (FOD WASO), own account

Figure 16. Employment evolution by joint committee in Belgium, 1996-2015



Source: National Social Security Office, own account including imputations