CAHIER D'ÉTUDES
WORKING PAPER

N° 104

EMPLOYMENT, WAGES AND PRICES: HOW DID FIRMS ADJUST DURING THE ECONOMIC AND FINANCIAL CRISIS? EVIDENCE FROM A SURVEY OF LUXEMBOURG FIRMS

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OCTOBRE 2016

BANQUE CENTRALE DU LUXEMBOURG
EUROSYSTÈME

Employment, wages and prices: How did firms adjust during the economic and financial crisis? Evidence from a survey of Luxembourg firms*

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October 2016

Abstract:

This report presents new insights on the nature, size and persistence of various shocks (demand, credit, costs etc.) experienced by Luxembourg firms during the initial years of the economic crisis in 2008-09 and subsequently in the period 2010-13, as well as on how firms adjusted to these shocks in terms of employment, wages and prices. It discusses the extent to which institutional changes in the Luxembourg labour market through various public support measures helped alleviate the effects of the economic crisis.

Keywords: Economic and financial crisis, reaction to shocks, wage and price rigidity, firms, survey, WDN

JEL Codes: C25, D22

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Résumé non technique

Durant la phase initiale de la récente crise économique et financière, l'économie luxembourgeoise a été plongée dans la récession du deuxième trimestre 2008 au deuxième trimestre 2009. Entre son point haut et son point bas, le PIB en volume s'est contracté de 9,2%. Ce recul, plus sévère que celui observé initialement au niveau de la zone euro (-5,8%), s'est expliqué par l'exposition de l'économie luxembourgeoise aux services financiers et l'effondrement du commerce international.

Cette étude documente l'impact de la crise sur les entreprises luxembourgeoises. L'analyse se base sur les résultats d'une enquête, réalisée par la Banque centrale du Luxembourg auprès d'un échantillon représentatif d'entreprises en fin d'année 2014. Cette enquête s'est inscrite dans le cadre d'un réseau de recherche (le Wage Dynamics Network) du Système Européen de Banques Centrales (SEBC). L'objectif était de mieux comprendre la réaction des entreprises face à un choc (en l'occurrence la récente crise) et de mieux appréhender les mécanismes d'ajustement et de fixation des salaires et des prix. Une enquête similaire avait déjà été réalisée en 2008 puis mise à jour en 2009 afin d'obtenir des informations sur la réaction des entreprises à la crise naissante. L'enquête de 2014 s'est inscrite dans la lignée des enquêtes précédentes. Par souci d'harmonisation avec d'autres enquêtes du SEBC, la principale période de référence couvre les années 2010 à 2013. Cependant, étant donné qu'au Luxembourg la phase la plus aigüe de la crise a eu lieu au tournant des années 2008-2009, les informations récoltées ont (dans la mesure du possible) été étendues à cette période.

Les résultats de l'enquête ont révélé qu'au Luxembourg, les trois quarts des entreprises ont subi un choc négatif entre l'année 2008 et l'année 2013. Cependant, ce constat au niveau agrégé masque le fait que les entreprises ont été touchées par différents types de chocs, dans différents secteurs et à des moments différents. Durant la phase initiale de la crise, en 2008-09, les entreprises ont principalement pâti des effets défavorables du *choc de demande négatif*. Cependant, un quart des entreprises interrogées a signalé un effet positif de l'évolution de la demande sur son activité au cours de cette phase. Le choc de demande négatif a été le plus prononcé en 2008 dans les services financiers et en 2009 dans l'industrie et les services aux entreprises. Les entreprises de la construction et du commerce ont au contraire indiqué avoir subi le choc de demande le plus sévère en 2013. Sur la période allant de 2010 à 2013, c'est la *capacité des clients à respecter leurs engagements* qui a le plus marqué l'activité des entreprises, suivie des effets liés à la détérioration de la demande. Aussi, lorsqu'on compare les deux périodes clés sous étude, on constate une dégradation des perceptions des entreprises en matière de persistance des chocs subis. Cette détérioration s'est principalement expliquée par les chocs de demande (perçus comme persistants par ¾ des entreprises en 2010-2013 contre un tiers seulement durant la phase initiale de la crise). La crise s'est également soldée par un accroissement des coûts salariaux et dans une moindre mesure des coûts d'approvisionnement. Il s'ensuit qu'outre la concurrence et la capacité à trouver des clients, les coûts de la main-d'œuvre ont constitué une source additionnelle de préoc-

cupation pour plus de la moitié des entreprises ayant subi un choc négatif sur la période 2010 à 2013.

En réponse à des chocs économiques, les entreprises peuvent avoir recours à différents modes d'ajustement. Les entreprises qui ont subi un choc négatif et pour lesquelles les coûts de la main-d'œuvre ont constitué un élément pertinent ont privilégié une réduction de leurs effectifs permanents à une baisse des salaires de base. Sur la période 2008-2013, la majorité des entreprises a d'ailleurs enregistré une hausse des salaires de base. Notons que le choix des stratégies d'ajustement a fortement varié en fonction de la taille de l'entreprise et de la branche d'activité. Durant la crise, certaines entreprises se sont également vues confrontées au besoin de réduire leur main-d'œuvre ou d'en modifier la composition. A cette fin, elles ont privilégié le gel ou la baisse du nombre d'embauches, les licenciements individuels, la diminution du nombre de travailleurs ou encore la réduction (non-subventionnée) des heures de travail.

Au niveau des mécanismes d'ajustement des salaires, il est apparu que, globalement, les entreprises ont eu tendance à changer les salaires de base une fois par an (valeur médiane). Durant la crise, une part croissante d'entreprises a procédé à des gels de salaire. En moyenne, 3% des entreprises interrogées ont indiqué avoir diminué les salaires sur la période 2008-2013.

L'enquête a aussi révélé qu'outre les conditions cycliques, les décisions de recrutement des entreprises dépendent de différents facteurs du marché du travail : le niveau des salaires et la pénurie de main-d'œuvre qualifiée sont apparus comme les principaux obstacles à l'embauche de salariés avec des contrats à durée indéterminée. La plupart des entreprises a indiqué rémunérer les nouvelles recrues à un salaire similaire à celui des employés établis, mais cette part a diminué entre 2008 et 2013. Les résultats de l'enquête révèlent aussi que les entreprises ont eu recours à certaines politiques publiques pour l'emploi, en particulier à des mesures d'incitation à l'embauche ou de préservation de l'emploi (notamment le chômage partiel).

Une large majorité des entreprises a déclaré disposer d'une certaine autonomie dans sa politique de fixation des prix. Sur le marché domestique, les prix ont été principalement fixés en fonction des coûts, avec une marge bénéficiaire préétablie ou ont été négociés individuellement avec les clients. Sur les marchés étrangers en revanche, les entreprises ont été davantage « preneuses de prix » et se sont alignées sur leurs principaux concurrents. Trente-six pourcent des entreprises ont déclaré avoir changé la fréquence d'ajustement de leurs prix durant la crise, essentiellement à la hausse. Cet accroissement s'est expliqué, selon elles, par une concurrence accrue, la hausse de la fréquence des changements de prix des principaux concurrents, la volatilité accrue de la demande et les changements plus fréquents des prix d'autres facteurs de production.

1 Introduction

This report summarises the answers of Luxembourg firms to a survey on the economic and financial crisis and their adjustment. The survey was conducted by the Banque centrale du Luxembourg (BCL) at the end of 2014 within the framework of the Eurosystem Wage Dynamics Network (WDN), including 25 national central banks in the European System of Central Banks. The survey asked firms to assess how they were affected by changes in the economic environment during the periods 2008-09 and 2010-13 and to indicate how they adjusted to these changes.[1] The survey focuses on labour market responses of firms both in terms of wages and employment and provides detailed information on the various adjustment measures taken along these margins.

The results show that a substantial share of firms was negatively affected by the recession, mainly through effects of the level and uncertainty/volatility of demand but also through customers' ability to pay. Firms' response to the crisis varied according to their size and sector of economic activity. Overall, more firms adjusted via cuts in employment than wages. The report discusses the extent to which institutional changes in the Luxembourg labour market through various public support measures helped alleviate the effects of the economic crisis. About 34% of firms made use of public support measures during the crisis. Short-time working applications soared in 2008-09, mainly in the manufacturing sector. Firms reported that about 20-25% of jobs involved in short-time working were saved this way.

Automatic wage indexation affects the frequency of base wage changes in the economy by reducing the share of firms having less frequent base wage changes. About one third of the firms adjusted the frequency of price changes during the crisis, of which almost three quarters changed prices more often, mainly reflecting changes in competition.

1.1 Macroeconomic and labour market performance during the crisis

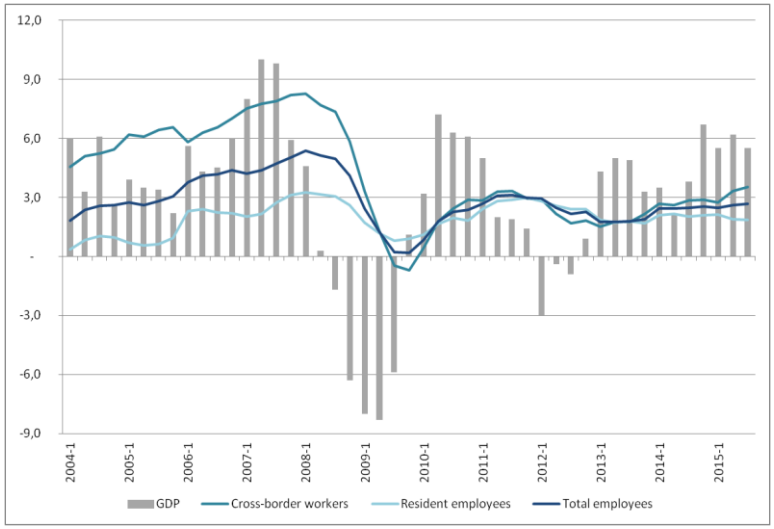
After a long period of sustained growth, Luxembourg was severely hit in the initial phase of the global economic and financial crisis that started in late 2007. The economy plunged into a deep recession between 2008Q2 and 2009Q2. Over the initial phase of the crisis in 2008-09, real GDP fell by 9.2% peak to trough, a sharper drop than the euro area average, reflecting the country's large exposure to financial services and the collapse in international trade (OECD, 2010). The sharp contraction of banking activity was partially offset by the resilience of Luxembourg's mutual fund industry and insurance services that helped to mitigate the effect on the domestic economy. By contrast, output fell by around one fourth in the export-oriented manufacturing sector, and industrial production is still lagging behind its pre-crisis levels in 2015 Q3. Construction, transportation and business services were also hit hard by the recession. After a short-

[1] A similar survey within the WDN was conducted in 2008. As the economic and financial market crisis developed, a short follow-up survey was conducted among participating firms to analyse firms' initial reactions. See BCL (2009) and Lünnemann and Mathä (2011).

lived rebound in 2010, real GDP slowed again in 2011 and receded the following year (-0.8%). Subsequently, Luxembourg's economy has been expanding at more than 4% each year.

Figure 1: GDP and employment

(year-on-year growth)



Source: STATEC, authors' own calculations

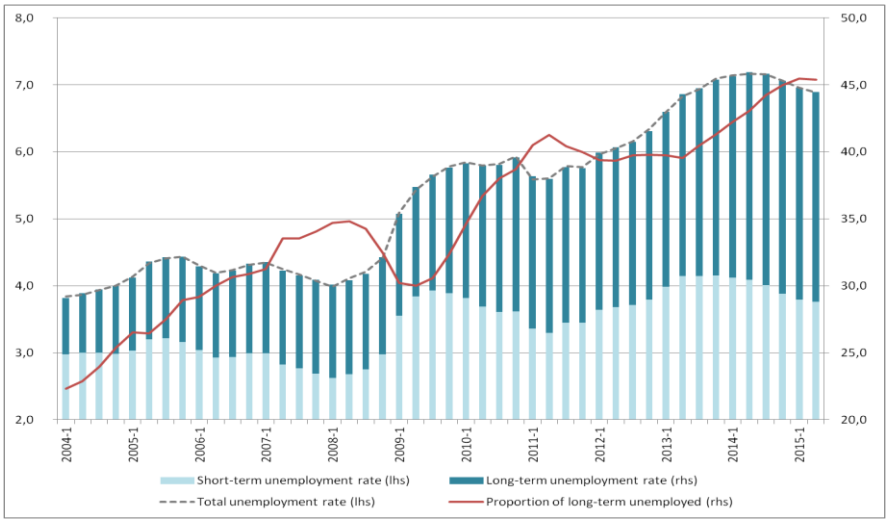
The onset of the financial crisis led to a standstill in job creation, with *employment* (excluding independent workers) virtually unchanged in the second half of 2009 (after a 4.9% rise the year before). However, given the severity of the fall in GDP, employment adjustment has been relatively muted (-0.4% from peak to trough, between 2008Q4 and 2009Q2), reflecting significant labour hoarding. Firms' preference to reduce hours worked (labour hoarding) rather than employment levels relates to extensive use of short-time work schemes (e.g. in manufacturing) and shortages of skilled labour (e.g. in the banking sector). In the latter case firms may be reluctant to cut jobs as they foresee difficulties in recruiting new employees with the required skills once the economy picks up again. Cross-border workers, who account for more than 40% of total domestic employment, were particularly hit by the crisis. This mainly reflects the sectoral distribution of cross-border workers, who are overrepresented in temporary contracts or internationally-oriented sectors (e.g. manufacturing, finance, business services and transportation).

During the financial and economic crisis of 2008-09, the "narrow" *unemployment* rate[2] rose from 4.1% in the second quarter of 2008 to 5.6% one year later. Despite the obvious impact of the crisis, cyclical factors alone do not appear to explain the surge in unemployment, which was increasing well before the onset of the recession (in contrast to the downward trend at the euro-area level). The number of long-term unemployed increased dramatically, probably reflecting structural problems in the labour market (BCL, 2013; 2015).

[2] This concept excludes unemployed that benefit from a public employment support measure.

Figure 2: Unemployment development

(left-hand scale: as a percentage of the labour force, right-hand scale: as a percentage of total unemployed)



Sources: ADEM, STATEC, authors' own calculations

1.2 Main institutional characteristics of the labour and product markets

Wages are either set by law (e.g. minimum wages), by collective agreements or negotiated individually. Luxembourg is characterised by a *decentralised wage setting mechanism*, with most wage negotiations at the sectoral / industry or company-level (see Table 3.1 in Appendix 3 for further details). Sector-level agreements are at first applicable only to firms associated with the employers' organisation signing the agreement. However, these agreements are most often extended by law to the entire sector as opt-out provisions do not exist. In 2013, around 55% of domestic employees were covered by collective agreements; this is similar to 2008 (European Commission, 2014). However, sectoral differences are important: coverage ranges from 12% in the hotel, restaurant and catering sector (HORECA) to 100% in public administration. Firm-level agreements are common in the retail sector. The duration of collective agreements is usually two to three years. During the recent crisis, negotiations were difficult for several firms and sectors and one-off premia were increasingly preferred to base wage increases.

Collective wage bargaining is deep-rooted in the so-called *Luxembourg social model*, which is based on a tripartite social dialogue (including government, employers' and trade unions' representatives). Within this consensus-oriented decision-making model, important agreements are reached at the central (national) level (e.g. on wage indexation). During the crisis, the tripartite dialogue was put under substantial strain and bipartite agreements emerged, either between employers' associations and trade unions or between the government and employers' / employees' representatives.

Wage setting in Luxembourg is also characterised by the *statutory minimum wage* set by law at the national level and covering all workers and employees of the economy. The minimum wage is pegged to developments in the cost of living (through the automatic wage indexation scheme). In addition to consumer price index induced changes, the

minimum wage was adjusted three times during 2008-2013 to reflect past real wage developments (+2.0% in 2009, +1.9% in 2011 and +1.5% in 2013). This adjustment mechanism has not been modified since 2008.

Luxembourg law requires that all wages are automatically increased by 2.5% whenever the six-month moving average of the National Index of Consumer Prices (NICP) exceeds a pre-specified threshold. The threshold itself (wage indexation scale) changes in steps of 2.5% on each payout. Unlike in other countries, wage increases do not occur at pre-specified dates such as the beginning or the end of the year, but are triggered by inflation developments. Although the indexation system is automatic, in the past it has been modified or temporarily suspended by the Tripartite Coordination Committee (including representatives of the government, employers' organisations and trade unions) or the government alone (in the absence of consensus).

Employment Protection Legislation (EPL) is another important feature of Luxembourg's labour market. According to the OECD, for permanent workers, protection against individual dismissal is slightly above the OECD average. However, protection against collective dismissal in Luxembourg is significantly higher than the OECD average (OECD, 2013a), as is legislation regarding temporary employment. In addition, redundancy payments must be paid in their entirety at the end of the notice period, which might weigh on firms' financial situation (see Table 3.2 in Appendix 3 for further details). While strict job protection provisions may prevent massive layoffs during downturns, they may also discourage firms from hiring during upturns (because of the potential future costs in case of a new drop in activity).

By OECD standards, *entrepreneurial barriers* are also high in network sectors, especially for railways, electricity, gas and telecoms (see Table 3.3 in Appendix 3 for further details). Regulation is also strict in retail trade, mainly reflecting strict provisions in licensing (e.g. permissions to engage in commercial activities, regulation on shop opening hours etc.). Barriers to entrepreneurship also remain high in professional services (e.g. accounting, legal etc.) principally due to strict entry conditions (OECD, 2013b).

1.3 Changes in important institutional and labour market characteristics

In the past few years, Luxembourg authorities have introduced a broad range of labour market policies to cushion the labour market from the effects of the recession. The package included a mix of i.) *activation measures* to increase job opportunities for the unemployed and improve matching between labour supply and demand, ii.) *passive income replacement measures* for those who lost their jobs and iii.) *other measures* to support and maintain labour demand (e.g. by encouraging employment retention) (see Table 3.4 in Appendix 3 for further details).

1.3.1 LABOUR CONTRACT REGULATION AND EMPLOYMENT PROTECTION

1.3.1.1 Changes in firing costs and firing regulations

In 2009, the long-planned so-called *single statute* reform came into force. The reform merged the former "blue-collar" and "white-collar" statutes into a single statute for all private sector employees. The major changes were (i.) equal treatment of paid sick leave for all employees, (ii.) creation of a mutual insurance framework to cover employers against extra wage costs due to the first point, (iii.) a single contribution rate for sickness insurance and iv.) higher firing costs (severance payments for blue-collar employees were raised to match redundancy pay of white-collar workers).

1.3.1.2 Incentives to job creation and subsidies for new hires

Hiring subsidies were introduced or scaled up to focus on new hires and target specific groups (e.g. young, older or long-term unemployed). In 2009, existing employment support contracts targeted at the unskilled young were extended to qualified young workers. These contracts provide youths with work experience and practical/theoretical training, while (partly) compensating firms for the wage and non-wage costs incurred. These (initially temporary) employment contracts were reformed and became permanent in 2013. In 2014, the government introduced the so-called youth guarantee, ensuring that all young job-seekers receive a reasonable offer (job, apprenticeship or training) within four months of registering with the national employment agency ADEM. The government also modified existing subsidies and social security rebates for employers hiring long-term or older unemployed. These temporary measures were successively extended to the end of 2016.

1.3.2 COLLECTIVE BARGAINING SYSTEM, WAGES AND REGULATION OF EMPLOYMENT

1.3.2.1 Changes in the regulation of wage setting

The *wage indexation scheme* came under substantial strain in the crisis and was adapted on several occasions. The timing of the automatic wage increases was no longer linked mechanically to inflation developments, but, once triggered, was delayed by some months to pre-specified dates. The objective was to dampen wage growth and, in particular, to avoid the overlap of two successive automatic wage increases within a year. These discretionary delays were intended to be temporary. They were initially announced for the period 2006-2009 only, but the government reintroduced them in 2010-2011 and 2012-2014, as the threat of potentially overlapping automatic wage hikes recurred.[3] Following the expiration of these temporary adjustments, in January 2015, the mechanism prevailing prior to 2012 became effective again. However, the government

[3] More precisely, in autumn 2010, the social partners agreed to a one-off change to the automatic indexation mechanism, postponing any wage increase in 2011 to October at the earliest. Along the same lines, in December 2011, the government decided to postpone any wage increase in 2012 to October at the earliest. In addition, over the period 2012 to 2014, at least twelve months were required between any two automatic wage hikes. This measure introduced a de facto cap of 2.5pp for the contribution of wage indexation to year-on-year nominal wage growth.

has informally committed to limit the index-related wage increases to a maximum of one per 12-month period over the years 2014-2018.

1.3.2.1 Changes in internal working conditions

As the crisis began to unfold, the government decided in 2009 to encourage employment retention and work sharing by temporarily modifying the existing short-time work schemes. Changes included to (i.) *extension of coverage and duration*, (ii.) *loosening of eligibility criteria* and (iii.) *enhancement of entitlements* (for both employees and employers). As the recession continued to deepen, the government decided to successively prolong and scale up the new short-time work provisions over the years 2010-2015. These temporary changes were phased out at the end of 2015.

1.3.3 LABOUR MARKET POLICIES

1.3.3.1 Unemployment benefits and other passive policies

Unemployment insurance was temporarily increased in 2010, through lower degressivity and broader eligibility criteria for extensions in benefit duration. These temporary measures, initially meant to be phased out in 2011, were extended up to the end of 2013 and 2016. Along with these temporary measures, benefits were permanently increased for unemployed people enrolled in *community work* or *training programmes*.

1.3.3.2 Activation of unemployed

In 2012, the government launched a major *reform of the national employment agency* ADEM in order to improve the efficiency of its job placement services. Measures included (i.) *recruitment of additional manpower* to mitigate the rise in caseload per worker, (ii.) *recruitment of employees from the private sector*, (iii.) *provision of professional training* and (iv.) *regional decentralisation of public employment services*. The reform also included the systematic profiling of the job seekers (early assessment of their skills, individual guidance and training / career counselling, enhanced job-search support). On the other side, activation requirements were strengthened and benefit entitlement linked to compliance with obligations (such as the early registration at the public employment services, the active job-search or the acceptance of suitable job offers). Mutual obligations and rights were formalised in binding contracts between job seekers and the agency.

In a recent *agreement with the government, the leading employers' association* pledged to increase the number of registered unemployed hired over the next three years (mainly through employment support programmes). It also committed to encourage firms to post their job openings at the ADEM. Additional measures included partnerships with leading firms, early assessment and identification of skills needed in the economy and training programmes matched to these needs.

1.3.3.3 Other

The Luxembourg parliament passed a law fundamentally reforming the public sector employment regime. The main aspects of the reform becoming effective in October 2015 included: first, the training period for civil servants / employees was extended from two to three years, with the starting salary during the training period lowered. The automatic pay increases over civil servants' careers will be flattened. The reform also introduces some performance evaluation in promotions, along with a seniority-based mechanism. It requires performance appraisals through "management by objectives" processes and the assessment of personal and professional skills. Other labour market-related policy measures are still pending vote by the Parliament, e.g. the introduction of time savings accounts in the private and public sectors or the reform of early retirement schemes.

2 The survey

2.1 Questionnaire

The survey questionnaire contains five separate sections (see Appendix 1). Section 1 collects basic information about the firm. Section 2 asks the firm to assess the main changes in its economic environment during the period under investigation. Section 3 addresses firms' labour force adjustment. Section 4 collects information on wage setting and the frequency of wage changes. Finally section 5 collects information on firms' price setting behaviour and their frequency of price changes. In this section, the answers relate to firms' "main product" ("activity" or "service"), defined as the one that generated the highest share of revenue in the "reference year". To harmonise with other ESCB surveys, the main time period is 2010-13. However, as the main economic downturn in Luxembourg occurred during 2008-09, we collected information for that period as well. In some cases, firms were asked to provide information on their situation and behaviour prior to 2008.

Questions were designed to limit the response burden, for example by requesting qualitative information based on a set of pre-defined answers (e.g. a 4-point Likert scale ranging from "*unimportant*" (1), "*minor importance*" (2), "*important*" (3) to "*very important*" (4)). Firms were provided with a dedicated telephone number and email address for assistance. To improve the return rate, questionnaires were available in French, German and English.

2.2 Initial sample composition

The sample is drawn from the population of firms in the Luxembourg firm register at the end of 2013. Firms were required to meet the following conditions: at the cost of introducing a survival bias into the sample, we required firms to be operational at least since the end of 2007. Unlike in other European countries, in Luxembourg the main economic shock to GDP took place in 2008-09 and therefore the survey had to cover this additional time period. A substantial number of questions address both sub-

periods 2008-09 and 2010-13. In contrast to WDN surveys in most other EU countries, we included micro firms, i.e. firms with 1-4 employees. Furthermore, we excluded agriculture (NACE 2: A) and non-market services (NACE2: O,P,Q,R,S,T,U) and focused on the following 5 broad sectors: Manufacturing (NACE 2: C), Construction (NACE 2: F), Trade (NACE 2: G), Business Services (NACE 2: H,I,J,L,M,N), Financial Services (NACE 2: K). In addition to sector of production, firms were stratified according the following size classes: "1-4 employees" (micro firms), "5-19 employees" (very small firms), "20-49 employees" (small firms), "50-199 employees" (medium-sized firms) and "200+ employees" (large firms).

To analyse changes over time, the sample included those firms that had already participated in the first wave of WDN survey in 2008 (>1,000 firms). Additional firms were sampled (ex ante) via a stratified random selection procedure, to ensure good coverage in all 25 strata defined by sector and size class combinations.

2.3 Fieldwork

The fieldwork was carried out by the Luxembourg Institute of Socio-Economic Research (LISER) on behalf of the BCL. Sampled firms were sent a letter and some documentation describing the survey, its intent, the preservation of firms' confidentiality etc., as well as how to contact either the BCL or LISER.

Contacted firms were asked to complete the questionnaire online. Firms were invited to connect to a secure website with an individual login and password. The web-based programme included a substantial number of internal consistency checks to reduce the burden of editing and checking the database. Before logging in, firms could download the questionnaire. Firms were provided with three different contact modes (email, phone or traditional mail) in case they wished to ask questions or to receive the paper version of the questionnaire.

A pre-test with 8 firms took place between 15-28 October 2014 and the main field phase began on 12 November 2014, lasting until the end of February 2015. Initially, 4996 firms were contacted to participate in the survey. During the field phase two reminders were sent to firms. Firms that had had begun the survey but had not finished by the deadline were given an additional extension. The final sample contains only firms that completed the survey; it contains 674 firms, representing a total response rate of 13.5% (representative of the underlying firm).

2.4 Final sample composition and weighting

The sample is reweighted to make the results representative of either the underlying firm population or the number of employees as represented by the underlying firm population. In few cases the size class provided by STATEC did not match the size class indicated in firms' answers. These were classified according to the size class stratum as reported by the firm. However, the number of firms and employees in the population were not adjusted. Summary statistics presented in this report are usually

based on firm weights (i.e. the inverse selection probability). Where applicable, we also report summary statistics based on employment weights. In these cases, differences in the weighting will be brought to the attention of the reader.

Table 1: Final sample composition

Sector	Size class	N	L	n	l	wb	wl
Manufacturing	1-4	282	328	19	36	14.8	17.3
	5-19	193	1968	26	243	7.4	75.7
	20-49	91	2883	10	343	9.1	288.3
	50-199	72	7332	16	1743	4.5	458.3
	200+	33	20765	4	1159	8.3	5191.3
	Total	*671*	*33276*	*75*	*3524*	*8.9*	*443.7*
Construction	1-4	1176	1226	19	45	61.9	64.5
	5-19	705	7092	47	547	15.0	150.9
	20-49	287	8854	59	1829	4.9	150.1
	50-199	121	10612	20	1587	6.1	530.6
	200+	24	7226	4	1194	6.0	1806.5
	Total	*2313*	*35010*	*149*	*5202*	*15.5*	*235.0*
Trade	1-4	3518	3573	45	100	78.2	79.4
	5-19	1064	9888	53	562	20.1	186.6
	20-49	240	7207	42	1314	5.7	171.6
	50-199	105	9460	14	1228	7.5	675.7
	200+	21	11219	3	4533	7.0	3739.7
	Total	*4948*	*41347*	*157*	*7737*	*31.5*	*263.4*
Business services	1-4	6512	5609	38	91	171.4	147.6
	5-19	1600	14836	79	770	20.3	187.8
	20-49	419	12865	41	1398	10.2	313.8
	50-199	205	18869	35	2920	5.9	539.1
	1-4	70	45742	10	9459	7.0	4574.2
	Total	*8806*	*97921*	*203*	*14638*	*43.4*	*482.4*
Financial services	5-19	535	532	19	42	28.2	28.0
	1-4	134	1216	28	308	4.8	43.4
	5-19	69	2229	18	616	3.8	123.8
	50-199	54	5279	12	1260	4.5	439.9
	200+	38	24143	13	9425	2.9	1857.2
	Total	*830*	*33399*	*90*	*11651*	*9.2*	*371.1*
Overall Total		17568	240953	674	42752	26.1	357.5

Note: N, L, n, l denote the total number of firms in the target firm population, of employees in the target firm population, of firms and of employees in the sample. The stratum-specific weights are calculated as wb=N/n to obtain representative results for the target population of firms and wl=L/n for the target population of employees.

2.5 Structural characteristics of Luxembourg firms

The survey collects information on various structural firm characteristics, allowing us to analyse how adjustments to the economic and financial crisis vary across firm typologies, such as company ownership and control. For example, 90% of firms are single establishment firms, 85% are mainly under domestic ownership and 47% are parent companies (responses weighted to be representative of the population of firms). Such

characteristics serve to partition the sample in calculating descriptive statistics or as covariates in regression models.

In terms of labour force composition, the survey suggests that Luxembourg firms employ mainly full-time permanent workers (88% in 2007 and 87% in 2013 in employment weighted terms). Permanent, part-time workers account for around 8% of employees. The remaining 4% are employees with temporary, fixed-term contracts. Aggregate statistics indicate no substantial changes in this composition since 2007. In 2007, 55% of employees were cross-border workers. This share slightly increased to 57% in 2013 (employment weighted).[4] Luxembourg is also the EU country with the highest share of immigrants and only about one fifth of the employees are Luxembourg nationals. Fifty-five percent of employees are considered highly skilled (23% non-manual and 32% manual) and employees have usually been employed by the firm for more than five years (59%). Across sectors and size classes the average (median) share of labour in total costs is 49% (50%), ranging from 42% (40%) in the trade sector to 53% (60%) in business services.

Table 2: Structural labour force characteristics (end of 2013), in %

Share of type of employees in total	in 2007	in 2013
Permanent full-time	87.8	86.7
Permanent part-time	8.4	9.3
Temporary or fixed-term	3.9	4.2
Total	100.1	100.1
Agency workers and others	45.0	43.2
Cross-border workers	55.1	56.6
Employees with Luxembourg nationality	23.1	21.5

OCCUPATIONAL GROUPS		
Higher skilled non-manual	(ISCO: 1, 2, 3)	23.0
Lower skilled non-manual	(ISCO: 4 and 5)	28.2
Higher skilled manual	(ISCO: 7 and 8)	32.7
Lower skilled manual	(ISCO: 9)	16.2
Total		100.1
JOB TENURE		
Below 1 year		10.8
Between 1 and 5 years		29.4
More than 5 years		59.4
Total		99.6

Note: Weighted to represent employees in the target population. Shares may not exactly sum to 100%.

2.6 Previous waves

Similar surveys were conducted by the Banque centrale du Luxembourg in mid-2008 and mid-2009. They were designed in close correspondence to other national surveys in the Eurosystem Wage Dynamics Network, in which most national central banks undertook or commissioned comparable surveys. The 2009 survey was specifically designed to ask firms how they responded to the initial phase of the economic and financial crisis. It was addressed to those firms that had previously participated in the 2008 survey on firms' wage and price setting behaviour. Both surveys were conducted by email and included an electronic questionnaire with built-in consistency checks alerting respondents of inconsistent or invalid answers. In contrast to the 3rd wave in 2014, firms in the initial survey in 2008 were sampled from the Luxembourg yellow pages "EDITUS", which included names of contact persons and email addresses.

[4] These figures only refer to employment in the sectors included in the WDN survey. Agriculture and non-market services are excluded. These figures are broadly in line with administrative data (around 53% of cross-border workers).

The results of the 2009 survey suggested that most firms were negatively affected by the onslaught of the crisis, due to a fall in demand, but also to difficulties in raising finance or receiving payment for their products and services. Firms adjusted using various measures depending on the type and the size of the shock. In the initial phase of the crisis, firms focused on cutting costs, predominantly via a reduction of non-labour costs, but they also considered cutting temporary staff, bonuses and overtime compensation. Although base wage freezes were rather common, cuts in base wages remained very rare and few firms reduced permanent staff. Firms attributed their reluctance to cut base wages to labour market regulation or existing wage agreements and the possible impact on staff morale and effort. For more detailed information see Lünnemann and Mathä (2011).

3 Main results on adjustments and changes to wage setting

3.1 Sources and size of shocks

For firms, a general economic downturn can manifest itself in various ways. Demand may drop, demand uncertainty or volatility may increase *(demand shock)*, credit may be limited or only available at less favourable conditions *(credit constraint shock)*, customers may find it more difficult to meet their contractual obligations *(cash flow shock)* and/or the supply chain may be interrupted *(supply shock)*. As a general proviso, the aggregate results below mask substantial heterogeneity across firms. Firms with *different* size in *different* sectors at *different* points in time experienced *different* types of shocks with *different* severities and *different* degrees of persistence, also reflecting the *different* stages of the crisis and its propagation (e.g. the subsequent sovereign debt crisis). Where applicable we will highlight important differences.

In Luxembourg, about three out of four firms report having experienced a negative shock between 2008 and 2013 (Table 3). For financial services firms the most negative demand shock was in 2008, for manufacturing and business services firms it was in 2009 and for construction and trade firms in 2013.[5] The shocks most commonly cited are demand-related shocks (66.1% and 63.1%). Over time, the year 2013 had the highest share of firms reporting having experienced a shock (46.2% of firms representing 37.5% of employees). This reflects many different shocks in 2013, not only demand related, while demand shocks clearly dominated in the beginning of the economic and financial crisis.

Applying employment weights instead of firm weights, the demand and demand volatility shock in 2008 and 2009 gain in importance (2008: 22% and 22%; 2009: 27% and 26%) raising the share of firms experiencing at least one shock to 28% and 34% in 2008 and 2009. The share of firms experiencing non-demand related shocks remains unaltered or diminishes. In contrast, when using employment weights the share of firms

[5] Industry is more export-oriented and suffered from the collapse in world trade in 2009, while the services sector is highly dependent on the financial sector and suffered from the drop in financial activity.

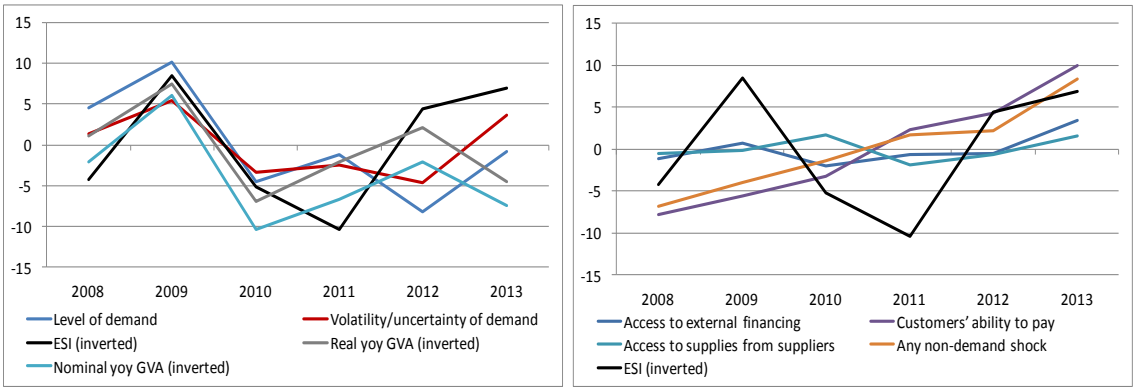
experiencing shocks remains unchanged in 2010 and 2011, while the share is substantially smaller in 2012 and 2013. From 2010 until 2013, the share of firms reporting at least one shock is 29%, 29%, 27% and 37%, respectively. The share of firms reporting a negative shock on demand or demand volatility in any year during the entire period 2008-2013 is largely unaffected while the share of firms reporting other non-demand related shocks declines by 8-9 percentage points.

Table 3 : The most negative shocks (% of firms, by year)

	2008	2009	2010	2011	2012	2013	At least in one year
Level of demand for your products/services	13.2	23.8	16.9	15.5	16.3	22.6	66.1
Volatility/uncertainty of demand for your products/services	11.4	21.4	13.7	17.3	18.5	25.6	63.1
Access to external financing needed for financing your firm's usual activity	5.0	10.1	6.3	9.3	11.8	14.5	31.1
Customers' ability to pay and meet contractual terms	8.4	10.0	11.3	12.3	18.5	26.8	51.6
Access to supplies from your firm's usual suppliers	3.0	6.2	3.8	5.7	7.5	7.7	23.4
At least one shock	18.9	30.9	27.8	30.0	37.0	46.2	76.5

Note: Weighted to represent the firm target population. "At least in one year" refers to the share of firms reporting having experienced a shock in at least one of the years considered.
Q2.9 In which years did the most negative shocks occur?

Figure 3: Shocks, GVA and economic sentiment



Source: STATEC; DG ECFIN, BCL

Note: y-o-y growth figures for real gross value added (GVA) aggregated for sectors included in the sample (in inverted scale, in %). 'Demeaned' absolute change in the Economic Sentiment Indicator (ESI, in inverted scale, in ppts) and share of firms' in employment weighted terms (in %) indicating in Q2.9 that most negative shocks occurred in specific years (Q2.9 In which years did the most negative shocks occur?)

The answers of firms are broadly line with the evolution of real year-on-year gross value added (y-o-y GVA) aggregated for sectors included in the sample or the economic sentiment indicator (ESI) (Figure 3). This is particularly the case during the initial phase of the economic and financial crisis. During the subsequent period, more divergence is observed. In 2013 in particular, a high share of firms report a negative shock, reflecting a combination of demand and non-demand shocks. Customers' inabil-

ity to pay or to meet contractual terms is important, growing steadily between 2008 and 2013. The economic sentiment indicator picks this up, but real y-o-y GVA does not - real GVA improved between 2012 and 2013.

Demand related factors at the heart of firms' initial problems

The predominance of demand related factors during the initial phase of the crisis (2008-09) also appears from the answers to question 2.1 in the survey (Table 4). Thirty-six percent of firms (representing of employment) report that their activity was negatively affected by demand in 2008-09. However, one out of four firms actually reported a positive effect of demand on their activity during this period. Presenting the results in terms of the net percentage change and assigning double weights to answers indicating strong (as opposed to moderate) decreases and increases reveals that the overall figures are heavily influenced by the large share of micro firms (1-4 employees) in the sample. The net percentage change is -22% in firm weighted terms and -13% in employment weighted terms.[6]

Table 4: Source, size and persistence of shocks, in %

Factors	Period	Effect on firms' activity				Persistence of the shocks (conditional on strong shock)		
		Decrease	Unchanged	Increase	Weighted net %Δ	Transitory	Only partly persistent	Long-lasting
The level of demand for your products/services	2008-09	36.1	38.0	25.8	-21.6	24.4	39.1	36.5
	2010-13	41.3	23.9	34.8	-18.9	7.1	25.6	67.3
Volatility/uncertainty of demand for your products/services	2008-09	29.0	57.0	13.9	-24.3	19.2	44.6	36.2
	2010-13	31.8	47.0	21.3	-19.1	1.0	22.7	76.3
Access to external financing through the usual financial channels	2008-09	18.3	79.2	2.5	-21.6	18.6	31.0	50.4
	2010-13	26.0	68.8	5.3	-31.7	3.3	40.0	56.7
Customers' ability to pay and meet contractual terms	2008-09	26.8	68.1	5.1	-25.1	15.8	40.6	43.6
	2010-13	43.5	48.7	7.8	-46.5	9.1	40.4	50.5
Availability of supplies from your usual suppliers	2008-09	10.0	85.8	4.2	-7.6	13.1	1.9	85.0
	2010-13	12.2	83.6	4.2	-10.9	3.3	9.8	86.9

Note: Weighted to represent the firm target population. The "weighted net %Δ" (weighted net percentage change), also called "diffusion index", is the difference between the shares of firms reporting increases and decreases weighted according to the intensity of the response, i.e. assigning double weight to strong decreases (-2) and increases (+2).
Q2.1 How did the following factors affect your firm's activity during 2008-09 and 2010-13?
Q2.2 For those factors which affected your firm strongly, were the effects transitory, partly persistent or long-lasting for 2008-09 and 2010-13?

[6] Micro firms represent 68% of firms but only 5% of employment.

In 2010-13, *customers' ability to pay* became the most relevant factor negatively affecting Luxembourg firms, followed by demand related shocks. In contrast to demand related shocks, however, few firms reported a positive impact of customers' ability to pay on their activity. A negative impact from customers' ability to pay was most often reported in construction, business services and manufacturing, as well as among smaller firms. Apart from financial services, all other sectors identified 2013 as the year in which customers' ability to pay had the largest negative impact on their activity. Most Luxembourg firms were not affected by restricted access to external finance through the usual channels and few firms reported a decrease in the availability of inputs from their usual suppliers. Again, a substantial fraction of firms (35%) reported a positive demand effect on their activity during this period (e.g. due to a substitution effect towards less expensive products).

Overall, a higher share of firms reported that their activity was affected (positively or negatively) by the above factors in 2010-13 than in the initial phase of the crisis. According to the non-parametric McNemar test, the difference between the shares of firms reporting that their activity was affected in 2008-09 and 2010-13 is statistically highly significant for all factors. However, assigning higher weights to factors that affected firms strongly and presenting factors as weighted net percentage change reveals that demand related factors were more relevant in 2008-09 than in 2010-13. This reflects the sharp (foreign) demand contraction in 2008-09 (e.g. OECD, 2010). For the other factors, the changes in the weighting of answers do not overturn the above statements.

Potentially long-lasting effects of the crisis

Firms that reported they were strongly affected (positively or negatively) by shocks found their effects to become longer-lasting over time (Table 4). In the initial phase of the crisis (2008-09), a significantly higher share of firms that reported they were strongly affected considered their effects to be transitory.[7] This mainly reflects demand related factors (perceived as long-lasting by 75% of firms in 2010-13 against 33% during the initial phase of the crisis). It should be noted that the persistence of shocks will determine how firms react. For example, when shocks are perceived to be transitory, firms are likely to be more reluctant to shed labour, discontinue temporary contracts, cut bonuses etc. (because of the cost of such adjustments).

The cost of labour: a major concern for firms

For most firms, total costs increased. This was driven by growing labour costs and, to a lesser extent, rising supply costs, such as raw materials (especially in manufacturing, construction and trade). The evolution of labour costs was a major concern for Luxembourg firms along with competition and finding customers. In 2008-2009, 43% of firms (50% in 2010-2013) identify labour costs as a relevant concern (Table 5). Focusing on

[7] According to the Wilcoxon-Mann-Whitney non-parametric version of the t-test (with exception of access to external finance).

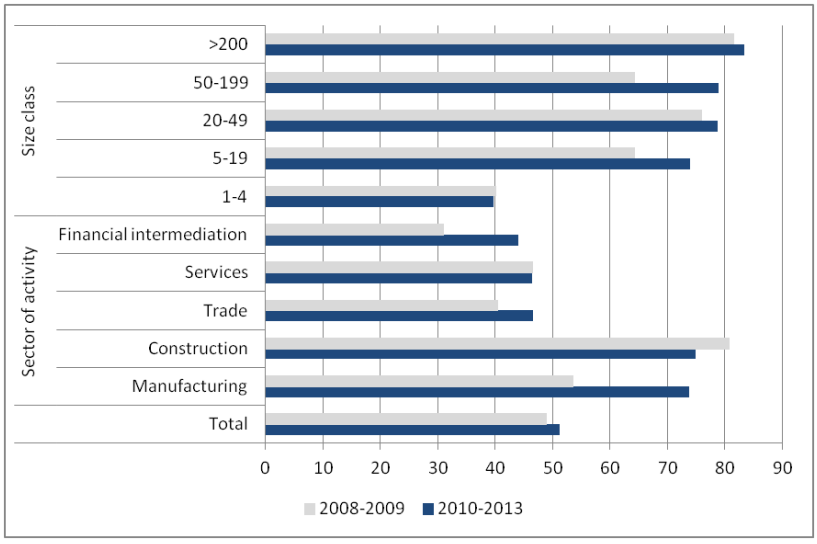
firms hit by a negative shock, this share increases to 49% (51% in 2010-2013) (Figure 4).[8] Labour costs are considered a more important concern in the manufacturing and construction sectors. Moreover, the cost of labour seems to have become a greater source of concern for manufacturing firms in 2010-13. In contrast, labour costs are least relevant in the financial intermediation sector.

Table 5: Most important issues faced by firms during the crisis, in %

Factors	2008-09	2010-13
Finding customers	61.5	72.9
Competition	57.3	67.0
Cost of labour	43.0	50.1
Of which – automatic wage indexation	*43.0*	*46.5*
Of which – minimum wage	*28.2*	*32.8*
Availability of skilled staff or experienced managers	45.2	53.4
Regulation	44.7	53.3
Other	13.3	15.7

Note: Weighted to represent the firm target population. The accept ratio is the sum of the answers "relevant" and "very relevant" expressed as a percentage of all answers.
Q2.10 What are the most important issues your firm faced during the period 2008-09 and 2010-13?

Figure 4: Share of firms facing a negative shock that reported labour costs as a relevant or very relevant issue, in %



Note: Weighted to represent the firm target population. Conditional on firms reporting a negative shock and reporting labour costs to be of relevant concern (354 responses representing 57% of firms or 75% of employment).
Q2.10 What are the most important issues your firm faced during the period 2008-09 and 2010-13?

[8] Again, this aggregate result is driven by micro firms. Only considering firms with 5 and more employees hit by a negative shock, this share increases to about 75%.

3.2 *Adjustment methods: costs and wages versus labour force size and composition*

Firms' adjustment to adverse economic shocks is likely to depend on the nature of these shocks. Since labour costs are of particular relevance for most of the firms, this section focuses on labour adjustment (labour demand and/or labour costs).

Cut in base wages seen as a last resort option

Table 6 captures the adjustment of firms that reported a negative shock and identified labour costs as a relevant issue. During 2010-13, firms adjusted primarily via cuts in permanent employment, with wage cuts less common: base wages increased in 71% of firms but decreased in 14% of firms. In this context, it should be noted that the rise in base wages is also attributable to the automatic indexation of wages to past inflation. Despite the temporary modulation of this mechanism, there were 4 indexation-induced wage hikes during 2010-13. Flexible wage components contributed little to the adjustment process. These declined in 16% and increased in 35% of firms.[9] The number of permanent employees declined in nearly 33% of firms while it increased in 20% of firms. Conversely, during 2010-13, many firms shifted their labour force from permanent staff to temporary/fixed-term employees. The share of firms reporting an increase in temporary staff is higher than the share of firms reporting a decrease.[10] Increasing demand uncertainty and volatility may encourage firms to hire temporary employees rather than permanent ones (usually covered by stricter employer protection legislation).[11]

Table 6 documents the general adjustment pattern also during 2008-09, when the share of firms reporting decreases was always below that in 2010-13.[12] This could be related to the results in Table 4: fewer firms reported a negative shock in 2008-09 and among those that were hit, a smaller share perceived the shock(s) to be long-lasting.

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[9] The rise in flexible wage components may indicate that during times of economic uncertainty firms prefer one-off bonuses to increases in base wages.

[10] Firms tend to use temporary or agency workers as a sort of employment buffer to absorb cyclical fluctuations. This type of employment allows them to react quickly and at lower cost to changing economic conditions. In Luxembourg, the share of temporary workers remained virtually unchanged during the crisis, at around 4% of total employees, below OECD average (11% in 2013), probably reflecting strict employment protection legislation. Only 2% of firms in the sample employ temporary workers. This share is highest in the manufacturing sector (9% in 2013).

[11] Results are conditional on firms reporting a negative shock and identifying labour costs as a relevant concern. Thus, they may not reflect developments in employment composition at the aggregate level.

[12] The difference is statistically significant for all labor costs adjustment channels except for the number of agency workers and "other components" (based on the McNemar test).

Table 6: Labour cost adjustment, in %

	Period	Decrease	Unchanged	Increase
Base wages or piece work rates	2008-09	7.1	33.2	59.7
	2010-13	14.2	15.0	70.9
Flexible wage components (bonuses, fringe benefits, etc.)	2008-09	12.6	55.3	32.1
	2010-13	15.8	49.3	34.9
Number of permanent employees	2008-09	24.1	67.9	8.0
	2010-13	31.4	48.8	19.7
Number of temporary/fixed-term employees	2008-09	9.8	78.5	11.6
	2010-13	13.7	65.2	21.1
Number of agency workers and others (free-lance work, etc, not hired under employment contracts)	2008-09	11.4	83.6	5.0
	2010-13	17.5	70.8	11.8
Working hours per employee	2008-09	16.4	68.1	15.6
	2010-13	21.0	54.0	25.0
Other components of labour costs	2008-09	1.2	74.9	23.8
	2010-13	3.6	67.7	28.7

Note: Weighted to represent the firm target population. Conditional on firms reporting a negative shock and identifying labour costs as a relevant concern.
Q2.5 Please indicate how each one of the components of labour costs listed below has changed during 2008-09 and 2010-13.

... but a large heterogeneity emerges across size classes

The aggregate numbers reported in Table 6 conceal a certain degree of heterogeneity across size classes. Table 7 analyses the adjustment of firms reporting (moderate or strong) decreases in labour costs by firm size and sector. Micro firms (fewer than 5 employees) identify reductions in base wages as more relevant, probably because these firms are less constrained in re-negotiating their wages (less than 10% of them apply a collective pay agreement).[13] In fact, only 5% of firms with 50-199 employees and no firm with more than 200 employees reported a decrease in basic pay during the period under review. In contrast, bonuses and other variable forms of compensation declined in one quarter of these firms.[14] Large firms (with 200+ employees) are also more likely to cut employment (both permanent and temporary or agency workers) than firms in any other size class.[15] In addition, during 2010-13, working hours per employee declined for 29% of both large and micro firms. A similar pattern is observed during 2008-09 although fewer firms were affected, although fewer firms were affected.

[13] However, the impact on aggregate wage dynamics is limited, as firms reporting a cut in base wages represent only 3.4% of employment. The difference is only statistically significant in the 2010-13 period (based on the Wilcoxon-Mann-Whitney test).

[14] Overall, there is a positive correlation between firm size and the use of flexible compensation components. This form of cost adjustment is less common in small firms.

[15] The difference is only statistically significant in 2008-09 (based on the Wilcoxon-Mann-Whitney test).

Table 7: Firms reporting a decrease (strong or moderate) in labour cost components, by sector and size class, (2008-09 / 2010-13), in %

Size class / Sector activity	Base wages or piece work rates	Flexible wage components	Number of permanent employees	Number of tempo-rary/fixed-term employees	Number of agency workers and others	Working hours per employee	Other compo-nents of labour costs
1-4	9.0 / 22.4	12.0 / 16.7	26.3 / 28.1	7.2 / 8.6	9.6 / 18.6	22.7 / 29.0	0.0 / 2.4
5-19	3.7 / 2.4	12.0 / 14.2	19.9 / 35.9	7.6 / 17.1	12.6 / 15.5	5.8 / 9.8	1.8 / 4.1
20-49	5.9 / 10.2	16.9 / 16.6	19.4 / 33.0	17.3 / 24.4	13.1 / 18.2	10.9 / 12.6	8.6 / 5.8
50-199	5.8 / 5.3	14.9 / 12.7	27.1 / 35.5	32.0 / 27.6	15.6 / 13.2	9.0 / 12.7	2.2 / 10.3
>200	4.6 / 0.0	15.5 / 24.8	32.9 / 45.2	37.5 / 25.7	42.1 / 25.7	20.3 / 29.0	0.0 / 12.3
Manufacturing	4.6 / 11.4	12.6 / 15.8	20.2 / 27.3	24.6 / 6.9	24.6 / 6.4	9.2 / 19.5	7.1 / 6.5
Construction	6.9 / 12.5	18.4 / 15.0	15.8 / 47.8	9.8 / 25.4	16.0 / 30.3	12.0 / 17.2	2.3 / 3.2
Trade	0.8 / 17.6	11.9 / 14.7	12.8 / 36.5	2.0 / 15.7	4.9 / 6.8	18.5 / 24.2	2.2 / 6.8
Business Services	9.6 / 13.7	11.8 / 22.4	31.2 / 21.6	11.3 / 8.5	11.0 / 19.4	17.0 / 20.8	0.0 / 1.8
Financial intermediation	14.1 / 6.6	12.5 / 12.9	51.8 / 43.3	20.9 / 8.9	15.4 / 5.1	39.1 / 27.7	0.0 / 0.0

Note: Weighted to represent the firm target population. Conditional on firms reporting a negative shock and identifying labour costs as a relevant concern.
Q2.5 Please indicate how each one of the components of labour costs listed below has changed during 2008-09 and 2010-13.

... and across economic sectors

The adjustment strategies also vary quite substantially across sectors. In 2008-09, a similar share of construction firms cut the flexible wage component, the number of permanent employees and agency workers and the number of working hours per employee (between 12% and 18% of firms). In the following period, however, construction firms primarily cut employment (including permanent, temporary and agency workers) with nearly half of firms reducing permanent employment. The difference between the two periods is highly statistically significant (based on the McNemar test). Employment reductions were also rather common in financial intermediation. More than 50% of firms in this sector cut permanent employment in 2008-09, and 40% in 2010-13. Selective layoffs may also have facilitated downward adjustment in base wages for 14% of these firms in 2008-09. However, between 2010 and 2013, more than 85% of financial intermediation firms reported a rise in basic pay.[16] In the trade sector a comparatively low share of firms lowered their labour costs in 2008-09. The most common adjustment was a cut in working hours per employee. As a result only 1% of firms reported a decline in base wage. However, during 2010-13, 36% of trade firms cut the

[16] This result is not particularly surprising as more than 60% of financial services employees were covered by collective wage negotiations in 2013. Collective agreements applicable to the banking and the insurance sectors included pay increases over 2010-2013 (affecting 80% of total employment in the financial sector).

number of permanent employees and 18% cut base wages, representing the highest share across sectors.[17]

Table 8: Methods used to adjust labour input, by sector and size class, Accept ratios for 2008-09 and 2010-13, in %

		Collective layoffs	Individual layoffs	Temporary layoffs	Subsidised reduction in working hours	Non-subsidised reduction in working hours	Non-renewal of temporary contracts at expiration	Early retirement schemes	Freeze or reduction of new hires	Reduction of agency workers and others
2008-2009	**Total**	**2.9**	**26.5**	**4.3**	**5.5**	**11.3**	**11.5**	**7.1**	**47.3**	**18.9**
Size class	1-4	1.4	26.8	0.0	3.8	7.6	9.1	8.4	44.5	17.5
	5-19	5.8	21.1	15.8	10.3	19.4	13.7	4.5	56.7	17.4
	20-49	5.6	45.5	10.8	0.0	13.7	13.9	0.0	41.5	30.3
	50-199	10.5	28.5	11.7	17.0	18.1	15.9	6.4	53.5	19.0
	>200	0.0	6.2	0.0	0.0	38.7	63.9	14.9	51.2	57.7
Sector	Manufacturing	3.3	33.7	13.2	18.6	18.0	42.1	12.0	68.0	33.4
	Construction	9.1	41.5	9.1	7.7	19.0	9.5	0.0	61.7	20.5
	Trade	0.0	24.8	5.3	15.0	35.2	0.0	0.0	58.2	10.8
	Business Services	1.3	22.2	3.1	2.1	3.6	12.7	10.1	40.1	20.7
	Financial Services	25.8	59.7	0.0	0.0	8.9	10.5	0.0	61.8	4.6
2010-2013	**Total**	**4.5**	**34.1**	**3.3**	**2.8**	**16.4**	**12.6**	**6.1**	**49.8**	**14.7**
Size class	1-4	3.8	35.1	2.2	2.2	17.7	7.3	4.7	46.7	7.3
	5-19	5.8	32.6	6.3	2.9	12.7	19.6	8.0	54.6	26.5
	20-49	6.5	34.3	3.0	4.2	16.4	26.9	4.6	58.2	36.4
	50-199	4.2	30.2	6.4	10.6	19.6	29.0	14.1	61.9	25.3
	>200	5.8	19.6	0.0	0.0	5.8	62.7	31.2	54.6	68.8
Sector	Manufacturing	7.6	31.7	8.3	18.3	20.6	34.0	12.3	58.2	37.7
	Construction	17.9	44.0	4.3	0.5	14.3	19.4	1.6	66.7	30.0
	Trade	0.0	18.5	6.7	6.7	22.8	2.7	5.7	38.4	6.5
	Business Services	1.4	37.4	1.4	0.7	14.7	12.2	7.0	47.1	11.0
	Financial Services	13.0	35.3	0.0	0.0	7.8	19.5	8.7	73.8	15.1

Note: Weighted to represent the firm target population. Conditional on firms reporting a need to reduce labour input or alter its composition. The accept ratio is the share of firms answering "moderately" or "strongly".
Q3.3bis If "yes" in question Q3.3a, which of the following measures did you use to reduce your labour input or alter its composition when it was most urgent?

In 2008-09, 18% of firms indicated the need to reduce labour input or alter its composition, while in 2010-13 this share rose to 30%. The difference is highly statistically significant (McNemar test). The most commonly used measure was to freeze or reduce the number of new hires, followed by individual layoffs, reduction of agency workers and others, non-subsidised reduction of working hours (e.g. limiting or abolishing overtime or resorting to part-time work) and non-renewal of temporary contracts at expiration (Table 8). The low importance assigned to collective layoffs possibly reflects stringent employment protection legislation. Also, significant (skilled) labour shortages in some sectors may make firms reluctant to fire staff. As the economy recovers, firms would

[17] The difference in the share of trade firms cutting base wages between the two sub-periods is statistically significant (McNemar test), while the difference between trade and non-trade firms is not statistically significant (Wilcoxon-Mann-Whitney test).

not only face difficulties recruiting qualified workers but hiring costs may also rise. Collective or temporary layoffs were also rarely used.[18]

The survey results also suggest that the subsidised reduction in hours worked (including short-time work) was not heavily used by firms, although official public data show a significant use of short-time work during the crisis (see section 3.5). This apparent contradiction between information collected among firms and official data may be linked to the structure of our sample (representing a given target population of firms or employees) and the share of micro firms. Figures (as well as data weighted by employees) confirm that subsidised reduction in working time was more common among i) medium-sized firms and ii) manufacturing firms. These results are qualitatively consistent with evidence that short-time work was largely confined to manufacturing.

3.3 Changes in wage setting

COVERAGE, SCOPE AND LEVEL OF COLLECTIVE BARGAINING

A high share of Luxembourg employees is covered by collective pay agreements

As mentioned in Section 1, a substantial share of employees in Luxembourg is covered by collective pay agreements. According to the survey, 5% of firms representing 25% of employees apply firm-level agreements and 10% of firms representing 31% of employees apply outside-the-firm agreements (Table 9). Among firms applying a collective wage agreement, the share of employees covered is 82% and 75%, respectively. In the total sample, 52% of employees are covered by collective wage agreements, regardless of their level.[19] The coverage varies strongly with the size class and sector of the firm in question (Figure 5). The incidence of firm-level wage agreements increases continuously with firm size, but for outside agreements there is a peak at medium-sized firms (50-199 employees). Sector differences are more striking. Outside agreements cover the largest shares of employees in financial intermediation and construction (which are subject to sector-wide collective agreements).[20] By contrast, the largest share of agreements at the firm level is found in the manufacturing sector.

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[18] "Temporary layoffs" refer to employees being temporarily laid off and subsequently rehired by their original employer (Feldstein, 1976). This is usually a response to a temporary shock. A temporary layoff suspends the employment contract without terminating it. Workers might be registered as unemployed and might be entitled to unemployment benefits or similar compensation. Although common in Austria or Canada, temporary layoffs for economic reasons do not exist in Luxembourg. This means that Luxembourg firms who reported temporary layoffs may have referred to short-time work or to "temporary layoffs" for non-economic reasons (involuntary impediments to production, e.g. natural disaster or bad weather conditions).

[19] This is close to the 59% reported by Ries (2013) for 2010, especially since public employees (not considered here) are 100% covered.

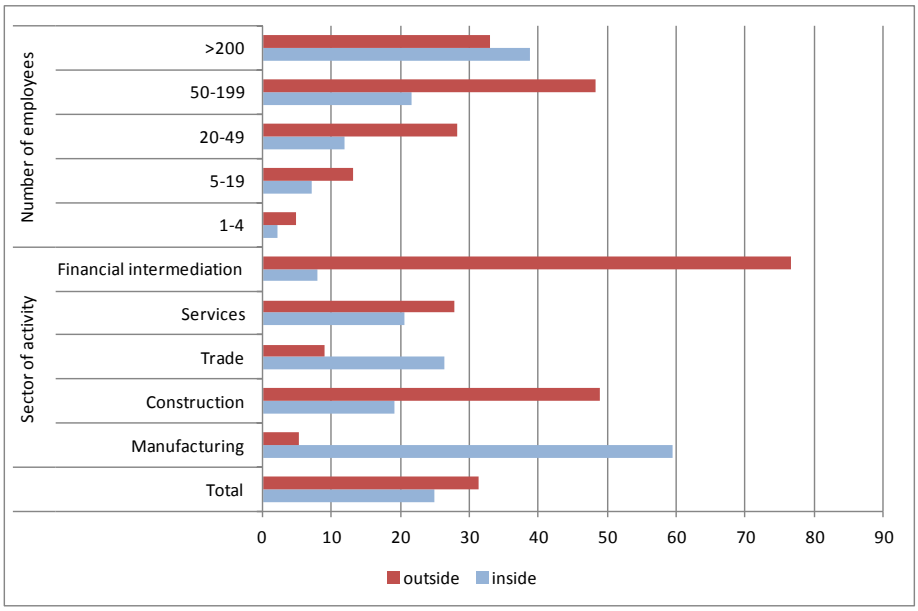
[20] The difference compared to other sectors is highly statistically significant. The same is true for agreements at the firm level when comparing manufacturing to the other sectors (Wilcoxon-Mann-Whitney test).

Table 9: Collective wage agreements in 2013, in %

	At the firm level	Outside the firm
No, such an agreement does not exist	72.9	67.7
No, the agreement exists but the firm opted out	2.1	0.9
Yes, such an agreement is in effect	25.0	31.3
Share of employees covered by collective pay agreement		
At level (conditional on existence)	81.8	75.0
At any level (unconditional)	52.2	

Note: Weighted to represent the employee target population.
Q4.2 and Q4.2bis In 2013, did your firm apply a collective pay agreement bargained and signed inside of the firm (at the firm level) and signed outside of the firm (at the national, regional, sectoral or occupational level)?
Q4.3 What is the proportion of your employees covered in 2013 by any collective agreement?

Figure 5: Collective wage agreements, in 2013 by sector and size class



Note: Weighted to represent the employee target population.

Omitting firms answering "not applicable" (firms representing almost 50% of employment), most collective wage agreements are changed less frequently than every two years (incl. never). This frequency is relatively stable over time. In contrast, the share of firms changing collective wage agreements every two years declined over time while the share of firms changing such agreements once a year increased.

Table 10: Changes in collective wage agreements, in %

	before 2008	2008-2009	2010-2013
More than once a year	0.4	0.4	0.2
Once a year	6.2	6.2	8.4
Once between one and two years	3.7	2.9	3.7
Every two years	15.0	14.8	12.5
Less frequently than once every two year	19.0	22.1	23.0
Never	8.6	6.6	5.1
Not applicable	47.1	47.1	47.0
Total	100.0	100.0	100.0

Note: Weighted to represent the employee target population.
Q4.4 How often does the collective pay agreement applied at your firm typically change?

FREQUENCY OF BASE WAGE CHANGES

In Luxembourg, wages are by law indexed to past inflation. This should affect the frequency of wage changes, unless firm-level wage reviews and where applicable new collective wage agreements, were fully synchronised with indexation dates. This is, however, not the case, as the application of the new index takes immediate effect after the predefined threshold has been reached (unless in times of wage modulation, as previously discussed). In theory, the effect should remove base wage changes of frequencies lower than indexation in the observed data and increase the share of more frequent base wage changes.

The application of wage indexation increased the share of firms implementing more frequent base wage changes

The survey provides new information in this respect. Luxembourg firms were asked to indicate how often they change base wages of employees in their main occupational group, both including and excluding automatic wage indexation (Table 11). Irrespective of the sub-period considered, the median frequency of base wage changes was "once a year" when automatic wage indexation is included, but "once between one and two years" or fewer when automatic wage indexation is excluded. For any of the sub-periods, the share of firms changing base wages more often than once a year is less than 2% excluding wage indexation, but increases by 5-9 percentage points when including wage indexation (Figure 6).

... and reduced the share of firms implementing less frequent base wage changes

Excluding wage indexation the modal category of base wage changes varies across the sub-periods. It is "once a year" prior to 2008, "once between one and two years" in 2008-2009 and "less than once every two years" in 2010-13. Including wage indexation, the most commonly reported category is "once a year" regardless of the sub-period considered. The share of firms changing wages once a year including indexation is 16-20 percentage points higher reaching 34-36%. The share of firms changing base wages "once between one and two years" is largely unaffected by wage indexation in pre-

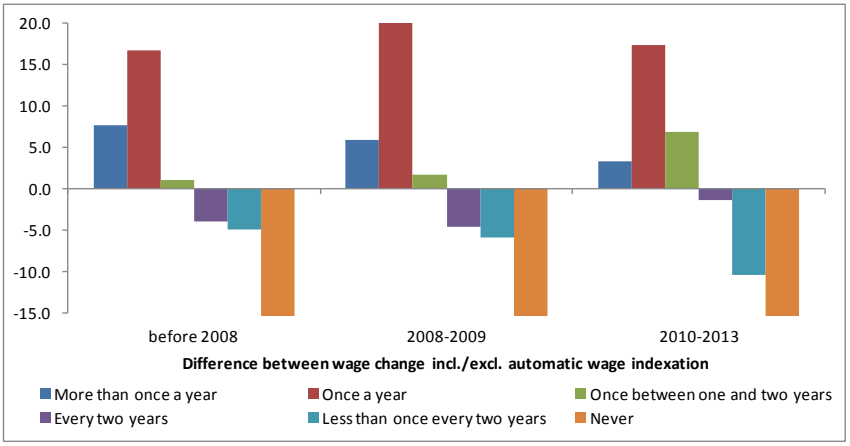
2008 and in 2008-09, unlike in 2010-13, when the difference rises substantially (by 7 percentage points). The share of firms changing base wages once every two years or less often is reduced if wage indexation is included. Together, these results confirm the theoretical argument above.

Table 11: Frequency of base wage changes, in % of firms

	before 2008			2008-2009			2010-2013		
	Automatic wage indexation			Automatic wage indexation			Automatic wage indexation		
	incl.	excl	Δ	incl.	excl.	Δ	incl.	excl.	Δ
More than once a year	8.9	1.2	7.7	6.8	0.9	5.9	5.2	1.9	3.3
Once a year	35.8	19.1	16.8	36.1	15.7	20.4	34.7	17.2	17.5
Once between one and two years	16.5	15.4	1.1	19.8	18.2	1.7	20.6	13.7	6.9
Every two years	2.6	6.6	-4.0	2.1	6.6	-4.6	4.9	6.2	-1.4
Less than once every two years	4.9	10.0	-5.0	4.3	10.3	-6.0	7.0	17.4	-10.4
Never	0.0	16.6	-16.6	0.0	17.5	-17.5	0.0	15.9	-15.9
Not applicable	31.2	31.2	0.0	30.9	30.9	0.0	27.7	27.7	0.0
Total	100.0	100.0	0.0	100.0	100.0	0.0	100.0	100.0	0.0

Note: Share of firms weighted to represent the firm target population. Δ =incl.-excl.
Q4.5a and Q4.5b How frequently was the base wage of an employee belonging to the main occupational group in your firm (largest group in Question Q3.2) typically changed in your firm – including/excluding base wage changes due to automatic wage indexation?

Figure 6: Changes in the frequency of base wage changes, incl./excl. wage indexation



Note: Weighted to represent the firm target population.

Results from a weighted ordered logit regression[21] reveal that the base wage change rigidity is negatively related to the presence of a collective wage agreement (Table 12). This result holds for both including and excluding automatic wage indexation. In addition, large firms (200+ employees) change base wages more frequently. Small (20-49 employees) and very small firms (5-19 employees) change base wages less frequently than micro firms (base category). Sectoral differences suggest trade firms change base wage more often (incl. indexation only) and construction and business services firms change base wages less often (excl. indexation only) than manufacturing firms (base category). Lastly, there seems to be a general trend toward changing base wages less

[21] The dependent variable is defined as follows: 1=more than once a year .... 6 = never.

often, i.e. toward higher nominal wage rigidity, during the period of investigation, as indicated by a significant positive period dummy for both 2008-09 and 2010-13 (base is pre-2008).

Table 12: Weighted ordered logit estimates for wage rigidity

	Wage change frequency (inverted)	
	incl. indexation	excl. indexation
Collective pay agreement	-0.288 ***	-0.243 ***
	-0.054	-0.048
Years 2008-2009	0.112 ***	0.135 ***
	-0.043	-0.040
Years 2010-2013	0.466 ***	0.136 ***
	-0.042	-0.039
Construction	-0.161	0.160 *
	-0.100	-0.088
Trade	-0.380 ***	-0.017
	-0.093	-0.084
Business Services	0.019	0.239 ***
	-0.089	-0.080
Financial Intermediation	-0.145	-0.039
	-0.110	-0.103
5-19 employees	0.435 ***	0.154 ***
	-0.042	-0.039
20-49 employees	0.467 ***	0.147 **
	-0.068	-0.060
50-199 employees	-0.161 *	-0.062
	-0.090	-0.082
200+ employees	-1.656 ***	-0.991 ***
	-0.154	-0.146
No. of obs.	1587	1587
Pseudo R-Squared	0.02	0.00
LogL	-15161.2 ***	-19832.0 ***

Note: * p<0.1, ** p<0.05, *** p<0.01. Weighted to represent the effects in the target population. Standard errors in smaller font. Dependent variable : How frequently was the base wage of an employee belonging to the main occupational group in your firm (largest group in Question C3.2) typically changed in your firm – including base wage changes due to automatic wage indexation? 1 = more than once a year, ..., 6 = never.

INCIDENCE OF FROZEN/CUT WAGES

Downward real wage rigidity in Luxembourg is very high in international comparison, reflecting automatic wage indexation (e.g. Lünnemann and Wintr, 2009, 2011).

Base wage freezes increased from low levels while wage cuts were rare

The incidence of base wage freezes remained rather low during the crisis. In 2008, 8% of firms froze base wages. However, this share steadily increased until 2013 when it reached 15%. The difference between 2008 and 2013 is statistically highly significant (McNemar test). Among firms that froze base wages, between 92% and 95% of their

employees were affected. Cuts in base wages are even rarer in Luxembourg. In 2008-2013, less than 3% of firms cut base wages, and for those that did almost their entire work force was affected (with the exception of 2011 and 2012).

Table 13: Wage freezes and cuts, in % of firms

	Wage freezes	% of employees affected	Wage cuts	% of employees affected	Wages neither frozen nor cut
2008	8.2	95.1	0.0	0.0	91.8
2009	8.3	94.1	0.6	94.3	91.1
2010	9.5	93.5	0.6	94.2	89.9
2011	10.2	94.7	1.6	74.4	88.3
2012	13.3	91.6	3.0	84.6	83.7
2013	14.7	94.2	1.7	95.5	83.7

Note: Weighted to represent the firm target population.
Q4.6 Did you freeze or cut base wages in a given year (please indicate in which years)?

Given such high downward wage rigidity, firms may prefer to change flexible pay components. In fact, the share of firms paying flexible wage components rose steadily between 2007 and 2013 from 20% to 26%. The average share of flexible pay components in the total wage bill, however, shrank from 19% to 12%.[22] At the same time, the median was largely unaffected, fluctuating between 8-10%, which suggests that it is mostly very high bonus payments that shrank.

Table 14: Flexible wage components paid by firms, in %

	Share of firms paying flexible wage components	Average share of wage components in wage bill	Median share of wage components in wage bill
2007	19.5	19.0	10.0
2008	20.7	16.0	8.0
2009	22.5	15.3	8.0
2010	21.2	11.4	9.0
2011	20.4	12.7	10.0
2012	23.3	10.3	9.0
2013	25.9	11.7	10.0

Note: Weighted to represent the firm target population.
Q4.7 Did your firm pay flexible wage components (i.e. bonus etc.) and what was their share in the total wage bill in each of the following years?

[22] Flexible wage components may have simply stagnated or, at least, did not rise as fast as other labour costs. According to table 6, most firms reported no change in flexible wage components, while more firms increased them than decreased them. Differences between 2007 and 2013 are statistically significant.

3.4 *Main obstacles to hiring and labour costs of newly hired workers*

Firms' willingness to create new permanent jobs is linked to both cyclical and structural factors. Luxembourg firms identified several obstacles to hiring workers with permanent contracts: uncertainty of economic conditions (accept ratio: 74%), high wages (61%) and insufficient availability of labour with the required skills (54%). Less important obstacles included high payroll taxes (47%), firing costs (45%), risk of labour law changes (40%), access to finance (38%) and costs of other inputs complementary to labour (32%).

Hiring is impeded by both cyclical and structural factors in the labour market

Table 15: Obstacles to hiring new employees, in % of firms

	not relevant	of little relevance	relevant	very relevant	Accept ratio
Uncertainty about economic conditions	20.7	5.4	38.4	35.4	73.8
Insufficient availability of labour with the required skills	26.3	19.6	30.7	23.4	54.1
Access to finance	34.1	28.0	27.4	10.5	37.9
Firing costs	29.1	25.7	29.3	16.0	45.3
Hiring costs	29.9	37.2	23.6	9.3	32.9
High payroll taxes	23.5	29.3	34.6	12.6	47.2
High wages	19.3	19.4	37.0	24.3	61.3
Risks that labour laws are changed	29.8	29.8	31.6	8.7	40.3
Costs of other inputs complementary to labour	33.6	34.1	22.4	9.8	32.2

Note: Weighted to represent the firm target population.
Q3.5 How relevant is each of the following factors as obstacles in hiring workers with a permanent, open-ended contract?

Table 16: Entry wages compared to similar workers, in % of firms

	before 2008	between 2008-2009	during 2010-2013
Much lower	1.0	1.6	1.7
Lower	12.1	13.0	17.2
Similar	78.7	73.8	63.8
Higher	6.3	10.9	13.2
Much higher	1.9	0.8	4.2
Total	100.0	100.0	100.0

Note: Weighted to represent the firm target population.
Q4.8 How did the labour cost of a newly hired worker compare with that of similar (in terms of experience and task assignment) workers at your firm?

Firms increasingly deviate from same pay principle for new entrants

Most firms report they pay similar wages to new hires relative to similarly qualified incumbent workers.[23] However, during the crisis years both lower and higher pay for new hires were more common. Prior to 2008, 79% of firms reported that they paid similar wages to new hires and incumbent workers. This share fell to 74% during 2008-09

[23] See also Mathä (2012) for results using the 2008 Luxembourg WDN survey in this respect.

and 64% in 2010-13.[24] The share of firms paying lower wages to new hires increased to 17.2% and the share of firms paying higher wages to new hires rose to 13.7%.

3.5 Use of specific labour market policies

About one-third of firms used of public support measures during the crisis (2008-13)

In 2010-13, a significantly larger share of firms used public employment support measures than in 2008-09 (based on the McNemar test). Firms primarily resorted to direct subsidies to hire unemployed workers (Table 17). In 2010-13, this measure was used by 15.6% of firms in manufacturing and by over 17% in construction and trade. The proportion of firms that (indirectly) benefited from the "Re-employment support" measure increased significantly (by 5.7 percentage points) to 12.8%. This measure guarantees that unemployed, who accept a lower-paid job, will receive 90% of their previous wage during four years. Employers benefit indirectly by paying lower wages as part of the cost is carried by public services (OECD, 2012). In the second phase of the crisis, this measure was particularly used in financial intermediation (16% of firms) and construction (14%). All measures were used more frequently in the manufacturing sector in the initial phase of the crisis, while later they became more common in construction, financial intermediation and trade. The resort to labour market policies was also more common in larger firms.

Table 17: Use of labour market measures, in % of firms

	Total		Manufacturing		Construction		Trade		Business services		Financial intermediation	
	2008 -2009	2010 -2013	2008 -2009	2010 -2013	2008 -2009	2010 -2013	2008 -2009	2010 -2013	2008 -2009	2010 -2013	2008 -2009	2010 -2013
(a) Workforce lending facility	1.7	3.2	4.8	6.5	5.0	5.2	1.1	4.0	1.0	1.7	1.1	6.5
(b) Financial aid to hire older workers or long-term unemployed	9.3	13.6	10.8	15.6	9.2	18.8	14.4	17.5	6.7	10.0	5.3	12.1
(c) Re-employment support	7.1	12.8	11.6	12.4	7.0	14.4	8.2	12.3	5.9	12.3	10.0	16.0
(d) Tax relief for hiring an unemployed person	8.1	10.3	14.3	7.4	7.2	12.1	12.0	13.2	5.8	8.4	7.3	10.6
(e) Apprenticeship subsidies	11.0	10.0	15.9	14.5	14.3	17.7	9.0	16.3	11.8	4.6	1.1	5.9
(f) Employment initiation contract	4.7	5.9	9.8	6.9	3.5	5.1	3.0	8.9	5.9	4.5	1.8	4.2
(g) Deduction of relocation expenses for highly skilled workers	1.0	1.4	0.0	2.2	0.7	1.5	2.4	2.4	0.3	0.2	0.7	7.2
(e) Other	1.8	1.6	2.5	3.2	5.1	0.3	2.5	4.3	0.4	0.4	2.1	2.0
At least one measure	23.6	26.8	30.4	32.0	28.2	34.3	25.7	30.9	21.6	21.6	14.4	31.9

Note: Weighted to represent the firm target population. The "Employment initiation contract" is targeted to young unemployed.
Q2.11 During the period 2008-09 or 2010-13, did your firm benefit from public measures (other than short-time work) such as hiring incentives or measures aimed at avoiding job or wage cuts?

[24] Differences between pre-2008 and 2010-2013 are statistically significant (McNemar test) except for firms paying much lower wages to new hires.

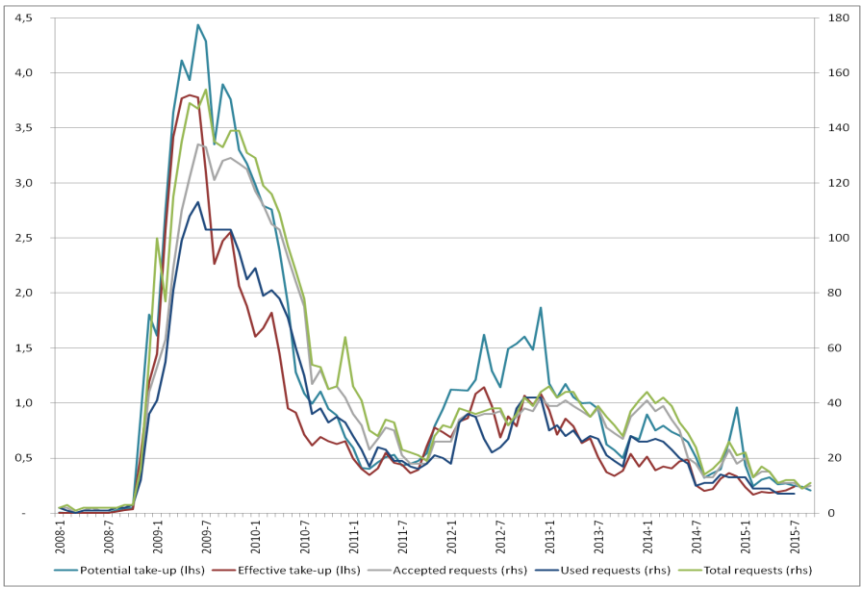
In addition to hiring incentives, the government encouraged employment retention, primarily through short-time work (see section 1.3.2.1). According to administrative data, recourse to short-time work surged in the second half of 2008, along with the sharp drop in economic activity (Figure 7). At the height of the crisis (2008Q2-2009Q2), participation in short-time work arrangements peaked at nearly 4.5% of all employees[25] (see effective take-up in Figure 7). Following a steady decline until 2011Q2, the use of short-time work rose again (affecting about 1% of all employees) with the renewed demand weakness resulting from the European sovereign debt crisis. Despite the downward trend since 2013, firms are still requesting short-time work schemes. The gap between potential and effective take-up signals that firms may be concerned by the fragility of the recovery and apply to the scheme on a precautionary basis.

Short-time work increased sharply in 2008-09

In 2009, the average employee in short-time work lost nearly 30% of the usual working hours of a full-time worker (based on monthly administrative data). The average reduction in hours worked per employee grew to 40% in 2014, while the number of short-time work participants declined simultaneously, probably reflecting less work sharing over time.

Figure 7: Participation in short-time work

(left-hand scale: as a percentage of total employees, right-hand scale: absolute number of firms)



Source: Comité de conjoncture, authors' own calculations

Firms were asked whether they applied for short-time work and whether their request was accepted. Survey responses show that the share of firms applying for short-time

[25] Total employees excluding agriculture and NACE Rev. 2 sectors O-U.

work remained broadly stable in 2008-09 and 2010-13, at 1.5%-1.6%[26], but the proportion of requests that were accepted declined by nearly 30% (Table 18).

Table 18: Use of short-time work, in % of firms

	(Yes,) our firm applied		*But the application was rejected*		*and the application was accepted*	
Sector	2008-09	2010-13	2008-09	2010-13	2008-09	2010-13
Total	1.6	1.5	*0.7*	*0.9*	*0.9*	*0.6*
Manufacturing	11.6	10.3	*1.3*	*1.4*	*10.4*	*8.9*
Construction	3.9	3.2	*2.5*	*1.6*	*1.4*	*1.6*
Trade	0.7	1.6	*0.0*	*1.6*	*0.7*	*0.0*
Business services	0.8	0.5	*0.6*	*0.3*	*0.2*	*0.1*

Note: Weighted to represent the firm target population. Financial intermediation (all figures are nil).

Q3.3b Did your firm apply for short-time work since the beginning of 2008?

... mainly in manufacturing

Most applications by firms for short-time work originated in the manufacturing sector, where around 11% of firms applied and their applications were rarely refused[27] unlike in 2010-13, construction, business services and trade (in 2010-13) that faced high "rejection rates" (Table 18). This reflects the legal provisions that govern the use of short-time work and the changes made to them as the crisis unfolded. Larger firms were more likely to apply and their applications were more likely to be accepted.

Firms involved in short-time work may have preserved 20-25% of jobs involved

The extended use of short-time work during the recent crisis may have helped to preserve jobs. However, it is difficult to estimate this impact. Firms were asked to provide the number of employees involved in short-time work and the number of employees that would have been laid off without it. Survey results suggest that the average firm that resorted to short-time work had 30 employees involved in 2008-09 and 34 employees involved in 2010-13. In addition, firms reported that 20% to 25% of employees involved in short-time work would have lost their job without this arrangement.

[26] Estimates based on administrative data are generally in line with these figures, suggesting that around 1.4% of firms applied for short-time work in 2008-09. However, for 2010-13, administrative data indicate less than 1%. This discrepancy may reflect our weighting since we assume that all firms in a stratum are identical.

[27] This is also confirmed by administrative data.

Table 19: Jobs preserved by short-time work
(average number of jobs per firm)

Period	2008-09	2010-13
Number of employees involved	30	34
Number of employees otherwise laid off	8	7

Note: Weighted to represent the firm target population.
Q3.3c: If you made use of short-time work please indicate how many employees were involved and how many would have been laid off otherwise?

4 Main results on price setting changes

The price setting section of the survey dealt with the product market as opposed to the input market. Most Luxembourg firms report some autonomy regarding their price setting policy (85%). The most common policy is to negotiate prices with individual customers, a characteristic more common in Business-to-Business (B2B) markets than Business-to-Consumer (B2C) markets. In the domestic market, setting prices by applying a self-determined margin over costs is more common than in foreign markets (26% versus 15%). In foreign markets, which account on average for 32% of firm revenue (ranging from 8.8% in construction to 71.7% in Financial Intermediation), Luxembourg firms are more often price takers, meaning that their prices follow those of their main competitors.

Table 20: Price setting policy of Luxembourg firms, in %

	Domestic market	Foreign markets
No autonomous price setting policy	16.3	15.0
The price is regulated	*6.4*	*4.6*
The price is set by a parent company / group	*7.4*	*7.1*
The price is set by the main customer(s)	*2.5*	*3.3*
The price is set following the main competitors	14.9	19.1
The price is set fully according to costs and a completely self-determined profit margin	26.3	15.4
Negotiated with individual customers	38.2	43.1
Other	4.3	7.4
Total	100.0	100.0

Note: Weighted to represent the firm target population.
Q5.2 In 2013, how did your firm typically set the selling price of your main product, activity or service in its main market (both domestically and internationally)?

Luxembourg firms face strong competition, both at home and abroad

About 66% of Luxembourg firms consider competition to be severe or very severe. This is true both for domestic and foreign markets (Table 21). Firms also indicated that competitive pressure has increased in both 2008-09 and 2010-13 (Table 22). The increase in competitive pressure is considered higher in domestic markets: 43% of firms report

domestic competitive pressure increased in 2008-09 and 57% in 2010-13.[28] The corresponding figures in the foreign market are 30% and 38%. The largest shares of firms reporting an increase in competitive pressure are in construction (domestic markets) and in financial services (foreign markets).

Table 21: Degree of competition in firms' product markets, in %

	Weak	Moderate	Severe	Very severe	Total	Severe / very severe
Domestic market	9.7	22.3	41.4	26.6	100.0	68.0
Foreign markets	9.8	21.9	40.6	27.8	100.0	68.3

Note: Weighted to represent the firm target population.
Q5.3 How would you characterise the degree of competition on domestic and foreign markets for your main product?

Table 22: Changes in competition in firms' product markets, in %

	Period	Strong decrease	Moderate decrease	Unchanged	Moderate increase	Strong increase	Does not apply	Decrease combined	Increase combined
Domestic Market	2008-09	1.3	6.3	44.8	31.1	12.1	4.4	7.6	43.2
	2010-13	1.1	5.9	31.3	24.3	32.8	4.6	7.0	57.1
Foreign Markets	2008-09	1.2	1.9	39.2	19.2	10.9	27.5	3.2	30.1
	2010-13	1.8	5.1	29.4	14.2	23.6	25.9	6.9	37.8

Note: Weighted to represent the firm target population.
Q5.4 Compared to the situation before 2008, how has the competitive pressure on your main product on domestic and foreign markets changed?

4.1 Changes in price setting due to labour market and wages setting changes

From a monetary policy perspective, it is important to know how rigid prices are, or put differently, how fast firms adjust their prices to various shocks. According to the survey almost 65% of firms reported that they did not change their price change frequency. Of the 36% of firms reporting a change in frequency, almost 75% reported to have changed prices more often.

A third of firms changed the frequency of price changes during the crisis

Table 23: Did firms change the frequency of price changes?, in % of firms

Yes	35.9
Yes, less often	*26.7*
Yes, more often	*73.3*
No	64.1

Note: Weighted to represent the firm target population.
Q5.5 Over 2010-13, did you change the frequency of price changes with respect to the period before 2008?

[28] The difference between domestic and foreign market is statistically significant in both sub-periods. The difference between sub-periods is also statistically significant (McNemar test).

... mainly due to changes in competition-related factors

Firms were asked to indicate the reasons for any change in price setting frequency. Judging from the accept ratios, it seems that for firms competition-related factors are the main cause of increases in price change frequency. Increased competition in the main product market (77%) and increased price change frequency by main competitors (68%) scored the highest accept ratios. However, increased volatile demand (accept ratio: 57%) and a higher frequency of price changes of other input costs (60%) also seem to have contributed. As for the reasons advanced for lower price change frequency, the acceptance ratios for most individual factors are lower than for increases in price change frequency.

Table 24: Reasons for change in the frequency of price changes, in % of firms

	Volatile Demand		Frequent changes in labour costs		Frequent changes in other input costs		Competition in the main product market		Frequent price changes by main competitors	
More / Less frequent	+	-	+	-	+	-	+	-	+	-
Not relevant	13.4	29.4	29.5	18.0	13.4	17.3	6.4	22.1	10.6	18.2
Of little relevance	29.6	16.5	38.2	35.2	26.2	40.2	17.0	29.1	21.0	27.0
Relevant	35.0	51.1	25.7	35.8	45.8	37.4	36.2	34.4	27.8	48.5
Very relevant	22.1	2.9	6.6	11.0	14.7	5.1	40.5	14.3	40.6	6.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Accept ratio	57.1	54.0	32.3	46.8	60.5	42.5	76.7	48.7	68.4	54.8

Note: Weighted to represent the firm target population. "+" stands for more frequent, "-" for less frequent.
Q5.5 Over 2010-13, did you change the frequency of price changes with respect to the period before 2008?
Q5.5a and Q5.5b If recently you changed prices more/less frequently, higher/lower frequency because of:

The frequency of price changes is a commonly used, yet imperfect, measure of price rigidity. The survey asked Luxembourg firms how often they change prices, distinguishing between price changes in regular time intervals and prices changes triggered by changing cost and demand conditions. The former is intended to capture time-dependent price setting and the latter state-dependent price setting.

The median frequency of price change is more than once a year

For both types of price setting behaviour, the most common frequency for Luxembourg firms is to change prices more often than once a year. However, the median frequency of price change is once a year (excluding "don't know" answers). This is the case both before 2008 and in 2013 and corroborates previous findings for Luxembourg firms (e.g. Mathä, 2013). Furthermore, the share of firms changing prices regularly at a given interval does not change perceptibly across time. In contrast, there was a significant increase in the share of firms changing prices irregularly more frequently than once a year (McNemar test). This reflects a lower share of firms reporting that they change prices once a year or less frequently than once a year.

Table 25: Price change frequency, in % of firms

	Before 2008		In 2013		Difference	
Price change frequency	Regular	Irregular	Regular	Irregular	Regular	Irregular
More than once a year:	26.0	24.9	27.1	30.2	1.0	5.3
More than once a year: daily	4.8	4.8	4.7	5.0	-0.1	0.2
More than once a year: weekly	3.0	2.8	3.1	3.0	0.1	0.2
More than once a year: monthly	6.4	5.5	6.2	7.6	-0.2	2.1
More than once a year: quarterly	6.6	4.9	7.9	6.1	1.3	1.2
More than once a year: half-yearly	5.3	6.9	5.2	8.5	0.0	1.6
Once a year	18.9	20.7	18.0	18.5	-0.9	-2.2
Less frequently than once a year	17.7	23.4	17.8	19.8	0.1	-3.6
Between one and two years	9.0	12.7	7.7	8.3	-1.4	-4.4
Less frequently than once every two years	8.7	10.7	10.1	11.5	1.4	0.8
Never	18.1	14.6	17.3	14.0	-0.8	-0.5
Don't know	19.3	16.5	19.9	17.4	0.6	0.9

Note: Weighted to represent the firm target population.
Q5.6 How and how often did you typically change the price of your main product?

Table 26: Weighted ordered logit estimates for price rigidity

	Price change frequency (inverted scale)			
	Regular	Irregular	Regular	Irregular
Wage change frequency				
incl. indexation	0.168 ***	0.338 ***		
	0.018	0.018		
excl. indexation			0.189 ***	0.173 ***
			0.012	0.013
Year 2013	0.031	-0.159 ***	0.028	-0.122 ***
	0.028	0.028	0.028	0.028
Construction	-0.609 ***	-1.071 ***	-0.707 ***	-1.157 ***
	0.079	0.079	0.079	0.080
Trade	-0.766 ***	-0.988 ***	-0.771 ***	-0.991 ***
	0.074	0.074	0.074	0.074
Business Services	0.603 ***	0.240 ***	0.583 ***	0.238 ***
	0.072	0.072	0.072	0.072
Financial Intermediation	1.135 ***	0.854 ***	1.080 ***	0.753 ***
	0.096	0.095	0.096	0.094
5-19 employyes	-0.397 ***	-0.652 ***	-0.423 ***	-0.668 ***
	0.035	0.035	0.035	0.035
20-49 employees	-0.637 ***	-0.756 ***	-0.658 ***	-0.757 ***
	0.057	0.060	0.057	0.060
50-199 employees	-0.767 ***	-0.966 ***	-0.782 ***	-0.996 ***
	0.078	0.081	0.080	0.080
200+ employees	-0.559 ***	-1.321 ***	-0.558 ***	-1.384 ***
	0.126	0.140	0.126	0.140
No. of obs.	831	859	829	859
Pseudo R-Squared	0.05	0.06	0.05	0.05
LogL	-25551.5 ***	-25255 ***	-25462.7 ***	-25347 ***

Note: * p<0.1, ** p<0.05, *** p<0.01. Weighted to represent the effects in the target population. Standard errors in smaller font. Dependent variable: How and how often did you typically change the price of your main product? 1 = more than once a year, ..., 5 = never.

Price rigidity is linked to base wage rigidity

Weighted ordered logit regressions also suggest that the frequency of price changes is positively related to the frequency of base wage change (Table 26). This holds for both regular and irregular price changes and whether wage indexation is included or excluded. The frequency of irregular price changes is higher in 2013 than in pre-2008. No such effect is found for regular price changes. The regular and irregular price change frequency is higher for larger firms (compared to micro firms) and in firms belonging to construction and trade. It is lower in the business and financial services (compared to manufacturing).

5 Concluding remarks

This report presents the results of a survey among Luxembourg firms conducted at the end of 2014 by the Banque centrale du Luxembourg within the 3rd wave of the Wage Dynamics Network survey. The report provides new insights on the nature, size and persistence of various shocks (demand, credit, costs etc.) that were experienced by Luxembourg firms during the initial years of economic crisis in 2008-09 and the subsequent period 2010-13. It also documents how firms described their adjustment to these shocks in terms of employment, wages and prices. It discusses how labour market policies introduced (or scaled up) by the Luxembourg government, including employment support measures and recourse to short-time working, helped to alleviate the effects of the economic crisis.

A substantial share of firms responded that they were negatively affected by the recession, mainly through shocks to demand and demand uncertainty but also shocks to customers' ability to pay. The survey confirms that for most Luxembourg firms access to finance was not a major concern. Firms' response to the crisis varied according to their size and sector of economic activity. Overall, more firms adjusted via cuts in employment than cuts to wages. In fact, between 2010 and 2013, base wages actually increased in 70% of Luxembourg firms. Firms with declining base wages (less than 15% of the total) tended to be smaller firms; hence, the impact on aggregate wage dynamics was limited. Firms that needed to reduce labour input or alter its composition did so by freezing or reducing the number of new hires, followed by individual layoffs, reduction of agency workers, non-renewal of temporary contracts and non-subsidised reduction of working hours. Another relevant finding is that larger firms used a wider variety of adjustment methods.

The survey reviews detailed information on various public employment support measures introduced by the Luxembourg government and discusses how much they helped alleviate the effects of the economic crisis. About a quarter of firms reported that they made use of these measures during the crisis. Also, short-time work applications, mainly in the manufacturing sector, soared in 2008-09. Firms reported that short-time work arrangements helped to preserve 20-25% of the jobs involved.

Luxembourg law links wages to past inflation, a factor that contributes to real wage rigidity. This affects the frequency of wage changes; less frequent base wage changes were effectively eliminated and the share of more frequent base wage changes increased. In practice, the median frequency of base wage change was "once a year" when automatic wage indexation is included, irrespective of the sub-period considered, whereas the median frequency was lower at "once between one and two years" or fewer when automatic wage indexation is excluded. Econometric results suggest that the frequency of base wage changes (whether or not automatic wage indexation is considered) is positively related to applying collective pay agreements. There seems to be a trend to less frequent changes of base wages (higher nominal wage rigidity) during the period of investigation.

More than a third of firms indicated that they changed the frequency of price changes during the crisis. Of these, almost three quarters changed prices more frequently. This may reflect higher competition, more frequent price changes by competitors, higher volatility of demand or more frequent changes for other input costs. The survey distinguishes between price changes in regular time intervals and price changes triggered by changing cost and demand conditions. For both types of price setting, the median frequency of price change was once a year. Finally, the frequency of price changes was positively linked to the frequency of base wage changes (both including and excluding wage indexation effects).

This report described the main results of the WDN survey in Luxembourg. Further research will explore the data in two dimensions. First, more analytical work will be done on specific issues relevant for Luxembourg, such as short-time working. Second, the results for Luxembourg will be put into the European context and compared across countries.

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7 Appendix 1: The questionnaire

C0.Preliminary questionnaire

0.0 – Could you please report the reference number of your questionnaire – you can find it in the mail you received:

Reference: n° !___!___!___!___!___!

0.1 – Before we begin with the questionnaire, please indicate

a) name of the firm _____

b) the legal form _____ (see appendix)

c) VAT number _____

d) Address _____

e) Name of respondent _____

f) Function of respondent _____

g) Telephone number _____

h) E-mail address _____

C1.Information about the firm

1.1 – What is your main sector of activity? (NACE2 sectorial classification)

- □ Agriculture, forestry and fishing
- □ Mining and quarrying
- □ Manufacturing
- □ Electricity, gas, Steam and air conditioning supply
- □ Water supply; sewerage, waste management and remediation activities
- □ Construction
- □ Wholesale and retail trade; Repair of motor vehicles and motorcycles
- □ Transportation and storage
- □ Accommodation and food service activities
- □ Information and communication
- □ Financial and insurance activities
- □ Real estate activities
- □ Professional, scientific and technical activities
- □ Administrative and support services activities
- □ Public administration and defence; compulsory social security
- □ Education
- □ Human health and social work activities
- □ Arts, entertainment and recreation
- □ Other service activities
- □ Activities of households as employers; undifferentiated goods- and services- producing activities of households for own use
- □ Activities of extraterritorial organisations and bodies

1.2 – What was the first year of operation of your firm?
_____

1.3 – What were the structure, ownership status and autonomy of your firm at the end of 2013?					
Structure:		Ownership:		Autonomy:	
Single establishment firm	□	Mainly domestic	□	Parent company	□
Multi-establishment firm	□	Mainly foreign	□	Subsidiary/affiliate	□
				Does not apply	□

C2. Changes in the economic environment

This section aims at assessing the main changes in economic environment your firm suffered during **2008-2009 and 2010-2013**. When answering the questions please refer to **"the most significant changes**" taking place over this period.

2.1 – How did the following factors affect your firm's activity during 2008-2009 and 2010-2013?
Please choose ONE option for each line.

		Strong decrease	*Moderate decrease*	*Unchanged*	*Moderate increase*	*Strong increase*
The level of demand for your products/services	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Volatility/uncertainty of demand for your products/services	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Access to external financing through the usual financial channels	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Customers' ability to pay and meet contractual terms	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Availability of supplies from your usual suppliers	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□

2.2 – For those factors which affected your firm strongly, were the effects transitory, partly persistent or long-lasting for 2008-2009 and 2010-2013? *Please choose ONE option for each line.*

		Transitory	*Only partly persistent*	*Long-lasting*
The level of demand for your products/services	2008-2009	□	□	□
	2010-2013	□	□	□
Volatility/uncertainty of demand for your products/services	2008-2009	□	□	□
	2010-2013	□	□	□
Access to external financing through the usual financial channels	2008-2009	□	□	□
	2010-2013	□	□	□
Customers' ability to pay and meet contractual terms	2008-2009	□	□	□
	2010-2013	□	□	□
Availability of supplies from your firm's usual suppliers	2008-2009	□	□	□
	2010-2013	□	□	□

2.3 – With regard to finance, please indicate for 2008-2009 and 2010-2013 how relevant each of the following events were for your firm? *Please choose ONE option for each line*. *Note: credit here refers to any kind of credit, not only bank credit*					
		Not relevant	*Of little relevance*	*Relevant*	*Very relevant*
Credit was not available to finance working capital	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Credit was not available to finance new investment	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Credit was not available to refinance debt	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Credit was available to finance working capital, but conditions (interest rate and other contractual terms) were too onerous	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Credit was available to finance new investment, but conditions (interest rate and other contractual terms) were too onerous	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Credit was available to refinance debt, but conditions (interest rate and other contractual terms) were too onerous	2008-2009	□	□	□	□
	2010-2013	□	□	□	□

2.4 – How did total costs and its components evolve during 2008-2009 and 2010-2013? ***Please choose ONE option for each line.*** ***See definitions in the Appendix.***						
		Strong decrease	*Moderate decrease*	*Unchanged*	*Moderate increase*	*Strong increase*
Total Costs	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Labour Costs	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Financing costs	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Costs of supplies	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Other costs (please specify_____)	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□

2.5 – Please indicate how each of the labour cost components below changed during 2008-2009 and 2010-2013. *Please choose ONE option for each line.* *See definitions in the Appendix.*

		Strong decrease	*Moderate decrease*	*Unchanged*	*Moderate increase*	*Strong increase*
Base wages or piece work rates	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Flexible wage components (bonuses, fringe benefits, etc.)	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Number of permanent employees	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Number of temporary/fixed-term employees	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Number of agency workers and others (free-lance work, etc, not hired under employment contracts)	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Working hours per employee	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Other components of labour costs (please specify_____)	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□

2.6 – How did prices and demand for your main product evolve during 2008-2009 and 2010-2013?
Please choose ONE option for each line as applicable.

		Strong decrease	*Moderate decrease*	*Unchanged*	*Moderate increase*	*Strong increase*
Domestic demand for your main product/service	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Foreign demand for your main product/service	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Prices of your main product in domestic markets	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Prices of your main product in foreign markets	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□

2.7 – How did the following factors evolve in your firm during 2008-2009 and 2010-2013?
Please choose ONE option for each line

		Strong decrease	*Moderate decrease*	*Unchanged*	*Moderate increase*	*Strong increase*
Average productivity per employee (as compared to labour costs per employee)	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Output Prices (as compared to total costs)	2008-2009	□	□	□	□	□
	2010-2013	□	□	□	□	□
Other (non-labour) costs (as compared to labour costs)	2008-2009	□	□	□	□	□
	2008-2009	□	□	□	□	□

2.8 – Has your firm off-shored or out-sourced part of its activity during 2008-2009 and 2010-2013?		
	2008-2009	2010-2013
Off-shored		
Yes	□	□
No, but it was considered	□	□
No and we did not consider it	□	□
Out-sourced		
Yes	□	□
No, but it was considered	□	□
No and we did not consider it	□	□

2.9 – In which years did the most significant NEGATIVE shocks occur? ***Please choose <u>as many</u> years as applicable***	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*No negative shock took place*
Level of demand for your products/services	□	□	□	□	□	□	□
Volatility/uncertainty of demand for your products/services	□	□	□	□	□	□	□
Access to external financing for your firm's usual activity	□	□	□	□	□	□	□
Customers' ability to pay and meet contractual terms	□	□	□	□	□	□	□
Access to supplies from your firm's usual suppliers	□	□	□	□	□	□	□

2.10 – What are the most important issues your firm faced over the periods 2008/2009 and 2010-2013? ***Please choose <u>ONE option for each line</u>.***		*Not relevant*	*Of little relevance*	*Relevant*	*Very relevant*
Finding customers	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Competition	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Cost of labour	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
of which - wage indexation	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
of which - minimum wage	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Availability of skilled staff or experienced managers	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Regulation	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Other, please specify:	2008-2009	□	□	□	□
_____	2010-2013	□	□	□	□

2.11 – During the period 2008/2009 or 2010/2013, did your firm benefit from public measures (other than short-time work), such as hiring incentives or measures aimed at avoiding job or wage cuts? If yes, select the appropriate option. *See definitions in the Appendix.*			
		Yes	*No*
Workforce lending facility	2008-2009	□	□
	2010-2013	□	□
Financial aid to hire older workers or long-term unemployed	2008-2009	□	□
	2010-2013	□	□
Re-employment support	2008-2009	□	□
	2010-2013	□	□
Tax relief for hiring an unemployed person	2008-2009	□	□
	2010-2013	□	□
Apprenticeship subsidies	2008-2009	□	□
	2010-2013	□	□
Employment initiation contract (Contrat Initiation Emploi - CIE)	2008-2009	□	□
	2010-2013	□	□
Deduction of relocation expenses for highly skilled workers from abroad	2008-2009	□	□
	2010-2013	□	□
Other, please specify: _____	2008-2009	□	□
	2010-2013	□	□

C.3. Labour force adjustments

3.1. – How many employees did your firm have on the payroll at the end of 2007 and 2013? How many agency workers and other workers did your firm have at the end of 2007 and 2013? *For definitions see Appendix*		
	End 2007	End 2013
Total Number of employees	_____	_____
A. Of which:		
Permanent full-time	_____	_____
Permanent part-time	_____	_____
Temporary or fixed-term	_____	_____
B. Of which:		
Resident in Luxembourg	_____	_____
Cross-border workers	_____	_____
C. Of which:		
Employees with Luxembourg nationality	_____	_____
Total number of agency workers and others (Note: not part of total no. employees)	_____	_____

3.2 – At the end of 2013, how were your firm's employees approximately distributed by occupational group or tenure? (*See definitions of the ISCO occupational groups and the definition of tenure in the Appendix*)				
OCCUPATIONAL GROUPS			*JOB TENURE*	
Higher skilled non-manual	(ISCO: 1, 2, 3)	_____%	Below 1 year	_____%
Lower skilled non-manual	(ISCO: 4 and 5)	_____%	Between 1 and 5 years	_____%
Higher skilled manual	(ISCO:7 and 8)	_____%	More than 5 years	_____%
Lower skilled manual	(ISCO: 9)	_____%		
	TOTAL (=	100 %)	TOTAL (=	100 %)

3.3a – During 2008-2009 and 2010-2013 did you need to significantly reduce your labour input or to alter its composition?		
Need to reduce labour cost or alter its composition	*YES*	*NO*
2008-2009	□	□
2010-2013	□	□

3.3bis. – If YES, which of the following measures did you use to reduce your labour input or alter its composition when it was most urgent*? Please choose ONE option for each line. See definitions in the appendix*					
		Not at all	*Marginally*	*Moderately*	*Strongly*
Collective layoffs	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Individual layoffs	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Temporary layoffs	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Subsidised reduction of working hours (i.e. short-time working)	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Non-subsidised reduction of working hours(including reduction of overtime)	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Non-renewal of temporary contracts at expiration	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Early retirement schemes	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Freeze or reduction of new hires	2008-2009	□	□	□	□
	2010-2013	□	□	□	□
Reduction of agency workers and others	2008-2009	□	□	□	□
	2010-2013	□	□	□	□

3.3b – Did your firm apply for short-time work since the beginning of 2008? If you made use of short-time work, please indicate how many employees were involved and how many would have been laid off otherwise? One option per column.		
	2008-2009	*2010-2013*
No, our firm did not apply	□	□
Our firm applied but the application was rejected	□	□
Our firm applied and the application was accepted	□	□
If you made use of short-time work, please indicate:		
the number of employees involved	_____	_____
the number of employees that would have been laid off	_____	_____

3.4 – Have any of the following actions become more or less difficult, compared to the situation in either 2008 or 2010? *Please choose ONE option for each line. (NOTE : if not concerned then tick Unchanged)*						
	Compared to year	*Much less difficult*	*Less difficult*	*Unchanged*	*More difficult*	*Much more difficult*
To lay off employees for economic reasons (collectively)	2008	□	□	□	□	□
	2010	□	□	□	□	□
To lay off employees for economic reasons (individually)	2008	□	□	□	□	□
	2010	□	□	□	□	□
To dismiss employees for disciplinary reasons	2008	□	□	□	□	□
	2010	□	□	□	□	□
To lay off employees temporarily for economic reasons	2008	□	□	□	□	□
	2010	□	□	□	□	□
To hire employees (cost of recruitment, including administrative costs)	2008	□	□	□	□	□
	2010	□	□	□	□	□
To adjust working hours	2008	□	□	□	□	□
	2010	□	□	□	□	□
To move employees to positions in other locations	2008	□	□	□	□	□
	2010	□	□	□	□	□
To move employees across different job positions	2008	□	□	□	□	□
	2010	□	□	□	□	□
To adjust wages of incumbent employees	2008	□	□	□	□	□
	2010	□	□	□	□	□
To lower wages at which you hire new employees	2008	□	□	□	□	□
	2010	□	□	□	□	□

3.4b. – ONLY FOR THOSE REPORTING CHANGES IN 3.4 –To what factors would you attribute the changes reported in Question 3.4? *Please choose ONE option for each line.*				
	Reforms of labour laws	*Jurisprudence/ law enforcement*	*Changes in trade union behaviour*	*Changes in individual behaviour*
To lay off employees for economic reasons (collectively)	□	□	□	□
To lay off employees for economic reasons (individually)	□	□	□	□
To dismiss employees for disciplinary reasons	□	□	□	□
To lay off employees temporarily for economic reasons	□	□	□	□
To hire employees (costs of recruitment, including administrative costs)	□	□	□	□
To adjust working hours	□	□	□	□
To move employees to positions in other locations	□	□	□	□
To move employees across different job positions	□	□	□	□
To adjust wages of incumbents employees	□	□	□	□
To lower wages at which you hire new employees	□	□	□	□

3.5 – How relevant is each of the following factors as obstacles in hiring workers with a permanent, open-ended contract?
Please choose ONE option for each line. At the end of 2013

	Not relevant	*Of little relevance*	*Relevant*	*Very relevant*
Uncertainty about economic conditions	□	□	□	□
Insufficient availability of labour with the required skills	□	□	□	□
Access to finance	□	□	□	□
Firing costs	□	□	□	□
Hiring costs	□	□	□	□
High payroll taxes	□	□	□	□
High wages	□	□	□	□
Risk that labour laws are changed	□	□	□	□
Costs of other inputs complementary to labour	□	□	□	□
Other (please specify _____)	□	□	□	□

3.6a – How have worker flows (entries plus exits) changed in your firm in 2013 compared to the year:

	Decreased strongly	*Decreased moderately*	*Unchanged*	*Increased moderately*	*Increased strongly*
2008	□	□	□	□	□
2010	□	□	□	□	□

3.6b – If you answered that worker flows changed strongly (increased or decreased), this was mostly due to:

	Changes in entries (increase or decrease)	*Changes in exits (increase or decrease)*	*Changes in both entries and exits*
For 2013 compared to 2008	□	□	□
For 2013 compared to 2010	□	□	□

C4.Wage adjustments

This section collects information on wage setting and the frequency of wage changes. Most of the questions refer to 2013, but some questions aim at assessing differences between before 2008, 2008-2009 and 2010-2013.

4.1 – In 2013: What percentage of your firm's total costs (all operating expenses) was due to labour costs (wages, salaries, bonuses, social security contributions, training, tax contributions, contributions to pension funds, etc.)?
See definitions in the Appendix.

Labour cost /Total cost _____ %

4.2 – In 2013, did your firm apply a collective pay agreement bargained and signed inside the firm (at the firm level)?

	At the firm level
No, such an agreement does not exist	□
No, the agreement exists but the firm opted out	□
Yes, such an agreement is in effect	□
Proportion of employees covered by such an agreement (approx.)	_____%

4.2bis – In 2013, did your firm apply a collective pay agreement bargained and signed outside the firm (at the national, regional, sectoral or occupational level)?	
	Outside the firm
No, such an agreement does not exist	□
No, the agreement exists but the firm opted out	□
Yes, such an agreement is in effect	□
Proportion of employees covered by such an agreement (approx.)	_____%

4.3 – What is the proportion of your employees covered in 2013 by any collective pay agreement?	
Proportion of employees covered by any collective pay agreement (approx.)	_____%

4.4 – How often does the collective pay agreement applied at you firm typically change?						
	More than once a year	Once a year	Once between one and two years	Every two years	Less frequently than once every two years	Never/Not applicable
Before 2008	□	□	□	□	□	□
2008-2009	□	□	□	□	□	□
2010-2013	□	□	□	□	□	□

4.5a – How frequently was the base wage of an employee belonging to the main occupational group in your firm (largest group in Question 3.2) typically changed in your firm – including base wage changes due to automatic wage indexation? *Please choose ONE option for each line*						
	More than once a year	Once a year	Once between one and two years	Every two years	Less frequently than once every two years	Never/Not applicable
Before 2008	□	□	□	□	□	□
During 2008-2009	□	□	□	□	□	□
During 2010-2013	□	□	□	□	□	□

4.5b – Excluding base wage changes due to automatic wage indexation, how frequently was the base wage of an employee belonging to the main occupational group in your firm (largest group in Question 3.2) typically changed in your firm? *Please choose ONE option for each line*						
	More than once a year	Once a year	Once between one and two years	Every two years	Less frequently than once every two years	Never/Not applicable
Before 2008	□	□	□	□	□	□
During 2008-2009	□	□	□	□	□	□
During 2010-2013	□	□	□	□	□	□

4.6 – Over 2008-2013, did you freeze or cut base wages in a given year (please indicate in which years)?						
	Wages were frozen		Wages were cut			Wages were neither frozen nor cut
	YES	% Workers affected	YES	% Workers affected	(average wage cut)	YES
2008	□	_____%	□	_____%	(%)	□
2009	□	_____%	□	_____%	(%)	□
2010	□	_____%	□	_____%	(%)	□
2011	□	_____%	□	_____%	(%)	□
2012	□	_____%	□	_____%	(%)	□
2013	□	_____%	□	_____%	(%)	□

4.7 – Did your firm pay flexible wage components (i.e. bonuses etc.) and what was their share in the total wage bill in each of the following years?

	No	Yes	If, yes, share
2007	□	□	_____%
2008	□	□	_____%
2009	□	□	_____%
2010	□	□	_____%
2011	□	□	_____%
2012	□	□	_____%
2013	□	□	_____%

4.8 – How did the labour cost of a newly hired worker compare with that of similar (in terms of experience and task assignment) workers at your firm?

	Much lower	*Lower*	*Similar*	*Higher*	*Much higher*
Before 2008	□	□	□	□	□
During 2008-2009	□	□	□	□	□
During 2010-2013	□	□	□	□	□

C5. Price setting and price changes

This section collects information on price setting and the frequency of price changes. Some questions aim at assessing differences in 2010-2013 with respect to the period before 2008.

If your firm produces (or sells) more than a single good or service, the answers should refer to the "main product ("activity" or "service"), defined as the one that generated the highest fraction of your firm's revenue in the "reference year". For instance, if your firm produces (or sells) several types of hats and shoes, by "product" we mean "hats" and "shoes" (irrespective of the specific type), whereas by "main product" we mean the one that generated the highest revenue in the "reference year".

5.1 – In 2013 what share of the revenues from your firm's main products, activity or service was due to sales in domestic markets and what share in foreign markets?

Sales in the domestic market	_____ %
Sales in the foreign markets	_____ %
	= 100 %

5.2 – In 2013, how did your firm typically set the selling price of your main product, activity or service in its main market (both domestically and internationally)? *Please choose ONE option*

	Domestic markets	*Foreign markets*
There is no autonomous price setting policy because:		
- the price is regulated	□	□
- the price is set by a parent company / group	□	□
- the price is set by the main customer(s)	□	□
The price is set following the main competitors	□	□
The price is set fully according to costs and a completely self-determined profit margin	□	□
Negotiated with individual customers	□	□
Other (please specify _____)	_____	_____

5.3 – How would you characterise the degree of competition on domestic and foreign markets for your main product?*Please choose ONE option for each line*					
	Weak	*Moderate*	*Severe*	*Very severe*	*Non applicable*
Domestic markets	□	□	□	□	□
Foreign markets	□	□	□	□	□

5.4 – Compared to the situation before 2008, how has the competitive pressure on your main product on domestic and foreign markets changed in the period 2008-2009 and 2010-2013? *Please choose ONE option for each line.*						
	Strong decrease	*Moderate decrease*	*Unchanged*	*Moderate increase*	*Strong increase*	*Does not apply*
Domestic markets						
2008-2009	□	□	□	□	□	□
2010-2013	□	□	□	□	□	□
Foreign markets						
2008-2009	□	□	□	□	□	□
2010-2013	□	□	□	□	□	□

5.5. – Over 2010-2013, did you change the frequency of price changes with respect to the period before 2008?	
YES, prices changed more often □ → **(go to 5.5a)**	NO □ → **(go to 5.6)**
YES, prices changed less often □ → **(go to 5.5b)**	

5.5a – If you now change prices more frequently: ***Please attach a ranking in order of importance to the factors listed below (0 non important to 3-most important)***				
	Not relevant	*Of little relevance*	*Relevant*	*Very relevant*
More volatile demand	□	□	□	□
More frequent changes in labour costs	□	□	□	□
More frequent changes in other input costs	□	□	□	□
Stronger competition in the main product market	□	□	□	□
More frequent price changes by main competitors	□	□	□	□

5.5b – If you now change prices less frequently: ***Please attach a ranking in order of importance to the factors listed below (0 non important to 3-most important)***				
	Not relevant	*Of little relevance*	*Relevant*	*Very relevant*
Less volatile demand	□	□	□	□
Less frequent changes in labour costs	□	□	□	□
Less frequent changes in other input costs	□	□	□	□
Weaker competition in the main product market	□	□	□	□
Less frequent price changes by main competitors	□	□	□	□

5.6 – How and how often did you typically change the price of your main product?
Please choose answer for both dates. <u>ONE option for each column, the one that best describes the situation in your firm</u>

	Before 2008		***In 2013***	
	ON A REGULAR TIME PATTERN	*WHENEVER COSTS and/or DEMAND CONDITIONS CHANGED (please select in this case the most typical frequency change)*	*ON A REGULAR TIME PATTERN*	*WHENEVER COSTS and/or DEMAND CONDITIONS CHANGED (please select in this case the most typical frequency change)*
More frequently than once a year:	□	□	□	□
Daily	□	□	□	□
Weekly	□	□	□	□
Monthly	□	□	□	□
Quarterly	□	□	□	□
Half-yearly	□	□	□	□
Once a year	□	□	□	□
Between one and two years	□	□	□	□
Less frequently than once every two years	□	□	□	□
Never	□	□	□	□
Don´t know	□	□	□	□

Would you like to receive any future publications?	
Yes	**No**
□	□
Please provide the email address, if different to the one provided at the beginning of the survey: _____	

Thank you for your participation

8 Appendix 2: Definitions for the questionnaire

Question 0.1

Legal form:

Indépendant à titre personnel

SARL (Société à responsabilité limitée)

SA (Société Anonyme)

SC (Société coopérative)

SE (Société européenne)

SECA/ SCA (Société en commandite par actions)

SECS (Société en commandite simple)

SENC (Société en nom collectif)

Other

Question 1.3

Parent Enterprise: An incorporated or unincorporated enterprise, or group of enterprises, which has a direct investment enterprise operating in a country other than that of the parent enterprise.

Affiliate Enterprise: An incorporated or unincorporated enterprise where a foreign investor has an effective voice in management. Such an enterprise may be a subsidiary, associate or branch.

Subsidiary Enterprise: An incorporated enterprise in the host country in which another entity directly owns more than half of the shareholders´ voting power, or is a shareholder in the enterprise, and has the right to appoint or remove a majority of the members of the administrative, management or supervisory body.

Question 2.4

Total costs: all operating expenses, e.g. include telecommunications, insurance and maintenance of building and equipment, utility expenses, travelling and other miscellaneous expenses.

Question 2.5

Labour costs: wages, salaries, bonuses, social contributions, training, tax contributions, contributions to pension funds.

From the employers point of view these are often grouped as: direct remuneration (direct pay for time worked and bonuses); other direct cost (payments in kind, payment in capital and remuneration for non-working days); indirect cost (soc. sec. contributions, vocational training and miscellaneous taxes

Base wage - direct remuneration excluding bonuses (regular wage and salary, commissions, piecework payments).

Bonuses / benefits (flexible wage components) - part of compensation different from the base wage and usually linked to individual's performance or firm's performance Hourly, piece-rate and monthly base wage - base wage per hour worked, per month worked, or per pieces produced.

Question 2.11

Workforce lending facility (Prêt temporaire de main-d'œuvre) – Employers (other than temporary work agencies) may be authorized to lend some of their workforce to other firms for a specific duration:

- in case of underemployment or threat of dismissals,
- to carry out an occasional task, in the same sector of activity and in case the user firm cannot fulfil this task by hiring permanent staff,
- in case of restructuring within a group of firms and
- within a job protection plan (Plan de maintien dans l'emploi).

Financial aid to hire older workers or long-term unemployed – Employers who hire an older or long-term unemployed person may, subject to certain conditions, recover the social security contributions paid.
Re-employment support (Aide au réemploi) – Following the loss of their employment in Luxembourg, workers who accept a new position in Luxembourg with a lower salary may benefit from re-employment support (aide au réemploi). Re-employment support guarantees recipients a level of pay amounting to 90 % of their previous salary for 48 continuous calendar months.
Tax relief for hiring an unemployed person – Employers who hire a job seeker may be entitled to receive tax relief (in the form of a monthly tax relief equivalent to 15% of the gross monthly wage and for a maximum duration of 36 months).
Apprenticeship subsidies – Employers hiring an apprentice under an apprenticeship contract can avail of financial aid intended to promote apprenticeships.
Employment initiation contract (Contrat Initiation Emploi - CIE) – The objective of the CIE is to ensure that its beneficiary receives practical training during working hours in order to facilitate his integration into the employment market. The employment initiation contract is not subject to the same provisions as a traditional employment contract.
Deduction of relocation expenses for highly skilled workers from abroad – In order to recruit highly skilled workers on the international market and attract them to Luxembourg, employers often have to pay a significant portion of their relocation, accommodation and travel expenses. Under this scheme, the employer can:
- pay these expenses without such amounts being deemed to form part of the highly skilled worker's income (benefit in kind),
- and declare these expenses as an operating expense for the company.

Question 3.1
Employees – Include all type of employees, i.e. those with employment contracts. Agency and freelance workers are excluded
Permanent full-time - Those with employment contracts that do not set a termination date, and whose regular working hours are the same as the collectively agreed or customarily worked.
Permanent part-time - Those with employment contracts that do not set a termination date, and whose regular working hours are less than those specified for permanent full-time.
Temporary or Fixed-Term - Those with employment contracts that set a termination date or a specific period of employment. [Include apprenticeships]
Agency workers and others – Theses are workers and employees not on the payroll of the firm, such as consultants, employees being officially registered with a different company, etc…

Question 3.2
Occupational categories according to ISCO-08 Structure, Group Titles and Codes

1	Managers	2	Professionals
3	Technicians and associate professionals	4	Clerical support workers
5	Service and sales workers	7	Craft & related trades workers
8	Plant and machine operators and assemblers	9	Elementary occupations

Job Tenure Job tenure (OECD definition) is typically measured by the length of time workers have been in their current job or with their current employer, and so refers to continuing spells of employment

Question 3.3bis

Regulations on dismissals/lay-offs (collective of individual) are those that impose legal restrictions on dismissals and set compensation to be paid to former employees being laid-off.

Subsidized short-time work we mean measures that subsidize hours reductions encouraging employers to reduce working time rather than laying off workers.

Early retirement schemes is to be understood as measures allowing persons being made redundant to receive a monthly pension and / or lump sum payment before reaching the statutory retirement age.

Question 4.1

Total costs: all operating expenses (same definition as in question C2.4)

Labour costs: wages, salaries, bonuses, social contributions, training, tax contributions, contributions to pension funds.

From the employers point of view these are often grouped as: direct remuneration (direct pay for time worked and bonuses); other direct cost (payments in kind, payment in capital and remuneration for non-working days); indirect cost (soc. sec. contributions, vocational training and miscellaneous taxes (same definition as in question C2.5)

Question 4.6

Freeze in base wage: base wage in nominal terms remains unchanged (from a revision to the next)

Cut in base wage: base wage in nominal terms decreases (from a revision to the next)

9 Appendix 3: Institutional characteristics

Table 3.1: Wage setting characteristics in Luxembourg

	2001(a) / 2002(b)	2007 (c) / 2008(d)	2012 (e) / 2013 (f)	Definition
Coordination of wage bargaining [1]	2 (a)	2 (c)	2 (f)	"Mixed industry and firm-level bargaining, with no or little pattern bargaining and relatively weak elements of government coordination through the setting of basic pay rates (statutory minimum wage) or wage indexation."
Dominant level of bargaining [1]	2 (a)	2 (c)	2 (f)	Intermediate or alternating between sector and company bargaining
Collective bargaining coverage	58 (b)	54.0 (d)	54 (f)	% of employees
Union density [1]	42.6 (b)	38.3 (c)	32.0 (f)	% of employees
Employer organisation rate [1]	80 (b)	80 (c/d)	nd	"(…) proportion of employees employed by firms that are members of employers' organisations (i.e. the proportion of firms that are members of employers' organizations, weighted by their size)."
Minimum wages [3]	9.8 (a)	11.0 (c)	16.0 (f)	% of employees paid at statutory minimum wage (there is a structural break in the data series in 2009)
Indexation	100	100	100	% of employees whose wages are automatically adapted to inflation

Sources: [1] European Commission, 2014, [2] Inspection Générale de la Sécurité Sociale, 2013

Table 3.2: Employment protection legislation (2013)

	Luxembourg	OECD average
Protection of permanent workers		
Individual and collective dismissals (regular contracts)	2.7	2.3
Individual dismissals (regular contracts) [1]	2.3	2.0
Procedural inconvenience	1.0	
Notice and severance pay for no-fault individual dismissal	0.7	
Difficulty of dismissal	0.5	
Collective dismissals (additional restrictions) [2]	3.9	2.9
Other special costs to employers in case of collective dismissals	1.1	
Additional delays involved in case of collective dismissals	0.5	
Additional notification requirements in case of collective dismissals	0.8	
Definition of collective dismissal	1.5	
Protection of temporary employment [3]	3.8	2.1

1. The figure presents the contribution of different subcomponents to the indicator for employment protection for regular workers against individual dismissal (EPR).
2. The figure presents the contribution of different subcomponents to the indicator for additional provisions for collective dismissals (EPC). Note that this indicator quantifies only additional restrictions, over and above those for individual dismissals.
3. This figure measures the strictness of regulation on the use of fixed-term and temporary work agency contracts.
Source: OECD (2013a), OECD (2015)

Table 3.3: Product market regulation (2013)

		Luxembourg			OECD average[1]
		2003	2007	2013	2013
Product market regulation		1.60	1.44	1.46	1.46
Barriers to entrepreneurship (overall)		1.87	1.75	1.71	1.69
Regulation in professional services	All	3.52	3.55	3.47	2.02
	Accounting	3.23	3.44	3.23	2.28
	Legal	4.15	4.17	3.96	2.96
	Architect	3.38	3.31	3.35	1.57
	Engineer	3.33	3.27	3.35	1.26
Regulation in retail trade	All	4.17	4.47	4.54	2.02
	Licenses or permits needed to engage in commercial	3.00	4.8	5.25	3.53
	Specific regulation of large outlet	6.00	6.01	6.00	2.3
	Protection of existing firms	3.00	3.01	3.00	2.03
	Regulation of shop opening hours	3.57	3.57	3.57	1.19
	Price controls	3.43	3.43	3.43	1.61
	Promotions / discounts	6.00	6.01	6.00	1.29
Regulation in network sectors	All	2.96	2.68	2.73	2.1
	Electricity	3.28	2.46	3.04	2.4
	Gas	3.48	3.04	2.61	2.46
	Telecom	3.26	2.67	2.66	0.9
	Post	2.67	2.67	2.33	2.56
	Rail	5.49	5.41	5.41	3.57
	Airlines	1.53	1.53	1.53	0.97
	Road	1.00	1.00	1.50	1.92

[1] Simple average of OECD countries. For the USA, the latest data refers to 2008.
Index scale 0 to 6 from least to most restrictive.
Source: OECD (2013b), BCL computations

Table 3.4: Labour market measures

Question	Name	Type of measure	Type of changes	Modification of the law (if applicable)	End date of temporary changes (if applicable)
3.3b	Short-time work	Subsidised reduction in hours worked	i. Extension of coverage and duration; ii. Loosening of eligibility criteria; iii. Enhancement of entitlements (in favour of both employees and employers)	January 2009	December 2015
2.11a	Work-lending facility	Work sharing	No changes		n/a: permanent measure
2.11b	Financial aid to hire older workers or long-term unemployed	Reduction in non-wage labour costs for hiring older workers and long-term unemployed	No changes		n/a: permanent measure
2.11c	Re-employment support	Incentives to hire unemployed people	No changes		n/a: permanent measure
2.11d	Tax relief for hiring unemployed	Tax reduction	No changes		n/a: permanent measure
2.11e	Apprenticeship subsidies	Incentives to increase the number of apprentices	No changes		n/a: permanent measure
2.11f	Contrat Initiation Emploi / Contrat Appui Emploi	Compensation for wage and non-wage costs incurred when hiring of young people.	Existing employment support contracts extended to qualified young people.	Modified temporarily in November 2009; again, permanently, in April 2013	n/a: permanent measure
2.11g	Deduction of relocation expenses for highly skilled workers from abroad		No changes		n/a: permanent measure

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