Choice of reference group and pay satisfaction: preliminary evidence from Luxembourg

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Abstract:

Social comparison is an important issue in the context of subjective well-being (Clark and Oswald, 1996; Luttmer, 2005; Clark and Senik, 2010). Subjective well-being is not only affected by individual salary but also by the salary of a reference group. There are very few economic studies that attempt to explain the formation or choice of the reference group. In most economic studies, the reference group is considered an exogenous variable which is imposed by the analysis and is the same for all individuals. This paper studies the relationship between relative and pay satisfaction allowing the choice of reference group to vary across individuals. The paper builds on the work of Clark and Senik (2010) and others by utilizing a survey on working conditions and quality of working life in Luxembourg that contains questions regarding the individual's choice of reference group. Moreover, the choice of reference group may help to explain the paradox in the Luxembourg labor market that cross-border workers are more satisfied with their pay than native workers despite lower wages. Following Clark and Senik, we use multinomial logistic regression to model the choice of the reference group. Our results show that cross-border workers and natives have not, everything else equal, the same probability of choosing a given reference group. Moreover, the determinants of reference group differ between natives and cross-border workers. It does not appear, however, that the choice of reference group fully explains the fact that cross-border workers are more satisfied with their pay than natives despite lower wages.

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Keywords: Job satisfaction, paid satisfaction, reference group

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1. Introduction

The psychological literature provides a consensus that individuals tend to assess their situations by using a benchmark. This benchmark can be internal, for example the individual's past situation, or can be external through social comparison. Empirical studies in the economics literature have shown that relative income, income compared with some benchmark, is an important determinant of subjective well-being. According to some studies, relative variables are even more important than absolute ones (Groot and Maassen Van den Brink, 1999). Whatever the importance of relative concerns on satisfaction compared to absolute concerns, this result challenges the classical economic model and can have potential implications on policy, for example, on redistributive policy and on wage policy inside the firm.

While the thesis that social comparison is important to take into account is not new in the economic literature, a central question remains: what is the appropriate choice of the benchmark reference group, and how does it vary across sub-groups? There are very few economic studies that adequately explain the formation or choice of the reference group. In most economic studies, the reference group is considered an exogenous variable which is imposed by the analyst and is the same for all individuals. Moreover, most of the time, the analyst assumes that individuals have perfect information on the reference group's income. These approaches lead Senik (2009) to suggest that the assumption that the proxy used by the analyst for reference group's income "*is capturing a comparison benchmark remains an interpretation.*"

This paper studies the relationship between relative income and pay satisfaction allowing the choice of reference group to vary across individuals. The paper builds on the work of Clark and Senik (2010) and others by utilizing a survey that contains questions regarding the individual's choice of reference group. Included in a recent *ad-hoc* survey on working conditions and quality of working life in Luxembourg, the questions provide a good opportunity to improve the body of knowledge on choice of reference group and the impact of this choice on pay satisfaction. Moreover, the choice of reference group may help to explain the paradox in the Luxembourg labor market that cross-border workers are more satisfied with their pay than natives despite lower wages. In this context, we seek to answer the following questions: First, what are the variables that influence the choice of reference group, and do these vary across the worker national status categories? Second, to what extent are differences across workers in pay satisfaction correlated with differences in the choice of reference group?

Regarding the first question, we find that gender, age, and income level all influence the choice of reference group. The result varies according to the national status (native, immigrant and cross-border) of the workers, however. Length of time in the Luxembourg labour market also affects the choice of reference group. Regarding the second question, we find that the choice of reference group does indeed affect the gap in pay satisfaction between the cross-border and native workers. Much of the gap, however, is left unexplained.

The paper is organized as follows. We first provide a review of the literature on reference group and on determinants of pay satisfaction. This is followed in section 3 by a description of the data and of pay satisfaction in the Luxembourg labor market. Empirical results are presented in section 4, with conclusions and topics for further research in section 5.

2. Literature review

2.1 Role of the reference group on satisfaction

It is well known that social comparison is an important issue in the context of subjective well-being (see among others Clark and Oswald, 1996; Luttmer, 2005; Clark and Senik, 2010). Subjective well-being (or utility) is not only affected, as suggested by classical theory, by individual performance but also by the performance of a reference group. Indeed, some authors, like Groot and Van den Brink (1999), suggest that relative performance influences satisfaction more than does absolute performance.

If a worker takes into account the reference group, then it is possible that an improvement of his or her own situation doesn't necessarily lead to an increase of subjective well-being when the situation of the reference group also improves. This relative aspect of subjective well-being helps to explain some paradoxes like Easterlin's paradox, that increasing the standard of living of a Nation does not lead to increased citizen satisfaction (Easterlin, 1974), or the paradox that women have higher levels of job satisfaction than men despite worse working conditions (Clark and Oswald, 1996). The level of utility that an individual derives can be expressed as $U=U(Y, Y^*, X)$ where Y is own performance (e.g., income), Y^* the performance of the reference group and X a vector of individual and job related characteristics. An increase of one's own income, everything else equal, leads to an increase in one's satisfaction ($dU/dY > 0$). There is, however, no consensus in the literature on the way that the performance of the reference group affects the individual's satisfaction. On the one hand, some studies conclude that an increase of performance of the reference group, everything else equal, decreases an individual's satisfaction according to relative deprivation or envy ($dU/dY^* < 0$) (Luttmer, 2005; Groot and Van den Brink, 1999 ; De La Garza, 2010; Montero and Vasquez, 2014). On the other hand, an increase of performance of the reference group may increase satisfaction because it provides a signal of the individual's prospects (Clark et al., 2009). This signaling effect is sometimes known in the literature under the name of Hirschman-Rothschild comparison (1973) or tunnel effect. Senik (2008), studying the impact of the reference group's income on subjective well-being, shows that the sign of dU/dY^* varies according to categories of countries. In countries where the degree of income mobility is high (e.g., United States), the signaling effect of the reference group's income on subjective well-being outweighs the jealousy effect. This result applies also in countries subject to high uncertainty in the evolution of income (Eastern Europe). However, in countries where income mobility and uncertainty are low (Western Europe), the jealousy effect outweighs the signaling effect (i.e. $dU/dY^*<0$).

This work still leaves open the question of the determination of the reference group. According to Diener and Fujita (1997) there are two opposing approaches: the "forced comparison approach" where the reference group is determined by social environment, and the "coping approach" where people have a role to play in the determination of the reference group. In this second approach, Festinger (1954) emphasizes that individuals choose as a reference group those who have similar characteristics to themselves to be able to evaluate their situation. Bygren (2004) defines reference group as "any entity a person perceives to be sufficiently contiguous to him to be used as a basis for a comparison." According to the social comparison literature, people pursue two goals when they choose their reference group: self-enhancement and self-improvement (Falk and Knell, 2000). Self-enhancement is comparing with people who are in a worse situation whereas self-improvement is comparing with others who are in a better situation. People trade off these two goals when they determine their reference group. Falk and Knell (2000) show that self-improvement is more developed for higher-ability individuals: they choose higher-income reference groups. Moreover, Clark and Senik (2010) conclude that social interactions play an important role in the determination of this group. The reference group seems therefore to be endogenous. Generally in the literature, however, authors impose a given reference group which is the same for each person studied and which depends on the

availability of data. For example, in their study, Clark et al. (2009) assume that the reference group is composed of co-workers whereas Luttmer (2005) considers neighbors as the reference group. There are, however, some exceptions. For example, Clark and Senik (2010) use Wave 3 of the European Social Survey to study the impact of reference group on happiness. The data allow them to account for the endogenous nature of the reference group, for in this wave of ESS there is a question on the composition of the reference group (colleagues, family members, friends …). They find that people compare their income more often with those of their colleagues than with others. They further explain the choice of the reference group with a multinomial logit regression, finding that some socio-demographic characteristics are relevant determinants (gender, age, marital status) and that the reference group reflects social interactions. Clark et al. (2013) use Japanese data to study the relationship between relative income and satisfaction and find that contrary to Europeans, the Japanese more often report their neighbors as the reference group.

Another question arises regarding assumptions about the individuals' beliefs about the level of performance of their reference group. Generally the level of income, for example, of the reference group is computed within sample by the authors thanks to Mincer's equation, or cell averages, or it comes from external data. For example, Bygren (2004) calculates "for each respondent, a reference earning level for others in their workplace with the same educational level and work experience as themselves." Montero and Vasquez (2014) compute reference wages according to cell averages based on two variables: category of economic activity and level of education. It is difficult, however, to imagine that people have perfect information on the performance of others and/or perform this type of calculation due to their limited rationality. It's more realistic to think that people form beliefs about others' performance on the basis on limited information. De la Garza et al. (2010) use data on self-reported reference wages and compare their result with what they would expect if the reference wage were calculated based on the Mincer equation, cell averages and external datasets. They find that the use of the Mincer equation in this context performed poorly due to multicollinearity, while cell averages and external datasets gave more reliable results. Clark et al. (2013) use a self-reported measure of reference group income and conclude that "a self-reported measure of others' income does better than cell-mean income in explaining satisfaction, and would arguably make a useful addition to many existing surveys."

Choice of reference group is used in the migration literature to explain the satisfaction differential between immigrants and natives. Two theories exist. On one hand, according to Piore (1979) and Stark (1991), subjective well-being of immigrants is driven by comparison with those in their home country and not by absolute performance or comparison with individuals in the host country. Nevertheless, the authors note that over time immigrants may change their reference group and drop the reference to the home country for the host country as they spend more time there. On the other hand, transnational theory (Basch et al., 1993) claims that immigrants determine their subjective well-being taking into account both comparisons with their country of origin and their host country. Gokdemir and Dumludag (2012) explain the paradox in the Netherlands that Turkish immigrants have a lower life satisfaction than Moroccan immigrants despite a better situation in the labor market by the fact that Turkish immigrants do not take into account the absolute level of income. They determine their level of satisfaction on the basis of relative comparison with natives. In contrast, for Moroccan immigrants both absolute and relative aspects are taken into account. Chowhan et al. (2012) study the differences in wage satisfaction between immigrants and the Canadian born. They show that, all things being equal, immigrants have a lower level of wage satisfaction than natives but this result doesn't hold for immigrants who have resided in Canada for a long time. Chowhan et al. express the idea, without being able to test it, that the reference group may play a role in the lower wage satisfaction of immigrants. They also highlight the importance of considering the demographic composition of the sector or firm in which the individual works: if it is composed mainly of immigrants then it will not have the same weight as if it is composed mainly of natives.

The Luxembourg labor market provides an interesting context in which to further study the role of the reference group in determining well-being. Given its history of receiving immigrants to work in specific industries and its location at the intersection of Belgium, France and Germany, the Luxembourg labor force is made up primarily of immigrants (the largest group being Portuguese) and "cross-border" workers who commute daily from the neighboring countries.[i] Pay levels differ between the natives, immigrants, and cross-border workers, as do levels of well-being, including satisfaction with pay. Interestingly, while the pay of natives is significantly higher than that of cross-border workers, they report similar levels of pay satisfaction. We explore the role of the reference group in explaining this paradox.

2.2. Other determinants of pay satisfaction

The previous literature identifies four major categories of variables that are potentially linked to pay satisfaction: needs, job inputs, job characteristics and organizational context.

First, individuals judge their wage according to the needs that their wage is able to cover. If their wage is unable to cover their needs, they will express dissatisfaction towards their wages. Some socio-demographic characteristics can be used as a proxy for the level of needs. For example, Loscocco and Spitze (1991) find that the number of dependents in the household can reveal the importance of these needs. Perhaps this stems from the financial burden that is linked to a child's education.

Second, regarding job inputs, Williams et al. (2006) argued that job inputs or effort are negatively related to pay satisfaction because they raise pay expectations. For example, they note that "employees who must invest more mental energy into their enriched jobs may expect higher levels of pays to compensate for their greater levels of responsibility". Some work related characteristics, such as whether the worker has a supervisory function or often works overtime, may therefore affect the satisfaction with pay.

Third, job characteristics may influence pay satisfaction. Williams et al. (2006) posit that task feedback is linked to pay satisfaction because the feedback may help worker to understand their pay level. Moreover, Nguyen et al. (2003) showed that the degree of job autonomy is significantly linked to pay satisfaction. Ruiz-Palomino (2013) argued that employees perceive a highly motivational job as a reward itself and therefore are less concerned with pay issues. Tanzel and Gazioglu (2012) found that training opportunities are positively linked to pay satisfaction.

Finally, regarding the organizational context, Ruiz-Palomino et al. (2013) find that the moral integrity of the supervisors plays a role in the perceptions of employees regarding their pay.

Our analysis below includes sets of control variables that attempt to hold these factors constant as we further examine the role of relative income, and reference group, in determining pay satisfaction.

3. Data and Methodology

3.1. Data

The data used in this analysis is from an *ad-hoc* survey on working conditions and quality of working life in Luxembourg, conducted by the Luxembourg Institute of Socio-Economic Research (LISER).[ii] The survey was a web survey realized between March and June 2013 on a representative sample of workers in Luxembourg who work in the private sector (temporary workers excluded) and who have at least six months of seniority in their firm. In total there were 17488 responses to the survey (a 24%

response rate), with 3606 Luxembourgish natives, 4642 immigrants (*i.e.* people living in Luxembourg who do not have Luxembourg nationality) and 9240 cross-border workers.

The survey includes numerous questions on working conditions and allows us to study the determinants of pay satisfaction and the choice of reference group.

The measure of pay satisfaction used in this study is derived from the question "on a scale from 0 to 10, how do you rate your satisfaction with your salary?" Because of the thin tails of the distribution (cf. figure 1), we do not use the full 11-point scale in our analysis but instead construct an ordinal variable indicating 3 different levels of pay satisfaction: low (0 to 4), medium (5 to 7) and high level (8 and more). However, sensitivity tests were performed to ensure the stability of the results with other constructions of the dependent variables.

The question regarding the reference group asks, "With whom do you most tend to compare your salary?" The possible answers are: colleagues, employees practicing the same profession as myself in Luxembourg, employees practicing the same profession as myself in a country other than Luxembourg, family members, friends, neighbors, and "I do not compare my salary with that of others." This question differs from the reference group question in the European Social Survey in terms of two responses. First, we have added the people who work outside of Luxembourg, to account for the fact that in Luxembourg the workforce is composed in majority by immigrants and cross-border workers. Second, we add the possibility of employees in the same profession in Luxembourg as a reference group, following Bygren (2004) who found that individuals compare themselves more with employees in general than to their colleagues.

In addition to identifying the reference group, the survey includes a question which allows us to know the perception that respondents have of their salaries compared to the salaries of three potential reference groups: "Do you agree or disagree with the following statements:

- I'm well paid compared with other employees in my company (working in the same profession as myself)
- I'm well paid compared with employees working in the same profession as myself but in other companies
- I'm well paid compared with my relatives/friends"

The possible answers are strongly disagree, disagree, agree, strongly agree and don't know.

The aim of this question is to give a proxy of relative wage. In their study on life satisfaction and relative income, Mayraz et *al.* (2009) use a fairly close proxy of relative income. They use a similar question, in the 2008 pretest module of the German Socio-Economic Panel Study, that asks people to report their feelings about their relative income for different references groups, the answers ranging from "much lower" to "much higher." Additionally, the use of the question in the current study allows an implicit test of the validity of the reference group question.

The survey does not include the salaries of the respondents, but thanks to information from the procedure of sample stratification, we are able to identify the salary of each individual in broad intervals.

Lastly, the survey provides information on standard socioeconomic and personal characteristics, as well as information about the jobs and working conditions. In addition, it includes, a measure of work climate, which proxies for social interactions within the firm, and the respondent's evaluation of whether her working hours are in line with leisure and social commitments, which we use as a proxy for social interaction outside the firm. We also include measures of work experience and whether the respondent was unemployed in the last 12 months. Finally, we include a self-reported measure of commuting time.

A weakness of this survey is that it is only cross-sectional: panel date methods cannot be used to reduce the biases which might arise due to unobserved heterogeneity.

The sample is restricted to individuals who have at least one year of seniority in the firm to be sure that they can judge appropriately their wage. Missing values have been imputed using median values for all variables. The complete dataset then consists of 15,651 people working in Luxembourg in the private sector (temporary workers excluded). Descriptive statistics for all of the variables used in the study are presented in Table 1 (excluding the wage, pay satisfaction and reference group variables, which are described in the results section 4), for each type of worker (Native, Immigrant, Cross-border).

Table 1: Descriptive statistics by types of workers

	Cross-border	**Natives**	**Immigrants**
Male	68.6%***	60.6%	62.9%*
Age			
Less than 30 years	15.9%*	17.3%	17.5%
30-49 years	65.8%***	54.3%	64.3%***
50 years or more	18.3%***	28.4%	18.2%***
Level of education			
Secondary inferior or less	17.3%	18.1%	22.3%***
Secondary superior	41.8%***	56.2%	39.7%***
Post-secondary	40.9%***	25.7%	38.0%***
Couple	82.1%***	74.4%	79.4%***
Child present	62.3%***	52.6%	56.7%***
Health problem	32.9%	33.2%	34.4%
Has been unemployed in the past 12 months	1.9%	2.3%	3.5%***
Union member	25.6%***	39.2%	26.9%***
Perceived risk of losing job			
High risk	24.5%***	19.9%	22.9%***
Relatively low risk	58.2%***	55.0%	57.4%**
Very low risk	17.3%***	25.1%	19.7%***
Occupation			
Top profession, scientific and technical	20.4%***	22.7%	21.4%
Intermediate occupation	22.3%***	19.0%	14.9%***
Administrative employee	13.7%***	27.1%	8.5%***
Seller, waiter	10.6%**	12.2%	16.9%***
Craft worker	25.0%***	15.2%	24.5%***
Unskilled worker or employee	8.0%***	3.8%	13.8%***
Years in the Luxembourgish labor market	11.6 years (std. 7.5)	20.5 years (std. 10.6)	12 years (std. 9.3)
Seniority in the firm			
1-2 years	20.2%***	15.3%	28.0%***
3-6 years	29.8%***	21.7%	28.5%***
7-9 years	13.4%***	10.0%	11.8%**
10-19 years	27.7%**	25.7%	21.6%***
20 years or more	8.9%***	27.3%	10.1%***
Work full-time	87.9%***	85.4%	87.4%**
Permanent contract	96.8%***	93.0%	88.7%***
Sector			
Industrial	14.9%***	11.5%	7.8%***
Construction	14.9%***	8.4%	19.1%***
Commerce + Horeca	21.8%	22.8%	24.0%
Transport	8.1%	7.9%	5.7%***
Information-communication	6.1%	6.3%	4.6%***
Finance	15.7%***	21.1%	16.6%***
Specialized Activities, scientific and technical	10.8%	11.5%	10.5%
Administrative Activities	5.6%***	3.3%	8.8%***
Other	2.0%***	7.1%	2.9%***
Firm size			
Less than 20	22.8%***	28.7%	29.5%
20-49	16.2%***	12.4%	16.8%***
50-299	32.4%***	24.5%	27.5%***
300 or more	28.6%***	34.3%	26.3%***
At least one difficult working conditions	55.0%***	45.6%	57.4%***
Overtime			

Never work overtime	22.1%	22.9%	25.1%**
Sometimes work overtime	46.5%**	48.9%	45.2%***
Often work overtime	31.4%***	28.2%	29.7%
Fringe benefits	64.1%***	74.3%	57.0%***
Fixed salary	69.5%*	71.3%	65.4%***
Opportunity for career advancement	42.7%**	45.5%	46.2%
Paid training	39.4%***	45.8%	33.1%***
Feedback			
Completely disagree feedback	11.1%	10.8%	9.8%
Disagree feedback	29.2%***	25.7%	25.9%
Agree feedback	47.0%	47.9%	50.0%*
Completely agree feedback	10.5%	10.6%	9.8%
Not concerned by feedback	2.1%***	5.0%	4.5%
Work climate			
Bad climate	30.5%	28.9%	26.1%***
Good climate	57.2%	57.2%	60.9%***
Very good climate	12.3%**	13.9%	13.0%
Relative performance (to colleagues)			
Worse performance	12.3%	13.1%	11.3%**
Equal performance	23.9%	24.9%	21.3%***
Higher performance	57.8%**	55.2%	59.6%***
Very higher performance	6.0%	6.7%	7.8%*
Position in the hierarchy			
No supervisory function	59.2%**	56.4%	55.4%
One hierarchical level below	20%	20.7%	19.2%
2 or more hierarchical levels below	20.8%**	22.8%	25.4%**
Working hours in line with leisure			
Not in line	46.9%***	36.2%	40.5%***
In line	44.9%***	51.2%	50.0%
Very in line	8.2%***	12.6%	9.5%***
Commuting time			
Between 0 and 20 minutes	8.2%***	45.2%	48.1%**
Between 21 and 40 minutes	33.2%***	39.8%	36.3%***
Between 41 and 60 minutes	34.8%***	11.6%	10.7%
More than 60 minutes	23.8%***	3.4%	4.9%***
N	**8 440**	**3 219**	**3 992**

Notes: difference from natives significant at *.10 level, **.05 level, ***.01 level

Referring to the table, we see that there are some differences in the personal characteristics and the jobs held by the sample of cross-border, native and immigrant workers in Luxembourg. In many ways the cross-border and immigrant workers are similar, in comparison with the natives. These two groups tend to be younger and with higher levels of education, for example, than the natives. They are more likely to live in a couple household and have a child, less likely to be a member of a union, feel more at risk of losing their job, and have fewer years of seniority both on their job and working in Luxembourg. The cross-border and immigrant workers also are more likely than native workers to have difficult working conditions, but less likely to receive fringe benefits, have a fixed salary, receive paid training, or report that their working hours are very in line with leisure hours. At the same time the distributions of occupations and sectors are quite different across all three of the groups. All of these differences could contribute to observed differences in pay satisfaction.

As would be expected, the commuting times are generally longer for the cross-border workers, as much of the employment in Luxembourg is located in the center, near Luxembourg City. We would expect this difference from natives to lead to lower, rather than higher, levels of satisfaction with pay, however.

There are only small or no differences between the groups in the rate of health problems, the percentage who work overtime, the opportunity for career advancement, work climate, receipt of feedback on the job, perceived performance relative to others. While these may be important determinants of satisfaction with pay in general, they are not likely to explain differences in satisfaction across the worker groups.

3.2. Methodology

Following Clark and Senik (2010), we use multinomial logistic regression to model the choice of the reference group. The probability that individual i (=1 to N) will choose reference group j (j=1 to 5), pij, can be written (when the category of reference is j=5) as:

$$P(j|x_i) = \frac{\exp(x_i\beta_j)}{1+\sum_{h=1}^{J-1}\exp(x_i\beta_h)} \text{ for j=1, …,4}$$

$$P(5|x_i) = \frac{1}{1+\sum_{h=1}^{J-1}\exp(x_i\beta_h)}$$

where Xi is a vector of explanatory variables and Bj a vector of choice-specific coefficients. We utilize two estimation strategies, first with the worker groups combined in a single pooled sample and dummy variables indicating the worker status, and second with the models estimated separately by worker type, which allows the coefficients on the explanatory variables to differ by type. Both estimations are conducted using maximum likelihood methods in STATA.

We use an ordinal logit model for the pay satisfaction specification. Let Y^* represent the unobserved utility associate with the pay in a job, Y the observed categorical response to the satisfaction question, and Y_i the cutoff value, where

$$Y_i = 0 \text{ if } Y_i^* \leq \alpha_1$$

$$Y_i = j \text{ if } \alpha_j \leq Y_i^* \leq \alpha_{j+1}$$

$$Y_i = 4 \text{ if } \alpha_4 \leq Y_i^*$$

We model the underlying value Y^* as a linear function of the vector of explanatory variables X_i:

$$Y_i^* = \beta' X_i + \varepsilon_i$$

where β is a vector of coefficients and ε_i is a random error term. Then the probability of observed response Y_i is

$$P(Y_i=0) = P(\varepsilon_i \leq \alpha_1 - \beta' X_i)$$

$$P(Y_i=j) = P(\alpha_j - \beta' X_i \leq \varepsilon_i \leq \alpha_{j+1} - \beta' X_i)$$

$$P(Y_i=4) = P(\varepsilon_i > \alpha_4 - \beta' X_i)$$

Again, the coefficients are estimated using maximum likelihood. We estimate several alternative specifications of the pay satisfaction equation and the relationship with the reference group. These alternative forms are described in the results section below.

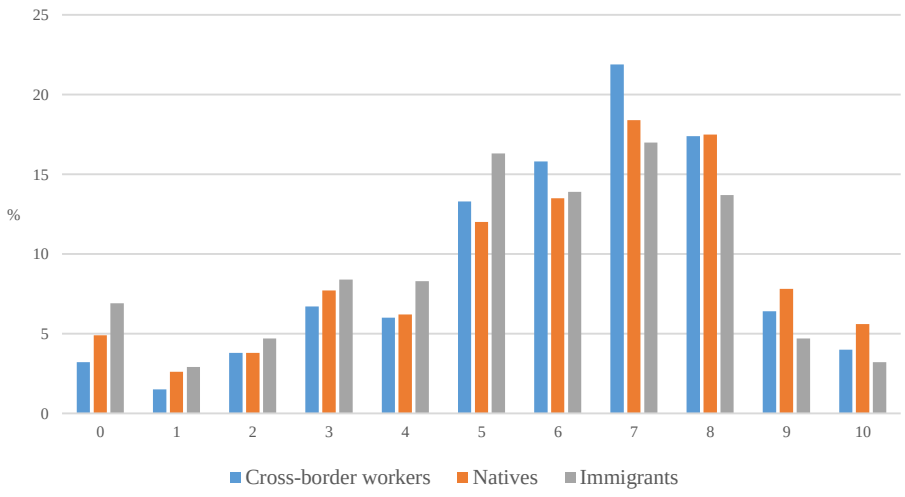
In order to determine whether the choice of reference group explains the observed differential in pay satisfaction between worker types, we estimate the pay satisfaction model separately for samples according to the chosen reference group, with dummy variables for worker type. Under the null hypothesis that the reference group choice explains the differential, then the coefficients on the worker type dummy variables should be zero.

4 Results

4.1 Pay satisfaction in Luxembourg

The average level of employee's pay satisfaction in our sample is 5.8 on a scale of 0 to 10 (standard deviation: 2.4). The distribution of the responses to the pay satisfaction variable are shown, by national status (native, immigrant and cross-border) in Figure 1. 4.5% of workers report pay satisfaction of zero and 4.1% a level of pay satisfaction of 10. While the general patterns are similar, we see that the cross-border workers are more likely than the other groups to give responses in the 6 to 8 range, and less likely to give very low (0, 1) responses.

Figure 1: Pay satisfaction by categories of workers



31.1% of immigrants report a low level of pay satisfaction compared to 25.1% of natives and 21.2% of cross-border workers. Conversely, 30.9% of natives, 27.8% of cross-border workers and 21.6% of immigrants report a high level of pay satisfaction.

Table 2 shows the average hourly wage and average level of pay satisfaction for the different worker groups. The data for this sample confirm the findings of others that cross-border workers earn, on average, a lower wage than natives in Luxembourg (Brosius, 2005; Brosius et al., 2014). Despite this fact, the cross-border workers report the same or slightly higher average level of pay satisfaction (respectively 6.05 and 5.9). This paradox doesn't exist for immigrants, who have both a lower wage and a lower level of pay satisfaction than natives.

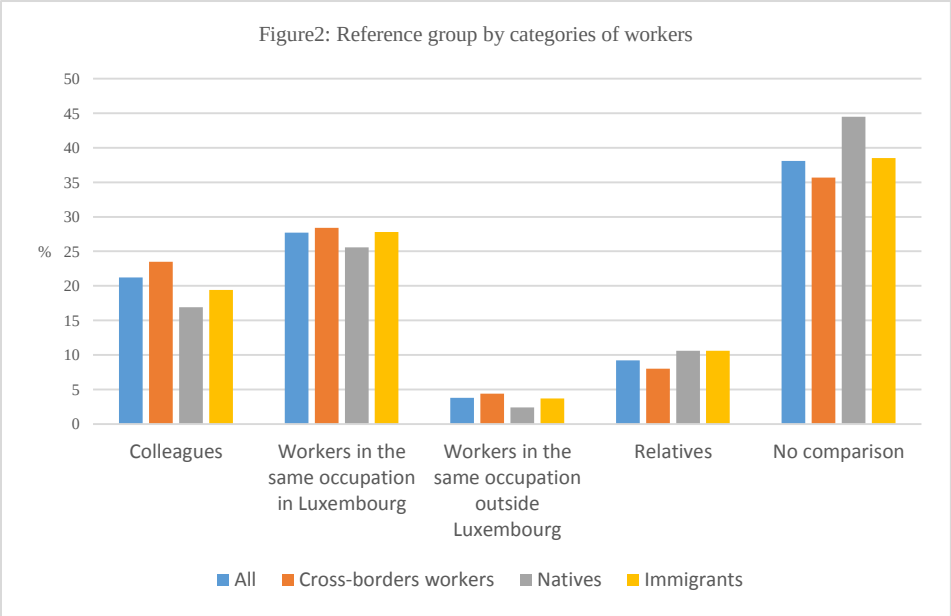
Table 2: wages and pay satisfaction

Worker Group	Average hourly wage	Average level of pay satisfaction
Natives	25.0 euros (Std=12.3)	5.9 (Std=2.4)
Immigrants	20.9 euros (Std=13.2)	5.4 (Std=2.7)
Cross-border workers	20.9 euros (Std=10.2)	6.0 (Std=2.3)
French cross-border workers	19.4 euros (Std=8.8)	5.8 (Std=2.3)
Belgian cross-border workers	22.4 euros (Std=10.9)	6.3 (Std=2.0)
German cross-border workers	22.0 euros (Std=11.8)	6.1 (Std=2.5)

When we distinguish the cross-border workers by their country of residence, we find that the French cross-border workers report the same or slightly lower levels of pay satisfaction as do natives whereas Belgian and German cross-border workers have a higher level of pay satisfaction than natives, despite again having lower average wages. In this paper we try to explain this paradox in the light of social comparison. We expect that cross-border workers are more satisfied with their pay than natives because they have different reference groups.

4.2 Reference group

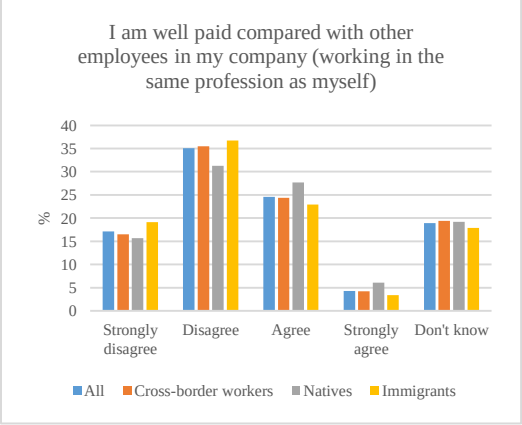
The distribution of responses to the question regarding reference group are presented in Figure 2. As was found by Clark and Senik (2010) for a sample of European countries, in Luxembourg workers are more likely to report that they don't compare their wage to the wage of others (38.1%) than make any comparison. The other responses, in order of frequency, are that they compare their wage to workers in the same occupation in Luxembourg (27.7%), to colleagues (21.2%), to relatives (9.2%) and to workers outside Luxembourg (3.8%). This ordering is consistent with the work of Bygren (2004), who suggests that "workers use broader social categories rather than closer social groups, such as the co-workers at their workplace, when they choose whom to compare themselves with."

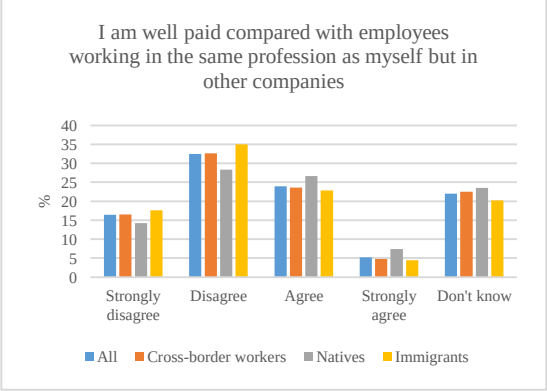


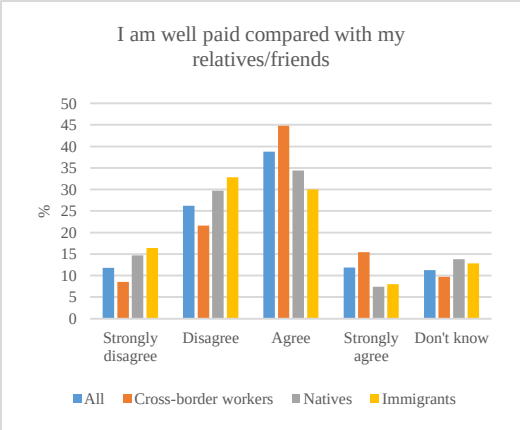
The general pattern across reference groups applies regardless of the worker national status (natives, immigrants and cross-border). There are some differences in the relative frequencies, however. Natives are proportionally more likely to report that they do not compare their wage to the wage of others (44.5%, with 38.5% for immigrants and 35.7% for cross-border workers). Moreover, unsurprisingly, natives are proportionally less likely to compare their wages with workers in another country (2.4%, versus 3.7% for immigrants and 4.4% for cross-border workers). The fact that the cross-border workers reconcile two aspects of their lives (life and work) in two different countries can perhaps explain why they are more likely, than immigrants and natives, to compare their wage with the wage of workers outside Luxembourg. However, cross-border workers are proportionally less likely to compare their wages to those of relatives.

As is noted above, the most common response to the reference group question among all the worker groups is that they do not compare their incomes with others. Also mentioned above, a subsequent set of questions forces the respondents to make a comparison of their incomes with others. The distributions of responses to these three questions (comparison with co-workers, comparison with other workers in Luxembourg, and comparison with relatives) are shown in Figure 3. In each case the respondents agree or disagree with the statement that they are well paid compared to the reference group, or that they "don't know."

Figure 3: Income comparisons







Regardless of the choice of the reference group, the majority of respondents answer that they disagree with the statement that they are well paid compared to their colleagues (52.2%). The proportion who disagree for the other two cases (employees working in the same occupation but in other companies and relatives) is lower, with 48.9% and 38%, respectively. Substantial proportions of workers report that they don't know if they are well paid compared with the various reference groups, of about 20 percent for the first two groups and about 11% when the reference group is composed of relatives. This suggests that we should not assume workers have perfect information about reference group incomes.

Cross-border workers and immigrants are less likely, than natives, to agree with the statement that they are well-paid compared to their colleagues or other workers of the same occupation in other firms. This is consistent with their lower-than-average levels of pay. Cross-border workers also are less likely to agree that they are well paid compared to relatives.

Regarding the "don't know" responses, one would expect that the proportion giving this answer would be higher for the workers who also indicate, in the reference group question (REFGRP), that they do not compare with others. Indeed a simple cross-tab analysis of the two variables supports this hypothesis. The percentages who reply that they "don't know" how their wage compares with that of the other groups is shown in Table 3, for each reference group, according to the response given for the reference group question.

In all three questions, the percentage who indicate that they "don't know" the relative wage is highest for those who also say that they do not compare with others (in the bottom row). Note also that the percentage who "don't know" their relative wage in comparison with colleagues is lowest (5.3%) for those who say they most compare themselves with colleagues. Similarly, those who don't know how their wage compares with other employees in Luxembourg is lowest (7.9%) for those who say they compare themselves most with other employees in Luxembourg. These results validate the responses to the "Reference Group" question.

Table 3: Percentage indicating "don't know" relative wage, by reference group category

	Percent "don't know"	Percent "don't know" for	Percent "don't know" for

Reference group	for Colleagues	Employees in Lux	relatives
Colleagues	5.26	15.92	5.31
Employees in Luxembourg	11.75	7.86	4.2
Employees outside Luxembourg	16.78	14.63	6.43
Relatives	18.63	19.27	5.51
Does not compare	32.05	37.12	21.74

4.3 Determinants of choice of reference group

The results of the multinomial models are presented in the appendix: Tables 4 and 5. Referring first to the control variables in the pooled analysis (Table 4), we find, as did Clark and Senik (2010), that women are more likely to compare their salaries with relatives (family member, friend or neighbors) than are men, other things equal. Similarly, younger workers are more likely to compare their salaries with relatives. Working in a small company (less than 20 employees) decreases the probability of comparing one's salary with the salary of colleagues. Contrary to Clark and Senik, we do not find that married workers or those with children are more likely to compare their wage with relatives than are other workers. Hourly wage is positively related to the probability that the worker does not compare his salary, except when the comparison is done with employees outside Luxembourg. In that case, a higher hourly wage increases the probability of comparing with employees outside Luxembourg.

We see that cross-border workers are more likely than are natives to compare their salaries with colleagues as well as with employees outside of Luxembourg. They are less likely than natives to compare with relatives. There is no statistically significant difference between the cross-border workers and natives in the probability of "no comparison," after controlling for the other variables in the model. Similar results hold for immigrants (compared to natives), except that there is no association of that status with the probability of comparing with colleagues.

The results for the analysis done separately by worker type are presented in Table 5. Some differences exist. We can see, for example, that age is not linked to the choice of reference group for natives whereas age decreases the probability of comparing one's salary with relatives for cross-border workers and for immigrants. Moreover, age increases the probability of not comparing her salary for cross-border workers and for immigrants. We can see also that there is no gender difference in comparing their salary with relatives among the cross-border workers, contrary to the finding for natives and immigrants.

The relationship between the time spent in the Luxembourg labour market and the probability of comparing ones salary to employees outside of Luxembourg is U-shaped for both cross-border workers and immigrants. That is, both groups are more likely to make such a comparison when they first start to work in Luxembourg, but then begin to compare themselves with others in the local labour market over time. Those with the longest time in Luxembourg, however, also are more likely to compare themselves with those outside of Luxembourg.

4.3 Determinants of Pay satisfaction

The results of the ordinal response model of the determinants of pay satisfaction are presented in Table 6.[2] There are five specifications presented, first a baseline estimate with only the log of hourly wage

[2] Sensitivity tests were performed in order to test the stability of the results when another division of the dependent variable is used.

and several control variables as explanatory variables, second with the addition of dummy variables indicating immigrant or cross-border status, but no control for reference group, third with dummy variables added indicating the choice of reference group, fourth with inclusion of the "comparison" questions but no reference group controls, and lastly with all variables included.

The baseline estimates (column 0) indicate a strong positive relationship between the absolute level of pay and the satisfaction with pay. When we control only for type of worker (column 1), we find that the odds of cross-border workers having a higher level of pay satisfaction is nearly 1.8 times the odds for natives. There is, however, no difference in the odds between immigrants and native workers. The log-odds ratio for the log-wage variable remains large and highly significant.

When we control for reference group (column 2), we find that the odds of cross-border workers having a higher level of pay satisfaction remains unchanged at about 1.8 times the odds for natives. Having the reference groups of "colleagues," "workers in Luxembourg," or "relatives" is correlated with lower pay satisfaction compared to making no comparison. At the threshold of 5%, there is no difference between the workers who have the reference group of "workers outside Luxembourg" and workers who have no reference group. Again, we find a positive relationship between pay satisfaction and the absolute wage, but the log-wage odds ratio is slightly smaller.

When we instead control for the "comparison" with others' wages (column 3), we again find that cross-border workers are more likely to report higher satisfaction with pay, although the magnitude of the odds ratio is reduced to about 1.5. Finally, when we control for both the reference group and the relative wage comparisons (column 4), we find that the cross-border workers are still significantly more likely than natives (and immigrants) to report higher levels of pay satisfaction. Note that log-odds ratio for the log-wage variable is considerably smaller in magnitude in both specifications that include the relative wage comparison variables (columns 3 and 4).

Table 6: Ordered Logit regression of pay satisfaction (Odds-ratio)

	(0)	(1)	(2)	(3)	(4)
Log of hourly wage	6.609***	7.288***	6.957***	5.030***	4.704***
Cross-border workers		1.769***	1.819***	1.475***	1.523***
Immigrant		1.032	1.050	1.055	1.080
Natives		Ref.	Ref.		Ref.
Colleagues as reference group			0.495***		0.426***
Workers in the same occupation in Luxembourg as reference group			0.416***		0.373***

Workers in the same occupation outside Luxembourg as reference group			0.935		0.732***
Relatives as reference group			0.569***		0.518***
No reference group			Ref.		Ref.
Feeling to be well-paid compared to colleagues				1.318***	1.399***
Feeling to be well-paid compared to employees in others companies				2.083***	2.105***
Feeling to be well-paid compared to relatives				2.494***	2.595***
N		15 651	15 651	15 651	15 651

Notes: difference significant at *.10 level, **.05 level, ***.01 level

What factors might lead cross-border workers to have higher satisfaction with pay even after controlling for worker and job characteristics? Two important features of the Luxembourg and the Great Region labour markets are the differences in the availability of jobs in the regions and differences in costs of living, especially housing costs. While the analysis above controls for differences in commuting time, the cost of housing is not accounted for. The "real" value of a given wage for a cross-border worker is therefore substantially higher than the same nominal wage for a resident of Luxembourg. In addition, the job market prospects for workers in their home countries is not as good as that in Luxembourg. To some degree the higher satisfaction with pay might simply reflect the satisfaction with having a job. These two factors combined could lead to the higher unexplained job satisfaction among cross-border workers. Future work should attempt to control for these regional differences.

The results presented above are subject to some limitations and must be interpreted in that light. First, and foremost, is the recognition that the "treatment" (whether a cross-border worker) is endogenous. To date we have not attempted to control for the effects of this on the analysis. Unfortunately the fact that the data is only cross-sectional places limitations on the methods we can use.

5. Summary and conclusions

This paper has provided further evidence regarding the choice of reference group for making salary comparisons, utilizing a unique survey of workers in Luxembourg. It also seeks to explain the apparent paradox evident in the Luxembourg labour market, that "cross-border" workers are more satisfied with their pay than are native workers, despite having lower average wages. We hypothesize that the choice of reference group can explain the "satisfaction gap." The results show that the choice of reference group has an effect on wage satisfaction. Moreover, the relative wage as compared to different groups has an impact on the magnitude of the absolute wage and the cross-border workers coefficients. However, despite all these controls, we still find a separate effect for the cross-border workers variable. That is to say, while the choice of reference group does differ for the cross-border

workers and has some effect on their satisfaction relative to natives, it does not fully explain the "satisfaction gap".

Further work using this data set should explicitly treat the choice of reference group as an endogenous variable, in addition to conducting separate analyses by reference group. It should also use information in the data regarding both subjective and objective measures of pay relative to the pay of others, by reference group. Finally, further work should address the endogeneity of cross-border status, and control for regional differences in costs of living and unemployment rates.

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APPENDIX:

Table 4: Multinomial Logit regression: choice of reference group (reference: employees in Luxembourg)

	Colleagues	Employees outside GDL	Relatives	No comparison
Men	-0.034	0.070	-0.286***	-0.132**
	(0.063)	(0.116)	(0.078)	(0.054)
Age				
Less than 30 years	*Ref.*	*Ref.*	*Ref.*	*Ref.*
30-49 years	-0.156*	0.149	-0.538***	0.166*
	(0.088)	(0.158)	(0.109)	(0.085)
50 years or more	-0.130	0.247	-0.841***	0.368***
	(0.117)	(0.213)	(0.159)	(0.106)
Category of workers:				
Natives	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Cross-border workers	0.243***	0.603***	-0.382***	-0.029
	(0.078)	(0.159)	(0.096)	(0.065)
Immigrants	0.090	0.432**	-0.103	0.030
	(0.087)	(0.171)	(0.108)	(0.073)
Level of education:				
Secondary inferior or less	0.202**	0.145	-0.028	0.448***
	(0.094)	(0.180)	(0.121)	(0.083)
Secondary superior	0.235***	0.301**	0.006	0.476***
	(0.068)	(0.122)	(0.087)	(0.061)
Post-secondary	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Seniority on the Luxembourgish labor market	-0.002	-0.081***	0.028*	0.019**
	(0.011)	(0.018)	(0.015)	(0.009)
Square of seniority on the Luxembourgish labor market	0.000	0.001***	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Couple	0.050	-0.123	-0.100	-0.038
	(0.071)	(0.133)	(0.089)	(0.063)
Whether there is a child	-0.010	0.0811	0.033	0.104*
	(0.062)	(0.115)	(0.082)	(0.054)
Health problem	-0.077	-0.208*	-0.244***	-0.203***
	(0.058)	(0.109)	(0.079)	(0.0511)
Work full-time	-0.048	-0.000	-0.209*	-0.203***
	(0.094)	(0.182)	(0.112)	(0.079)
Log of hourly wage	-0.346***	1.012***	-0.279**	0.157**
	(0.086)	(0.143)	(0.113)	(0.071)
Permanent contract	-0.288**	-0.606***	-0.274*	-0.232**
	(0.119)	(0.196)	(0.149)	(0.107)
Has been unemployed in the past 12 months	-0.179	-0.291	-0.002	-0.155
	(0.178)	(0.348)	(0.229)	(0.162)
Union member	0.028	0.019	-0.018	0.026
	(0.062)	(0.114)	(0.085)	(0.054)
High risk to lost his job	-0.111*	-0.139	-0.164*	-0.278***
	(0.062)	(0.115)	(0.087)	(0.056)
Bad work climate	0.051	-0.211*	-0.022	-0.141***
	(0.059)	(0.110)	(0.081)	(0.053)
Working hours not in line with leisure	-0.065	0.046	-0.143**	-0.182***
	(0.054)	(0.098)	(0.072)	(0.048)
Activity's sector:				
Industry	0.300***	0.822***	0.320**	0.571***
	(0.095)	(0.171)	(0.132)	(0.085)
Construction	0.082	0.215	-0.037	0.263***
	(0.107)	(0.230)	(0.152)	(0.096)
Commerce and catering	-0.073	0.805***	0.293**	0.405***
	(0.094)	(0.171)	(0.121)	(0.081)
Transport	0.108	1.468***	0.250	0.464***
	(0.120)	(0.178)	(0.167)	(0.106)
Informatics and communication	0.192*	0.122	0.184	0.304***
	(0.100)	(0.211)	(0.137)	(0.090)
Finance	Ref.			
Specialised activities, scientifics and technical	-0.010	0.406***	0.150	0.288***
	(0.087)	(0.157)	(0.111)	(0.076)
Administrative tasks	-0.057	0.535*	0.596***	0.878***
	(0.151)	(0.277)	(0.179)	(0.125)
Others sectors	0.294	1.03***	0.029	0.515***

	(0.179)	(0.299)	(0.249)	(0.151)
Firm's size:				
Less than 20	-0.779***	-0.321**	-0.278***	-0.081
	(0.083)	(0.135)	(0.102)	(0.068)
20-49	-0.523***	-0.532***	-0.380***	-0.161**
	(0.082)	(0.149)	(0.113)	(0.071)
50-299	-0.263***	-0.376***	-0.060	-0.135**
	(0.064)	(0.116)	(0.086)	(0.059)
300 or more	Ref.			
Intercept	1.254***	-4.750***	1.082***	-0.419
	(0.317)	(0.556)	(0.406)	(0.277)
	N=15 651 Wald chi2(124)=1333.88 Prob>chi2 = 0.0000 Pseudo R2 = 0.0368			

Table 5: Multinomial Logit regression by type of workers: choice of reference group (reference: employees in Luxembourg)

Colleagues

	Cross-Border	Natives	Immigrants
Men	0.020	-0.109	-0.083
	(0.083)	(0.144)	(0.128)
Age			
Less than 30 years	*Ref.*	*Ref.*	*Ref.*
30-49 years	-0.107	-0.111	-0.266
	(0.115)	(0.251)	(0.175)
50 years or more	-0.011	-0.320	-0.122
	(0.151)	(0.320)	(0.245)
Level of education:			
Secondary inferior or less	0.065	0.722***	0.234
	(0.121)	(0.229)	(0.212)
Secondary superior	0.247***	0.548***	0.089
	(0.088)	(0.162)	(0.156)
Post-secondary	*Ref.*	*Ref.*	*Ref.*
Seniority on the Luxembourgish labor market	-0.011	-0.025	0.019
	(0.017)	(0.030)	(0.023)
Square of seniority on the Luxembourgish labor market	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Couple	-0.078	0.327**	0.125
	(0.096)	(0.152)	(0.145)
Whether there is a child	0.066	-0.177	-0.051
	(0.082)	(0.139)	(0.132)
Health problem	-0.048	-0.024	-0.175
	(0.074)	(0.137)	(0.123)
Work full-time	0.014	0.044	-0.273
	(0.122)	(0.205)	(0.208)
Log of hourly wage	-0.540***	-0.037***	-0.173
	(0.120)	(0.187)	(0.167)
Permanent contract	-0.193	0.369	-0.616***
	(0.192)	(0.270)	(0.185)
Has been unemployed in the past 12 months	0.097	-0.189	-0.582*
	(0.248)	(0.411)	(0.337)
Union member	0.104	0.162	-0.159
	(0.082)	(0.132)	(0.138)
High risk to lost his job	-0.112	-0.260*	0.002
	(0.079)	(0.155)	(0.132)
Bad work climate	-0.034	-0.372***	0.092
	(0.077)	(0.135)	(0.128)
Working hours not in line with leisure	-0.087	-0.189	0.032
	(0.069)	(0.133)	(0.116)
Activity's sector:			
Industry	0.074	0.590***	0.711***
	(0.125)	(0.205)	(0.222)
Construction	0.065	0.465	-0.000
	(0.142)	(0.283)	(0.226)
Commerce and catering	-0.264**	0.200	0.204
	(0.128)	(0.218)	(0.193)
Transport	-0.114	0.369	0.511*
	(0.160)	(0.245)	(0.281)

Informatics and communication	0.129 (0.133)	0.275 (0.239)	0.281 (0.214)
Finance	*Ref.*	*Ref.*	*Ref.*
Specialised activities, scientifics and technical	0.060 (0.119)	0.139 (0.224)	-0.249 (0.167)
Administrative tasks	-0.165 (0.192)	0.524 (0.365)	-0.104 (0.316)
Others sectors	-0.102 (0.279)	0.576* (0.297)	0.852** (0.410)
Firm's size:			
Less than 20	-0.827*** (0.111)	-0.735*** (0.203)	-0.757*** (0.169)
20-49	-0.659*** (0.104)	-0.192 (0.204)	-0.402** (0.177)
50-299	-0.385*** (0.083)	-0.238 (0.154)	-0.024 (0.141)
300 or more	*Ref.*	*Ref.*	*Ref.*
Intercept	2.155*** (0.434)	-0.850 (0.687)	-1.129* (0.584)

Notes: difference significant at *.10 level, **.05 level, ***.01 level

Employees outside Luxembourg:

	Cross-border	Natives	Immigrants
Men	0.096 (0.158)	-0.005 (0.316)	-0.096 (0.205)
Age			
Less than 30 years	*Ref.*	*Ref.*	*Ref.*
30-49 years	0.055 (0.203)	0.376 (0.593)	0.196 (0.305)
50 years or more	0.409 (0.254)	-0.079 (0.731)	0.006 (0.484)
Level of education:			
Secondary inferior or less	0.157 (0.224)	0.244 (0.503)	-0.049 (0.492)
Secondary superior	0.375** (0.165)	-0.030 (0.329)	0.287 (0.245)
Post-secondary	*Ref.*	*Ref.*	*Ref.*
Seniority on the Luxembourgish labor market	-0.091*** (0.028)	-0.024 (0.070)	-0.114*** (0.037)
Square of seniority on the Luxembourgish labor market	0.001** (0.000)	0.000 (0.001)	0.002** (0.011)
Couple	-0.288 (0.175)	0.261 (0.337)	-0.042 (0.259)
Whether there is a child	0.259* (0.155)	-0.077 (0.275)	-0.0245 (0.231)
Health problem	-0.314** (0.109)	0.195 (0.291)	-0.112 (0.212)
Work full-time	0.073 (0.237)	-0.116 (0.505)	-0.213 (0.356)
Log of hourly wage	0.756*** (0.207)	1.095*** (0.382)	1.241*** (0.261)
Permanent contract	-0.627** (0.315)	-0.111** (0.546)	-0.806*** (0.290)
Has been unemployed in the past 12 months	-0.237 (0.488)	-1.078 (1.041)	-0.200 (0.562)
Union member	0.083 (0.149)	0.045 (0.259)	-0.068 (0.255)
High risk to lost his job	-0.001 (0.148)	-0.462 (0.367)	-0.304 (0.222)
Bad work climate	-0.200 (0.141)	-0.780** (0.315)	-0.127 (0.218)
Working hours not in line with leisure	-0.100 (0.129)	0.349 (0.246)	0.295 (0.187)
Activity's sector:			
Industry	0.796*** (0.229)	1.494*** (0.447)	0.758** (0.386)
Construction	0.495* (0.293)	0.982 (0.604)	-0.617 (0.545)
Commerce and catering	1.041*** (0.233)	0.821* (0.465)	0.174 (0.338)
Transport	1.404*** (0.252)	2.428*** (0.408)	1.315*** (0.354)

Informatics and communication	0.155 (0.303)	0.904* (0.532)	-0.026 (0.352)
Finance	*Ref.*	*Ref.*	*Ref.*
Specialised activities, scientifics and technical	0.745*** (0.223)	-0.263 (0.615)	-0.025 (0.244)
Administrative tasks	0.920*** (0.330)	1.569** (0.330)	-2.359** (1.081)
Others sectors	0.911** (0.447)	1.596*** (0.527)	0.925 (0.606)
Firm's size:			
Less than 20	-0.520*** (0.184)	-0.117*** (0.368)	0.017 (0.227)
20-49	-0.745*** (0.190)	0.0098*** (0.449)	-0.326 (0.283)
50-299	-0.538*** (0.150)	-0.055 (0.294)	-0.217 (0.228)
300 or more	*Ref.*	*Ref.*	*Ref.*
Intercept	-3.304*** (0.751)	-6.631*** (1.559)	-4.491*** (0.957)

Notes: difference significant at *.10 level, **.05 level, ***.01 level

Relatives

	Cross-border	Natives	Immigrants
Men	-0.137 (0.113)	-0.381** (0.160)	-0.436*** (0.152)
Age			
Less than 30 years	*Ref.*	*Ref.*	*Ref.*
30-49 years	-0.391** (0.153)	-0.065 (0.269)	-0.826*** (0.199)
50 years or more	-0.709*** (0.221)	-0.367 (0.363)	-1.089*** (0.313)
Level of education:			
Secondary inferior or less	-0.354** (0.179)	-0.025 (0.274)	0.250 (0.235)
Secondary superior	0.103 (0.125)	0.154 (0.175)	-0.254 (0.180)
Post-secondary	*Ref.*	*Ref.*	*Ref.*
Seniority on the Luxembourgish labor market	-0.016 (0.024)	-0.044 (0.035)	0.074*** (0.027)
Square of seniority on the Luxembourgish labor market	0.000 (0.000)	0.000 (0.000)	-0.001* (0.000)
Couple	-0.247* (0.129)	-0.031 (0.175)	0.066 (0.177)
Whether there is a child	0.133 (0.117)	-0.100 (0.166)	-0.089 (0.163)
Health problem	-0.338*** (0.111)	0.137 (0.159)	-0.323** (0.157)
Work full-time	-0.223 (0.154)	-0.053 (0.230)	-0.355 (0.230)
Log of hourly wage	-0.285* (0.167)	-0.137 (0.225)	-0.147 (0.211)
Permanent contract	-0.533** (0.243)	-0.049 (0.291)	-0.223 (0.232)
Has been unemployed in the past 12 months	-0.018 (0.372)	-0.059 (0.437)	0.087 (0.382)
Union member	-0.115 (0.115)	-0.013 (0.159)	-0.209 (0.182)
High risk to lost his job	-0.0469 (0.116)	-0.201 (0.183)	-0.381** (0.183)
Bad work climate	-0.089 (0.111)	0.246 (0.159)	-0.029 (0.167)
Working hours not in line with leisure	-0.250** (0.099)	0.021 (0.145)	-0.067 (0.142)
Activity's sector:			
Industry	0.185 (0.174)	0.476* (0.284)	0.506* (0.301)
Construction	-0.080 (0.207)	-0.125 (0.358)	0.113 (0.304)
Commerce and catering	0.225 (0.168)	0.414* (0.245)	0.391 (0.246)
Transport	-0.135	0.513*	0.881**

	(0.236)	(0.309)	(0.359)
Informatics and communication	-0.184	0.616**	0.451*
	(0.206)	(0.269)	(0.268)
Finance	*Ref.*	*Ref.*	*Ref.*
Specialised activities, scientifics and technical	0.116	0.379	-0.085
	(0.163)	(0.242)	(0.207)
Administrative tasks	0.466*	-0.193	0.956***
	(0.243)	(0.493)	(0.325)
Others sectors	-0.918*	0.180	0.892*
	(0.557)	(0.385)	(0.484)
Firm's size:			
Less than 20	-0.331**	0.069	-0.335*
	(0.147)	(0.219)	(0.202)
20-49	-0.595***	0.359	-0.297
	(0.155)	(0.235)	(0.226)
50-299	-0.179	0.185	0.039
	(0.117)	(0.185)	(0.178)
300 or more	*Ref.*	*Ref.*	*Ref.*
Intercept	1.350**	0.053	0.496
	(0.592)	(0.782)	(0.733)

Notes: difference significant at *.10 level, **.05 level, ***.01 level

No comparison

	Cross-border	Natives	Immigrants
Men	-0.156**	-0.328***	0.040
	(0.076)	(0.119)	(0.110)
Age			
Less than 30 years	*Ref.*	*Ref.*	*Ref.*
30-49 years	0.255**	-0.018	0.174
	(0.116)	(0.212)	(0.164)
50 years or more	0.522***	-0.277	0.518**
	(0.140)	(0.275)	(0.216)
Level of education:			
Secondary inferior or less	0.426***	0.679***	0.328*
	(0.108)	(0.184)	(0.184)
Secondary superior	0.526***	0.494***	0.344***
	(0.081)	(0.124)	(0.138)
Post-secondary	*Ref.*	*Ref.*	*Ref.*
Seniority on the Luxembourgish labor market	0.0017	-0.007	-0.037**
	(0.015)	(0.025)	(0.019)
Square of seniority on the Luxembourgish labor market	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Couple	-0.110	0.223*	-0.092
	(0.088)	(0.124)	(0.127)
Whether there is a child	0.138*	-0.100	0.195*
	(0.073)	(0.112)	(0.113)
Health problem	-0.241***	0.038	-0.293***
	(0.068)	(0.108)	(0.106)
Work full-time	-0.101	-0.159	-0.410**
	(0.105)	(0.167)	(0.173)
Log of hourly wage	0.214**	0.361**	0.002
	(0.103)	(0.147)	(0.140)
Permanent contract	-0.138	-0.137	-0.290*
	(0.191)	(0.193)	(0.170)
Has been unemployed in the past 12 months	-0.199	-0.534	0.047
	(0.241)	(0.348)	(0.265)
Union member	0.105	-0.044	-0.072
	(0.074)	(0.107)	(0.118)
High risk to lost his job	-0.244***	-0.415***	-0.292**
	(0.074)	(0.124)	(0.114)
Bad work climate	-0.221***	0.0569	-0.080
	(0.070)	(0.109)	(0.114)
Working hours not in line with leisure	-0.234***	-0.174*	-0.093
	(0.063)	(0.104)	(0.101)
Activity's sector:			
Industry	0.551***	0.658***	0.515**
	(0.114)	(0.173)	(0.207)
Construction	0.205	0.497**	0.179**
	(0.133)	(0.225)	(0.194)
Commerce and catering	0.408***	0.618***	0.246
	(0.113)	(0.173)	(0.165)
Transport	0.415***	0.564***	0.513**

	(0.144)	(0.212)	(0.252)
Informatics and communication	0.256**	0.548***	0.220
	(0.124)	(0.195)	(0.185)
Finance	*Ref.*	*Ref.*	*Ref.*
Specialised activities, scientifics and technical	0.364***	0.411**	0.052*
	(0.109)	(0.173)	(0.139)
Administrative tasks	0.756***	0.585*	1.025***
	(0.168)	(0.301)	(0.238)
Others sectors	0.151	0.774***	0.794**
	(0.239)	(0.248)	(0.355)
Firm's size:			
Less than 20	-0.112	0.004	-0.082
	(0.095)	(0.153)	(0.134)
20-49	-0.326***	0.151	-0.026
	(0.093)	(0.168)	(0.150)
50-299	-0.203***	0.090	-0.176
	(0.078)	(0.125)	(0.129)
300 or more	*Ref.*	*Ref.*	*Ref.*
Intercept	-0.630	-1.087**	0.145
	(0.398)	(0.549)	(0.508)

Notes: difference significant at *.10 level, **.05 level, ***.01 level

Endnotes

[i] Indeed, natives of Luxembourg make up only about XX percent of the labor force.
[ii] The survey, “ ,” was funded by the …….