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### Immigration and the gender wage gap

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#### ABSTRACT

This paper investigates the effects of immigration on the gender wage gap. Using a detailed individual French dataset, we shed lights on the strong feminization of the immigrant workforce which coincides with a rise in the gender wage gap from 1990 to 2010. Our theoretical model predicts that a shift in the supply of female workers increases the gender wage gap when men and women are imperfect substitutes in production. Our structural estimate points to an imperfect substitutability between men and women workers of similar education, experience and occupation. Our econometric result indicates that a 10% increase in the relative supply of immigrant female workers lowers by 4% the relative wage of female native workers belonging to the same education–experience group. Accounting for cross-group effects, our simulations show that the rise in the relative number of female immigrants decreases the relative wage of female native workers, thereby contributing to a widening native gender wage gap.

#### 1. Introduction

An extensive literature in social sciences and economics has searched for the driving force behind the gender wage gap. This gap is often related to differences in productivity and discrimination between men and women (Altonji and Blank, 1999; Blau and Kahn, 2000; Goldin, 2014) and also to the role of the feminization of the labor workforce (Topel, 1997; Juhn and Kim, 1999; Acemoglu et al., 2004).<sup>1</sup> Surprisingly, the role of immigration has received less attention. It is however a potential important factor as the feminization of the immigration labor force has been one of the most significant trends in the recent years according to the United Nations Population Division (UN, 2013).<sup>2</sup> In this paper, we analyze the impact of immigration on the wage gaps between female and male native workers of similar education and experience.

The increasing proportion of employment-related migrants is particularly important in France, where the share of women in the immigrant labor force has increased from 34% in 1990 to 47% in 2010.<sup>3</sup> The feminization of the immigrant workforce might have an impact on the wages of female and male native workers and therefore on the gender wage gap.

We explore this question by using a rich dataset taken from the French labor survey that covers the period from 1990 to 2010.

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<sup>&</sup>lt;sup>1</sup> In a very interesting study, Acemoglu et al. (2004) show, for instance, that the supply shift induced by the rapid rise in female labor force participation after World War II has mainly contributed to reduce female wages, thus increasing the gender wage gap.

<sup>&</sup>lt;sup>2</sup> The United Nations Population Division (UN, 2013) reports that about half of the total number of migrants around the world are women. There are few articles investigating the feminization of the migration population, see, *e.g.*, the interesting contributions of Zlotnik (1995), Marcelli and Cornelius (2001), Omelaniuk (2005), Docquier et al. (2009), and Docquier et al. (2012).

<sup>&</sup>lt;sup>3</sup> More specifically, we find an increase in the share of female immigrants with higher education. In a recent study, Docquier et al. (2009) examine the skill composition of female migrants. Using the same period of investigation, they find that women represent an increasing share of the OECD immigration stock and exhibit relatively higher skilled emigration rates than men.

The dataset provides enough detailed information to investigate the impact of immigration on native wages along different important dimensions. In particular, it contains precise information on the educational attainment of natives and immigrants as well as information on their age, occupation and wages.

We show that the evolution of the native wage gap coincides with the increase in the relative number of female immigrants since 1990. We also document significant differences in the pattern of occupation across male and female immigrant workers who share similar education – female immigrants are concentrated in few occupations such as administrative jobs. We also find that occupational differences by gender are more important than occupational differences by nativity status.<sup>4</sup> These last facts may suggest an imperfect substitutability between men and women within each education group.

We develop a model that takes into account the possibility of a substitution between male and female workers. In case of an imperfect substitutability between men and women, immigration should impact wages of male and female differently (Topel, 1997). Given (i) the strong feminization of the immigrant workforce and (ii) the imperfect substitutability between men and women, immigration should increase the relative wage of male native workers. Our results indicate an imperfect substitution between men and women workers with similar education, experience and broad occupational categories.<sup>5</sup> This result is consistent with Acemoglu et al. (2004) for the U.S. and Pellizzari et al. (2014) for Italy who find that men and women with similar state of residence are imperfect substitutes in production.

We find that an immigration-induced increase in the relative supply of female workers has a negative impact on the relative wage of female native workers. This finding is robust to two complementary empirical methodologies. First, we analyze the effect of the rise in the relative supply of immigrant women on the relative wage of native women workers within the same education–experience group. This econometric analysis which examines the "*within-group*" effects of immigration shows that an immigration-induced increase in the relative labor supply of women raises the wage gap between native men and women with similar education and experience. As the relative labor supply is likely to be endogenous, we implement a set of instrumental variable (IV) regressions. The identification of the causal effect is challenging and rest on the exclusion restriction assumption. As pointed out by Conley et al. (2012), it may be more credible to assume that the instrument does not fully satisfy the exclusion restriction. Using their methodology, our main finding remains and is robust to deviations from the exclusion restriction imposed by the IV methodology. Second, we use a structural approach to analyze the overall impact of immigration on the wages of female and male native workers. This methodology allows us to account for the impact of immigrants that are not competing in the same group than native workers (Borjas, 2003; Manacorda et al., 2012; Ottaviano and Peri, 2012). We find a negative effect of the increase in the relative supply of women native workers, thereby contributing to a widening gender wage gap.

This paper contributes to the immigration literature in several respects. The literature on labor market gender gap documents the differences in jobs and wages between women and men of similar education (Anker et al., 1998; Blau and Kahn, 2000; Goldin, 2014). However, it does not quantify the elasticity of substitution between male and female workers with similar human capital characteristics (*i.e.*, education and experience).<sup>6</sup> We set out a methodology and provide a structural estimate of the elasticity of substitution between male and female workers within the same education and experience group.

While structural methods have been widely applied to samples from different countries, none of the papers use them to investigate the impact of immigration on the relative wage of female native workers.<sup>7</sup> Our model which also incorporates wage rigidities as in D'Amuri et al. (2010) to account for the sluggish adjustment of the French labor market, offers new predictions concerning the effect of immigration on the gender wage gap.

The paper also contributes to a different strand of the literature that focuses on the effect of female migration. While most papers examine the effect of female migration on the labor supply or job specialization of female workers (Amuedo-Dorantes and De La Rica, 2011; Barone and Mocetti, 2011; Cortes and Tessada, 2011; Farré et al., 2011), none have examined the differential effect of immigration on the gender wage gap through its impact on the relative labor supply of women. The literature on the impact of immigration labor supply shocks on wage and employment focuses mostly on male workers. A notable exception is the interesting study of Cortes and Pan (2015) which investigates the relationship between low-skilled immigration and the gender wage gap among high-skilled workers. Using the U.S. intercity variation in low-skilled immigrant flows, they show that a supply shock induced by low-skilled immigrants does not only increase the probability that highly skilled women work long hours, but also leads to a reduction in the gender wage gap in the upper tail of the skill distribution, especially in occupations where the returns to overwork is important. Our econometric analysis examines the effect of immigration on the native wage gap within an education–experience cell. The

<sup>&</sup>lt;sup>4</sup> Similar results are found in the literature (Anker et al., 1998; Blau et al., 2002; Dustmann et al., 2007).

<sup>&</sup>lt;sup>5</sup> There are many factors which could contribute to the explanation of imperfect substitutability in production between male and female workers of similar education and experience. The gender wage gap might be driven by differences in workers' productive attributes. Borghans et al. (2014) show that women are for instance relatively more productive in tasks requiring interpersonal skills, *i.e.*, ability to interact with people (Gilligan, 1982). The prevalence of important gender differences in psychological attributes is an additional source of imperfect substitution between men and women. In particular, women are relatively more risk averse and have lower taste for competition (see the literature review by Croson and Gneezy, 2009). Thus, women tend to sort into occupations with more stable earnings and avoid competitive environments (Marianne, 2011). Gender discrimination in employment should also produce some degree of imperfect substitutability between men and women. Such discriminatory behaviors are supported by Booth and Leigh (2010) who find that females are more likely to find a job when they apply to female-dominated occupations. Another explanation for the existence of the gender gap is the existence of social norms which drive women's decisions to participate in the workforce or induce differential sorting of men and women across occupations (Eccles, 1994; Charles and Grusky, 2005; Marianne, 2011).

<sup>&</sup>lt;sup>6</sup> Acemoglu et al. (2004) and Pellizzari et al. (2014) provide an estimate of the elasticity of substitution between men and women but at the regional level. In this paper, we estimate the degree of substitution between men and women at the education–experience level.

<sup>&</sup>lt;sup>7</sup> See, *e.g.*, Aydemir and Borjas (2007), Borjas and Katz (2007), and Ottaviano and Peri (2012) for the United states, D'Amuri et al. (2010), Felbermayr et al. (2010), and Brücker and Jahn (2011) for Germany, Gerfin and Kaiser (2010) for Switzerland, Manacorda et al. (2012) for the United Kingdom, Edo and Toubal (2015) for France, as well as Docquier et al. (2013) for OECD countries or Elsner (2013) on the emigration wage effect in Great Britain.

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