

2.3 HOW VALUABLE ARE LANGUAGE SKILLS IN THE LUXEMBOURG LABOUR MARKET? ⁸⁴

This analysis explores the languages skills in the Luxembourg labour market and how they affect employment income, using data on residents and cross-border workers collected through the Household Finance and Consumption Survey (HFCS). On average, workers in the Luxembourg labour market are proficient in more than one language, reflecting the country's linguistic diversity. Native and foreign-born residents tend to be proficient in more languages than cross-border workers. Employees who master more languages tend to earn higher employment income. Mastering an additional language is associated with a 5% higher hourly wage. In particular, proficiency in English is associated with an 18% higher hourly wage.

Language skills are important in the labour market, as well as in everyday life. They reduce transaction costs and cultural barriers to international trade, even within the European Union. In fact, the Council of the European Union (2002) recommends teaching two foreign languages from a very young age.

The decision to learn a foreign language entails an evaluation of expected benefits and costs (see Church and King, 1993). In the economics literature, language skills are mostly analysed in relation to their effect on wages and employment, especially for international migrants. Empirical analyses established a positive relationship between language skills and labour market participation, income, and probability of employment (see for example, Chiswick, 1991; Chiswick and Miller, 1995; Charette and Meng, 1998; Dustmann and van Soest, 2001; McIntosh and Vignoles, 2001; Dustmann and Fabbri, 2003; Bleakley and Chin, 2004 and Lochmann et al., 2019).

While learning the local language can be particularly important for immigrants, speaking additional languages may also be beneficial for natives – especially in countries with more than one official language (e.g., Shapiro and Stelcer, 1997; Grenier, 1984; Cattaneo and Winkelmann, 2005). Williams (2011) analyses the financial return from mastering a second language in the workplace for 14 EU countries and estimates an average wage gain of 5-20%. In all countries except the UK, the use of a foreign language at work is rewarded by higher wages. Across countries, English is the most widely rewarded foreign language, while French, Italian and German are also rewarded in some countries.

From this perspective, the Luxembourg labour market is a special case. Luxembourg attracts over 200,000 cross-border commuters from neighbouring regions. Thus, unlike most other European countries, Luxembourg is fundamentally multilingual, as about 50% of employees live across the border, of which roughly 50% commuting from France, about 25% from Belgium and 25% from Germany. In addition, even among the 50% of employees who live within the country about 50% are foreign-born, of whom 25% are from Portugal. Thus, natives account for only about 25% of total employment in Luxembourg.

Luxembourg's three official languages include French and German as well as Luxembourgish. In addition, a substantial share of residents speaks English fluently. This language diversity means that employers in Luxembourg often require proficiency in several languages. For employees, the expected financial returns may drive the decision to become proficient in an additional language. For example, Klein (2007) uses Luxembourg household level data from 1998-2000 and finds that mastering several languages raises labour market participation of both men and women, and wages for men. Williams (2011) finds that Luxembourg is the only country where French, German and English all have positive returns through higher wages.

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This analysis confirms that French is the most common language in the Luxembourg labour market and finds substantial differences between resident and cross-border workers. Residents, both native and foreign-born, tend to be proficient in more languages than cross-border workers. Our results suggest that language skills matter for employment income. Workers proficient in more languages tend to earn higher employment income. In particular, proficiency in English appears to matter the most.

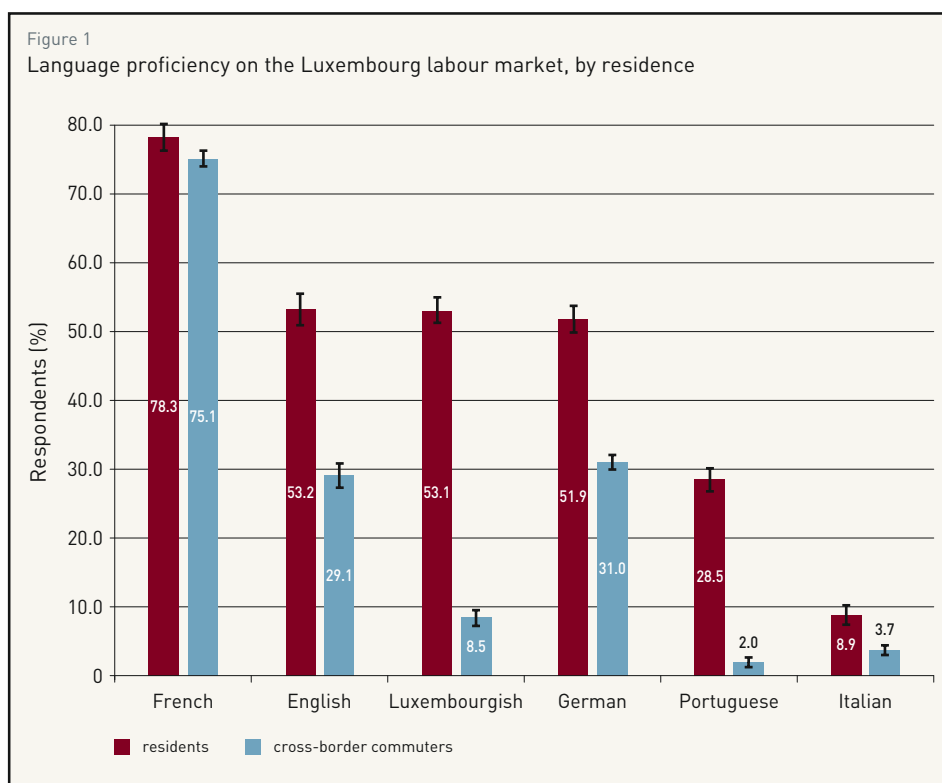
Data source and key variables

We use data from the 2018 Household Finance and Consumption Surveys (HFCS). This includes a survey of Luxembourg residents (LU-HFCS) and one of cross-border commuters (XB-HFCS). For the purpose of this analysis, we will only consider employed residents, to facilitate comparisons with cross-border commuters, who are all employed (by definition). The 2018 edition of these surveys contained detailed information about employment income and a dedicated set of questions regarding language skills. All cross-border workers and employed residents were asked to assess their proficiency in six different languages: Luxembourgish, French, German, Portuguese, Italian and English. In each case, they ranked their language skills according to the following five categories: i. mother tongue, ii. proficient/advanced, iii. intermediate/independent, iv. basic knowledge and v. no knowledge. We aggregate the answers into a dummy variable that takes the value '1' if the respondent selected one of the first two categories (mother tongue or proficient/advanced) and zero otherwise.

The sample of employed residents consists of 2,048 individuals representing 248,627 employees in Luxembourg. The sample of cross-border workers consists of 2,440 individuals representing 151,961 cross-border commuters.⁸⁵ Results reported below are based on five multiply imputed datasets and a set of 1,000 replicate weights. For more details concerning the two surveys, see Chen et al. (2020, 2021).

Languages in the Luxembourg labour market

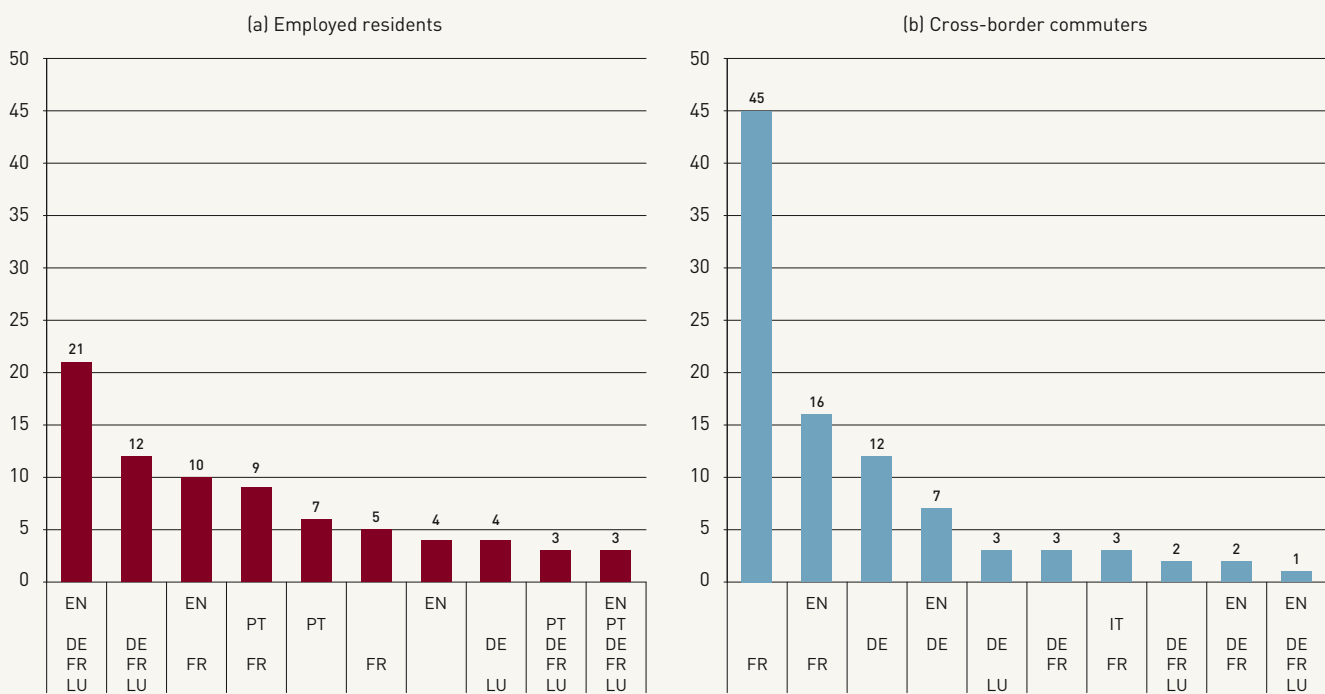
Not every employee in Luxembourg masters all three official languages: Luxembourgish, French and German (Figure 1). For resident employees, language proficiency is most common in French (78%), followed by English (53%), Luxembourgish (53%), and German (52%). Portuguese and Italian are also common. The non-negligible share of those proficient in Portuguese and Italian reflects large immigrant groups. Among cross-border workers, French is the only language mastered by more than 50%. German is spoken proficiently



Note: Data are multiply imputed and weighted. Error bands indicate the 90% confidence interval. Sources: Own calculations based on 2018 LU- and XB-HFCS data (wave 3)

⁸⁵ For cross-border commuters information on language skills was only collected for the survey respondent, even if others living in the same household were also cross-border commuters. Therefore, the selected sample may not be fully representative of the total population of cross-border workers.

Figure 2
Ten most common combinations of languages (in %)



Note: The figure reports the shares of the ten most spoken language combinations.
Sources: Own calculations based on 2018 LU- and XB-HFCS data (wave 3). Data are multiply imputed and weighted

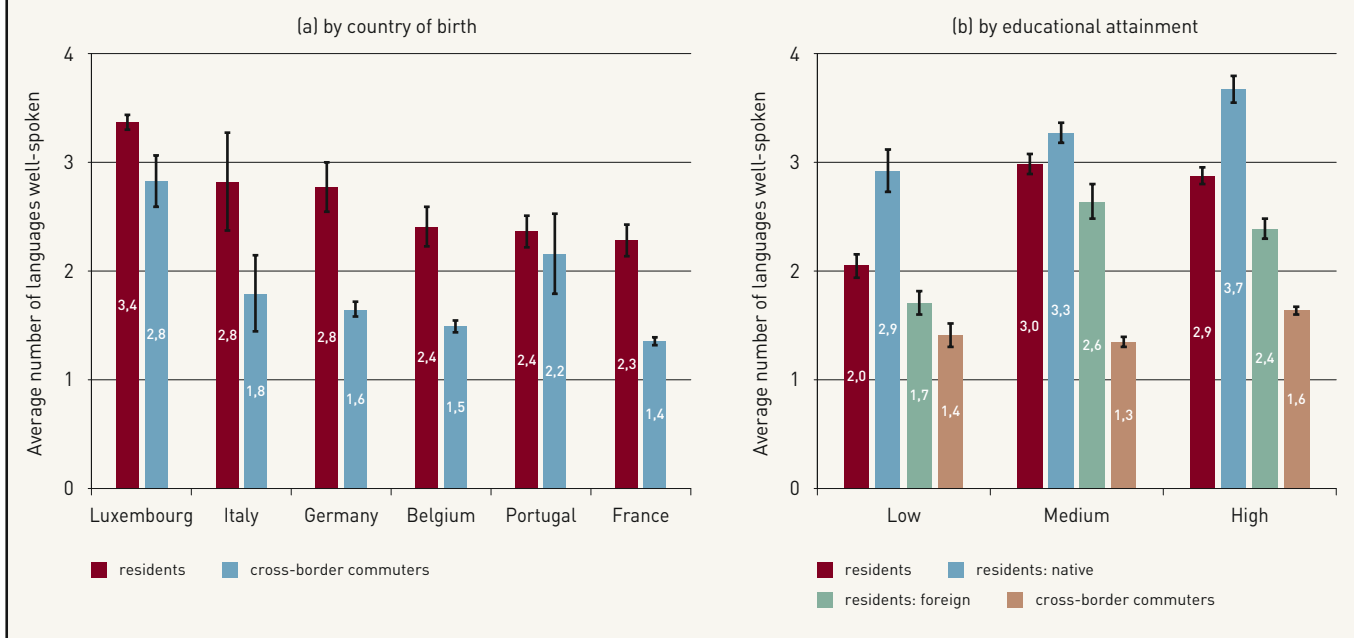
by 31% of cross-border workers and English by 29%. In addition, 2-4% of cross-border commuters are proficient in Portuguese or Italian.

Many employees in the Luxembourg labour market are proficient in more than one language. Figure 2 identifies the most common language combinations. Among employed residents, the most common combination includes the three official languages plus English, while most cross-border commuters are proficient in only one language - French. As 75% of cross-border workers commute from France or from the French-speaking part of Belgium, there is less incentive for them to master a foreign language since French is an official language in Luxembourg. About 45% of employed residents are proficient in both French and German, which is only the case for 8% of cross-border commuters.

Employed residents born in Luxembourg (natives) tend to be proficient in more languages than either residents who were born abroad or cross-border commuters (Figure 3a). Cross-border commuters who were born in Luxembourg but moved across the border tend to be proficient in fewer languages than those born in Luxembourg who still reside in the country. For Luxembourg-born cross-border commuters, the average number of languages is similar to that of foreign-born residents, in particular those from Italy or Germany.

In addition, there is a clear link between educational attainment and proficiency in several languages (Figure 3b). Language skills improve with educational attainment. Low-educated residents are usually proficient in two languages, while medium- to highly educated residents usually master one additional language. For employed residents, proficiency is clearly higher among medium- to highly- educated employees. However, native residents already master three languages at low levels of educational attainment and language proficiency does not increase much at medium levels of educational

Figure 3
Number of languages spoken proficiently



Note: Data are multiply imputed and weighted. Error bands indicate the 90% confidence interval.

Sources: Own calculations based on 2018 LU- and XB-HFCS data (wave 3)

attainment. In contrast, immigrants with medium levels of education master one more language compared to those with low levels of education. In general, cross-border commuters are proficient in fewer languages. This is true for all education levels. Compared to employed residents, the number of languages mastered by cross-border workers barely increases with their educational attainment.

Going into more detail, Figure 4 considers the level of proficiency in individual languages, comparing respondents with low and medium levels of educational attainment to those with high levels. More than 80% of native residents are proficient in any of three official languages. Differences in the educational attainment do not seem to affect proficiency in Luxembourgish or German. However, for those residents who were born in Luxembourg, proficiency in English increases from 37% for the low- and medium-educated to 83% for the highly-educated (Figure 4a).

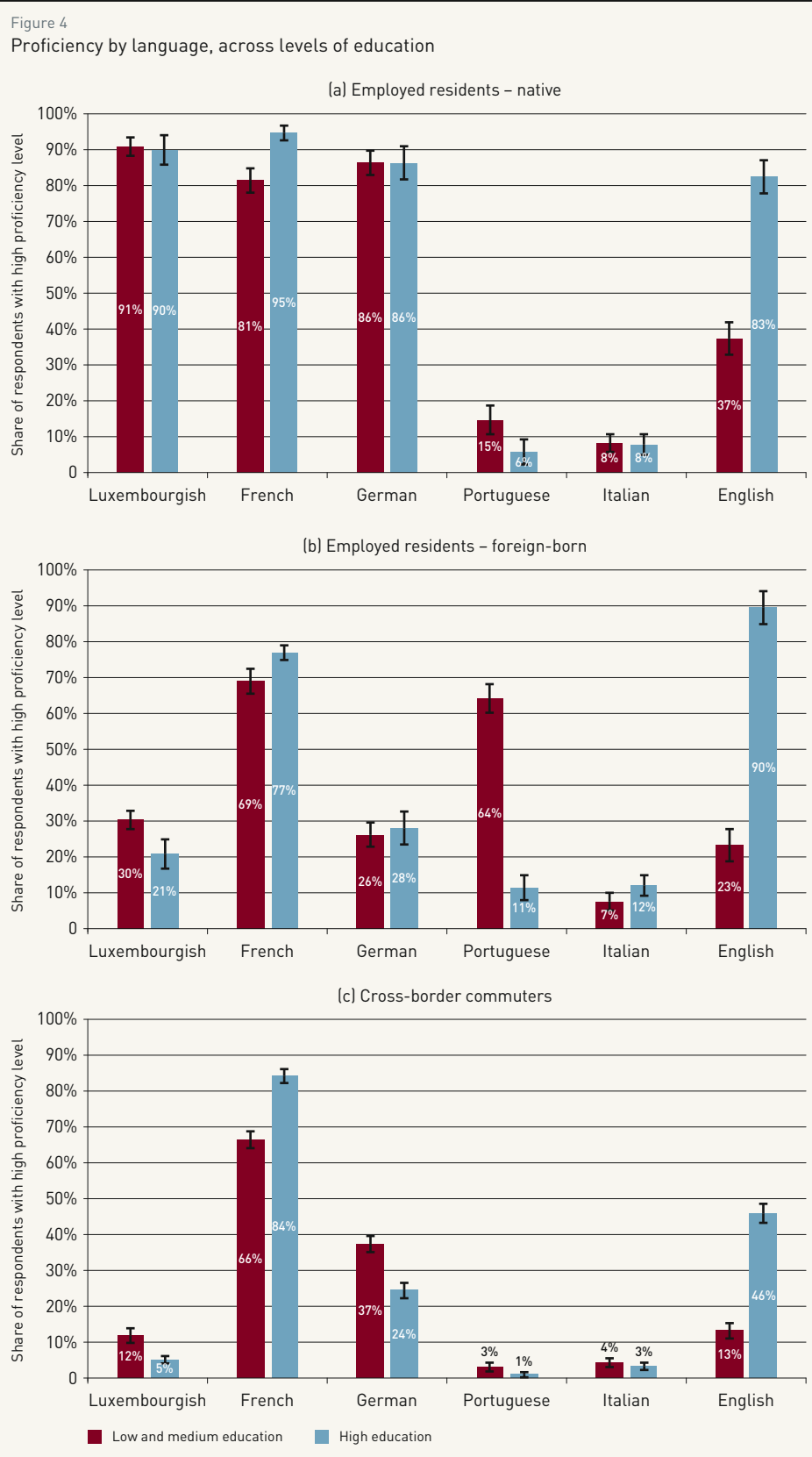
For foreign-born residents, the picture is clearly different (Figure 4b). Most of these immigrants are proficient in French (69% for low and medium levels of education and 77% for a high level of education). Sixty-four percent of immigrants with a low or medium level of education master Portuguese, reflecting the overall share of this immigrant group in the population. Among highly-educated immigrants, only 11% are proficient in Portuguese, suggesting that most Portuguese-speaking immigrants have not attained a high level of education. Only 30% of immigrants with a low or medium level of education master Luxembourgish. This share is even lower for highly-educated immigrants. By contrast, proficiency in English increases with educational attainment. Only 23% of immigrants with low and medium levels of education are proficient in English, while this is the case for 90% of highly-educated immigrants.

For cross-border commuters, the picture is more similar to that of immigrants than that of Luxembourg natives (Figure 4c). Luxembourgish plays an even less significant role, proficiency in Portuguese and Italian is negligible, and German is mastered by almost one third of those with a low or medium level of education and about one quarter of the highly-educated. This may be because many

cross-border commuters from Germany are skilled workers without a high level of education. As was the case for Luxembourg residents (native or foreign-born), English is much more common among highly educated cross-border commuters than among those with a low or medium level of education. Overall, these figures confirm the importance of French and English for the Luxembourg labour market.

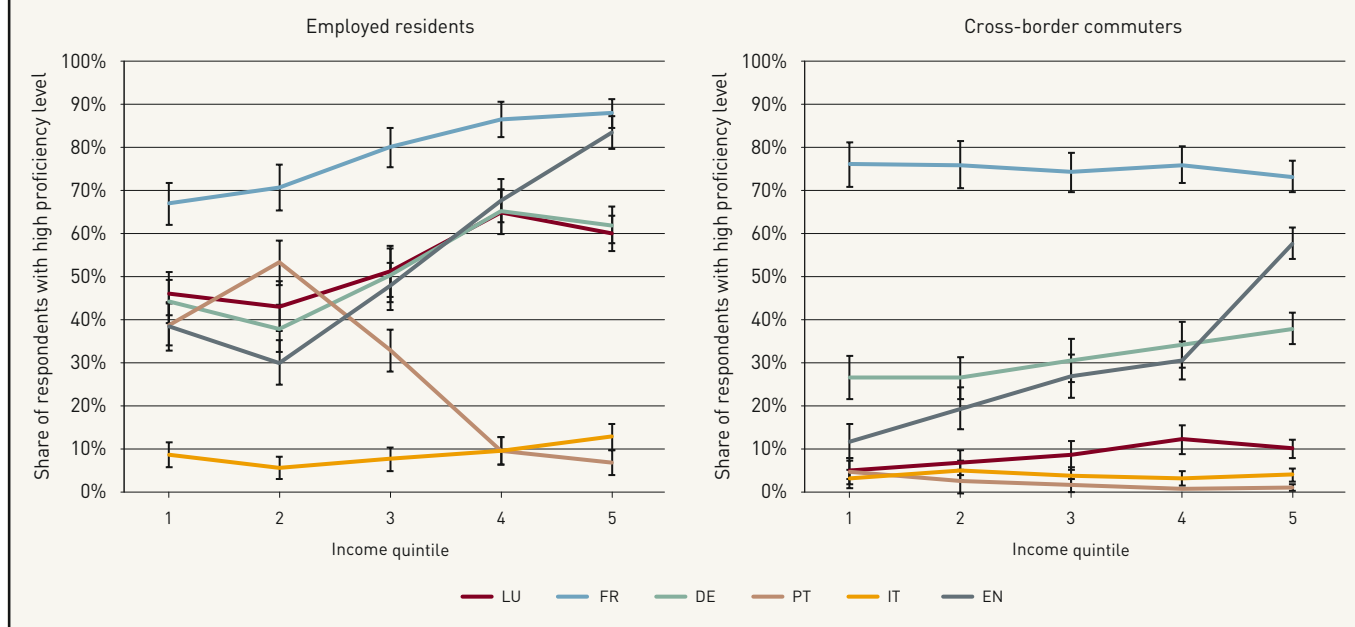
Finally, there is a positive correlation between language proficiency and employment income (Figure 5). For residents, this is clear for French and particularly striking for English. Residents in higher income categories tend to be more proficient in English, French, German and Luxembourgish, but less proficient in Portuguese. In comparison, cross-border commuters in higher income categories tend to be less proficient in French. However, proficiency in English and German does seem to be positively linked to income.

While there may be a positive correlation between language proficiency and income, the two may be simultaneously affected by other individual characteristics, such as education. This seems all the more plausible as one cannot reasonably assume that a proficiency in Portuguese would be a cause for lower income, as one may otherwise read from chart 5 (left side), if one erroneously mixed up “causal effect” and “correlation”. Therefore, these descriptive statistics in isolation are not conclusive evidence of a causal relation between language proficiency and income. For this reason, the next section reports a multivariate regression analysis that controls for additional factors.



Note: Data are multiply imputed and weighted. Error bands indicate the 90% confidence interval.
Sources: Own calculations based on 2018 LU- and XB-HFCS data (wave 3)

Figure 5
Language proficiency, by employment income quintile



Note: Data are multiply imputed and weighted. Error bands indicate the 90% confidence interval.
Sources: Own calculations based on 2018 LU- and XB-HFCS data (wave 3)

Econometric exercise

We run a simple OLS regression based on a typical Mincer (1958) earnings function including variables measuring language proficiency:

$$\log(W_i) = \beta_0 + \beta_1 X_i + \beta_2 L_i + u_i,$$

where $\log(W_i)$ is the natural logarithm⁸⁶ of hourly employment income of individual i , X_i is the corresponding vector of socio-demographic and employment characteristics, L_i is the corresponding vector of variables measuring language skills and u_i is a normally and independently distributed error term.

Identifying a causal link from language skills to labour income presents several empirical challenges. These are mainly related to unobserved variable bias, simultaneity and measurement error. In particular, self-assessed language skills reported in surveys are known to be prone to significant measurement errors. Moreover, econometric models omit (unobserved) respondent ability, which may influence both language skills and labour income.

Since we can only rely on self-assessed measures of language proficiency, the resulting estimates are likely downward biased.⁸⁷ Therefore, it is safer to interpret them as measuring the correlation between language skills and employment income than as evidence of causality.

⁸⁶ We use an inverse hyperbolic sine transformation in logarithmic form as some self-employed cross-border workers report negative income.

⁸⁷ Several studies addressed these issues with an instrumental variable approach (see Chiswick and Miller, 1995; Dustmann and van Soest, 2001; Bleakley and Chin, 2004). These studies show that neglecting such problems leads to downward bias in estimating the impact of language proficiency on labour market outcomes.

Equations (1) and (2) use different functional forms to incorporate language skills. Equation (1) includes a single variable indicating the number of languages spoken with proficiency. Instead, equation (2) includes six separate dummy variables for proficiency in each of the languages considered (Luxembourgish, French, German, Portuguese, Italian and English). Both specifications include socio-demographic and economic characteristics typically used for these kind of analyses (see the legend of Table 1 for details).

Estimates of equation (1) indicate that the number of languages spoken with proficiency is positively correlated with hourly wages. Proficiency in one additional language is associated with a 5% increase in hourly wages. Estimates of equation (2) suggest that this effect is mainly driven by proficiency in English. The coefficient for English suggests an 18% increase in the hourly wage. The estimated coefficient for German is only 9% and estimated coefficients on the other languages are not statistically significant. The coefficient for proficiency in French is 7%, slightly below the German coefficient but not statistically significant. This may be related to sample composition, since more than three quarters of employees are proficient in French.

Estimated effects of the socio-demographic and employment characteristics are in line with those of the literature (not shown in Table 1, but consistent across all specifications): the hourly wage is higher for men, for those born in Luxembourg and for those with higher educational attainment. Workers with permanent employment contracts have higher wages, while full-time employees have a lower hourly wage than part-time employees, possibly due to some working hours reported in excess of 40 hours per week, which may not be compensated for some full-time workers. The self-employed and those employed in the financial and insurance sector, information and communication sector or the public sector tend to report higher hourly wages than employees in other sectors.

Table 1:

OLS regression of employment income on individual socio-demographic and employment characteristics and language skills

VARIABLES	(1)	(2)
Language proficiency		
Number of languages spoken with proficiency (n)	0.051*** (0.019)	
Luxembourgish (d)		-0.062 (0.056)
French (d)		0.074 (0.052)
German (d)		0.085* (0.048)
Portugese (d)		-0.092 (0.061)
Italian (d)		-0.051 (0.063)
English (d)		0.183*** (0.041)
Socio-demographic and employment characteristics	yes	yes
Observations	4488	4488
Adjusted R2	0.28	0.29

Note: Data are multiply imputed and weighted. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; (d) indicates a dummy variable and (n) indicates a numerical variable. The adjusted R2 is the average across 5 multiply imputed imputates. We control for the following characteristics: gender; level of education (low [ISCED-2011=0,1,2], middle [ISCED-2011=3,4] and high [ISCED-2011=5-8]); age and age squared; country of birth (Luxembourg, all other countries); job status (full-time [32 or more working hours per week]; part-time [fewer than 32 working hours per week]); type of contract (permanent, temporary); number of years working in current job; number of years working in previous jobs; self-employed and dummies grouping different sectors of employment. The regression also includes a dummy for cross-border commuters and a constant term.

Sources: Own calculations based on 2018 LU- and XB-HFCS data (wave 3)