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# Risky Working Conditions: An Immigrant Trap or an Income Effect?

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# Risky working conditions: an immigrant trap or an income effect?

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**Abstract**

Immigrants' income has been proved to converge to the average native income level with years of residence in the host country. This income assimilation effect is surprisingly not associated with a health improvement. Some emerging studies point towards the role of working conditions as a driver of the counterfactual relation between immigrants' health and income. Using French data, we first show that, consistently with Viscusi (1978), working conditions are a normal good. An increase in 10% in non-earned income is associated with a decrease by 0.85% in professional injuries and by more than 3.2% in disabilities induced by professional illnesses. Second, we find that while immigrants bear in average worse working conditions than natives, this divergence results from an income divergence effect since for an equivalent non-earned income level there are no significant differences in working conditions between natives and immigrants. Income assimilation of immigrants is associated with an assimilation in working conditions. We conclude then that bad working conditions cannot be blamed for the degradation of immigrants' health with years of residence in the host country.

*Keywords*: immigrants, working conditions, income

*JEL*: A14; J15; J61; J81

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# 1 Introduction

While there exists a large literature on labor market performance of immigrants in the host country and their impact on natives' wages or employment (see among others Card (1990), Hunt (1992), Katz and Murphy (1992), Card (2005), Algan et al. (2010), Ottaviano and Peri (2012), D'Amuri and Peri. (2014) or Moreno-Galbis and Tritah (2016)) less is known about working conditions borne by immigrants and how these conditions evolve with immigrant assimilation in the host country. The objective of this paper is to gain insights on immigrants working conditions and the role of income assimilation as a potential driver of them.

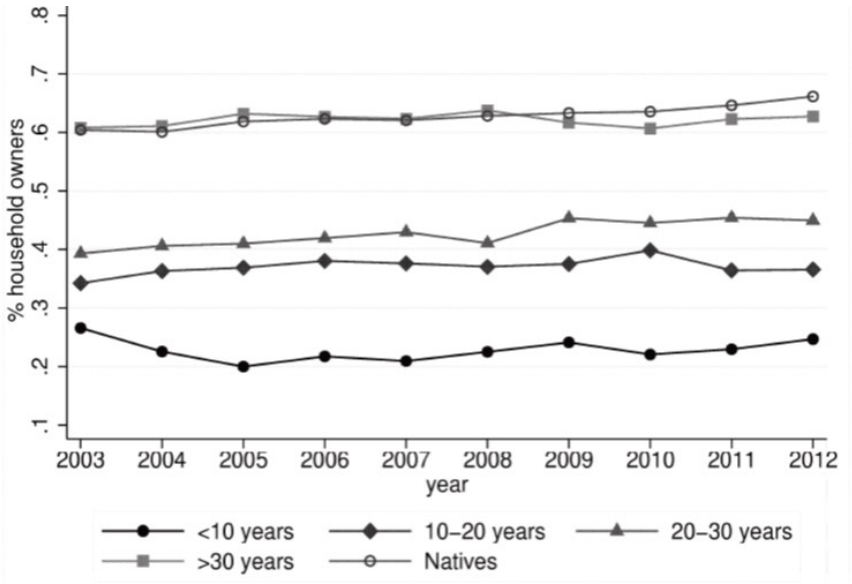
With years of residence in the host country immigrants' income tends to converge to the native income level (see Borjas (1985), Borjas (1995), Chiswick (1986), Hu (2000) or Antecol, Kuhn, and Trejo (2006) among others). This income assimilation effect is surprisingly not associated with a health improvement (see Marmot, Adelstein, and Bulusu (1984), Antecol and Bedard (2006) or Hao and Kim (2009)). Why the improvement of immigrants' income is not associated with a better health dynamics? The economic literature has tried to provide alternative explanations to this counterfactual result. Acculturation (and the associated risky behaviors) is often underlined as the main driver of the counterfactual relation between immigrants' health in the host country and income (see Antecol and Bedard (2006), McDonald and Kennedy (2004), Stephen et al. (1994), Kasl and Berkman (1983) or Marmot and Syme (1976)). Some emmerging studies also point towards worse working conditions of immigrants with respect to natives as determinant of their deteriorated health dynamics (see Case and Deaton (2005), Fletcher and Sindelar (2009), Orrenius and Zavodny (2009), Fletcher, Sindelar, and Yamaguchi (2011) or Giuntella and Mazzona (2015)). This statement seems though contradictory with the idea that working conditions are rather a normal good: the higher the individual's non-earned income the better working conditions he will require to accept a job (see Viscusi (1978) for a seminal work on the subject). With years of residence in the host country, immigrants' income tends to converge to the native level. Under the hypothesis that working conditions are a normal good we should then find a convergence in immigrants' and natives' working conditions. If this is not the case we may wonder whether immigrants are actually caught in a trap of bad working conditions due to differences in risk perception, human capital or outside opportunities.

There are several reasons that can rationally explain why immigrants should be willing to accept riskier jobs than their natives counterparts (see Orrenius and Zavodny (2009) for more details on these reasons). First, because working conditions of immigrants in their home country may be very hard and since they may have also gone through very hard migration trip conditions, immigrants are likely to have a differing perception of risk with respect to natives. As a result, immigrants may be more willing to accept riskier jobs than natives (even for an identical wage rate), since they do not perceive these jobs as dangerous.

Second, lower levels of education, social capital or bad language proficiency may lead immigrants to have less information on the actual risks associated with a job. Moreover, employers may have an

interest in hiding the actual risks associated with the job. Third, even if immigrants are perfectly aware about the risky nature of a job, they may not have other choice than accept it because of the lack of alternative opportunities. This particularly applies for undocumented immigrants.
Fourth, upon arrival immigrants tend to be in better health than natives (see McDonald and Kennedy (2004), Antecol and Bedard (2006) or Park, D. Myers, and Min (2009)). Therefore, recently arrived immigrants might be willing to hold more physically strenuous jobs than natives. These physically strenuous jobs may involve more workplace risks.
Finally, even if immigrants and natives have similar knowledge about job risks and the same legal status, immigrants might still occupy riskier jobs than natives because of differences in non-earned income (along the paper we will also refer to non-earned income as wealth). Our paper focuses on this point.
Figure 1 uses French Labor Force Survey data 2003-2012 to compute the share of household owners among immigrants depending on their residence duration in France. Household ownership is used here as a proxy of wealth. Figure 1 reveals first that the share of household owners among immigrants increases with years of residence in the host country, progressing from a proportion of around 22% of immigrants with less than 10 years of residence, to 38% for immigrants with 10-20 years of residence, to 42% for immigrants with 20-30 years of residence and to slightly more than 60% for immigrants with more than 30 years of residence. Second, among immigrants with more than 30 years of residence in the host country the share of household owners equals along time the average proportion of natives who are household owners.
Consistently with previous finding in the literature, years of residence are thus associated with income convergence of immigrants towards the natives' average level. If as remarked by Viscusi (1978) or Orrenius and Zavodny (2009)) working conditions, are a normal good whose quantity demanded increases with non-earned income we should find an improvement in immigrants' working conditions with years of residence in the host country and, everything else equal, undifferentiated working conditions between immigrants and natives having similar level of non-earned income.
The paper seeks to gain insights on the role of non-earned income as a determinant of working conditions and, more precisely, as a determinant of immigrants' working conditions. We propose a sequential analysis. First we focus on the relationship between working conditions and non-earned income. We exploit data at the department level to estimate the elasticity of professional injury/illness indicators with respect to wealth indicators. Second, we study the differences between immigrants' and natives' working conditions and disentangle cohort effects (i.e. years of residence in the host country) from income effects, so as to test if income convergence is associated with a convergence in working conditions.
We work with French data. We use the same technique as in Berger and Gabriel (1991), Hamermesh (1998) and Orrenius and Zavodny (2009) and merge industry injury and illness rates with individual-level data. Industry data comes from the national statistics provided by the National Health Insurance Fund for Salaried Workers ("Caisse nationale de l'assurance maladie des tra-

Figure 1: Share of immigrant household owners depending on residence duration




Source: Labor Force Survey 2003-2012.

vailleurs salaries") 2014-2016 on professional injuries and illnesses by NAF5 2008 activity classification.

We use two alternative sources of individual data covering distinct periods and differing in their content. The French Labor Force Survey (LFS) is a representative database of the French labor force and our sample covers the period 2003-2012 (after this date there is no information on the country of birth). The LFS contains information on the individuals' level of wealth in an indirect way, since we know if the individual is a household owner. It does not contain information on working conditions but we will merge the LFS with national statistics on professional accidents and illness coming from the National Health Insurance Fund for Salaried Workers. Furthermore, we also merge the LFS with fiscal data on wealth provided by the French Fiscal Authority at the department level.[1]

The individual medical database CONSTANCES corresponds to a non representative sample covering the period 2012-2018. Participation in this survey is voluntary, implying that participants may be more likely to care about their health than the average. The number of observations is evidently below the LFS but CONSTANCES will allow us to contrast results obtained on the LFS. More precisely, CONSTANCES contains information on the origin of the individual's revenue. We have information on whether the individual is perceiving capital income from dividends or housing rentals. We use this variable as a proxy for high non-earned income. We also enrich CONSTANCES by merging it with national statistics on professional accidents and illness coming

[1]The department is the geographical unit immediately below the region.

from the National Health Insurance Fund for Salaried Workers. We will then contrast results obtained from the LFS with results obtained from CONSTANCES data.
CONSTANCES contains also information on current job content of the individual (physical hardness, use of ICT, repetitive nature of the job, etc.) as well as job content of past positions (whether the individual has been exposed to organizational, physical, chemical, noise or other constraints).[2] We use this information in appendix to show the relationship between our indicators of risky working conditions, *i.e.* professional accidents/illness indicators, and job content.
The paper is organized as follows. The economic rationale behind our empirical findings is explained in section 2 using a simplified labor market representation. Section 3 describes our data bases and the merging procedure between data bases containing information at the individual level (LFS and CONSTANCES) and activity branch data coming from the National Health Insurance Fund for Salaried Workers. Descriptive statistics are also provided in this section. The econometric strategy is presented in section 4. Results from benchmark estimations are commented in section 5. Section 6 concludes.

# 2 Economic rationale

## 2.1 The framework

We build a simplified matching model based on Pissarides (1990). Time is continuous, agents are risk neutral and discount the future at a common rate $\rho$. Wages are exogenously determined and workers have an exogenous probability of finding a job. The individual can be employed or unemployed. While in the former case the individual devotes all the time to work, in case of unemployment the individual profits from the value of leisure. The economy is composed by $J$ independent labor markets each corresponding to a different occupation or activity branch.[3] Within a particular labor market, workers are homogeneous in terms of productivity and thus they all earn the same wage. In contrast, workers may be heterogeneous with respect to the outside opportunity of employment.
For simplicity, we assume here that the outside opportunity of employment is composed by the unemployment benefit $b_j$ potentially indexed to the previous wage in the corresponding occupation/activity branch $j$ and by non-earned income of the worker, $R_i$. The outside opportunity of employment equals $b_j + R_i$, where the value of leisure is assumed to be equal to non-earned income. While all individuals in market $j$ benefit from the same level of $b_j$, they are heterogenous with respect to $R_i$. Depending on its nature, non-earned income can contribute to finance or

[2]CONSTANCES also contains information on the individual health status and it has a panel dimension on what concerns the follow up of individuals' health status. The analysis on the relationship between working conditions and individual health dynamics is studied in another ongoing paper.

[3]While the hypothesis of independence across labor markets may seem unrealistic, it is easier to justify it if we consider occupations or activity branches defined in large sense, so that mobility across occupations or activities is more difficult.

not consumption. More precisely, if non earned income is composed by income capital coming from dividends or rentals, it can finance consumption independently on the employment status of the individual. In contrast, if non-earned income corresponds to household ownership, it cannot directly contribute to finance current consumption but it contributes to the value of leisure when the individual is unemployed.

Consumption is financed by the individual's wage $w_j$ in occupation/activity branch $j$ and by the monetary part of non-earned income, $\sigma R_i$, where $\sigma$ stands for the proportion of wealth that can be used to finance consumption.

A job seeker in labor market $j$ successfully matches a vacancy with probability $p_j$. The value of unemployment equals then:

$$\rho U_j = b_j + R_i + p_j[W_j - U_j] \tag{1}$$

where $W$ stands for the value of employment.

To keep as close as possible to the standard search models traditionally used in the literature (see Pissarides (1990)) we assume that jobs are destroyed by a common exogenous shock with probability $\chi$ (but this hypothesis does not play any role for our analysis). The expected utility of an employee in labor market $j$ equals:

$$\rho W_j = w_j - \tau_j + \sigma R_i + \chi(U_j - W_j) \tag{2}$$

where $w_j$ represents the wage and $\tau_j$ stands for the utility loss associated with working conditions in occupation/activity branch $j$. The difference between the wage paid in occupation/activity $j$ and the disutility generated by working conditions in $j$, *i.e.* $w_j - \tau_j$, captures what is known as the compensating wage differential. A wage differential refers to the relation between the wage rate and the unpleasantness, risk, or other undesirable attributes of a particular job. A compensating wage differential is the additional amount of revenue that a given worker must be offered in order to motivate him to accept a given undesirable job, relative to other jobs in which working conditions could be such that $\tau_j = 0$.

A job seeker in labor market $j$ accepts a job if and only if:

$$W_j \geq U_j \qquad W_j - U_j \geq 0 \tag{3}$$

Replacing equations (1) and (2) in the previous expressions leads to:

$$W_j - U_j \geq \frac{w_j - \tau_j - b_j - (1-\sigma)R_i}{\rho + \chi + p_j} \tag{4}$$

where the denominator is always positive. The decision to accept a job or remain unemployed is thus driven by the sign of the numerator:

- If $w_j - \tau_j - b_j - (1-\sigma)R_i < 0 \Rightarrow w_j - \tau_j < b_j + (1-\sigma)R_i$, the individual prefers to keep the outside opportunity of employment and not work. The compensating wage differential does not manage to overcome the unemployment benefit and the additional utility obtained while unemployed from the non-monetary part of wealth (value of leisure).

- If $w_j - \tau_j - b_j - (1-\sigma)R_i > 0 \Rightarrow w_j - \tau_j > b_j + (1-\sigma)R_i$, the compensating wage differential together with the monetary component of wealth overcomes the outside opportunity of employment. The individual accepts the job.

## 2.2 Comparative static analysis

### 2.2.1 Non-earned income and labor supply

Consider a particular labor market $j$, where all individuals face same working conditions $\tau_j$, earn the same wage $w_j$ and have then the same unemployment benefit $b_j$. For simplicity we actually set $b_j = 0$. The proportion of monetary non-earned income $\sigma$ has been assumed identical for all individuals. We initially set also $\sigma = 0$. In this case, from equation (4) we deduce that only individuals with non-earned income $R_i < R^* = w_j - \tau_j$ accept to work. Individuals with $R_i > R^*$ refuse to work under these conditions.

If we assume a strictly positive proportion of monetary non-earned income, only individuals with an income below $\frac{w_j - \tau_j}{(1-\sigma)} = R^{**}$ accept a job. Because $R^{**} > R^*$, the proportion of people that accepts to work, increases when we consider the possibility that a fraction of non-earned income can be used to finance current consumption. For a given $\sigma$ and for a given compensating wage differential, individuals with a non-earned income $R_i > R^{**}$ will refuse to work, while individuals with lower non-earned income accept the job. Identical working conditions are then refused by high non-earned income individuals whereas accepted by lower non-earned income individuals.[4]

As shown by Figure 1, it takes more than 30 years of residence in the host country for immigrants to attain the average wealth level of natives, where wealth has been proxied by household ownership. In average, immigrants have then lower non-earned income than natives. Using results from our theoretical framework, this means that for an identical compensating wage differential immigrants may be willing to accept jobs that natives with higher non-earned income refuse. Immigrants should then bear, in average, worse working conditions than natives.

### 2.2.2 Non-earned income, risk aversion and labor supply

As underlined by Orrenius and Zavodny (2009) immigrants may be actually willing to accept hard working conditions simply because they have a different perception of the risk with respect to natives. Because working conditions of immigrants in their home country may be very hard and since they may have also gone through very hard migration trip conditions, immigrants may be more willing to accept riskier jobs than natives. In this case, for an identical level of wealth,

[4] If the proportion of monetary wealth was individual specific, $\sigma_i$, for an identical level of non-earned income $R$ individuals with a higher proportion of monetary non-earned income, $\sigma_2 > \sigma_1$, may be willing to work while individuals with a lower proportion of monetary non-earned income may non be willing to work: $\frac{w_j - \tau_j}{(1-\sigma_2)} < R < \frac{w_j - \tau_j}{(1-\sigma_1)}$. While we are perfectly aware that the nature of non-earned income influences individuals' labor supply, with data in hand we are unable to identify the composition of the individual's non-earned income.

immigrants may be willing to accept a job which has been refused by a native simply because immigrants do not perceive this job as dangerous.

We modify our framework to introduce the possibility of different risk perception by individuals. Up to now, we have considered that everyone is risk neutral and utility is linear in consumption. When the individual is employed, consumption is financed by both earned income (*i.e.* wages) and the monetary part of non-earned income:

$$U(C_W) \;=\; C_W - \tau_j \quad \Rightarrow \quad U(C_W) = w_j + \sigma R_i - \tau_j$$

where $C_W = w_j + \sigma R_i$ stands for current consumption when the individual is employed and benefits then from a total income equal to $w + \sigma R_i$. Again $\tau_j$ represents the lump-sum utility loss associated with working conditions in occupation/activity branch $j$.

When the individual is unemployed, the utility of the individual is determined by consumption of goods and leisure (remember that when employed there was no leisure consumption):

$$U(C_U) \;=\; C_U \quad \Rightarrow \quad U(C_U) = b_j + \sigma R_i$$

where $C_U = b_j + R_i$ must be interpreted as a composite including everything that drives utility of the unemployed individual (consumption of goods and leisure, essentially).

Let us assume now, that some individuals, for example natives, are risk averse. Their utility function becomes then concave in consumption: $U'(C_i) > 0$ and $U''(C_i) < 0$. We consider the simplest risk averse utility function :

$$U(C_W) \;=\; \alpha ln\, C_W - \tau_j \quad \Rightarrow \quad U(C_W) = \alpha ln\, (w + \sigma R_i) - \tau_j \tag{5}$$

$$U(C_U) \;=\; \alpha ln\, C_U \quad \Rightarrow \quad U(C_U) = \alpha ln\, (b_j + R_i) \tag{6}$$

with $0 < \alpha < 1$. For computational simplicity, we set again $b_j = 0$ and replace equations (5) and (6) in expression (3):

$$W_j - U_j \geq \frac{\alpha ln\, (w_j + \sigma R_i) - \tau_j - \alpha ln\, R_i}{\rho + \chi + p_j} \tag{7}$$

Again, because the denominator is always positive, we focus on the numerator and analyze under which conditions is positive (*i.e.* the individual accepts to work):

$$\begin{aligned} \alpha[ln\, (w_j + \sigma R_i) - ln\, R_i] - \tau_j &\geq 0 \\ ln\, \frac{(w_j + \sigma R_i)}{R_i} &\geq \frac{\tau_j}{\alpha} \\ \frac{w_j}{e^{\tau/\alpha} - \sigma} &\geq R_i \end{aligned} \tag{8}$$

Risk averse natives accept to work if and only if their non-earned income is below $R_r^* = \frac{w_j}{e^{\tau/\alpha} - \sigma}$. Natives with $R_i > R_r^*$ refuse to work and rationally prefer to remain job seekers.

Consider now a native and an immigrant facing identical compensating wage differentials and having identical non-earned income $R_{Migrant} = R_{Native}$ but different risk perceptions. The native is risk averse while the immigrant is risk neutral.

The risk neutral immigrant accepts to work if and only if $R_M < R^{**} = \frac{w_j - \tau_j}{(1-\sigma)}$ while the risk averse native accepts to work if $R_N < R_r^* = \frac{w_j}{e^{\tau/\alpha} - \sigma}$. Is the non-earned income threshold value of risk neutral individuals above or below that of risk averse individuals? We analyze under which circumstances both thresholds are equalized :

$$\begin{aligned} R^{**} &= R_r^* \\ \frac{w_j - \tau_j}{(1-\sigma)} &= \frac{w_j}{e^{\tau/\alpha} - \sigma} \\ w_j(e^{\tau_j/\alpha} - 1) &= \tau_j(e^{\tau_j/\alpha} - \sigma) \\ \frac{w_j}{\tau_j} &= \frac{(e^{\tau_j/\alpha} - \sigma)}{(e^{\tau_j/\alpha} - 1)} = \left[\frac{w_j}{\tau_j}\right]^* \end{aligned}$$

where $e^{\tau/\alpha} > 1$ since $\tau/\alpha \neq 0$.

If $\frac{w_j}{\tau_j} > \left[\frac{w_j}{\tau_j}\right]^*$ the threshold value of income below which individuals are willing to work is higher for risk neutral individuals, *i.e.* $R^{**} > R_r^*$, implying that for an identical $R_M = R_N$ risk neutral individuals (immigrants) may be willing to work while risk averse individuals (natives) refuse to work, *i.e.* $R^{**} > R_M = R_N > R_r^*$. If $\frac{w_j}{\tau_j} < \left[\frac{w_j}{\tau_j}\right]^*$, the opposite situation arises. The threshold value of income below which individuals are willing to work is higher for risk averse individuals (natives) *i.e.* $R^{**} < R_r^*$.

Differences in risk perception between risk neutral immigrants and risk averse native imply different working choices for identical levels of non-earned income. All in all, our theoretical framework suggests two alternative mechanisms that may be driving the divergence in working conditions between natives and immigrants:

- On the one hand, if immigrants and natives do not differ in their perception of risks, differences in working conditions can simply be justified by differences in the level of non-earned income as shown by our benchmark framework (*i.e.* as revealed by Figure 1 natives have in average higher non-earned income level.
- On the other hand, if immigrants and natives actually differ in their perception of professional risks, we should find that for identical non-earned income levels, immigrants and natives bear in average different working conditions.

The econometric part of the paper will test the three theoretical predictions or implications of the model:

1. Working conditions are a normal good. The higher the non-earned income level the better the working conditions individuals require to accept a job, *i.e.* for an identical compensating wage differential high income people may refuse a job that is actually accepted by low income people.

2. Since immigrants have in average lower non-earned income level than natives, they should bear in average worse working conditions than natives.

3. If differences in working conditions between immigrants and natives come from differences in their risk perception, we should find that for identical levels of non-earned income immigrants bear worse working conditions.

As explained in the introduction there are other reasons that could explain differences in the observed working conditions borne by immigrants and natives, as the fact that immigrants may actually have less information on the actual risks associated with a job due to their lower level of education, social capital or bad language proficiency, or the fact that upon arrival immigrants are healthier than natives and therefore they might be willing to hold more physically strenuous jobs than natives. With our data it is not possible to test these potential explanations or to infer any evidence about them. However, we will be able to provide evidence on the role of non-earned income and infer consequences regarding potential differences in risk perception across nativity groups. More precisely, we will be able to compare working conditions between natives and immigrants when they have the same level of non-earned income.

# 3 Data sources, variables and descriptive statistics

## 3.1 Data sources and variables

Our paper combines different data sources:

- The French Labor Force Survey (LFS) was established as an annual survey in 1982. Redesigned in 2003, it is now a continuous survey providing quarterly data. Participation is compulsory and it covers private households in mainland France. All individuals in the household older than 15 are surveyed. The LFS provides detailed information on individual characteristics of the respondent. Information on the country of birth is only available for the period 2003-2012. Since immigrants are defined as people born abroad, we exclusively consider the period 2003-2012 so as to be able to identify natives and immigrants.[5]

  The main topics covered by the LFS concern employment, unemployment, hours of work,

[5]The quarterly sample is divided into 13 weeks. From a theoretical point of view, the sampling method consists of a stratification of mainland France into 189 strata (21 French regions $\times$ 9 types of urban unit) and a first stage sampling of areas in each stratum (with different probabilities, average sampling rate = 1/600). Areas contain about 20 dwellings and among them only primary residences are surveyed. Each area is surveyed over 6 consecutive quarters. Every quarter, the sample contains 6 sub-samples: 1/6 of the sample is surveyed for the first time, 1/6 is surveyed for the second time, ..., 1/6 is surveyed for the 6th (and last) time. When it was run as an annual survey, every year a third of the sample was renewed meaning that each individual was interviewed only 3 times. The collection method has always been a face-to-face interview. However, since 2003, a telephone interview has been employed for intermediate surveys (2nd to 5th).

wages, activity classification[6], four digit occupation classification, status in employment, education/qualification and secondary jobs. There is no much information on employers since the worker is simply asked to indicate the approximative size of his employer (the questionnaire proposes several size-intervals). Moreover, for some years this variable is poorly informed.

There is not direct information either on individual's level of non-earned income. The LFS contains though information on whether the individual is a household owner. We will use this variable as a proxy for wealth. Combining information of several variables we can also know if the individual rents a social housing facility in a sensible urban area. We consider this situation to be an indicator of low non-earned income, and we will control for it in our estimations.

For our paper we exclusively consider employed individuals which reduces our sample size for the period 2003-2012 to 1,429,915 native individuals and 173,417 immigrant individuals.

- We use the statistics provided by the National Health Insurance Fund for Salaried Workers ("Caisse nationale de l'assurance maladie des travailleurs salaries") on both professional accidents and illnesses. These statistics are available for the period 2012-2016, but it is only for 2014, 2015, 2016 that they are provided at the 5 digit NAF2008 level, *i.e.* more than 720 activity branches. Appendix A provides more detailed information on the definition of professional accidents and illnesses. The main difference between both of them is that while declaring the existence of a professional illness can become a long time-consuming procedure for the employee, declaring a professional accident is done immediately by the employer. This difference is going to play a key role when comparing working conditions of natives and immigrants. We adopt here the professional accident and illness indicators proposed by the National Health Insurance Fund for Salaried Workers:
  - The "Professional Accident Frequency Rate" ($PAFR$) corresponds to the number of professional accidents by million of hours worked.
  - The "Severity Rate for Temporary Disabilities" induced by professional accidents ($PATD$) is the number of temporary disability days per 1,000 hours of work;
  - The "Severity Index for Permanent Disabilities" induced by professional accidents ($PAPD$) is the total rate of permanent disabilities per million hours of work, including deaths as permanent disabilities.
  - The "Severity Rate for Temporary Disabilities" induced by professional illness ($ODTD$) is the number of temporary disability days per 1,000 hours of work;

[6]The LFS 2003-2008 use the 2003 NAF classification while the LFS 2009-2012 use the NAF 2008 classification. We will use tables provided by the National Statistical Institute (INSEE) to convert one classification into the other, so that we obtain consistent NAF series.

- The "Severity Index for Permanent Disabilities" induced by professional illness ($PDPD$) is the total rate of permanent disabilities per million hours of work, including deaths as permanent disabilities.

- We use yearly statistics provided by the French Fiscal Authority for the period 2003-2010 for each French department. The department is the geographical unit immediately below the region in France. There are actually 18 regions in metropolitan France, but 95 departments. Due to their small size and particular economic characteristics explained by the over-representation of the tourist sector, the two departments corresponding to the Corsica region are dropped from our analysis.

  Our first wealth indicator equals the total value of wealth owned by the richest people in each department. The richest people in France are identified as those that are liable to the "wealth tax" also known as the "fortune tax". Before 2007 to be liable to this tax the individual needed to have a net wealth of 800,000 euros. From 2007 to be liable to the wealth tax the individual needs to have a net wealth of 1,300,000 euros. Evidently there are many relatively wealthy individuals that do not reach this threshold and that we cannot take into account when computing the total wealth of the department. Therefore, our department wealth level stands for a lower bound of total wealth in the department.

  As second wealth indicator, we will use the number of people in the department that are liable to the wealth task. Because wealth may be concentrated in a very reduced number of people in the department, it seems interesting to consider this second indicator to test the robustness of our results. .

- The medical database CONSTANCES is designed as a randomly selected non representative sample (participation is done on a voluntary basis) of French adults aged 18-69 years at study inception; 200,000 subjects are included over a five-year period (starting in 2012). The data collected include social and demographic characteristics (sex, age, civil status, children, country of birth, parents' country of birth), socioeconomic status, occupational factors (current job defined at four digit occupation classification, current and past working conditions). Moreover, we can also know if the individual receives monthly revenue coming from professional activities, lodging aid, handicap aide, other types of aids or capital income (dividends or housing rentals). We use the capital income variable as a proxy for wealth. Data on the socio-demographic characteristics, socioeconomic status, occupational factors is only available at inclusion since the follow-up questionnaires refer only to health issues.

  CONSTANCES database contains also detailed information on job content characteristics. Appendix A provides a detailed description of the following job content indicators: ($i$) Fixed schedule; ($ii$) Physical hardness; ($iii$) ICT; ($iv$) Repetitive; ($v$) Bad quality job. The database also provides information on the workers' past job characteristics. It reports whether the individual has borne in the past physical constraints, organizational constraints, chemical

constraints, noise constraints or other constraints.[7]

As with the LFS, when using the CONSTANCES database we only consider employed individuals. Our final sample covers 106,203 natives and 10,000 immigrants.

To summarize, for the LFS we have a sequence of cross sections from 2003 to 2012. We use yearly statistics on wealth at the department level from 2003 to 2010. Statistics an professional accidents and illness are available at 5 digit NAF 2008 classification for the period 2014-2016. For the CONSTANCES database we have a sequence of cross-sections from 2012 to 2018 since we do not exploit the panel dimension (as it concerns the health status of the individual and the relationship between working conditions and health is above the scope of this paper.

### 3.2 Combining data sources

For our analysis we combine information on these data sources. Using the statistics on professional accidents and illnesses we compute for each of the more than 720 activity branches the average value of the injury and illness indicators ($PAFR$, $PATD$, $PAPD$, $ODTD$, $PDPD$) described above for the period 2014-2016. We merge this data with the LFS using the 5 digit NAF 2008 classification. Therefore for every year from 2003 to 2012 every individual in the labor survey is affected to the injury and disease indicator (computed for the period 2014-2016) corresponding to the activity branch where the individual is employed.[8] Finally, department statistics on the value of wealth and the number of people liable to the wealth tax are merged with the enriched LFS-injury/disease statistics database.

From this database, we proceed next by steps in order to impute to the CONSTANCES database both the LFS weights, so as to improve CONSTANCES' representativeness, and the statistics on occupational injuries and diseases.[9]

In CONSTANCES there is no information on the the 5 digit NAF classification. There is only information at the 2 digit level, which we believe is too aggregated. In contrast, in CONSTANCES occupations are provided at the 4 digit level. Therefore, as a first step we use the enriched LFS-Injury and disease database to create an intermediate database defined by cells at the 4 digit occupation classification (remember that we are only considering employed individuals), by department, gender, nativity group (foreign born vs. natives) and age (15-29 years old, 30-39 years old, 40-49 years old, 50-59 years old and more than 60 years old). For each of these cells defined at the occupation-department-gender-nativity-age level we compute both the weighted average values of

[7] All these indicators are increasing in the number of constraints in the corresponding category that the individual has borne in the past. For example, if the individual has been exposed in the past to smokes and dust, the chemical constraint variable equals 2. If the individual has been exposed to smokes, dust, fuels and solvents the chemical constraint variable will equal 4.

[8] In spite of the detailed definition of activity branch (we have more than 720 activities), we still find several occupations (defined at the 4-digit level) within the same activity branch. In 50% of the cases there are 3 or less occupations by activity branch in the year and in 90% of the cases there are less than 15 occupations.

[9] Data on wealth will only be used with the enriched LFS-injury/disease statistics database.

the considered activity injury and disease indicators ($PAFR$, $PATD$, $PAPD$, $ODTD$, $PDPD$) and the average weight provided by the LFS for the period 2003-2010.[10] This intermediate database only contains information on LFS average weights corresponding to the occupation-department-gender-nativity-age cell level and professional injury and disease indicators at this cell level. We merge it with the individual database CONSTANCES using as merging variables occupation-department-gender-nativity-age. There are almost 62,236 individuals for whom there is a perfect match with the intermediate database. All individuals having the same occupation, living in the same department, having the same gender, belonging to the same nativity group (*i.e.* native vs. immigrants) and having the same age, are imputed the same weight and the same injury/illness indicators. There are around 43,967 individuals in CONSTANCES for which there is no perfect match at the occupation-department-gender-nativity-age level.

Step 2 creates from the LFS-Injury and disease statistics database a second intermediate database defined by cells at the 4 digit occupation classification, by department, gender and nativity group (foreign born vs. natives). Age is not longer considered in this intermediate database. Again for each of the cells defined at the occupation-department-gender-nativity level we compute the average values of the considered activity injury and disease indicators ($PAFR$, $PATD$, $PAPD$, $ODTD$, $PDPD$) and the average weight provided by the LFS for the period 2003-2010. We merge this new intermediate database with CONSTANCES using as merging variables occupation-department-gender-nativity. This merge leads to a perfect match for more than 12,200 individuals in CONSTANCES, but there still remains more than 31,767 individuals without match.

Starting from the LFS-Injury and disease statistics database, step 3 creates a third intermediate database defined by department, gender, nativity group (foreign born vs. natives) and age group (15-29, 30-39, 40-49, 50-59, +60). The 4 digit occupation classification is not longer considered in this intermediate database. For each department-gender-nativity-age cell we compute again the average values of the activity injury and disease indicators and the average weight provided by the LFS for the period 2003-2010. After merging this new intermediate database with CONSTANCES, we find 28,322 perfect matches. There are 3,446 individuals from CONSTANCES for whom there is no match. For these individuals the department is missing that is why it was impossible to make the match.

All in all we have now the individual data LFS 2003-2012 enriched with yearly wealth statistics by department and with the average values of the activity injury and disease indicators 2014-2016 computed at 5 digit NAF 2008 classification level provided by the National Health Insurance Fund for Salaried Workers. The second data source is the individual data CONSTANCES enriched with the time-constant average weights coming from LFS to improve the representativeness of the sample and with the average activity injury and disease indicators.

[10] Years 2011 and 2012 cannot be used to compute the average weight and injury/disease indicators, since for these two waves there is no information on the department of residence of the individual.

## 3.3 Descriptive statistics

### 3.3.1 Labor Force Survey-Injury Disease database

Table B.1 from Appendix B summarizes the main unweighted LFS sample characteristics distinguishing between natives and immigrants. The share of women is lower among immigrants. Immigrants are also slightly older than natives and are more often married than them. There are three times more immigrants than natives living in sensible urban areas (SUA), and there are twice more immigrants living in moderate rental housing, MRH (*i.e.* social housing) than natives. Moreover, immigrants are less often household owners. The proportion of immigrants without any diploma is twice the proportion of natives, and they are in average less educated for all diploma levels except from higher than BAC+2 years.

Immigrants suffer more often than natives professional injuries (indicator $PAFR$) and have thus a larger number of temporary and permanent disabilities ($PATD$ and $PAPD$, respectively) associated with professional accidents. On the opposite, immigrants suffer less temporary and permanent disabilities resulting from an professional disease ($ODTD$ and $PDPD$, respectively). This may be precisely explained by the fact that the recognition of a professional illness implies a long procedure including a survey over the victim. Immigrants may be less willing to follow this screening procedure or conversely, this screening procedure may provide less often a favorable decision for immigrants. Injury and fatality indicators values associated with immigrants tend to fall and converge to the values obtained for natives, with years of residence in the host country (see Table B.2).

Unsurprisingly, workers with an educational level below or equal to Baccalaureate occupy positions associated with higher professional injuries and disease indicators (see Table B.3). Moreover, while for the educational subgroup with Baccalaureate or less immigrants display higher professional injuries and disease rate values than natives, for workers with an educational level above Baccalaureate, the immigrant group displays very close values of the injury and disease indicators with respect to natives.

Concerning women (see Table B.4), we find that they are employed in jobs associated with lower values of injury and disease indicators than men of their respective nativity group. Surprisingly, native women are employed in jobs displaying higher rates of professional injuries and diseases than immigrant women.

Table B.5 in Appendix B, reveals that both immigrants and natives being households owners display lower values of the activity injury and disease indicators. Moreover, the values of these indicators become surprisingly close across nativity groups when considering household owners. In contrast, immigrants and natives living in sensible urban areas (SUA) display higher activity injury and disease indicators than their peers living out of SUAs. Both nativity groups living in Moderate Rental Housing (MRH) located in SUAs do worse than their counterparts living also in social housing but outside SUAs (see Table B.6). Immigrants, living in MRH always do worse than natives, independently on whether they are or not in a SUA.

### 3.3.2 CONSTANCES enriched database

Tables B.7, B.8, B.9, B.10 and B.11 in Appendix B present some unweighted descriptive statistics of the CONSTANCES sample. As shown by Table B.7, in the CONSTANCES sample there are more women among natives than among immigrants. Immigrants in the sample are slightly older and are less likely to be married. Immigrants are relatively more allocated towards activities having higher frequency of professional accidents and temporal or permanent disabilities due to both professional accidents and illnesses. Actually, immigrants are employed in jobs having less often fixed schedules and are much more physically demanding. Their jobs are more often repetitive and they are much less exposed to ICTs. Immigrants have also lower job security than natives.[11] Finally, they undergo or have undergone in the past more organizational, physical, chemical and noise constraints than natives.

In the sample of immigrants interviewed by CONSTANCES, residence duration does not seem to improve working conditions of immigrants (see Table B.8). After more than 30 years of residence in the host country professional accidents and illness indicators ($PAFR$, $PATD$, $PAPD$, $PDTD$ and $PDPD$) are around the same levels as for individuals with less than 10 years of residence. Education seems the only factor that protects immigrants against these bad job characteristics (see Table B.9). While for identical education levels immigrants continue to bear worse job characteristics than natives, we find that among immigrants, those having more than secondary education benefit more often from better quality jobs, with improved accident/illness indicators, having more often fixed schedules, less physically demanding and repetitive, and use more often ICT. Higher educated workers (both natives and immigrants) undergo or have undergone lower organizational, physical, chemical and noise constraints than lower educated workers. In the CONSTANCES sample female immigrants have an equivalent working conditions than female natives (see Table B.10).

The share of immigrants in the sample perceiving capital income (dividends or/and rentals from housing) is one third smaller than that of natives. However, when comparing working conditions of immigrants and natives with high non-earned income (*i.e.* perceiving dividends or/and rentals from housing) there seems to be a convergence in both professional accident/illness indicators and job content (see Table B.11).

## 4 Econometric strategy

Our objective is to estimate the relationship between working conditions (captured by professional accident and illness indicators), non-earned income and nativity. The first prediction of the model we would like to test is the normal or inferior nature of working conditions. We will exploit department data on wealth to measure the elasticity of our working conditions indicators with respect to non earned income (proxied by wealth and the number of people liable to the wealth

[11] Note though that this indicator is subjective.

tax in the department).

The second prediction of the model that we want to test is if immigrants occupy in average riskier jobs than natives in France (as found by Orrenius and Zavodny (2009) for the US or Giuntella and Mazzona (2015) for Germany) . To measure the risky nature of working conditions we use activity accident and illness indicators.[12] Finally, the third prediction of the model is that individuals with an identical level of non-earned income will bear different working conditions if they have different risk perceptions. We then test if non-earned income has the same effect on people's working conditions, independently on their nativity group, or if there is an immigrant specific income effect.

We use individual data from the enriched LFS and CONSTANCES surveys. As a proxy of high non-earned income we use a dummy variable which equals unity if the individual is a household owner when working with the LFS and a dummy variable equal to unity if the individual perceives capital income (such as dividends or rentals from housing) when using CONSTANCES. It is evidently assumed that individuals being household owners or perceiving capital income, have high non-earned income. With data in hand these two variables are the best two non-earned income indicators we can find.

### 4.1 Identifying the income effect: the cell strategy

The only information we have on wealth levels is provided at the department level. To identify the impact of wealth changes on working conditions we propose then a cell approach where the unit of observation is the individual cell defined at the department-nativity-year level. We estimate the elasticity of working conditions with respect to non-earned income by exploiting heterogenous time variation in working conditions across departments following changes in the department wealth level.

To ensure a sufficient number of observations by department and a sufficient number of cells we only consider the LFS enriched with statistics on activity accidents/disease indicators and on wealth levels by department.[13] Since we are working with departments our analysis focuses on the period 2003-2010 since afterwards there is no information on department. We estimate the following equation:

$$ln\, Y_{dt} \quad = \quad \varrho_H\, ln\, (H_{dt}) + \varrho_t + \varrho_N + \varrho_d + \varrho_t \cdot \varrho_d + \vartheta_{rnt} \tag{9}$$

where $Y_{dt}$ stands for the value of an activity injury and illness indicator in department $d$ in year $t$. $H_{dt}$ is the non-earned income level at the department which will be proxied either by the total level of wealth in the department or by the total number of people in the department that are liable to the wealth tax.

[12] In appendix E we analyze the relationship between activity accident and illness indicators and job content indicators, so as to show that strenuous job content characteristics are actually associated with worse accident and illness indicators.

[13] Note that CONSTANCES has a lower number of observations and it only concerns 20 departments.

We control for systematic differences in working conditions between natives and immigrants by introducing an immigrant fixed effect $\varrho_N$; we control for systematic differences in working conditions across departments by introducing a department fixed effect ($\varrho_d$);[14] we control by economic shocks ($\gamma_t$) and by department specific shocks on working conditions interacting department-year fixed effects ($\gamma_d\gamma_t$). We use weighted OLS regressions with robust standard errors clustered at the department level and weights equal to the cell weight resulting from aggregating at the department-nativity-year level individual weights provided by the LFS.
The coefficient of interest is $\varrho_H$, which captures the elasticity of working conditions in the department with respect to the the level of non-earned income. It must be intepreted as follows: when the non-earned income indicator increases by 1% accident and disease indicators change by $\varrho_H$%.

### 4.2 Divergence in working conditions: the individual data strategy

In a second step, we seek to gain insights on potential differences in working conditions borne by immigrants and natives. Our analysis is based on both ($i$) the individual data set resulting from merging the average value of 2014-2016 national statistics on professional injuries and illnesses by NAF5 2008 with the LFS 2003-2012 and ($ii$) the individual data set CONSTANCES 2012-2018 enriched also with the injuries and illnesses statistics as well as with the imputed weights coming from the LFS. Both individual databases stand for a sequence of cross-section and no panel dimension exists. The baseline estimated equation is:

$$Y_{it} = \alpha_M IMM_{it} + \alpha_I Income_{it} + \alpha_x X_{it} + \alpha_t + \alpha_R + \alpha_t\alpha_R + \alpha_N + \epsilon_i \quad (10)$$

where the outcome variable $Y_{it}$ corresponds to the working condition indicator for individual $i$ in year $t$, which can be activity accident/illness indicator ($PAFR$, $PATD$, $PAPD$, $ODTD$, $PDPD$). Our unit of observation is the individual to whom working conditions have been imputed depending on the activity branch where he is employed for the LFS and on depending on the occupation for CONSTANCES.[15] In sum, while our indicators of working conditions ($PAFR$, $PATD$, $PAPD$, $ODTD$, $PDPD$) are constant along time within the 720 activity branches, the sample of individuals to whom these indicators are imputed changes from one year to another. Because the sample of individuals changes, population composition of people employed within each activity also changes from year to year, implying that we can exploit heterogeneity across individuals within a year and across time to identify the impact of nativity (and income) on working conditions. Moreover, the fact of computing working conditions over the period 2014-2016 ensures that the dependent variable is at

[14] Note that this type of fixed effect is also capturing systematic differences in the population composition across departments that may be affecting working conditions. For example, some departments may be characterized by a young recently arrived immigrant population with less than 20 or 30 years of residence, while in some other departments we may only find immigrants with more than 30 years of residence. These systematic differences in population composition are captured by the department fixed effect.

[15] Activity accident/illness indicators at the occupation level are though computed using information of accident/illness at the activity branch level.

least partially exogenous with respect to economic and technological shocks that may be pushing people towards some activity branches during the LFS sample period 2003-2012.

$IMM_{it}$ equals unity if individual $i$ in period $t$ is foreign born. We consider being a household owner as an indicator of a high non-earned income indicator.[16] When using the LFS, we control for low non-earned income by introducing an indicator which equals unity if the individual is living in a social housing (MRH) located in a SUA. For the CONSTANCES survey the high non-earned income indicator equals unity if the individual perceives dividends or rentals from housing.

$X_{it}$ stands for a vector of control variables including gender, age, age squared, civil status, children, diploma level (no diploma, BEPC only, CAP-BEP, Baccalaureate, Baccalaureate+2 years, higher degree),[17], size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. We also control for residence duration in the host country (less than 10 years, between 10 and 20 years or between 20, 30 years and more than 30 years) since as shown by Figure 1 years of residence are associated with a convergence of immigrants' income level towards the average native income level. Residence duration captures at least partially an income convergence effect. Therefore, in order to disentangle both effects we introduce separately on income indicator and a residence duration indicator.

We also control by differences in working conditions across years[18] and by systematic differences in working conditions across regions (due to differences in productive structures across geographical areas) through the introduction year and region (for the LFS) or department (for CONSTANCES)[19] fixed effects ($\alpha_t$ and $\alpha_R$, respectively). To control for the fact that some yearly changes in working conditions may be region/department specific, we also interact region/department and year fixed effects. Even if our accident and illness indicators are computed at the 5 digit NAF 2008 level, their values are then imputed to individuals according to the activity branch where they are employed. Since our objective is to isolate the impact of immigrant and income effects on these indicators, we also introduce in our LFS regression an activity branch fixed effect,[20] while when using CONSTANCES we introduce occupation fixed effects.

We implement weighted OLS regressions with robust standard errors clustered at the NAF level when working with the LFS and at the job-department level when using CONSTANCES. When working with the LFS we employ weights provided directly by the survey while when working

[16]Note though that household owners may still be paying their house through a credit.

[17]When using CONSTANCES the diploma level is classified as no diploma, BEPC only, CAP-BEP, Baccalaureate, Baccalaureate+2 or 3 years, Baccalaureate+4 years, Baccalaureate+5 years or more.

[18]Note that even if working conditions are originally constant since they are computed as an average of the injury and illness indicators 2014-2016, they are then yearly imputed to workers according to their activity branch. If the economic structure of the country changes and favors some activity branches against others, we are likely to observe a change in working conditions. The introduction of a year fixed effect allows to purge from this yearly shocks.

[19]We use department fixed effects, since the CONSTANCES survey is not national and is only implemented for a reduced sample of 20 departments.

[20]We introduce a fixed effect for each of the 2 digit NAF 2008 activity branches.

with CONSTANCES we have imputed average weights computed from the LFS 2003-2010 at the 4-digit-occupation-native-gender-department-age level.
To test the robustness of the results concerning the relationship between nativity and working conditions, we estimate equation (10) distinguishing between foreign born (*i.e.* immigrants) and (*i*) foreign born having acquired the French nationality ("naturalized"); (*ii*) foreign born married with a French citizen ("assimilated"); (*iii*) native born with foreign born parents ("2nd generation").

# 5 Estimation results

## 5.1 The income effect

Estimations from equation (9) are summarized in Table 1, where odd columns use the level of wealth at the department level as an indicator for non-earned income, while even columns use the number of people liable to the wealth tax in the department as an indicator of the level of non earned income.
We find that an increase in 10% in the total wealth of the department, decreases the average frequency of professional accidents in the department by 0.85% and the associated disabilities by 0.69% for temporal ones and by 1.21% for permanent ones. When considering the consequences on disabilities induced by professional illnesses, the impact is even more important. An increase by 10% in the total level of wealth in the department decreases temporal disabilities by 3.29% and permanent disabilities by 3.36%.
If instead of considering the total amount of wealth in the department (which could be actually very concentrated among very few people) we consider the total number of people in the department that are liable to the wealth tax, we reach similar conclusions. An increase by 10% in the number of liable people decreases by 0.35% the frequency of professional accidents and by 0.37% and 0.79% the associated temporal and permanent disabilities. Again the effect is even stronger for professional diseases where we find that an increase by 10% in the number of liable people reduces by 1.55% and 1.72% temporal and permanent disabilities, respectively.
The improvement in working conditions associated with an increase in non-earned income is also confirmed by Table C.1 in Appendix C, which presents estimation results from equation (9) without the logs. Increases in the level of departmental wealth or increases in the number of people liable to the wealth tax in the department are systematically associated with an improvement in professional accident and illness indicators. Results from Tables 1 and C.1 suggest that working conditions are a normal good. Increases in the level of non-earned income induce lower frequency of accidents and less temporal and permanent disabilities.
The main issue with wealth statistics is that they are only available at the department level. No individual data is provided. We can only exploit these statistics using a cell approach as in Tables 1 and C.1, but we are unable to impute this data to individuals depending on their nativity group. Therefore, we only employ statistics on wealth to show the normal nature of working conditions

Table 1: Elasticity of working conditions with respect to non-earned income. Cell analysis. LFS 2003-2010.

| | Dependent variable: Log(professional accident/illness indicators) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Log(PAFR) | | Log(PATD) | | Log(PAPD) | | Log(PDTD) | | Log(PDPD) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Log (wealth) | -0.0846*** | | -0.0691*** | | -0.121*** | | -0.329*** | | -0.336*** | |
| | (0.00119) | | (0.00150) | | (0.00168) | | (0.00249) | | (0.00267) | |
| Log (nb liable to wealth tax) | | -0.0353*** | | -0.0370*** | | -0.0788*** | | -0.155*** | | -0.172*** |
| | | (0.000626) | | (0.000792) | | (0.000884) | | (0.00131) | | (0.00140) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,437 | 1,437 | 1,437 | 1,437 | 1,437 | 1,437 | 1,437 | 1,437 | 1,437 | 1,437 |
| R-squared | 0.920 | 0.920 | 0.908 | 0.908 | 0.910 | 0.910 | 0.896 | 0.896 | 0.888 | 0.888 |

Source: Labor Force surveys 2003-2012, department statistics on wealth 2003-2010 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: cells are defined at the department-immigrant-year level. Weighted OLS estimation with robust standard errors clustered at the department level and weights equal to the cell weight when considering weights provided by the LFS. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

while for the rest of the paper, based on individual data, we need to use alternative indicators of non-earned income. More precisely, as already explained above, when using the LFS we consider household ownership as an indicator of wealth while when using CONSTANCES we use the fact of perceiving capital income (dividends or rentals) as a high non-earned income indicator. Evidently, the main limitation of both indicators is that they are dummy variables, not variables in levels as the department statistics on wealth.

### 5.1.1 Immigrants' income

Since the paper seeks to gain insights on working conditions of immigrants (to see if they are driving the immigrants' deterioration in health) and working conditions arise as a normal good, a natural conclusion would be to say that immigrants have worse working conditions because they have in average a lower level of non-earned income as suggested by Figure 1 and Tables B.1 and B.7. With data on hand, we are unable to determine the actual level of non-earned income of individuals in the LFS or CONSTANCES. We can only use household ownership (for the LFS) and perceiving capital income (for CONSTANCES) as indicators of wealth. We propose then a linear probability model to estimate the probability of being a high non-earned income individual depending on the nativity group:

$$\begin{aligned} H_{it} &= \upsilon_M IMM_{it} + \upsilon_{10} Residence_{10} + \upsilon_{10-20} Residence_{10-20} + \upsilon_{20-30} Residence_{20-30} \\ &+ \upsilon_x X_{it} + \upsilon_t + \upsilon_R + \upsilon_t \upsilon_R + \chi_i \end{aligned} \tag{11}$$

where $H_{it}$ stands for the wealth indicator corresponding to household ownership or to the perception of capital income. $IMM_{it}$ represents the dummy immigrant and $Residence_{10}$, $Residence_{10-20}$ and $Residence_{20-30}$ stand for dummy indicators of residence duration. We include as controls $X_{it}$ gender, age, age squared, civil status, children, diploma level, size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. For CONSTANCES, there is no information on the size of the firm or the contract type.

We control for aggregate shocks by introducing year fixed effects. We also control by systematic differences in the probability of having high non-earned income across regions (when using the LFS[21]) or departments (when using CONSTANCES) through the introduction of regional/department fixed effects. We also allow shocks to be regional/department specific through the introduction of year-region/department interacted fixed effects.

Table 2 contains estimations from the linear probability model in equation (11). Results in columns (1)-(4) are based on the LFS while estimations in columns (5)-(7) are based on CONSTANCES. In average, immigrants are less likely than natives to have high non-earned income, that is, they are less likely to be household owners when using the LFS (columns (1)-(4))[22] and less likely to perceive capital income when using CONSTANCES. However, consistently with descriptive statistics provided in Figure 1, with years of residence in the host country the likelihood of having high non-earned income rises. From columns (1)-(4) we find that the probability of becoming a household owner increases with years of residence, *i.e.* the negative and significant coefficient associated with the dummies capturing residence duration increases (becomes less negative) with residence duration. From columns (5)-(7) we conclude that immigrants with less than 20 years of residence are less likely to perceive capital income than those with more than 20 years of residence.

In column (2) we define naturalized immigrants as the interaction between the dummy variables "Immigrant" and "French Nationality". Similarly in column (3) the variable "Assimilated" results from the interaction of the two dummy variables "Immigrant" and "French wife or husband". Results in coluns (2) and (3) confirm the intuition that there is an income convergence as residence duration increases. More precisely, column (2) reveals that immigrants having acquired the French nationality ("Naturalized" immigrants) are more likely than the average immigrant to be household owners. Similarly, immigrants that are married to a French citizen ("Assimilated" immigrants in column (3)) are significantly more likely than the average immigrant to be household owners. Assimilation into the host country is coupled with an income assimilation.

Lastly, columns (4) and (7) consider natives but having both parents foreign born, that is, second generation immigrants. This variable results from the interaction of two dummy variables "Native" and "Having both parents foreign born". The negative and significant coefficient must be

[21] When using the LFS, considering smaller geographical unit, as the department implies restricting our sample to the period 2003-2010, since for years 2011 and 2012 there is no data on department.

[22] In contrast, as shown by Table C.5 in Appendix C, immigrants are in average more likely to live in social housing located in sensible urban areas.

interpreted with respect to other natives. This means that natives with foreign parents are significantly less likely than other natives to have high non-earned income. However, the size of this negative coefficient is smaller than the size of the negative coefficient associated with the dummy "Immigrant", underlining the fact that second generation immigrants are in any case more likely than immigrants to benefit from a high non-earned income. Again, host country assimilation is associated with an income assimilation.

Table 2: Probability of being a high non-earned income individual. LFS 2003-2012 and CONSTANCES 2012-2018.

| | Dependent variable: High non-earned income Household owner | | | | | | |
|---|---|---|---|---|---|---|---|
| | Household owner | | | | Dividends & Rents | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Immigrant | -0.570*** | -0.548*** | -0.564*** | -0.613*** | -0.0933*** | -0.0909*** | -0.0943*** |
| | (0.0207) | (0.0179) | (0.0201) | (0.0206) | (0.0164) | (0.0168) | (0.0164) |
| Residence duration <10 years | -0.245*** | -0.201*** | -0.209*** | -0.237*** | -0.0272*** | -0.0239** | -0.0272*** |
| | (0.0134) | (0.0117) | (0.0120) | (0.0108) | (0.0104) | (0.0110) | (0.0104) |
| Residence duration 10-20 years | -0.137*** | -0.114*** | -0.114*** | -0.136*** | -0.0443*** | -0.0424*** | -0.0443*** |
| | (0.0117) | (0.00996) | (0.0106) | (0.0152) | (0.00611) | (0.00706) | (0.00611) |
| Residence duration 20-30 years | -0.108*** | -0.0973*** | -0.0935*** | -0.106*** | 0.0136 | 0.0146 | 0.0136 |
| | (0.00986) | (0.00821) | (0.00855) | (0.00696) | (0.0104) | (0.0104) | (0.0104) |
| Naturalized | | 0.0757*** | | | | 0.00443 | |
| | | (0.0100) | | | | (0.00607) | |
| Assimilated | | | 0.111*** | | | | |
| | | | (0.00803) | | | | |
| 2nd generation | | | | -0.136*** | | | -0.0141*** |
| | | | | (0.0195) | | | (0.00369) |
| Year FE | Yes | Yes | Yes | Yes | No | No | No |
| Region FE | Yes | Yes | Yes | Yes | No | No | No |
| Department FE | No | No | No | No | Yes | Yes | Yes |
| Region × Year FE | Yes | Yes | Yes | Yes | No | No | No |
| Department × Year FE | No | No | No | No | Yes | Yes | Yes |
| Observations | 1,601,952 | 1,601,952 | 1,601,952 | 1,295,112 | 97,909 | 97,909 | 97,909 |
| R-squared | 0.164 | 0.165 | 0.165 | 0.173 | 0.048 | 0.048 | 0.048 |

Source: Labor Force surveys 2003-2012. Note: Linear probability estimation with robust standard errors clustered at the region level and weights provided by the LFS. Control variables include: gender, age, age squared, civil status, children, diploma level, residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years), size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Estimations from Tables 1 and C.1 point towards the normal nature of working conditions. Estimations from Table 2 show that immigrants are less likely to have high non-earned income than

natives. Consistently with Figure 1, Table 2 shows that this gap tends though to fall with years of residence in the host country. Combining both findings we must expect that consistently with the model's predictions immigrants bear in average worse working conditions than natives (since they have in average lower non-earned income). However, it remains to see if once income convergence has been achieved, immigrants benefit from the same working conditions as natives or if they still bear worse working conditions. In this last case, we might argue that immigrants are less risk averse than natives or they may have different outside opportunities. The following sections study predictions 2 and 3 of the model.

### 5.2 Heterogeneity across individuals: nativity, working conditions and income

In this section we identify both the relationship between nativity and working conditions' indicators as well as the driving role of income in this relationship. In Table C.2 in Appendix C we analyze the correlation between our indicators of professional accidents and illness and the fact of being foreign born without any type of control or fixed effect. The correlation does not display a clear positive or negative sign for all our indicators. While for the "Professional Accident Frequency Rate" (PAFR) the correlation is not significant, it becomes positive for the severity index of temporary and permanent disabilities associated with professional accidents (PATD and PAPD, respectively). For severity indexes of temporary and permanent disability associated with professional illness the correlation becomes again non-significant. In sum, from simple correlations we cannot anticipate the potential relationship between working conditions and the fact of being foreign born.

Table 3 bellow, resulting from the estimation of equation (10), analyzes the relationship between the professional accident/illness indicators and being an immigrant depending on income effects. We control for gender, age, age squared, civil status, children, diploma level, size of the establishment or plant where the individual works and whether the individual has a permanent contract. We introduce year, region and NAF2 fixed effects as well as the interacted fixed effect between region and year. Because of the positive correlation between years of residence and non-earned income we also display in Table 3 estimated coefficients for residence duration, so as to disentangle the income effect from the residence duration effect.

Table 3 reveals that household owners are less likely to suffer a professional accident, the temporal or permanent disability associated to it, as well as the temporary or permanent disability associated with professional illnesses. Consistently with Viscusi (1978) and with our previous findings on department level data, this result suggests that working conditions are a normal good. Household owners have a higher relative non-earned income with respect to non-owners and this pushes them to ask for better working conditions. On the other hand, Table 3 shows that residents in social housing (MRH) located in sensible urban areas (SUAs) are more likely to allocated into activities with high frequency of professional accidents as well as the associated temporary or permanent disability following the accident. Residents in MRH in SUA are low-income people who seem ready to accept harder working conditions with respect to non residents en social housing in SUA.

What about immigrants? Does the income effect hold also for them or are they willing to accept riskier jobs than natives for an identical level or non-earned income? As revealed by the coefficient associated with the dummy variable "Immigrant", this nativity group is significantly more allocated in activities with high frequency of professional accidents and the temporal and permanent disabilities associated with them. This tendency to allocate towards riskier activities is though reduced with years of residence. As observed from columns (1)-(6), the coefficients associated with the dummy variables "Residence duration <10 years", " Residence duration 10-20 years" and " Residence duration 20-30 years" are positive and significant, but they become progressively smaller with years of residence.[23]

Interestingly, working conditions of immigrants' household owners do not significantly differ from working conditions of natives (see coefficients of the interacted term "Immigrant·Household owners"), except from the fact that they are significantly less concerned than natives by permanent disabilities resulting from professional accidents.

All in all, comparing estimated coefficients of the variables "Immigrant", "Household owners" and "Immigrant·Household owners", we can draw the following conclusions:

- An average, immigrants are relatively more allocated in activities displaying high frequency of professional accidents and the associated temporal and permanent disabilities.
- Household owners benefit in average from better working conditions, since they are significantly less present in activities with high frequency of professional accidents and they bear significantly less temporal and permanent disabilities induced by both accidents and diseases.
- There are no significant differences between working conditions among household owners, whatever their nativity group.

Given the normal nature of working conditions, average differences in working conditions between immigrants and natives reflect a divergence in income level. For identical income levels no significant differences arise between both nativity groups (except from permanent disabilities associated with accidents, which are significantly lower for immigrants). According with our framework, these results suggest that immigrants and natives do not differ in their risk perception. Income convergence with years of residence fosters a convergence in working conditions of immigrants and natives. Bad working conditions do not seem to be the driver of the degradation of immigrants' health status with years of residence in the host country since income improves with years of residence and working conditions improve together with income.

Appendix D proposes a cell analysis, with cells defined at the department-nativity-year level to test the robustness of results obtained on individual data. Estimation by cells confirms that immigrants bear worse working conditions than natives. In line with estimations on individual data, household ownership is still associated with better working conditions and non significant differences in working conditions arise among household owners whatever their nativity group.

[23]Note that the reference category for years of residence is "Residence duration >30 years".

Table 3: Immigrants and professional accident/illness : the role of income. LFS 2003-2012.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | PATD | | PAPD | | ODTD | | PDPD | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Immigrant | 3.212*** | 3.222*** | 0.324*** | 0.323*** | 2.799*** | 2.767*** | 0.000146 | 0.00416 | -0.0610 | -0.0511 |
| | (1.233) | (1.206) | (0.106) | (0.103) | (0.834) | (0.823) | (0.0575) | (0.0539) | (0.136) | (0.127) |
| MRH in SUA | 0.920* | 0.925** | 0.0813** | 0.0808** | 0.593** | 0.574** | -0.0240 | -0.0217 | -0.0676 | -0.0620 |
| | (0.479) | (0.462) | (0.0413) | (0.0399) | (0.264) | (0.256) | (0.0301) | (0.0280) | (0.0719) | (0.0668) |
| Household owner | -0.683** | -0.691** | -0.0546*** | -0.0539*** | -0.172** | -0.145* | -0.0692* | -0.0726* | -0.164* | -0.172 |
| | (0.270) | (0.283) | (0.0175) | (0.0179) | (0.0779) | (0.0750) | (0.0408) | (0.0440) | (0.0984) | (0.106) |
| Immigrant · Household owner | | 0.0742 | | -0.00613 | | -0.253* | | 0.0312 | | 0.0769 |
| | | (0.311) | | (0.0237) | | (0.149) | | (0.0317) | | (0.0763) |
| Residence duration <10 years | 1.352*** | 1.379*** | 0.130*** | 0.128*** | 1.204*** | 1.113*** | -0.00930 | 0.00186 | -0.0504 | -0.0229 |
| | (0.421) | (0.365) | (0.0336) | (0.0286) | (0.298) | (0.283) | (0.0283) | (0.0180) | (0.0673) | (0.0419) |
| Residence duration 10-20 years | 0.904** | 0.920** | 0.0911** | 0.0897*** | 0.833*** | 0.776*** | -0.0101 | -0.00306 | -0.0401 | -0.0227 |
| | (0.428) | (0.382) | (0.0357) | (0.0318) | (0.261) | (0.244) | (0.0223) | (0.0165) | (0.0529) | (0.0389) |
| Residence duration 20-30 years | 0.707* | 0.720** | 0.0690** | 0.0679** | 0.493** | 0.448** | -0.00965 | -0.00411 | -0.0369 | -0.0233 |
| | (0.392) | (0.355) | (0.0321) | (0.0290) | (0.225) | (0.210) | (0.0180) | (0.0129) | (0.0425) | (0.0301) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| NAF2 FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 |
| R-squared | 0.534 | 0.534 | 0.532 | 0.532 | 0.596 | 0.596 | 0.173 | 0.173 | 0.160 | 0.160 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, ODTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the NAF5 level and weights provided by the LFS. Control variables include: gender, age, age squared, civil status, children, diploma level, residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years), size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

These conclusions are next contrasted using data from CONSTANCES[24] where high non-earned income people are defined as those perceiving capital income from dividends or/and rentals. Results are summarized in Table 4. Consistently with previous findings immigrants bear, in average, worse working conditions. Immigrants are actually significantly more allocated towards activities with higher frequency of professional accidents and temporary and permanent disabilities associated with these accidents. Again, in line with findings based on LFS data immigrants do not display a significant different behavior with respect to natives when considering temporal and permanent disabilities associated with professional diseases.

When defining high non-earned income individuals as those who perceive not only professional revenues (since our sample is only composed by employed workers) but also capital income coming

[24]Appendix E presents complementary results exploiting CONSTANCES data to analyze the relationship between professional accident and illness indicators and job content characteristics (such as "Fixed Schedule", "Physical hardness", "ICT", "Repetitive" or "Bad Quality Job").

from dividends or/and housing rentals we still find that high non-earned income individuals benefit from better working conditions. Whatever the working condition indicator we consider in Table 4, the coefficient associated with the variable "Non-earned income" is negative and significant, pointing towards the normal nature of working conditions.

In line with findings from Table 3 immigrants with high non-earned income do not display significantly different allocation with respect to high income natives. More precisely, the frequency of accidents and the temporal and permanent disabilities associated with accidents do not significantly differ between both groups. In contrast, immigrants perceiving dividends or/and housing rentals display significantly higher temporal and permanent disabilities associated with professional diseases. This finding is in contrast with previous results where we find that in average immigrants do not display a significantly different behavior with respect to natives in what concerns temporal and permanent disabilities associated with professional diseases. These differences may be explained by the fact that participation in the CONSTANCES survey is voluntary and there may be a representativeness issue. Only people caring about their health and trusting the health system are likely to participate in the survey. If this bias is equal for natives and immigrants its effect neutralizes. However if the bias is more present in one of the nativity groups our results may be biased.

Conclusions from Table 4 based on the CONSTANCES survey tend to reinforce in any case main findings from Table 3. An average immigrants are relatively more present in activities displaying higher frequency of professional accidents as well as temporal and permanent disabilities associated with these accidents. Whatever the working condition indicator we consider, individuals with high non-earned income display an average better working conditions. This income effect applies similarly for both immigrants and natives. When working with the LFS database we find though that high income immigrants are relatively less present in activities with high frequency of permanent disabilities, suggesting that they actually benefit from better working conditions than high income natives. When considering the CONSTANCES survey we find that high non-earned income immigrants are relatively more present in occupations with frequent disabilities associated with professional disease. We believe though that this result is likely to be explained by selection issues concerning the CONSTANCES sample, particularly because disabilities associated with professional illness require the worker to go through a relatively long administrative procedure. The recognition of a professional illness is then tightly linked to the willingness of the worker to undertake this procedure. People over-caring about their health may be more willing to go through this procedure.

### 5.3 Nativity, working conditions and income: robust tests

To test the robustness of our main conclusions, Table 5 replicates estimates of Table 3 considering both immigrants that have acquired the French nationality, *i.e.* naturalized immigrants, and immigrants that are married to a French citizen, *i.e.* assimilated immigrants. The intuition

Table 4: Immigrants and professional accident/illness : the role of non-earned income. CONSTANCES 2012-2018.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | PATD | | PAPD | | ODTD | | PDPD | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Immigrant | 2.013*** | 2.024*** | 0.205*** | 0.206*** | 2.491*** | 2.497*** | -0.00424 | -0.00365 | -0.0233 | -0.0222 |
| | (0.676) | (0.677) | (0.0456) | (0.0456) | (0.419) | (0.419) | (0.0174) | (0.0174) | (0.0426) | (0.0426) |
| Non-earned income | -0.155** | -0.184*** | -0.00998** | -0.0119*** | -0.0872* | -0.102** | -0.00692** | -0.00844*** | -0.0161** | -0.0190*** |
| | (0.0682) | (0.0697) | (0.00448) | (0.00456) | (0.0504) | (0.0506) | (0.00277) | (0.00288) | (0.00631) | (0.00659) |
| Immigrant · Non-earned income | | 0.491 | | 0.0323 | | 0.253 | | 0.0260** | | 0.0496* |
| | | (0.410) | | (0.0269) | | (0.268) | | (0.0126) | | (0.0275) |
| Residence duration <10 years | -0.436 | -0.405 | -0.0198 | -0.0177 | 0.0419 | 0.0578 | -0.0425*** | -0.0409*** | -0.0995*** | -0.0964*** |
| | (0.345) | (0.346) | (0.0239) | (0.0241) | (0.242) | (0.244) | (0.00928) | (0.00916) | (0.0216) | (0.0214) |
| Residence duration 10-20 years | 0.225 | 0.251 | 0.0222 | 0.0239 | 0.170 | 0.184 | -0.0202*** | -0.0188** | -0.0486** | -0.0460** |
| | (0.315) | (0.314) | (0.0211) | (0.0210) | (0.169) | (0.170) | (0.00777) | (0.00775) | (0.0195) | (0.0195) |
| Residence duration 20-30 years | 0.207 | 0.206 | 0.0145 | 0.0144 | 0.140 | 0.140 | 0.0120 | 0.0119 | 0.0240 | 0.0239 |
| | (0.304) | (0.302) | (0.0203) | (0.0201) | (0.196) | (0.196) | (0.00833) | (0.00834) | (0.0200) | (0.0201) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Job FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 |
| R-squared | 0.639 | 0.639 | 0.664 | 0.665 | 0.708 | 0.708 | 0.509 | 0.509 | 0.516 | 0.516 |

Source: CONSTANCES survey 2012-2018 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, ODTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the occupation-department level and weights imputed from the LFS at the department-occupation-gender-nativity-age level, or at the department-occupation-gender-nativity level or at the department-gender-nativity-age level. Control variables include: gender, age, age squared, civil status, children, diploma level and residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years). Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

behind these tests is that if during the assimilation process in the host country there is an income convergence effect, we should find that foreign born people that have already acquired the French nationality or foreign born that benefit from a native network through marriage with a French citizen should benefit from better working conditions.

From columns (1), (5), (9), (13) and (17) in Table 5 we conclude that, consistently estimates from Table 3 foreign born workers (variable "Immigrant") bear an average worse working conditions in terms of injury indicators and associated disabilities. In contrast, among foreign born workers, those that have acquired the French nationality and are thus "Naturalized" display an average better working conditions than other foreign born workers. The variable "Naturalized" results from the interaction between the dummy variables "Immigrant" and "French nationality" and the associated coefficients are systematically negative and significant whatever the working conditions indicator we consider.

From columns (3), (7), (11), (15) and (19) in Table 5 we still conclude that in average foreign born workers are significantly more allocated towards activities with higher frequency of profes-

sional accidents and with more temporal and permanent disabilities resulting from these accidents. Nevertheless, foreign born people that are married with a French citizen ("Assimilated" results from the interaction between "Immigrant" and "French husband or wife") display systematically a negative and significant coefficient, underlining the fact that they benefit from better working conditions. Assimilation seems again associated with an improvement in working conditions.

What about the income effect? For household owners (*i.e.* high income people) whatever the injury/illness indicator we consider we find that they systematically benefit from better working conditions than non-owners. In contrast, low income individuals (those living in MRH in SUA) are significantly more present in activities with higher frequency of injuries and the associated disabilities. Finally, and consistent with previous findings, columns (2), (4), (6), (8), (10), (12), (14), (16), (18) and (20) reveal that high income naturalized immigrants and high income assimilated immigrants do not display a significant different allocation with respect to the other household owners across activities.

These findings confirm that immigrants bear in average worse working conditions than natives. Working conditions arise as a normal good. As immigrants assimilate to the host country, their working conditions are improved. More precisely, foreign born having acquired the French nationality or being married to a French citizen, who are also household owners do not bear significantly different working conditions with respect to the average household owner. Again high income level equalizes working conditions among nativity groups.

Table 5: Naturalized immigrants, assimilated immigrants and professional accident/illness: the role of income. LFS 2003-2012.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | | | PATD | | | | PAPD | | | | PDTD | | | | PDPD | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) |
| Immigrant | 2.921** | 3.023*** | 3.186*** | 3.254*** | 0.295*** | 0.302*** | 0.321*** | 0.325*** | 2.453*** | 2.457*** | 2.780*** | 2.736*** | -0.0117 | -0.00170 | -0.00143 | 0.00937 | -0.0877 | -0.0642 | -0.0650 | -0.0384 |
| | (1.153) | (1.134) | (1.222) | (1.205) | (0.0977) | (0.0968) | (0.105) | (0.104) | (0.748) | (0.750) | (0.826) | (0.827) | (0.0590) | (0.0522) | (0.0580) | (0.0498) | (0.140) | (0.123) | (0.137) | (0.117) |
| MRH in SUA | 0.922* | 0.937** | 0.919* | 0.929* | 0.0815** | 0.0826** | 0.0812** | 0.0817** | 0.596** | 0.597** | 0.592** | 0.586** | -0.0239 | -0.0224 | -0.0240 | -0.0225 | -0.0674 | -0.0639 | -0.0678 | -0.0640 |
| | (0.477) | (0.474) | (0.477) | (0.474) | (0.0412) | (0.0410) | (0.0412) | (0.0411) | (0.262) | (0.262) | (0.263) | (0.263) | (0.0301) | (0.0291) | (0.0301) | (0.0289) | (0.0718) | (0.0693) | (0.0719) | (0.0690) |
| Household owner | -0.673** | -0.694** | -0.673** | -0.685** | -0.0537*** | -0.0552*** | -0.0537*** | -0.0544*** | -0.161** | -0.162** | -0.165** | -0.157** | -0.0689* | -0.0709* | -0.0687* | -0.0706* | -0.163* | -0.168* | -0.163* | -0.167 |
| | (0.269) | (0.275) | (0.268) | (0.275) | (0.0174) | (0.0177) | (0.0173) | (0.0178) | (0.0767) | (0.0778) | (0.0766) | (0.0778) | (0.0407) | (0.0422) | (0.0406) | (0.0422) | (0.0983) | (0.102) | (0.0979) | (0.102) |
| Residence duration <10 years | 0.728** | 0.777** | 1.119*** | 1.160*** | 0.0680*** | 0.0716*** | 0.109*** | 0.111*** | 0.462** | 0.464** | 1.031*** | 1.005*** | -0.0347 | -0.0298 | -0.0231 | -0.0167 | -0.108 | -0.0962 | -0.0855 | -0.0696 |
| | (0.344) | (0.334) | (0.382) | (0.370) | (0.0237) | (0.0232) | (0.0282) | (0.0277) | (0.181) | (0.181) | (0.252) | (0.253) | (0.0325) | (0.0290) | (0.0332) | (0.0280) | (0.0777) | (0.0692) | (0.0792) | (0.0666) |
| Residence duration 10-20 years | 0.571 | 0.621* | 0.754* | 0.784** | 0.0579** | 0.0616** | 0.0774** | 0.0790** | 0.437** | 0.439** | 0.722*** | 0.703*** | -0.0237 | -0.0187 | -0.0190 | -0.0143 | -0.0706 | -0.0589 | -0.0625 | -0.0511 |
| | (0.356) | (0.343) | (0.387) | (0.376) | (0.0282) | (0.0275) | (0.0312) | (0.0307) | (0.200) | (0.198) | (0.226) | (0.226) | (0.0242) | (0.0210) | (0.0253) | (0.0220) | (0.0577) | (0.0499) | (0.0605) | (0.0522) |
| Residence duration 20-30 years | 0.554 | 0.599* | 0.614* | 0.638* | 0.0538* | 0.0571** | 0.0605** | 0.0618** | 0.312 | 0.314 | 0.424** | 0.409** | -0.0158 | -0.0114 | -0.0151 | -0.0114 | -0.0509 | -0.0405 | -0.0509 | -0.0416 |
| | (0.354) | (0.342) | (0.366) | (0.357) | (0.0284) | (0.0277) | (0.0293) | (0.0288) | (0.192) | (0.192) | (0.204) | (0.204) | (0.0188) | (0.0157) | (0.0197) | (0.0167) | (0.0447) | (0.0371) | (0.0469) | (0.0396) |
| Naturalized | -1.092*** | -1.268*** | | | -0.109*** | -0.122*** | | | -1.299*** | -1.305*** | | | -0.0444*** | -0.0617*** | | | -0.100*** | -0.141*** | | |
| | (0.402) | (0.418) | | | (0.0353) | (0.0359) | | | (0.379) | (0.388) | | | (0.0118) | (0.0228) | | | (0.0267) | (0.0540) | | |
| Naturalized· Household owner | | 0.351 | | | | 0.0256 | | | | 0.0138 | | | | 0.0346 | | | | 0.0814 | | |
| | | (0.266) | | | | (0.0178) | | | | (0.110) | | | | (0.0267) | | | | (0.0644) | | |
| Assimilated | | | -0.725** | -0.856** | | | -0.0665** | -0.0738** | | | -0.538** | -0.453* | | | -0.0429** | -0.0638* | | | -0.109** | -0.160* |
| | | | (0.331) | (0.384) | | | (0.0287) | (0.0311) | | | (0.225) | (0.238) | | | (0.0181) | (0.0342) | | | (0.0430) | (0.0821) |
| Assimilated · Household owner | | | | 0.236 | | | | 0.0131 | | | | -0.152 | | | | 0.0373 | | | | 0.0918 |
| | | | | (0.286) | | | | (0.0189) | | | | (0.129) | | | | (0.0322) | | | | (0.0774) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| NAF2 FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 |
| R-squared | 0.534 | 0.534 | 0.534 | 0.534 | 0.533 | 0.533 | 0.532 | 0.532 | 0.596 | 0.596 | 0.596 | 0.596 | 0.173 | 0.173 | 0.173 | 0.173 | 0.160 | 0.160 | 0.160 | 0.161 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the NAF5 level and weights provided by the LFS. Control variables include: gender, age, age squared, civil status, children, diploma level, residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years), size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Table C.3 in Appendix C confirms the importance of the assimilation process in the convergence of working conditions. This table makes a focus on second generation immigrants, that is on natives having both parents who are foreign born.[25] As observed from columns (1), (7) and (9), second generation immigrants are an average relatively less allocated than the average native into activities displaying a higher frequency of professional accidents. Second generations are in average less concerned by temporal and permanent disabilities associated with illness. Their situation is then improved with respect to immigrants who systematically display worse injury indicators ($PAFR$, $PATD$, $PAPD$) and not significantly different disability indicators associated with illness.

Using the CONSTANCES database, Table C.4 in Appendix C tests the robustness of estimations in Table 4. Again we find that immigrants are an average significantly more allocated into activities with high frequency of professional accidents and therefore high severity index of temporal and permanent disabilities associated with these accidents. When focusing on disabilities associated with professional illness we still not find significantly different behavior between natives and immigrants.

Natives with both parents being foreign born, that is, second generation immigrants, and naturalized immigrants do not seem to display here a significantly different allocation across activities with respect to natives for 2nd generation of immigrants and with respect to immigrants for naturalized foreign born, except from the fact that naturalized people are more present in activities with more permanent disabilities associated with injury.[26]

The income effect is still salient and all individuals perceiving capital revenues (from dividends or/and housing rentals) benefit from better working conditions, whatever the working condition indicator we consider. This applies to all high income people, including naturalized immigrants, who do not display a significantly different allocation with respect to the average. Interestingly, 2nd generation immigrants (natives with both parents foreign born) perceiving capital income, benefit from significantly better working conditions ($PAFR$, $PATD$ and $PAPD$) than the average, underlining the importance of residence duration and income assimilation as a driver of better working conditions.

All in all, results from Tables 3, 4, 5, C.3 and C.4 confirm that foreign born, *i.e.* immigrants, are more likely than natives to allocate towards activities characterized by worse indicators of professional accidents and, to a lesser extent, professional illness. This effect seems mostly explained by differences in non-earned income between both nativity groups, since working conditions are a normal good. Actually, high non-earned income individuals benefit from better working conditions independently of their nativity. Income assimilation seems associated with working conditions' assimilation. Consistently with this result, Table 5 reveals that naturalized and assimilated immigrants benefit from better working conditions than the average immigrant. Natives with foreign

[25] Unfortunately the place of birth of the parents is provided only the first time the individual is interviewed by the LFS, implying that our sample is strongly reduced and results must be interpreted with caution.

[26] This result is in contrast with findings from Table 5 and may be explained by the selection bias nature of the CONSTANCES sample.

born parents (2nd generation immigrants) having high non-earned income benefit from significantly better working conditions than average (see Table C.4), underlining again the importance of income assimilation.

# 6 Conclusion

With years of residence in the host country immigrants' income tends to converge to the native average income level (see Borjas (1985), Borjas (1995), Chiswick (1986), Hu (2000) or Antecol, Kuhn, and Trejo (2006) among others). This income assimilation effect is surprisingly not associated with a health improvement (see Marmot, Adelstein, and Bulusu (1984), Antecol and Bedard (2006) or Hao and Kim (2009)). A large number of studies point towards acculturation (and the associated risky behaviors) as a major driver of the counterfactual relation between immigrants' health dynamics in the host country and income dynamics (see Antecol and Bedard (2006), McDonald and Kennedy (2004), Stephen et al. (1994), Kasl and Berkman (1983) or Marmot and Syme (1976)). Some emerging studies point towards worse working conditions of immigrants with respect to natives as determinant of their deteriorated health dynamics (see Case and Deaton (2005), Fletcher and Sindelar (2009), Orrenius and Zavodny (2009), Fletcher, Sindelar, and Yamaguchi (2011) or Giuntella and Mazzona (2015)). This statement seems though contradictory with the idea that working conditions are rather a normal good (see Viscusi (1978) for a seminal work on the subject). With years of residence in the host country, immigrants' income convergence towards the natives' average income level should promote a simultaneous convergence in working conditions. If this is not the case, we may argue that immigrants are caught in a "bad working conditions trap" that may be explained by differences in the perception of risk, in human capital or in employment opportunities.

This paper seeks to gain insights on the relationship between working conditions, nativity and income. Using two alternative French data sources merged with national industry statistics on professional accidents and illnesses and with department statistics on wealth, we show that working conditions are a normal good and that immigrants bear an average worse working conditions than natives. This difference seems though explained by differences in income levels. Individuals with high non-earned income benefit from better working conditions and no specific nativity effect applies. With years of residence in the host countries immigrants' income tends to converge to the native income level and this promotes an improvement in their working conditions. For equivalent level of non-earned income, no significant differences arise between immigrants and natives working conditions. According to our theoretical model, this rules out the possibility of differences in risk perception as a factor responsible for differences in working conditions across nativity groups.

Because immigrants' income assimilation is associated with an improvement in their working conditions, we cannot claim that bad working conditions are driving the deterioration of immigrants' health status with years of residence in the host country. On the contrary, working conditions

are rather improved with residence duration as non-earned income converges to the native average level.

Immigrants' health issues are not considered in this paper and are left for future work where we plan to exploit the longitudinal nature of the CONSTANCES survey.

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# A Appendix: Data sources

Statistics provided by the National Health Insurance Fund for Salaried Workers ("Caisse nationale de l'assurance maladie des travailleurs salaries") concern both professional illness and accidents. These statistics are available for the period 2012-2016, but it is only for 2014, 2015, 2016 that they are provided at the five digit NAF2008 level. So for more than 720 activity branches we have information on:

- The statistics of professional accidents that led to ($i$) a repair in the form of a first payment of daily "illness allowance" (resulting from a full day leave of work in addition to the day when the accident actually happened); ($ii$) or to a financial compensation due to a permanent disability or fatal accident (death benefit). An professional accident is defined as an accident which occurred to the employee by the fact or at the time of his work, whatever the cause. In order for the work accident to be recognized, the employee must justify the following 2 conditions: ($i$) he was the victim of an accidental act in the course of his professional activity, and ($ii$) the accidental event results in the sudden appearance of a lesion. The cause of the accident at work must be sudden (which distinguishes it from the appearance of the occupational illness). It can come from an event or series of events, which must be dated with certainty. The accident is presumed to be of professional origin as soon as it occurs on company premises, even during a break. This implies that the employee must be placed under the authority of the employer when the event occurs.

- The statistics occupational illness that gave rise to ($i$) a repair in the form of a first daily "illness allowance" payment (following an interruption of work); ($ii$) or to a financial compensation due to a permanent incapacity or fatal loss (death benefit). In France, the occupational disease is a work-related illness, that is to say, the exposure more or less prolonged to a risk existing during the usual exercise of the worker's mission. To be considered as an occupational illness, it must appear in one of the 118 tables of the Social Security Code, but it must also be recognized as such by the Primary Health Insurance Fund following a survey conducted on the victim. Once the occupational illness is proven, the victim is compensated without a waiting period until the end of his work stoppage and is entitled to reimbursement for his medical expenses. If the injury or the occupational illness is consolidated, a permanent incapacity rate is pronounced by the Primary Health Insurance Fund and the worker is entitled to the payment of a life annuity or a lump sum compensation in capital. At the end of the work stoppage, the employee must return to his position under the usual conditions and if he is not declared fit by the doctor, the employer must propose a new position adapted to his situation. The recognition of an occupational illness may therefore a long procedure including a survey over the victim. This implies that there must really be a willingness of

the worker to go through all this administrative procedure.

Using information on job content provided by CONSTANCES survey, we define the following indicators:

- Fixed schedule: dummy variable equal to unity if the individual has a job with fixed schedules.
- Physical hardness. This indicator results from the addition of 3 indicators whose values are defined between $[0, 1]$:
  - The first indicator is increasing with the following working conditions: standing, kneeling, leaning forward, manipulating an object weighing more than 1 kg, moving objects weighing more than 10/20/25 kg, head down, arms in the air, separated arms, pinching, movement of screwing , with back to back, elbow flexed, wrist twisted, hitting with hand.
  - Physical effort: variable provided by CONSTANCES and adopting the 0 value when the job implies no physical effort at all and unity when the job is physically exhausting.
  - Extreme temperature: indicator defined between $[0, 1]$ and increasing with the frequency at which the individual is exposed to extreme temperatures (high or low).
- ICT: variable defined within the interval $[0, 1]$ and resulting from the addition of the $(i)$ frequency at which the individual uses a computer screen or control screen at work and $(ii)$ the frequency at which the individual uses a computer keyboard, computer mouse or equivalent.
- Repetitive: indicator resulting from the addition of two $[0, 1]$ variables: $(i)$ do you have to repeat the same actions 2 to 4 times per minute? $(ii)$ low concentration required for the job. This variable increases with the frequency at which the individual can interrupt his job during at least 10 minutes per hour and with the frequency at which the individual can raise his eyes from work during some seconds even if he is not in a break.
- Bad quality job: indicator resulting from the addition of two $[0, 1]$ variables: $(i)$ weak promotion perspectives (the weaker the perspectives the higher the value of the variable); $(ii)$ threaten job security (this variable increases with job insecurity).

# B Appendix: Descriptive statistics

Table B.1: Native and immigrant sample composition, LFS 2003-2012.

| | Natives | | | Immigrants | | |
|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| Female | 1429915 | 0.479 | 0.500 | 173417 | 0.449 | 0.497 |
| Age | 1429915 | 41.108 | 11.404 | 173417 | 44.546 | 10.648 |
| Married | 1429915 | 0.506 | 0.500 | 173417 | 0.660 | 0.474 |
| Children | 1429915 | 0.523 | 0.499 | 173417 | 0.614 | 0.487 |
| SUA | 1429915 | 0.044 | 0.205 | 173417 | 0.129 | 0.335 |
| MRH | 1429915 | 0.118 | 0.322 | 173417 | 0.240 | 0.427 |
| Household owner | 1429915 | 0.630 | 0.483 | 173417 | 0.472 | 0.499 |
| no diploma | 1429915 | 0.157 | 0.364 | 173417 | 0.337 | 0.473 |
| BEPC only | 1429915 | 0.076 | 0.265 | 173417 | 0.065 | 0.247 |
| CAP-BEP | 1429915 | 0.278 | 0.448 | 173417 | 0.160 | 0.367 |
| Baccalaureate degree | 1429915 | 0.184 | 0.387 | 173417 | 0.156 | 0.363 |
| Baccalaureate+2 | 1429915 | 0.145 | 0.352 | 173417 | 0.087 | 0.282 |
| Higher degree | 1429915 | 0.160 | 0.367 | 173417 | 0.195 | 0.396 |
| Residence duration $< 10$ | 1429915 | 0.000 | 0.000 | 173417 | 0.174 | 0.379 |
| Residence duration $10 - 20$ | 1429915 | 0.000 | 0.000 | 173417 | 0.177 | 0.381 |
| Residence duration $20 - 30$ | 1429915 | 0.000 | 0.000 | 173417 | 0.191 | 0.393 |
| Residence duration above 30 | 1429915 | 0.000 | 0.000 | 173417 | 0.459 | 0.498 |
| PAFR | 1415042 | 20.770 | 15.555 | 170688 | 22.147 | 16.719 |
| PATD | 1415042 | 1.286 | 1.055 | 170688 | 1.450 | 1.207 |
| PAPD | 1415042 | 11.945 | 11.510 | 170688 | 13.752 | 13.492 |
| PDTD | 1415042 | 0.392 | 0.758 | 170688 | 0.388 | 0.603 |
| PDPD | 1415042 | 0.852 | 1.766 | 170688 | 0.835 | 1.383 |

Table B.2: The role of residence duration for immigrants, LFS 2003-2012.

| | 10 years or less of residence | | | 10-20 years of residence | | | 20-30 years of residence | | | More than 30 years of residence | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 29535 | 23.975 | 17.578 | 30096 | 23.357 | 17.280 | 32560 | 22.281 | 16.506 | 78491 | 20.940 | 16.150 |
| PATD | 29535 | 1.607 | 1.284 | 30096 | 1.556 | 1.259 | 32560 | 1.468 | 1.203 | 78491 | 1.343 | 1.146 |
| PAPD | 29535 | 15.443 | 14.847 | 30096 | 14.781 | 14.340 | 32560 | 13.533 | 13.020 | 78491 | 12.814 | 12.702 |
| PDTD | 29535 | 0.419 | 0.572 | 30096 | 0.387 | 0.507 | 32560 | 0.371 | 0.512 | 78491 | 0.385 | 0.678 |
| PDPD | 29535 | 0.873 | 1.227 | 30096 | 0.816 | 1.206 | 32560 | 0.775 | 1.139 | 78491 | 0.852 | 1.580 |

Table B.3: The role of education, LFS 2003-2012.

| | Natives | | | | | | Immigrants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Secondary educ. or less | | | More than secondary educ. | | | Secondary educ. or less | | | More than secondary educ. | | |
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 983074 | 23.064 | 15.849 | 431968 | 15.551 | 13.483 | 122556 | 24.731 | 16.871 | 48132 | 15.568 | 14.364 |
| PATD | 983074 | 1.444 | 1.089 | 431968 | 0.927 | 0.873 | 122556 | 1.643 | 1.236 | 48132 | 0.958 | 0.968 |
| PAPD | 983074 | 13.540 | 12.380 | 431968 | 8.315 | 8.135 | 122556 | 15.866 | 14.515 | 48132 | 8.370 | 8.288 |
| PDTD | 983074 | 0.449 | 0.802 | 431968 | 0.261 | 0.627 | 122556 | 0.450 | 0.626 | 48132 | 0.232 | 0.506 |
| PDPD | 983074 | 0.974 | 1.865 | 431968 | 0.576 | 1.480 | 122556 | 0.964 | 1.420 | 48132 | 0.505 | 1.225 |

Table B.4: Female composition for natives and immigrants, LFS 2003-2012.

| | Natives | | | Immigrants | | |
|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 678958 | 18.912 | 14.846 | 76893 | 18.604 | 15.691 |
| PATD | 678958 | 1.153 | 1.004 | 76893 | 1.184 | 1.111 |
| PAPD | 678958 | 9.203 | 8.170 | 76893 | 9.191 | 8.225 |
| PDTD | 678958 | 0.310 | 0.539 | 76893 | 0.292 | 0.449 |
| PDPD | 678958 | 0.624 | 1.167 | 76893 | 0.589 | 0.949 |

Table B.5: The role of income: owner versus resident in a sensible urban area. LFS 2003-2012.

| | Natives | | | | | | Immigrants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Household owner | | | Resident in a urban sensible area | | | Household owner | | | Resident in a urban sensible area | | |
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 891559 | 20.119 | 15.376 | 62376 | 22.453 | 15.456 | 80747 | 20.728 | 16.449 | 21976 | 25.675 | 16.725 |
| PATD | 891559 | 1.242 | 1.039 | 62376 | 1.409 | 1.075 | 80747 | 1.329 | 1.165 | 21976 | 1.744 | 1.261 |
| PAPD | 891559 | 11.850 | 11.544 | 62376 | 12.099 | 10.688 | 80747 | 12.771 | 13.038 | 21976 | 16.474 | 14.323 |
| PDTD | 891559 | 0.366 | 0.669 | 62376 | 0.447 | 0.900 | 80747 | 0.366 | 0.605 | 21976 | 0.435 | 0.479 |
| PDPD | 891559 | 0.795 | 1.532 | 62376 | 0.981 | 2.140 | 80747 | 0.798 | 1.406 | 21976 | 0.918 | 1.047 |

Table B.6: The role of income: moderate rental Housing (MRH) and sensible urban areas. LFS 2003-2012.

| | Natives | | | | | | Immigrants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MRH | | | MRH in a sensible urban area | | | MRH | | | MRH in a urban sensible area | | |
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 166241 | 23.145 | 15.560 | 33353 | 24.083 | 15.392 | 40960 | 25.235 | 16.433 | 14121 | 26.907 | 16.465 |
| PATD | 166241 | 1.453 | 1.095 | 33353 | 1.528 | 1.097 | 40960 | 1.692 | 1.224 | 14121 | 1.831 | 1.247 |
| PAPD | 166241 | 12.827 | 11.204 | 33353 | 13.121 | 11.008 | 40960 | 15.659 | 13.575 | 14121 | 17.107 | 14.174 |
| PDTD | 166241 | 0.409 | 0.667 | 33353 | 0.437 | 0.748 | 40960 | 0.424 | 0.481 | 14121 | 0.450 | 0.463 |
| PDPD | 166241 | 0.885 | 1.591 | 33353 | 0.939 | 1.754 | 40960 | 0.888 | 1.020 | 14121 | 0.945 | 1.002 |

Table B.7: Native and immigrant sample composition, CONSTANCES 2012-2017.

| | Natives | | | Immigrants | | |
|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| Female | 92951 | 0.534 | 0.499 | 9806 | 0.505 | 0.500 |
| Age | 92951 | 43.590 | 10.413 | 9806 | 44.556 | 10.406 |
| Married | 92951 | 0.591 | 0.492 | 9806 | 0.557 | 0.497 |
| Children | 89138 | 0.587 | 0.492 | 8966 | 0.582 | 0.493 |
| Dividends & rents | 92951 | 0.094 | 0.292 | 9806 | 0.063 | 0.243 |
| BEPC only | 92191 | 0.031 | 0.172 | 9399 | 0.056 | 0.229 |
| CAP/BEP | 92191 | 0.136 | 0.343 | 9399 | 0.127 | 0.333 |
| Bac | 92191 | 0.152 | 0.359 | 9399 | 0.136 | 0.342 |
| Bac +2 ou 3 | 92191 | 0.291 | 0.454 | 9399 | 0.201 | 0.401 |
| Bac +4 | 92191 | 0.092 | 0.289 | 9399 | 0.083 | 0.277 |
| Bac +5 or more | 92191 | 0.278 | 0.448 | 9399 | 0.333 | 0.471 |
| Residence duration $< 10$ | 92951 | 1.000 | 0.000 | 9806 | 0.121 | 0.327 |
| Residence duration $10 - 20$ | 92951 | 1.000 | 0.000 | 9806 | 0.184 | 0.388 |
| Residence duration $20 - 30$ | 92951 | 1.000 | 0.000 | 9806 | 0.120 | 0.325 |
| Residence duration above 30 | 92951 | 1.000 | 0.000 | 9806 | 0.251 | 0.433 |
| PAFR | 92672 | 18.273 | 9.983 | 9764 | 19.165 | 10.705 |
| PATD | 92672 | 1.105 | 0.673 | 9764 | 1.221 | 0.750 |
| PAPD | 92672 | 9.900 | 6.596 | 9764 | 11.163 | 7.828 |
| PDTD | 92672 | 0.293 | 0.296 | 9764 | 0.314 | 0.359 |
| PDPD | 92672 | 0.633 | 0.676 | 9764 | 0.684 | 0.838 |
| Fixed schedule | 92951 | 0.602 | 0.489 | 9806 | 0.596 | 0.491 |
| Physical hardness | 8232 | 0.502 | 0.455 | 7947 | 0.609 | 0.527 |
| ICT | 90164 | 0.726 | 0.362 | 9256 | 0.656 | 0.410 |
| Repetitive | 8618 | 0.928 | 0.425 | 8688 | 0.980 | 0.455 |
| Bad quality job | 87368 | 0.872 | 0.441 | 8514 | 0.881 | 0.473 |
| Other constraints | 92951 | 0.020 | 0.079 | 9806 | 0.018 | 0.076 |
| Organizational constraints | 92951 | 0.101 | 0.136 | 9806 | 0.124 | 0.152 |
| Physical constraints | 92951 | 0.123 | 0.218 | 9806 | 0.149 | 0.237 |
| Chemical constraints | 92951 | 0.030 | 0.070 | 9806 | 0.035 | 0.076 |
| Noise constraints | 92951 | 0.118 | 0.207 | 9806 | 0.122 | 0.210 |

Table B.8: The role of residence duration for immigrants, CONSTANCES 2012-2017.

| | 10 years or less of residence | | | 10-20 years of residence | | | 20-30 years of residence | | | More than 30 years of residence | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 1182 | 18.269 | 10.961 | 1795 | 19.257 | 11.320 | 1172 | 18.278 | 11.006 | 2454 | 18.471 | 10.126 |
| PATD | 1182 | 1.167 | 0.743 | 1795 | 1.238 | 0.797 | 1172 | 1.170 | 0.787 | 2454 | 1.162 | 0.703 |
| PAPD | 1182 | 10.610 | 7.655 | 1795 | 11.246 | 8.353 | 1172 | 10.767 | 8.335 | 2454 | 10.672 | 7.261 |
| PDTD | 1182 | 0.280 | 0.385 | 1795 | 0.312 | 0.357 | 1172 | 0.282 | 0.252 | 2454 | 0.312 | 0.364 |
| PDPD | 1182 | 0.615 | 0.918 | 1795 | 0.671 | 0.800 | 1172 | 0.609 | 0.563 | 2454 | 0.690 | 0.865 |
| Fixed schedule | 1190 | 0.569 | 0.495 | 1806 | 0.572 | 0.495 | 1176 | 0.581 | 0.494 | 2458 | 0.606 | 0.489 |
| Physical hardness | 973 | 0.589 | 0.515 | 1473 | 0.620 | 0.546 | 957 | 0.617 | 0.542 | 1961 | 0.590 | 0.516 |
| ICT | 1133 | 0.666 | 0.417 | 1714 | 0.635 | 0.421 | 1103 | 0.662 | 0.412 | 2326 | 0.669 | 0.399 |
| Repetitive | 1083 | 0.980 | 0.442 | 1607 | 0.986 | 0.458 | 1032 | 0.993 | 0.462 | 2151 | 0.968 | 0.452 |
| Bad quality job | 1092 | 0.814 | 0.472 | 1579 | 0.843 | 0.484 | 1044 | 0.900 | 0.487 | 2181 | 0.907 | 0.470 |
| Other constraints | 1190 | 0.016 | 0.073 | 1806 | 0.019 | 0.083 | 1176 | 0.017 | 0.073 | 2458 | 0.020 | 0.080 |
| Organizational constraints | 1190 | 0.131 | 0.153 | 1806 | 0.136 | 0.158 | 1176 | 0.118 | 0.142 | 2458 | 0.117 | 0.148 |
| Physical constraints | 1190 | 0.117 | 0.211 | 1806 | 0.150 | 0.240 | 1176 | 0.146 | 0.236 | 2458 | 0.146 | 0.240 |
| Chemical constraints | 1190 | 0.027 | 0.057 | 1806 | 0.035 | 0.082 | 1176 | 0.030 | 0.067 | 2458 | 0.036 | 0.081 |
| Noise constraints | 1190 | 0.102 | 0.197 | 1806 | 0.115 | 0.205 | 1176 | 0.107 | 0.194 | 2458 | 0.123 | 0.212 |

Table B.9: The role of education, CONSTANCES 2012-2017.

| | Natives | | | | | | Immigrants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Secondary educ. or less | | | More than secondary educ. | | | Secondary educ. or less | | | More than secondary educ. | | |
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 31042 | 21.552 | 10.551 | 60873 | 16.592 | 9.246 | 3549 | 22.516 | 11.367 | 5809 | 16.975 | 9.608 |
| PATD | 31042 | 1.332 | 0.727 | 60873 | 0.988 | 0.612 | 3549 | 1.468 | 0.826 | 5809 | 1.059 | 0.645 |
| PAPD | 31042 | 12.154 | 7.956 | 60873 | 8.745 | 5.439 | 3549 | 13.549 | 9.258 | 5809 | 9.606 | 6.246 |
| PDTD | 31042 | 0.369 | 0.345 | 60873 | 0.254 | 0.258 | 3549 | 0.376 | 0.367 | 5809 | 0.273 | 0.354 |
| PDPD | 31042 | 0.798 | 0.772 | 60873 | 0.548 | 0.604 | 3549 | 0.814 | 0.860 | 5809 | 0.598 | 0.830 |
| Fixed schedule | 31098 | 0.650 | 0.477 | 61093 | 0.578 | 0.494 | 3564 | 0.664 | 0.472 | 5835 | 0.552 | 0.497 |
| Physical hardness | 26512 | 0.750 | 0.527 | 55192 | 0.383 | 0.359 | 2655 | 0.930 | 0.559 | 5012 | 0.430 | 0.412 |
| ICT | 29964 | 0.556 | 0.421 | 59486 | 0.813 | 0.292 | 3283 | 0.417 | 0.429 | 5631 | 0.805 | 0.318 |
| Repetitive | 28188 | 1.027 | 0.459 | 57335 | 0.878 | 0.398 | 2993 | 1.075 | 0.479 | 5374 | 0.925 | 0.429 |
| Bad quality job | 28696 | 0.946 | 0.451 | 58033 | 0.836 | 0.432 | 2963 | 0.946 | 0.480 | 5442 | 0.845 | 0.466 |
| Other constraints | 31098 | 0.017 | 0.071 | 61093 | 0.022 | 0.082 | 3564 | 0.014 | 0.067 | 5835 | 0.021 | 0.082 |
| Organizational constraints | 31098 | 0.140 | 0.160 | 61093 | 0.081 | 0.117 | 3564 | 0.157 | 0.166 | 5835 | 0.105 | 0.138 |
| Physical constraints | 31098 | 0.226 | 0.264 | 61093 | 0.070 | 0.168 | 3564 | 0.252 | 0.270 | 5835 | 0.084 | 0.186 |
| Chemical constraints | 31098 | 0.055 | 0.096 | 61093 | 0.017 | 0.047 | 3564 | 0.060 | 0.101 | 5835 | 0.019 | 0.050 |
| Noise constraints | 31098 | 0.188 | 0.250 | 61093 | 0.082 | 0.170 | 3564 | 0.188 | 0.244 | 5835 | 0.081 | 0.174 |

Table B.10: Female composition for natives and immigrants, CONSTANCES 2012-2017.

| | Natives | | | Immigrants | | |
|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 49625 | 17.612 | 9.509 | 4932 | 17.119 | 10.139 |
| PATD | 49625 | 1.048 | 0.636 | 4932 | 1.062 | 0.676 |
| PAPD | 49625 | 8.354 | 4.671 | 4932 | 8.333 | 4.546 |
| PDTD | 49625 | 0.258 | 0.242 | 4932 | 0.255 | 0.304 |
| PDPD | 49625 | 0.520 | 0.506 | 4932 | 0.521 | 0.671 |
| Fixed schedule | 49678 | 0.631 | 0.482 | 4948 | 0.609 | 0.488 |
| Physical hardness | 43428 | 0.478 | 0.416 | 3944 | 0.556 | 0.471 |
| ICT | 48022 | 0.730 | 0.361 | 4644 | 0.663 | 0.413 |
| Repetitive | 45409 | 0.920 | 0.448 | 4299 | 0.985 | 0.461 |
| Bad quality job | 46126 | 0.895 | 0.435 | 4197 | 0.901 | 0.476 |
| Other constraints | 49678 | 0.018 | 0.075 | 4948 | 0.015 | 0.068 |
| Organizational constraints | 49678 | 0.088 | 0.125 | 4948 | 0.106 | 0.135 |
| Physical constraints | 49678 | 0.096 | 0.194 | 4948 | 0.114 | 0.210 |
| Chemical constraints | 49678 | 0.012 | 0.032 | 4948 | 0.014 | 0.036 |
| Noise constraints | 49678 | 0.081 | 0.164 | 4948 | 0.083 | 0.172 |

Table B.11: Individual perceiving dividends and/or rentals from housing. CONSTANCES 2012-2017.

| | Natives | | | Immigrants | | |
|---|---|---|---|---|---|---|
| Variable | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| PAFR | 8709 | 16.733 | 9.538 | 618 | 16.977 | 9.847 |
| PATD | 8709 | 1.011 | 0.642 | 618 | 1.055 | 0.662 |
| PAPD | 8709 | 9.338 | 6.130 | 618 | 9.747 | 6.578 |
| PDTD | 8709 | 0.268 | 0.279 | 618 | 0.301 | 0.443 |
| PDPD | 8709 | 0.590 | 0.650 | 618 | 0.660 | 1.050 |
| Fixed schedule | 875 | 0.537 | 0.499 | 619 | 0.538 | 0.499 |
| Physical hardness | 7948 | 0.359 | 0.363 | 540 | 0.360 | 0.388 |
| ICT | 8546 | 0.809 | 0.304 | 596 | 0.829 | 0.296 |
| Repetitive | 8232 | 0.914 | 0.384 | 576 | 0.936 | 0.412 |
| Bad quality job | 8233 | 0.812 | 0.434 | 575 | 0.846 | 0.454 |
| Other constraints | 8750 | 0.023 | 0.083 | 619 | 0.023 | 0.081 |
| Organizational constraints | 8750 | 0.087 | 0.122 | 619 | 0.109 | 0.137 |
| Physical constraints | 8750 | 0.072 | 0.173 | 619 | 0.082 | 0.183 |
| Chemical constraints | 8750 | 0.023 | 0.058 | 619 | 0.020 | 0.051 |
| Noise constraints | 8750 | 0.086 | 0.182 | 619 | 0.074 | 0.166 |

# C Appendix: Estimation results

Table C.1: The impact of non-earned income on working conditions. Cell analysis. LFS 2003-2010.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | PATD | | PAPD | | PDTD | | PDPD | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Wealth | -0.137*** | | -0.00783*** | | -0.115*** | | -0.000890*** | | -0.000716*** | |
| | (0.00124) | | (9.62e-05) | | (0.000897) | | (5.55e-05) | | (0.000132) | |
| Nb liable to wealth tax | | -0.135*** | | -0.00820*** | | -0.0964*** | | -0.00360*** | | -0.00735*** |
| | | (0.000847) | | (6.55e-05) | | (0.000611) | | (3.78e-05) | | (9.00e-05) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,438 | 1,438 | 1,438 | 1,438 | 1,438 | 1,438 | 1,438 | 1,438 | 1,438 | 1,438 |
| R-squared | 0.901 | 0.901 | 0.886 | 0.886 | 0.880 | 0.880 | 0.877 | 0.877 | 0.871 | 0.871 |

Source: Labor Force surveys 2003-2012, department statistics on wealth 2003-2010 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: cells are defined at the department-immigrant-year level. Weighted OLS estimation with robust standard errors clustered at the department level and weights equal to the cell weight when considering weights provided by the LFS. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Table C.2: Correlation between nativity group and working condition indicators. LFS 2003-2012.

| | Dependent variable: Professional accident/illness indicators | | | | |
|---|---|---|---|---|---|
| | PAFR | PATD | PAPD | PDTD | PDPD |
| Immigrant | 1.215 | 0.155** | 1.722** | -0.00995 | -0.0312 |
| | (0.899) | (0.0707) | (0.839) | (0.0326) | (0.0765) |
| Year FE | No | No | No | No | No |
| Region FE | No | No | No | No | No |
| NAF2 FE | No | No | No | No | No |
| Region × Year FE | No | No | No | No | No |
| Observations | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 | 1,584,562 |
| R-squared | 0.001 | 0.002 | 0.002 | 0.000 | 0.000 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the NAF5 level and weights provided by the LFS. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Table C.3: 2nd generation immigrants and professional accident/illness : the role of income. LFS 2003-2012.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | PATD | | PAPD | | PDTD | | PDPD | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Immigrant | 3.508*** | 3.597*** | 0.337*** | 0.342*** | 2.941*** | 2.953*** | 0.00193 | 0.00972 | -0.0513 | -0.0312 |
| | (1.085) | (1.094) | (0.0921) | (0.0929) | (0.777) | (0.777) | (0.0519) | (0.0503) | (0.122) | (0.118) |
| MRH in SUA | 1.015* | 1.003* | 0.0883* | 0.0875* | 0.572* | 0.570* | -0.0112 | -0.0123 | -0.0331 | -0.0359 |
| | (0.519) | (0.518) | (0.0455) | (0.0453) | (0.300) | (0.299) | (0.0231) | (0.0243) | (0.0545) | (0.0575) |
| Household owner | -0.626*** | -0.523*** | -0.0508*** | -0.0447*** | -0.165** | -0.152** | -0.0588* | -0.0499* | -0.137* | -0.114* |
| | (0.221) | (0.189) | (0.0145) | (0.0129) | (0.0725) | (0.0738) | (0.0321) | (0.0257) | (0.0775) | (0.0620) |
| 2nd generation | -0.407** | -0.196 | -0.0163 | -0.00373 | -0.140 | -0.113 | -0.0181** | 0.000346 | -0.0417** | 0.00565 |
| | (0.188) | (0.250) | (0.0158) | (0.0176) | (0.135) | (0.144) | (0.00892) | (0.0301) | (0.0207) | (0.0724) |
| 2nd generation · Household owner | | -0.371 | | -0.0221 | | -0.0482 | | -0.0324 | | -0.0833 |
| | | (0.394) | | (0.0258) | | (0.153) | | (0.0541) | | (0.130) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| NAF2 FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 218,457 | 218,457 | 218,457 | 218,457 | 218,457 | 218,457 | 218,457 | 218,457 | 218,457 | 218,457 |
| R-squared | 0.551 | 0.551 | 0.547 | 0.547 | 0.604 | 0.604 | 0.178 | 0.178 | 0.164 | 0.164 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the NAF5 level and weights provided by the LFS. Control variables include: gender, age, age squared, civil status, children, diploma level, residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years), size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Table C.4: 2nd generation immigrants, naturalized immigrants and professional accident/illness : the role of income. CONSTANCES 2012-2018.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | | | PATD | | | | PAPD | | | | PDTD | | | | PDPD | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) |
| Immigrant | 2.018*** | 2.020*** | 2.145*** | 2.160*** | 0.205*** | 0.205*** | 0.215*** | 0.216*** | 2.493*** | 2.495*** | 2.654*** | 2.665*** | -0.00404 | -0.00400 | -0.000887 | 0.000301 | -0.0230 | -0.0229 | -0.0167 | -0.0144 |
| | (0.676) | (0.676) | (0.686) | (0.687) | (0.0456) | (0.0456) | (0.0461) | (0.0462) | (0.419) | (0.419) | (0.420) | (0.420) | (0.0173) | (0.0173) | (0.0167) | (0.0168) | (0.0425) | (0.0425) | (0.0413) | (0.0414) |
| Non-earned income | -0.154** | -0.142** | -0.157** | -0.171** | -0.00987** | -0.00917** | -0.0101** | -0.0111** | -0.0865* | -0.0780 | -0.0885* | -0.0991* | -0.00685** | -0.00668** | -0.00695** | -0.00812*** | -0.0160** | -0.0152** | -0.0162** | -0.0184*** |
| | (0.0684) | (0.0689) | (0.0682) | (0.0698) | (0.00449) | (0.00454) | (0.00448) | (0.00457) | (0.0505) | (0.0511) | (0.0504) | (0.0510) | (0.00278) | (0.00282) | (0.00276) | (0.00285) | (0.00635) | (0.00643) | (0.00631) | (0.00654) |
| Residence duration <10 years | -0.436 | -0.434 | -0.188 | -0.181 | -0.0197 | -0.0196 | -0.00130 | -0.000822 | 0.0420 | 0.0430 | 0.347 | 0.351 | -0.0425*** | -0.0425*** | -0.0362*** | -0.0357*** | -0.0995*** | -0.0994*** | -0.0870*** | -0.0860*** |
| | (0.345) | (0.345) | (0.391) | (0.392) | (0.0239) | (0.0239) | (0.0274) | (0.0274) | (0.242) | (0.242) | (0.277) | (0.277) | (0.00928) | (0.00927) | (0.00990) | (0.00984) | (0.0216) | (0.0216) | (0.0227) | (0.0226) |
| Residence duration 10-20 years | 0.226 | 0.227 | 0.341 | 0.353 | 0.0222 | 0.0223 | 0.0308 | 0.0317 | 0.171 | 0.172 | 0.313* | 0.322* | -0.0201*** | -0.0201*** | -0.0172** | -0.0163** | -0.0485** | -0.0484** | -0.0427** | -0.0410** |
| | (0.315) | (0.315) | (0.343) | (0.342) | (0.0211) | (0.0211) | (0.0226) | (0.0226) | (0.169) | (0.169) | (0.180) | (0.180) | (0.00777) | (0.00776) | (0.00749) | (0.00747) | (0.0195) | (0.0195) | (0.0189) | (0.0189) |
| Residence duration 20-30 years | 0.208 | 0.207 | 0.265 | 0.269 | 0.0145 | 0.0145 | 0.0188 | 0.0191 | 0.140 | 0.140 | 0.211 | 0.214 | 0.0120 | 0.0120 | 0.0135 | 0.0137 | 0.0240 | 0.0240 | 0.0269 | 0.0275 |
| | (0.304) | (0.304) | (0.309) | (0.309) | (0.0203) | (0.0203) | (0.0205) | (0.0205) | (0.196) | (0.196) | (0.199) | (0.199) | (0.00833) | (0.00833) | (0.00838) | (0.00842) | (0.0200) | (0.0200) | (0.0202) | (0.0203) |
| 2nd generation | 0.0584 | 0.0843 | | | 0.00377 | 0.00534 | | | 0.0226 | 0.0418 | | | 0.00252 | 0.00290 | | | 0.00394 | 0.00581 | | |
| | (0.0895) | (0.0921) | | | (0.00606) | (0.00627) | | | (0.0739) | (0.0768) | | | (0.00406) | (0.00420) | | | (0.00984) | (0.0102) | | |
| 2nd generation · Non-earned income | | -0.714** | | | | -0.0432** | | | | -0.529** | | | | -0.0105 | | | | -0.0514 | | |
| | | (0.327) | | | | (0.0212) | | | | (0.241) | | | | (0.0169) | | | | (0.0385) | | |
| Naturalized | | | 0.331 | 0.310 | | | 0.0246 | 0.0231 | | | 0.407** | 0.392** | | | 0.00836 | 0.00671 | | | 0.0167 | 0.0136 |
| | | | (0.271) | (0.268) | | | (0.0183) | (0.0182) | | | (0.178) | (0.178) | | | (0.00794) | (0.00797) | | | (0.0175) | (0.0175) |
| Naturalized · Non-earned income | | | | 0.290 | | | | 0.0217 | | | | 0.211 | | | | 0.0233 | | | | 0.0437 |
| | | | | (0.443) | | | | (0.0284) | | | | (0.264) | | | | (0.0142) | | | | (0.0310) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Job FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 | 75,478 |
| R-squared | 0.639 | 0.639 | 0.640 | 0.640 | 0.664 | 0.664 | 0.665 | 0.665 | 0.708 | 0.708 | 0.708 | 0.708 | 0.509 | 0.509 | 0.509 | 0.509 | 0.516 | 0.516 | 0.516 | 0.516 |

Source: CONSTANCES survey 2012-2018 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the occupation-department level and weights imputed from the LFS at the department-occupation-gender-nativity-age level, or at the department-occupation-gender-nativity level or at the department-gender-nativity-age level. Control variables include: gender, age, age squared, civil status, children, diploma level and residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years). Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Table C.5: Probability of being a resident in a moderate rent housing located in a sensible urban area. LFS 2003-2012.

| | Dependent variable: Moderate Rent Housing in Sensible Urban Areas | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Immigrant | 0.145*** | 0.145*** | 0.145*** | 0.136*** |
| | (0.0232) | (0.0220) | (0.0230) | (0.0232) |
| Residence duration <10 years | 0.0358*** | 0.0349*** | 0.0333*** | 0.0324** |
| | (0.0122) | (0.0100) | (0.0104) | (0.0132) |
| Residence duration 10-20 years | 0.0398*** | 0.0394*** | 0.0382*** | 0.0347*** |
| | (0.00569) | (0.00458) | (0.00473) | (0.00657) |
| Residence duration 20-30 years | 0.0439*** | 0.0437*** | 0.0430*** | 0.0389*** |
| | (0.00551) | (0.00500) | (0.00516) | (0.00400) |
| Naturalized | | -0.00141 | | |
| | | (0.00507) | | |
| Assimilated | | | -0.00741 | |
| | | | (0.00599) | |
| 2nd generation | | | | 0.0137*** |
| | | | | (0.00175) |
| Year FE | Yes | Yes | Yes | Yes |
| Region FE | Yes | Yes | Yes | Yes |
| Region × Year FE | Yes | Yes | Yes | Yes |
| Observations | 1,601,952 | 1,601,952 | 1,601,952 | 1,295,112 |
| R-squared | 0.034 | 0.034 | 0.034 | 0.032 |

Source: Labor Force surveys 2003-2012. Note: Linear probability estimation with robust standard errors clustered at the region level and weights provided by the LFS. Control variables include: gender, age, age squared, civil status, children, diploma level, residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years), size of the establishment or plant where the individual works (less than 10 employees, between 10 and 50 employees, between 50 and 200 employees and more than 200 employees) and whether the individual as a permanent contract. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

# D Appendix: Aggregated data approach

This section proposes an alternative methodological approach to study the relationship between nativity, working conditions and income. Because the LFS 2003-2012 is a sequence of cross-sections, we propose to aggregate individual data by cells at the department-nativity-year level and exploit changes across cells and across time to characterize the relationship between nativity, working conditions and income. Information about department of residence in not available after 2010,

so for the cell analysis our sample is limited to 2003-2010. Again our dependent variables, *i.e.* accident and illness indicators, are computed during the period 2014-2016 and imputes yearly by activity branch, while the explanatory variables are computed yearly at the department-nativity level. We have defined 1518 cells, 760 cells of natives and 758 of immigrants. We only use for this approach the enriched LFS and not the enriched CONSTANCES survey, since the sample is too small to ensure a sufficient number of cells and a sufficient number of observations within cells every year.

For every year and for every department we compute the average professional injury and illness indicators $PAFR$, $PATD$, $PAPD$, $ODTD$, $PDPD$. Within a department and within a nativity group, the variation of these indicators from one year to another will be driven by the distribution of workers of the corresponding nativity group across activity branches, since the occupational injury and illness indicators are time-invariant within the NAF5 activity branches. We will relate these yearly changes in working conditions to yearly changes in the proportion of household owners in the department. Equation (10) is then adapted to the cell approach:

$$Y_{rnt} = \gamma_M IMM_{rt} + \gamma_I Income_{rt} + \gamma_t + \gamma_d + \gamma_d\gamma_t + \nu_{rnt} \tag{12}$$

where $Y_{rnt}$ stands for the value of an activity injury and illness indicator for nativity group $n$ in department $r$ in year $t$. $Income_{rt}$ is an income indicator that corresponds to the share of household owners in the department. We control for systematic differences in working conditions between natives and immigrants by introducing an immigrant fixed effect ($IMM_{rt}$). We estimate if there are specific immigrant income effect by interacting household ownership with the dummy "Immigrant". We control for systematic differences in working conditions across departments by introducing a department fixed effect ($\gamma_d$),[27] we control by economic shocks ($\gamma_t$) and by department specific shocks on working conditions interacting department-year fixed effects ($\gamma_d\gamma_t$).

We use weighted OLS regressions with robust standard errors clustered at the department level and weights equal to the cell weight resulting from aggregating at the department-nativity-year level individual weights provided by the LFS.

Estimation results from equation (12) are summarized in Table D.1. They confirm our findings on individual data (*i.e.* see Table 3). Immigrants are significantly more allocated in jobs with higher frequency of professional accidents and disabilities, both temporary and permanent, associated with them. In contrast there are no significant differences between natives and immigrants concerning temporary and permanent disabilities associated with professional diseases. Again, this

[27]Note that this type of fixed effect is also capturing systematic differences in the population composition across departments that may be affecting working conditions. For example, some departments may be characterized by a young recently arrived immigrant population with less than 20 or 30 years of residence, while in some other departments we may only find immigrants with more than 30 years of residence. These systematic differences in population composition are captured by the department fixed effect.

probably reflects the fact that the recognition of a professional illness requires a long administrative procedure which immigrant individuals may be not willing to undertake.

The larger the share of wealthy individuals (*i.e.* household owners) the lower the frequency of professional accidents and the associated temporal or permanent disability at the cell level, while there is no significant impact of household ownership on professional disease indicators, PDTD and PDPD (see columns (7)-(10)). When considering the share of immigrants who are household owners we find that the effect is not significantly different from the average. The share of households owners seems then a driver of the improved working conditions in the department, whatever the nativity group of households owners.

Our analysis by cells confirms then that immigrants bear worse working conditions than natives. High non-earned income is still associated with better working conditions and no significant differences in working conditions arise among household owners whatever their nativity group.

Table D.1: Immigrants and professional accident/illness : the role of income. Cell analysis based on the LFS 2003-2012.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | PATD | | PAPD | | PDTD | | PDPD | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Immigrant | -6.880*** | -5.180* | -0.564*** | -0.388* | -5.257*** | -3.075 | -0.220 | -0.337* | -0.462 | -0.781* |
| | (2.439) | (2.919) | (0.178) | (0.208) | (1.816) | (2.195) | (0.159) | (0.180) | (0.378) | (0.435) |
| Household owner | 1.883*** | 2.955*** | 0.181*** | 0.292*** | 2.245*** | 3.622*** | 0.00641 | -0.0672 | -0.000419 | -0.201 |
| | (0.366) | (1.054) | (0.0258) | (0.0841) | (0.248) | (0.907) | (0.0245) | (0.0646) | (0.0587) | (0.161) |
| Immigrant · House. owner | | -1.890 | | -0.195 | | -2.427 | | 0.130 | | 0.354 |
| | | (1.892) | | (0.148) | | (1.563) | | (0.0935) | | (0.234) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 |
| R-squared | 0.902 | 0.902 | 0.888 | 0.890 | 0.880 | 0.882 | 0.875 | 0.876 | 0.867 | 0.869 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: cells are defined at the department-immigrant-year level. Weighted OLS estimation with robust standard errors clustered at the department level and weights equal to the cell weight when considering weights provided by the LFS. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

## D.1 Robust tests

Table D.2 replicates estimations from Table 5 over aggregated data. The share of naturalized immigrants and the share of assimilated immigrants in the department are introduced as explanatory variables of working conditions. Consistently with previous findings, we observe that, in

average, immigrants are significantly more allocated towards activities with higher frequency of professional accidents and the associated disabilities. This effect is though cancelled for immigrants having acquired the French nationality. As we observe the coefficient associated with "Naturalized" is negative, significant and overcomes the size of the positive coefficient associated with "Immigrant". For immigrants being married with a French citizen we also find a negative and significant coefficient but of slightly smaller size than the positive and significant coefficient of "Immigrant", suggesting that whereas assimilated immigrants benefit from better working conditions than the average immigrants, they are still worse off than natives.

The income effect still applies. The higher the share of household owners in the department, the better the working conditions. Again, this result holds whatever the nativity group of household owners, since there is no significant specific effect associated with naturalized immigrants' household owners or assimilated immigrants' household owners.

Finally Table D.3 considers second generation immigrants. Estimations are in line with previous findings. Immigrants are relatively more present in activities with high frequency of injuries and the associated disabilities. The larger the share of household owners in the cell the lower the the frequency of professional accidents and the corresponding disabilities. In contrast, the larger the share of natives with both parents being foreign born (2nd generation immigrants), the higher the frequency of professional accidents and temporal disabilities. The significant and positive coefficient associated with "2nd generation" remains though smaller than that of "Immigrant", suggesting that, while natives with foreign parents bear worse working conditions than the average native, they are still better off than immigrants.

Results based on aggregate data confirm findings on individual data. Immigrants bear an average worse working conditions than natives. Working conditions are a normal good. Whatever their nativity group, high non-earned income individuals benefit from better working conditions and there is no significant specific effect associated with nativity. Average differences in working conditions between natives and immigrants seem then to reflect income differences. Immigrant assimilation in the host country is associated with an assimilation in working conditions.

Table D.2: Naturalized immigrants, Assimilated immigrants and professional accident/illness: the role of income. Cell analysis based on the LFS 2003-2010.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | | | PATD | | | | PAPD | | | | PDTD | | | | PDPD | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) |
| Immigrant | 4.851*** | 4.850*** | 3.490*** | 3.451*** | 0.454*** | 0.453*** | 0.352*** | 0.347*** | 5.700*** | 5.727*** | 4.265*** | 4.282*** | 0.0168 | 0.0263 | -0.0554 | -0.0475 | 9.75e-05 | 0.0237 | -0.168 | -0.148 |
| | (0.930) | (0.962) | (0.823) | (0.832) | (0.0752) | (0.0766) | (0.0708) | (0.0710) | (0.931) | (0.930) | (0.886) | (0.886) | (0.0668) | (0.0605) | (0.0581) | (0.0546) | (0.161) | (0.144) | (0.141) | (0.131) |
| Household owner | -5.031** | -5.017** | -5.991*** | -5.771** | -0.394** | -0.385** | -0.470*** | -0.444** | -3.106* | -3.380* | -4.141** | -4.237** | -0.214 | -0.313* | -0.254* | -0.298* | -0.462 | -0.709* | -0.555 | -0.669 |
| | (2.108) | (2.474) | (2.250) | (2.690) | (0.154) | (0.177) | (0.161) | (0.191) | (1.755) | (2.030) | (1.774) | (2.128) | (0.133) | (0.163) | (0.148) | (0.176) | (0.317) | (0.391) | (0.353) | (0.422) |
| Naturalized | -5.029*** | -5.004* | | | -0.462*** | -0.445** | | | -5.854*** | -6.358*** | | | -0.0177 | -0.200 | | | -0.000874 | -0.455 | | |
| | (1.542) | (2.733) | | | (0.120) | (0.197) | | | (1.463) | (2.216) | | | (0.122) | (0.166) | | | (0.294) | (0.403) | | |
| Naturalized· Household owner | | -0.0354 | | | | -0.0243 | | | | 0.712 | | | | 0.258 | | | | 0.641 | | |
| | | (2.740) | | | | (0.206) | | | | (2.314) | | | | (0.165) | | | | (0.406) | | |
| Assimilated | | | -3.039* | -2.537 | | | -0.322** | -0.264 | | | -3.819** | -4.038 | | | 0.117 | 0.0169 | | | 0.317 | 0.0585 |
| | | | (1.533) | (2.705) | | | (0.126) | (0.202) | | | (1.558) | (2.447) | | | (0.110) | (0.158) | | | (0.265) | (0.378) |
| Assimilated · Household owner | | | | -0.622 | | | | -0.0711 | | | | 0.271 | | | | 0.124 | | | | 0.320 |
| | | | | (3.042) | | | | (0.224) | | | | (2.487) | | | | (0.163) | | | | (0.395) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Departement FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Departement × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 |
| R-squared | 0.906 | 0.906 | 0.903 | 0.903 | 0.896 | 0.896 | 0.892 | 0.892 | 0.890 | 0.890 | 0.885 | 0.885 | 0.875 | 0.877 | 0.876 | 0.876 | 0.867 | 0.870 | 0.869 | 0.869 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: cells are defined at the department-immigrant-year level. Weighted OLS estimation with robust standard errors clustered at the department level and weights equal to the cell weight when considering weights provided by the LFS. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

Table D.3: 2nd generation immigrants and professional accident/illness: the role of income. Cell analysis based on the LFS 2003-2012.

| | Dependent variable: professional accident/illness indicators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PAFR | | PATD | | PAPD | | PDTD | | PDPD | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Immigrant | 2.427*** | 2.412*** | 0.221*** | 0.219*** | 2.457*** | 2.439*** | 0.0214 | 0.0223 | 0.0373 | 0.0397 |
| | (0.427) | (0.428) | (0.0303) | (0.0304) | (0.329) | (0.328) | (0.0236) | (0.0233) | (0.0558) | (0.0550) |
| Household owner | -6.602*** | -6.620*** | -0.544*** | -0.545*** | -5.149*** | -5.172*** | -0.212 | -0.211 | -0.443 | -0.440 |
| | (2.437) | (2.411) | (0.178) | (0.175) | (1.847) | (1.800) | (0.158) | (0.157) | (0.376) | (0.372) |
| 2nd generation | 0.939** | -0.669 | 0.0681** | -0.0826 | 0.365 | -1.576 | 0.0259 | 0.123 | 0.0653 | 0.321 |
| | (0.417) | (1.621) | (0.0298) | (0.124) | (0.392) | (1.391) | (0.0226) | (0.0860) | (0.0526) | (0.212) |
| 2nd generation · Household owner | | 2.841 | | 0.266 | | 3.429 | | -0.171 | | -0.451 |
| | | (2.750) | | (0.211) | | (2.294) | | (0.143) | | (0.353) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 | 1,518 |
| R-squared | 0.903 | 0.904 | 0.890 | 0.891 | 0.881 | 0.882 | 0.875 | 0.876 | 0.868 | 0.870 |

Source: Labor Force surveys 2003-2012 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: cells are defined at the department-immigrant-year level. Weighted OLS estimation with robust standard errors clustered at the department level and weights equal to the cell weight when considering weights provided by the LFS. Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

# E Appendix: The relationship between job content and working condition indicators

Working conditions are summarized by activity accident and illness indicators provided by the National Health Insurance Fund for Salaried Workers 2014-2016. These indicators are likely to reflect the nature of job content, that is, activities implying hard physical work are more likely to have more frequently professional accidents than activities in office where the individual is simply exposed to ICT. In this section we present some evidence on the relationship between activity accident and illness indicators and job content indicators. Because the merge between the CONSTANCES survey and the activity accident and illness indicators provided by the National Health Insurance Fund for Salaried Workers has been done by occupations and not by activity branch, we are now exploiting heterogeneity in the job content of occupations (classified at the 4-digit level) where individuals are employed at different moment of times to identify the impact of job content on the average accident/illness indicator of the corresponding job. We then re-estimate equation (10) taking as dependent variable the individual's occupation working condition indicators and as explanatory variable the job content of this occupation. The objective being to study the correlation between injury/illness indicators and job content.

Table E.1: Immigrants and professional accident/illness : the role of job content and conditions. CONSTANCES 2012-2018.

| | Dependent variable: professional accident/illness indicators | | | | |
|---|---|---|---|---|---|
| | PAFR | PATD | PAPD | PDTD | PDPD |
| Immigrant | 2.164** | 0.234*** | 3.133*** | 0.0503** | 0.130** |
| | (0.918) | (0.0678) | (0.882) | (0.0224) | (0.0545) |
| Fixed schedule | 0.115 | 0.00454 | -0.0122 | 0.00389 | 0.00660 |
| | (0.0740) | (0.00534) | (0.0794) | (0.00329) | (0.00838) |
| Immigrant·Fixed schedule | 0.175 | 0.0249 | 0.210 | 0.00409 | 0.00815 |
| | (0.307) | (0.0220) | (0.305) | (0.0102) | (0.0252) |
| Physical work | 0.739*** | 0.0475*** | 0.405** | 0.0185*** | 0.0404*** |
| | (0.158) | (0.0117) | (0.164) | (0.00515) | (0.0126) |
| Immigrant · Physical work | -1.197** | -0.0731** | -0.224 | -0.0207 | -0.0366 |
| | (0.486) | (0.0341) | (0.424) | (0.0127) | (0.0303) |
| ICT | -0.0602 | -0.00299 | -0.145 | -0.00518 | -0.0139 |
| | (0.171) | (0.0122) | (0.177) | (0.00666) | (0.0167) |
| Immigrant · ICT | 1.365** | 0.0721 | 0.573 | 0.0256 | 0.0511 |
| | (0.688) | (0.0494) | (0.617) | (0.0161) | (0.0385) |
| Repetitive | -0.179* | -0.0124 | -0.232** | -0.00576 | -0.0128 |
| | (0.107) | (0.00791) | (0.114) | (0.00521) | (0.0130) |
| Immigrant · Repetitive | -0.138 | -0.0276 | -0.437 | -0.0137 | -0.0431 |
| | (0.379) | (0.0283) | (0.385) | (0.0119) | (0.0292) |
| Bad quality job | -0.0853 | -0.00506 | -0.0667 | -0.00849*** | -0.0190** |
| | (0.0735) | (0.00517) | (0.0763) | (0.00320) | (0.00771) |
| Immigrant · Bad quality job | -0.0721 | -0.0138 | -0.348 | 0.00682 | 0.0163 |
| | (0.392) | (0.0278) | (0.347) | (0.0101) | (0.0238) |
| R-squared | 0.604 | 0.622 | 0.551 | 0.426 | 0.403 |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Department FE | Yes | Yes | Yes | Yes | Yes |
| Job FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 61,817 | 61,817 | 61,817 | 61,817 | 61,817 |
| Department × Year FE | Yes | Yes | Yes | Yes | Yes |

Source: CONSTANCES survey 2012-2018 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the occupation-department level and weights imputed from the LFS at the department-occupation-gender-nativity-age level, or at the department-occupation-gender-nativity level or at the department-gender-nativity-age level. Control variables include: gender, age, age squared, civil status, children , diploma level and residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years). Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.

We consider the following job content variables: "Fixed schedule ", "Physical work ", "ICT", "Repetitive" and "Bad quality job". Moreover, since for an identical job content less risk averse

individuals may take less prevention measures to avoid accidents/diseases, we test if there is a significant immigrant specific effect associated with job content that could be explained by the potential lower aversion of immigrants to risk.

Consistently with findings from previous tables, Table E.1 reveals that immigrants are in average relatively more present in positions displaying worse performance in terms of professional accidents and illness. Unsurprisingly, there is a positive and significant correlation between bad working conditions and the physical content of the job. In contrast, repetitive tasks are an average negatively correlated with permanent disabilities associated with accidents. Similarly, bad quality jobs with no security against being fired and lower probability of promotion negatively correlate with temporal and permanent disability associated with professional illness.

Surprisingly, there is a negative and significant immigrant specific effect associated with physical work. Among workers declaring facing strenuous physical conditions, immigrants are significantly less concerned by professional accidents and the associated temporal disability. In contrast, among workers using ICT at their jobs, immigrants are significantly more affected by professional accidents, which may reflect the divergent nature of jobs implemented by immigrants.

Table E.2 complements these findings. Instead of considering as explanatory variable the current job content of the individual's occupation, Table E.2 considers variables capturing both the current and past job content conditions the worker has known along the professional career. As explained in the data section, these variables are increasing with the number of constraints the individual has borne. In line with our previous findings, organizational and physical constraints are associated to worse accidents and illness indicators. Chemical constraints induce worse professional disease indicators and permanent disabilities associated with professional accidents.

Table E.2: Immigrants and professional accident/illness : the role of past job content and conditions. CONSTANCES 2012-2018.

| | Dependent variable: professional accident/illness indicators | | | | |
|---|---|---|---|---|---|
| | PAFR | PATD | PAPD | PDTD | PDPD |
| Organization constraints | 0.929*** | 0.0680*** | 1.205*** | 0.0405*** | 0.106*** |
| | (0.284) | (0.0206) | (0.291) | (0.0124) | (0.0310) |
| Physical constraints | 0.454** | 0.0355** | 0.397* | 0.0151** | 0.0310* |
| | (0.197) | (0.0147) | (0.223) | (0.00703) | (0.0174) |
| Chemical constraints | 1.318 | 0.0836 | 3.146*** | 0.0853*** | 0.286*** |
| | (0.885) | (0.0714) | (1.177) | (0.0245) | (0.0613) |
| Noise constraints | 0.0650 | 0.00453 | 0.0635 | 0.0143* | 0.0324 |
| | (0.194) | (0.0141) | (0.211) | (0.00855) | (0.0212) |
| Other constraints | 0.780* | 0.0529* | 0.458 | 0.0108 | 0.00723 |
| | (0.455) | (0.0319) | (0.452) | (0.0185) | (0.0453) |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Departement FE | Yes | Yes | Yes | Yes | Yes |
| Job FE | Yes | Yes | Yes | Yes | Yes |
| Departement × Year FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 79,175 | 79,175 | 79,175 | 79,175 | 79,175 |
| R-squared | 0.589 | 0.602 | 0.528 | 0.413 | 0.391 |

Source: CONSTANCES survey 2012-2018 and National Health Insurance Fund for Salaried Workers 2014-2016 for working condition indicators PAFR, PATD, PAPD, PDTD and PDPD. Note: weighted OLS estimation with robust standard errors clustered at the occupation-department level and weights imputed from the LFS at the department-occupation-gender-nativity-age level, or at the department-occupation-gender-nativity level or at the department-gender-nativity-age level. Control variables include: gender, age, age squared, civil status, children, diploma level and residence duration in the host country (<10 years, 10-20 years, 20-30 years and more than 30 years). Significance levels are $***(p < 0.01)$, $**(p < 0.05)$ and $*(p < 0.1)$.