The Impact of Unionization on the Wage of Hispanic Workers

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Abstract

This paper explores the role of unionization on the wages of Hispanic workers in the US from 1994 to 2013. Preliminary evidence indicates a 25 to 29 percent positive wage gap between unionized Hispanic male workers and their non-unionized counterparts. Once we control for socio-demographic characteristics and account for non-random selection into union membership, there is still a positive effect of union membership on the wages of male Hispanic workers. Estimates suggest that had non-unionized Hispanic male workers be instead unionized, the average real hourly wage of male Hispanics would have between 6 and 13 percent higher each year during the 1994-2013 period.

Implementing the re-weighting approach along the wage distribution reveals that unions may act differently for different ethnic groups, while Hispanics relatively unskilled would benefit the most from unionization. Results suggest different "needs" of being unionized for workers of different skills and race.

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I. Introduction

There is a vast literature which explores the effect of unionization on wages (Card, 1996; Freeman, 1993; DiNardo, Fortin and Lemieux, 1996 (DFL hereafter)), including the wages of low-skilled workers (Card, 1996).

In the past decades the labour force has been characterized by a de-unionization (Card, 2001). According to the Bureau of Labor Statistics (BLS) in 2013 the union membership rate was 11.3 percent compared to the 20.1 percent in 1983. Additionally, during the past two decades the labor force composition has changed, becoming not only more educated and older (Lemieux, 2006) but also more ethnically and racially diverse (Lee et al 2012) partially as a result of increasing immigration.

Despite their increasing importance in the US labor force, scarce attention has been paid to the role of unionization on the wage of ethnic minorities, and of that of Hispanic workers in particular. Although declining membership numbers, unions are still able to raise wages substantially over the equivalent non-union wage (Blanchflower and Bryson, 2003).

Hispanics are the fastest growing and largest ethnic minority group in the US. This is the result of relatively high fertility rates and continuous immigration from Latin America. In 2013 Hispanics represented 48% of the foreign-born population and 14% of the US labor force.

They are concentrated at the bottom tail of the wage distribution and are exposed to higher employment uncertainty. For these reasons, unionization could represent a form of protection for Hispanics, as well as an opportunity to elevating their job quality, and a way to increase their bargaining power given their weak labor market status.

The relationship between Hispanics and unions depends not only on the choice of Hispanics to join the unions, but also on the openness of unions to recruit Hispanics, including foreign-born Hispanics. This seems to be particularly the case in recent years when US labor unions have changed their position regarding immigration. There have historically existed tensions between unions and immigration. Labor unions have often viewed immigrants as competitors for jobs and as threats to wages and working of conditions of existing workers (Ness, 2005). Some organizations, such as the American Federation of Labor (AFL), have previously supported immigration restrictions (Briggs, 2001). However, in recent decades most US labor unions have changed their position regarding immigration and have put emphasis in the organization of immigrant workers. This includes defending the legal and human rights of irregular immigrant workers (Ness, 2005).

Given the socio-economic characteristics of Hispanics and changes in the attitudes of unions towards immigrants we would expect a substantial share of Hispanics to join the unions. However, Hispanics have lower unionization rates (Blanchflower, 2007) than other ethnic minority groups (e.g. Blacks) and their unionization rate has decreased over time. This negative trend in Hispanic unionization rate is part of an overall de-unionization process in the US during the last few decades (Card, 2001) and indicates that Hispanics do not have an "optimal" unionization rate given their social and demographic characteristics.

Limited evidence has paid explicit attention to the link between unions and Hispanics, and/or other minorities. Among the few existing studies, Schmitt (2008) finds that unionization raised Hispanic workers' wages by 18 percent, and that being unionized has additional benefits, for example, increases the chance of having health insurance and a pension plan. Leonard (1985) investigates whether unions have helped or hindered the employment prospects of Blacks and

Hispanics in the California manufacturing plants from 1974 to 1980. He finds that unions have not generally hindered the employment growth of minorities and women.

This paper analyzes the role of unionizations on wages of Hispanic workers in the US from 1994 to 2013 by assessing whether and to what degree Hispanic workers benefit from being unionized. In this context a key question is: *What is the benefit, if any, of joining unions for Hispanic workers?*

To answer this question we use different methodologies. Firstly, following the established empirical evidence we analyze the effect of union on wages using a standard OLS regression. Secondly, we account for selection on observables by adopting a propensity score matching. Thirdly, we implement a re-weighting approach that allows constructing the counterfactual wage of non-unionized Hispanic workers had they been unionized offering therefore a visual representation of the benefits of being unionized. Although focusing on Hispanics, the current analysis also compares other ethnic groups, such as Whites, Blacks and Asians.

Whilst we mainly focus on the entire density of wages, as it has important consequences for understanding the role of institutions over time, in contrast with most previous work we also analyze the union wage gap across the wage distribution to identify where unions have a more/less important role. This is particularly relevant given that not only Hispanics are more concentrated in the bottom part of the wage distributions, but also existing studies have shown a higher effect of unions on lower-skilled workers (Lewis, 1986; Card, 2001).

In so doing, this paper contributes to the existing literature on unionization in different ways. Firstly, by focusing on the role of unions on wages of Hispanics for the past twenty years, we present recent evidence of this relationship for a time period characterized by de-unionization

and by an increasing share of minorities in the US labour force. This is particularly relevant given the changes in composition of the labour force due to higher level of education and increasing immigration. The current paper also adds to the existing literature by providing insights of the role that institutions (i.e. unions) have on labour market outcomes of ethnic minority. Finally, the comparative analysis of the effect of unions on average wage as well as along the wage distributions of different ethnic groups, presents an opportunity to ask whether unions act differently for Hispanics, Whites, Blacks, and Asians.

Next section describes the data used in this paper. Part three explains the different econometric methodologies adopted. Part four and five discuss the results, and part six concludes.

II. Data

We use data from the Outgoing Rotation Group (ORG)/Current Population Survey (CPS).

The ORG/CPS is a monthly household survey conducted by the Bureau of Labour Statistics to measure labour force participation and employment. The data are sufficiently large to analyse minority populations by union status.

The survey provides individual data for about 30,000 individuals per month. Every household that enters the ORG/CPS is interviewed each month for four months, then ignored for eight months, then interviewed again for four more months. Standard weekly hours/earnings questions are asked only during a household's fourth and eighth interviews. These outgoing

interviews are the only ones included in the extracts. New households enter each month, so one fourth of the households are in an outgoing rotation each month.

One of the main advantages of the ORG/CPS is that it provides point-in-time measures of the usual hourly wage for 60 percent of the sample; for the rest of the sample the hourly wage can easily be calculated as the ratio of earnings to hours. One of the main issues encountered when working with the ORG/CPS dataset relates to the top-coded earnings. In the data released to the public, the Census Bureau restricts the top of the earnings distribution to $99,999 a year. This restriction means that all earnings above that level appear in the ORG/CPS public dataset as $99,999, whatever the actual earnings are. We adjust for the top-coding issue by using the log-normal approach recommended by Schmitt (2003). In contrast[1] to the procedure that is usually applied, the log-normal procedure models the entire distribution, not just the top portion of interest, under the assumption that the entire distribution of earnings is log-normally distributed. The properties of the log-normal distribution allow for the straightforward estimation of the mean and variance of the "true" distribution.[2]

A worker is defined unionized if he reports being a member of a union or if he reports being represented by unions in the workplace.

In the ORG/CPS data education is reported as educational attainment. We derive average years of education based on lower, intermediate and higher level of education. The lower education group includes workers who have completed compulsory education, i.e. less than a

[1] A large part of the existing literature on wage inequality (Lemieux 2006, Autor and Autor, 1999, Autor et al.2005, 2008) addresses the top-coding issue by multiplying top-coded wages by a factor of 1.3 or 1.4, which is believed to provide estimates of the mean and the variance that are closer to their true values.

[2] For details, see John Schmitt (2003): 'Creating a consistent hourly wage series from the Current Population Survey's Outgoing Rotation Group, 1979-2002'. Center for Economic and Policy Research, Washington, DC.

lower secondary education; this group corresponds to 0 to 11 years of schooling. The intermediate category includes workers with qualifications that exceed those of a high-school dropout but do not reach those of a college-degree holder (both excluded). This corresponds to any individual with at least 12 years of schooling and at most 15 years of schooling. The high education group refers either to individuals with graduate or postgraduate education, corresponding to 16 or more years of schooling.

The years of potential labor market experience variable is conventionally derived as age – years of completed education- the age at which children start school.

Additionally, the data also contain information on whether the individual was born in the US or is an immigrant i.e. born outside the US. This information is particularly relevant given the increasing share of immigrants in the US labor force. We also derive the decade when immigrant move to the US based on the variable when arrived[3] in the US. Specifically we derive 8 categories as follows: arrived before the 1950s; arrived in the 1950s; arrived in the 60s; arrived in the 1970s; arrived in the 1980s; arrived in the 1990s; arrived in the 2000s, and arrived during the past 3 years.

Our sample only includes males, who are employees (part time and full time) and of working age (16-65). We exclude a small fraction of individuals reporting to be full time students and those who report being of "other" race given the small sample size. The analysis is carried out for 1994-2013. Following existing studies (DFL, 1996, Lemieux, 2006) the sample only includes individuals reporting an hourly wage from $1 to $100 (in 2013 US dollars). The main sample excludes workers in the public sector since the unionization process is different and recent foreign-born workers might not have access to some public sector jobs. Additionally, the

[3] Although ideally we would want to derive years since in the US as a continuous variable, this has not been possible since the latest version of the data only contains the variable when arrived in the US in band.

vast majority of the labor force is employed in the private sector, with the percentage of workers of different ethnicity employed in the public sector[4] ranging between 8 and 16 percent. However, due to the growing interest in the public sector and that, as documented by the BLS, in 2013 public-sector workers had a union membership rate (35.3 percent) more than five times higher than that of private-sector (6.7 percent), we also repeat the main analysis for the public sector. All estimates reported are weighted by the ORG/CPS sample weights.

II. Empirical Analysis

Estimating the effects of unions on wages is challenging for several reasons. First, unionized and non-unionized workers can have different unobserved characteristics that lead to selection bias. The non-random selection may vary depending on the distribution of wages, sector of employment, and region of the country, among other factors. For these and other reasons causal inference is problematic (Blanchflower and Bryson, 2003). Despite the carefully drafted research on the impact of unions on the wage distribution of workers, it is still unclear whether the differences in wages between unionized and non-unionized workers are the result of unionization rather than a consequence of non-random selection into unions (DFL 1996, Lewis, 1986, Card, 1996). As explained by DFL (1996) the non-random selection and the general equilibrium effects are the two main reasons considered as why the conditional density of wage may depend on the unionisation rate.

[4] In 2013 workers employed in the public sector were 8% amongst Hispanics; 12% amongst White; 16% amongst Black and 10% amongst Asian.

While longitudinal data measuring the wage gains or losses of workers who change unions can be ideal (Card, 1996) their sensitivity to measurement errors may actually lead to significant biases. Based on this reason Lewis (1986) has concluded that it is impossible to measure the "true" effect of unions on wage distribution (DFL, 1996).

Card (1996) uses external information on union status misclassification rates to account explicitly for the misclassification errors in reported union status and finds that the "true" union wage effect is larger for less-skilled workers. Farber (2005) uses CPS data for 1977–2002 to investigate the extent to which the threat of union organization increases nonunion wages and reduces the union/nonunion wage differential. Estimates employing the predicted probability of union membership as a measure of the union threat show no important link between the union threat and either nonunion wages or the union wage gap. Farber exploits the introduction in some states of right-to-work laws which affect the threat of union organization independently of changes in labor demand. He shows that in one state the law was associated with a statistically significant drop in nonunion wages.

We begin by using Ordinary Least Squares (OLS) to obtain estimates of the effect of unions on wages. Following existing research (Blanchflower and Bryson, 2003) the OLS regression has the following specification:

(1) $$y_{it} = U_{it} + X_{it} + Y_t + S + C + ST + \varepsilon_{it}$$

where y_{it} is the log hourly wage of individual *i* in year *t;* U_{it}, the main variable of interest, is a dummy variable equal to 1 if worker is a union membership or his workplace is covered by unions; X_{it} includes a set of individual controls such as: age, age squared, years of schooling, years of schooling squared, years of experience in the labor market and dummy variables for being foreign-born, being a US citizen, being married, being a full time worker, and a dummy for

decade of arrival if immigrants. Y_t is a year dummy, S is the sector dummy (agriculture, services, manufacturing), C is the 2 digit occupation, ST is the states dummy, and ε is an error term. Because we are not able to control for membership endogeneity, we assume that any bias in our estimates arising from unobserved heterogeneity is constant over time.

The OLS regression is likely to provide an upward biased estimate of the effect of unions given the possibility of non-random selection into unions. In order to explore the validity of the OLS estimates, we also use propensity score matching (PSM).

PSM has the advantages of not relying on functional form assumptions and that it restricts inference to individuals who are as comparable as possible so that they have similar propensity to be treated. Because of its convincing way of matching treated and control groups (i.e. unionized and non-unionized) PSM reduces (although perhaps not completely) the selection bias (Dehejia and Wahba, 2002). In fact, due to the no quasi-experimental nature of our data, if there is a selection on unobservable problem this cannot be addressed with current data.

Using propensity score matching we match workers with different characteristics who are comparable as much as possible so that they all have similar propensities to be treated.

Following the standard approach, we first estimate the conditional probability of being unionized, i.e. the propensity score. The model calculating the probability of being unionized can then be written as follows:

(2) $P(U=1|x) = \Lambda (\beta x_{it})$.

Where *x* is a vector of explanatory variables based on individual characteristics, and Λ refers to the cumulative distribution function.

We match unionised workers based on the following characteristics: age, age squared, immigrants, whether US citizenship, years of schooling, and years of schooling squared, years of experience in the labour market, married, full time worker, years, states, sector and occupation.

The estimated propensity scores are then used to create a matched group and for each unionized worker we find a comparison worker using the 1-to-1 nearest neighbor matching without replacement, as it ensures a better balance. The non-matched individuals are dropped from the analysis.

In order to compare covariate distributions across matched workers and to ensure an adequate balance is achieved we run the appropriate tests[5].

Finally, to complement the OLS and PSM analysis and in order to provide a visual representation of the role of unionization on wages of Hispanic male workers and of its potential gains, we adopt a reweighting estimator. This methodology is well established in the empirical literature to study the role of institutional factors (DFL, 1996) as well as compositional changes on wage inequality (Lemieux, 2006, Rienzo 2014).

The methodology constructs the counterfactual wage distribution that would have prevailed had the non-unionized Hispanic workers be instead unionized. This is done by reweighting those sample members who are non-unionized so their observable characteristics resemble to those of their unionized counterparts.

First, we estimate a logit model in which the dependent variable is a 0/1 dummy for unionization status. The logit model is ran separately for every year. From this estimation we obtain the predicted probability of each worker of being unionized[6]. Second, we use those predicted

[5] Tests available upon request from authors.
[6] The re-weighting approach is equivalent to the PSM.

probabilities to re-weight the non-unionized workers in the sample as to give more weight to those non-unionized workers with high estimated probabilities of being unionized.

Specifically, the weights (ω_{it}^{*}) are computed as $(1-P_i)/P_i$, where P_i is the predicted probability of each non unionized worker to be instead unionized.

We then compare the actual mean wages to the counterfactual mean wages. The difference between the actual and the counterfactual wage can be interpreted as the potential contribution of unions to the average wage of non-unionized workers. While we are mainly interested in the average wage, in similar vein to Bryson et al (2014) we apply the re-weighting approach to recover counterfactual wages across the whole distribution. To do so we compare the actual wage gap between unionized and non unionized workers, to the counterfactual wage gap. The analysis of the wage distribution is particularly relevant given that Hispanics are more likely to be unskilled and located on the lower part of the wage distribution, moreover unskilled Hispanics are likely to have different unobserved skills and to be different from other races, due for example to the fact that nearly half on them are immigrants. Therefore, this methodology allows us identifying the part of wage gap that is more likely to be affected by unions.

The analysis is run separately by ethnic groups. Although the private sector remains the main focus in our study, we also perform the main analysis for the public sector.

IV. Results

Sample characteristics

This section presents the baseline characteristics of Hispanic male workers and compare these with White, Black and Asian workers.

Table 1 reports the distribution of unionized workers in 1994 and 2013. The variable Unionized is equal to 1 if the individual reports to be a member of a union or being represented by a union in the workplace. The table shows that between 1994 and 2014 the percentage of unionized workers who are White and Black decreased by 9 and 5 % respectively, while the percentage of unionized workers being Hispanics or Asian increased by 60 and 76 percentage respectively.

Table 1: Distribution of unionised workers across ethnicity

Ethnicity Group	**1994**	**2013**	**1994-2013 % Change**
White	74.6	67.63	-9.34%
Black	12.66	11.99	-5.29
Hispanic	7.91	12.7	+60.56
Asian	3.81	6.72	+76.37
Other	1.01	0.97	-3.96
Total	100	100	

Notes: Based on ORG/CPS. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

The increasing percentage of unionized workers being Hispanics does not translate into a higher unionization rate of Hispanics. This is documented in Table 2a that presents the rate of unionization of the workers in the sample by ethnic group. Around 13% of Hispanic males were unionized in 1994, a unionization rate close to White and Asian males, but well below that of Black males (21%). By 2013 the unionization rate of all groups had decrease substantially, particular that of Blacks, but it was still the case that Black males had a higher unionization rates than the other groups.

Table 2a also provides information on the percentage wage difference between unionized and non-unionized workers in each ethnic group. In 1994 and 2013 the wage gap was larger for Hispanics than for other groups. By 2013 the union/non-union wage gap had disappeared for Asians and decreased substantially for Whites and Blacks. Meanwhile, the union/non-union wage gap for Hispanics remained relatively high (25%). As reported in Table 2a, Hispanics who were members of unions earned an average of $22.10 per hour compared to $16.50 for non-unionized Hispanics in 2013 (a gap of $5.60 per hour). The difference in the unionized-non unionized wage gap amongst Hispanics could reflect the higher percentage of low skilled workers not being unionized.

Table 2a: Unionization rates and wage gap for male workers in US by ethnicity

	Hispanic	White	Black	Asian
		Panel A – 1994		
Unionized, percent	13	15	21	13
Hourly wage unionized, 2013 $	20.30	25.40	21.40	24.60
Hourly wage non-unionized, 2013 $	14.40	22.20	15.70	22.50
Wage gap unionized non-unionized, percent	29	13	27	9
		Panel B – 2013		
Unionized, percent	7	10	11	7
Hourly wage unionized, 2013 $	22.10	26.90	20.80	26.70
Hourly wage non-unionized, 2013 $	16.50	24.90	17.80	27.00
Wage gap unionized non-unionized, percent	25	7	15	-1

Notes: Data for 1994 to 2013. Sample is limited to male workers of working age who are employees (full time or part time) and reporting real hourly wage between $1 and $100.

Table 2b provides information on the socio-demographic characteristics of the sample. The US Hispanic labor force (unionized and non-unionized) has become older and more educated over time, but it is still younger and with fewer average years of education than the White, Black and Asian working populations. The vast majority of White and Black workers, both unionized and

non unionized, have a US Citizen with a small fraction of them being immigrants. The situation reverses for Hispanics and Asians, in fact nearly half or more of them are immigrants. The fraction of Hispanic and Asian having a US citizenship is higher among the unionized workers, though still smaller than that of Whites and Blacks.

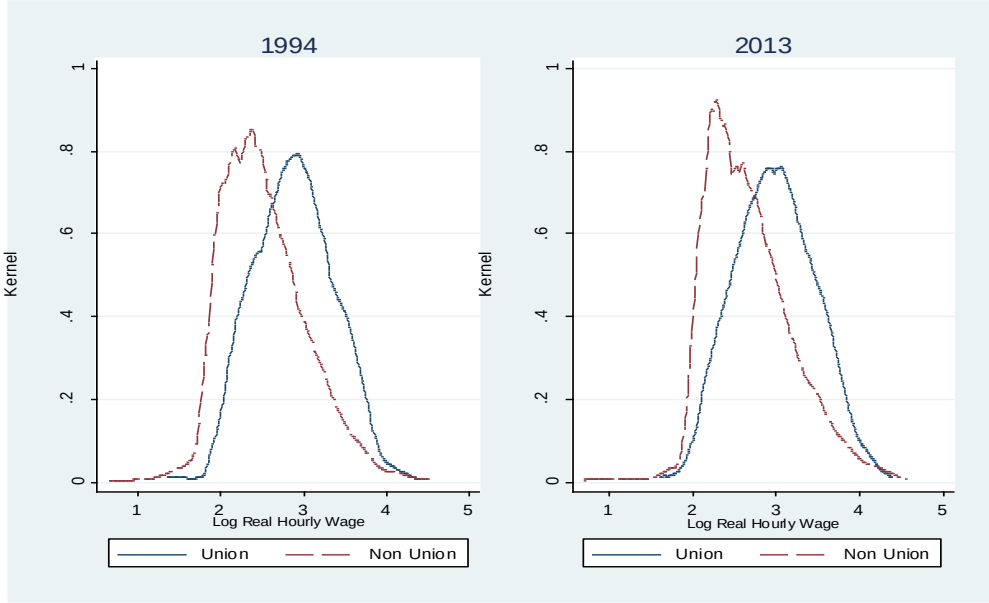
Table 2b: Characteristics of different ethnic groups in the US labor force

	1994				***2013***			
	Hispanic	*White*	*Black*	*Asian*	*Hispanic*	*White*	*Black*	*Asian*
				Unionized				
Age, years	37	40	39	39	39	43	43	42
Schooling, years	12	13	13	14	13	14	14	15
Immigrants	49	3	8	67	47	4	21	68
US Citizen	61	99	95	68	73	99	92	77
Share of working age population, %	10	75	13	2	15	66	12	5
				Non-unionized				
Age, years	33	36	34	36	36	40	38	38
Schooling, years	12	14	13	15	13	14	14	15
Immigrants	63	3	9	79	58	5	15	68
US Citizen	47	98	93	51	57	98	93	68
Share of working age population, %	9	80	7	3	15	70	8	6

Notes: Based on ORG/CPS from 1994 to 2013. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

To illustrate the importance of considering the density of wages, Figure 1a plots the 1994 and 2013 density of real log wages for unionized (solid line) and non-unionized (dotted line) Hispanic male workers. The kernel density of the non-unionized Hispanic workers is to the left of the unionized ones in both periods, meaning a lower average wage, with a higher concentration of workers at about $2 log. The higher concentration of lower wages in 2013 is likely to reflect the higher increase of low skill/paid Hispanics in the US. The union wage distribution is shifted to the right, resulting in a higher and more normally distributed wage. This is true in both years, though being more remarked in 2013.

Figure 1a: Kernel density real Hourly wage Hispanic male workers



Notes: Based on ORG/CPS. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

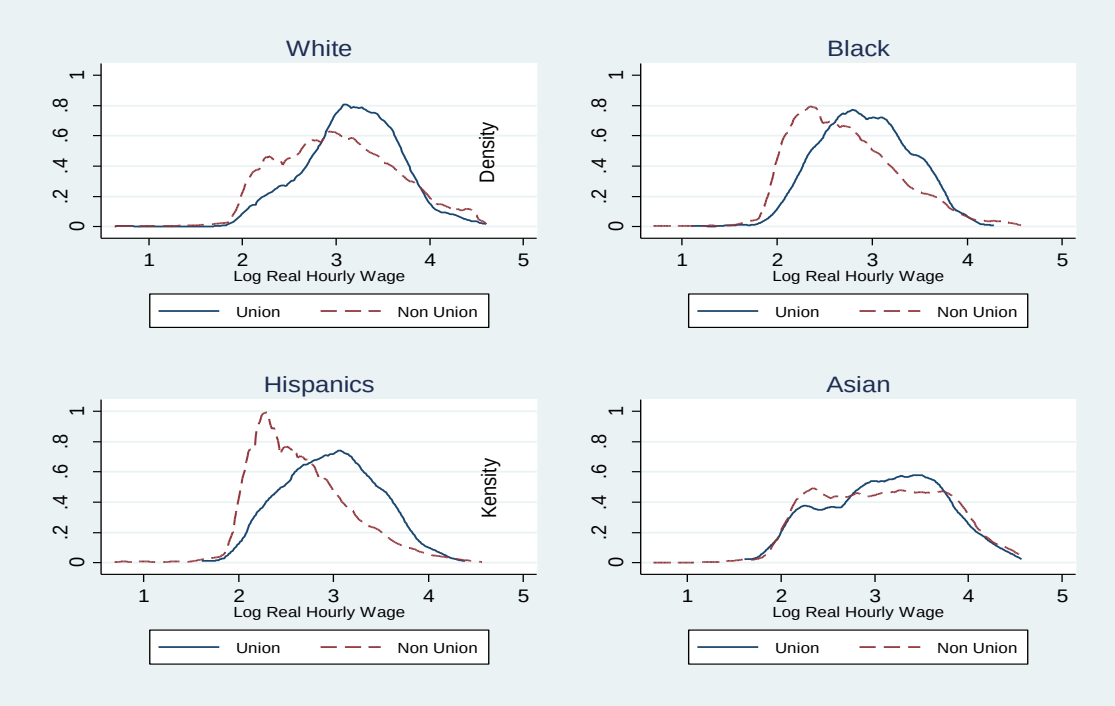
To exploit whether unions act differently across ethnic groups, Figure 1b compares the kernel densities of unionised (solid line) and non uninised (dotted line) workers by race, for 2013 and for the private sector only. The figure documents that althought in all cases unions still have a

substantial effect on the wage distribution, contributing particularly to the decline of the "middle", variations exist across the four ethnic groups analysed. In fact, the difference between the kernel density of unionised and non unionised workers appear to be more significant for Hispanics, while the difference is less marked for Asians. Union wages for Whites are similarly shifted to the right, resulting in a higher concentration of workers with higher hourly wage.

From these figures there is a clear evidence that although the unionisation rate has declined over the past few years, it still shows a clear contribution of the unions to changes in densities of wages.

Moreover, the clear different role of unions across the four ethnic groups analysied, promped us to investigate its role for the largest minority group in the US. The role of unions on wage of Hispanics workers suggest that relatively unskilled workers benefit the most from unionization which moves them toward the "middle" of the wage distribution. This is consistent with earlier findings of the literature (see, for example, Lewis, 1986). While unions increases the wage of Asians as well as of workers in the public sector by a smaller amont.

Figure 1b: Kernel density real Hourly wage male workers, by ethnic group, 2013



Notes: Based on ORG/CPS 2013. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

IV. Estimation Results

The results from the estimation of the effect of unions on the log real hourly wage of Hispanic male workers are presented in Table 3. The estimates of the control variables are not reported. The results of the OLS estimates (columns 1 and 2) show a positive and significant effect of unions on wages. The results decrease in magnitude when we include an interaction term between union membership and US citizenship. Being a US citizen but not being unionized is associated with a decrease in hourly wage. The PSM estimates (columns 3 and 4) are generally consistent with those reported from the OLS regression, with slightly higher effects, on average, reported from the PSM.

Table 3: Impact of Unions on Log Hourly Wages of Hispanic Male Workers

Independent variables	OLS (1)	OLS (2)	PSM (3)	PSM (4)
Union	0.200***	0.177***	0.198***	0.203***
	(0.004)	(0.006)	(0.005)	(0.008)
Interactions				
Non-union*US Citizen	0.092***	0.123***	0.100***	0.097***
	(0.004)	(0.008)	(0.008)	(0.009)
Union*Non-US Citizen		-0.035***		0.008
		(0.008)		(0.010)
Union*US Citizen		0.000		0.000
		(0.000)		(0.000)
Observations	171,344	171,344	33,640	33,640
R^2	0.365	0.365	0.323	0.323

Notes: Data for 1994 to 2013. Sample is limited to male Hispanic workers of working age who are employees (full time or part time) and reporting real hourly wage between $1 and $100. Additional controls not reported are: age, age squared, years of schooling, years of schooling squared, years of experience in the labor market and dummy variables for being foreign-born, being a US citizen, being married, being a full time worker, and a dummy for decade of arrival if immigrants. Y_t is a year dummy, S is the sector dummy (agriculture, services, manufacturing), C is the 2 digit occupation, ST is the states dummy. *** Significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

However, as documented in the previous section, the distribution of wages of unionized and non unionized workers varies by race. We therefore extend and compare the main regression analysis of Hispanics to Whites, Blacks and Asians in Table 4a (OLS) and Table 4b (PSM). The estimates in the first row of Table 4a reports the effect of unions and show that although positive and statistically significant for the four ethnic groups analyzed, the effect varies across them with the wage premium of Hispanic workers being higher than the others. This is particularly relevant given that Hispanics are among those with a higher concentration of workers in lower wages, as documented by the previous figures. The table also shows that being US citizen is associated with a higher wage, but non being unionized and a US citizen is associated with a lower wage.

Other relevant variables are those capturing immigration status of workers, specifically those who are foreign born and the decade of arrivals in the US. Being foreign born Hispanics is associated with a higher wage, while the effect is negative and statistically significant for Whites. The decades since arrived in the US shows that on average those who arrived after the 1970s or later in the US experience on average a lower wage compared to natives. This variable could also capture cohort effects, and may imply that older workers have higher employment protection provided by law or labour courts (Blanchflower, 2002). This is particularly the case for Hispanics, but the direction and significance is pretty much the same for other ethnic groups.

Table 4a: OLS Impact of Unions on Log Hourly Wages Workers, by Race

VARIABLES	(1) White	(2) Black	(3) Hispanics	(4) Asian
Union	0.084***	0.118***	0.177***	0.097***
	(0.013)	(0.016)	(0.006)	(0.014)
Age	0.050***	0.036***	0.039***	0.046***
	(0.000)	(0.001)	(0.001)	(0.001)
age2	-0.001***	-0.000***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Forborn	-0.036***	-0.025	0.028***	0.016
	(0.007)	(0.020)	(0.006)	(0.012)
Years of schooling	-0.020***	-0.033***	0.092***	0.006
	(0.004)	(0.013)	(0.010)	(0.015)
Years of schooling2	0.003***	0.004***	-0.001*	0.002***
	(0.000)	(0.000)	(0.000)	(0.001)
Arrived in the US (relative to the Natives)				
Before the 50s	0.048**	-0.269**	0.106***	-0.035
	(0.021)	(0.122)	(0.034)	(0.059)
Arrived in the 50s	0.035***	0.158***	0.029*	0.090**
	(0.010)	(0.048)	(0.016)	(0.038)
Arrived in the 60s	0.016**	0.073**	0.021**	0.047***
	(0.008)	(0.031)	(0.009)	(0.018)
Arrived in the 70s	-0.003	0.027	-0.036***	-0.012
	(0.008)	(0.020)	(0.007)	(0.013)
Arrived in the 80s	-0.032***	-0.000	-0.077***	-0.069***
	(0.008)	(0.020)	(0.007)	(0.013)

Arrived in the 90s	-0.057***	-0.029	-0.103***	-0.104***
	(0.009)	(0.021)	(0.007)	(0.013)
Arrived in the 2000s	-0.076***	-0.076***	-0.132***	-0.157***
	(0.010)	(0.022)	(0.007)	(0.015)
Arrived in the past 3 years	-0.046	-0.047	-0.114***	-0.192***
	(0.034)	(0.046)	(0.022)	(0.028)
Married	0.104***	0.081***	0.070***	0.061***
	(0.001)	(0.003)	(0.002)	(0.006)
Full time	0.268***	0.209***	0.151***	0.240***
	(0.002)	(0.005)	(0.004)	(0.009)
Citizen	0.091***	0.091***	0.123***	0.067***
Interactions				
	(0.013)	(0.017)	(0.008)	(0.016)
Non Union*Citizen	-0.094***	-0.054***	-0.035***	-0.044***
	(0.013)	(0.016)	(0.008)	(0.016)
Union*Non Citizen	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Union*Citizen	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Sector (Agriculture)				
Manufacturing	0.283***	0.210***	0.171***	0.235***
	(0.006)	(0.020)	(0.009)	(0.039)
Services	0.213***	0.148***	0.127***	0.140***
	(0.006)	(0.020)	(0.009)	(0.039)
Constant	1.214***	1.509***	0.800***	1.326***
	(0.029)	(0.094)	(0.080)	(0.122)
Observations	991,421	102,044	171,344	60,996
R-squared	0.411	0.345	0.365	0.459

Notes: Data for 1994 to 2013. Sample is limited to male workers of working age who are employees (full time or part time) and reporting real hourly wage between $1 and $100. Additional controls not reported include dummies for years, State, occupation. *** Significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 4b reports the main estimates only for the PSM and confirms the positive and significant effects of unions on wages and also confirms the variation of the effects of unions on wages for different ethnic groups with the effect being higher for Hispanics. Accounting for selection into observables the effect of unions on wages is higher. However, these results cannot rule out the possibility of selection into unobservable being more important than selection into observables.

Table 4b:OLS using PSM. Impact of Unions on Log Hourly Wages Workers, by Race

	(1) White	(2) Black	(3) Hispanics	(4) Asian
Union	0.146***	0.138***	0.203***	0.131***
	(0.017)	(0.021)	(0.008)	(0.020)
Interactions				
Non-union*US Citizen	-0.041**	-0.037*	0.008	0.012
	(0.017)	(0.022)	(0.010)	(0.023)
Union*Non-US Citizen	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Union*US Citizen	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	(0.070)	(0.235)	(0.205)	(0.292)
Observations	236,850	30,466	33,640	13,006
R^2	0.281	0.265	0.323	0.369

Notes: Data for 1994 to 2013. Sample is limited to male Hispanic workers of working age who are employees (full time or part time) and reporting real hourly wage between $1 and $100. Additional controls not reported are: age, age squared, years of schooling, years of schooling squared, years of experience in the labor market and dummy variables for being foreign-born, being a US citizen, being married, being a full time worker, and a dummy for decade of arrival if immigrants. Y_t is a year dummy, S is the sector dummy (agriculture, services, manufacturing), C is the 2 digit occupation, ST is the states dummy. *** Significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

In order to provide a visual representation of the effect of unions on wages of the different ethnic groups analyzed, we now present the results for the reweighting approach that allows constructing the counterfactual wage that would have prevailed had the non unionized workers be instead unionized.

The actual (solid line) and counterfactual (dotted line) log real hourly wages (mean) of Hispanic workers from 1994 to 2013 are depicted in Figure 2. The difference between the actual and the counterfactual wage can be interpreted as the potential gain in wages due to unionization. As the figure documents between 1994 and 2013 had the non-unionized Hispanic workers be instead unionized, their real hourly wage would have been 6% to 13% higher. This implies that

unions would have had a substantial role on the pay structure of Hispanics during the two decades analyzed.

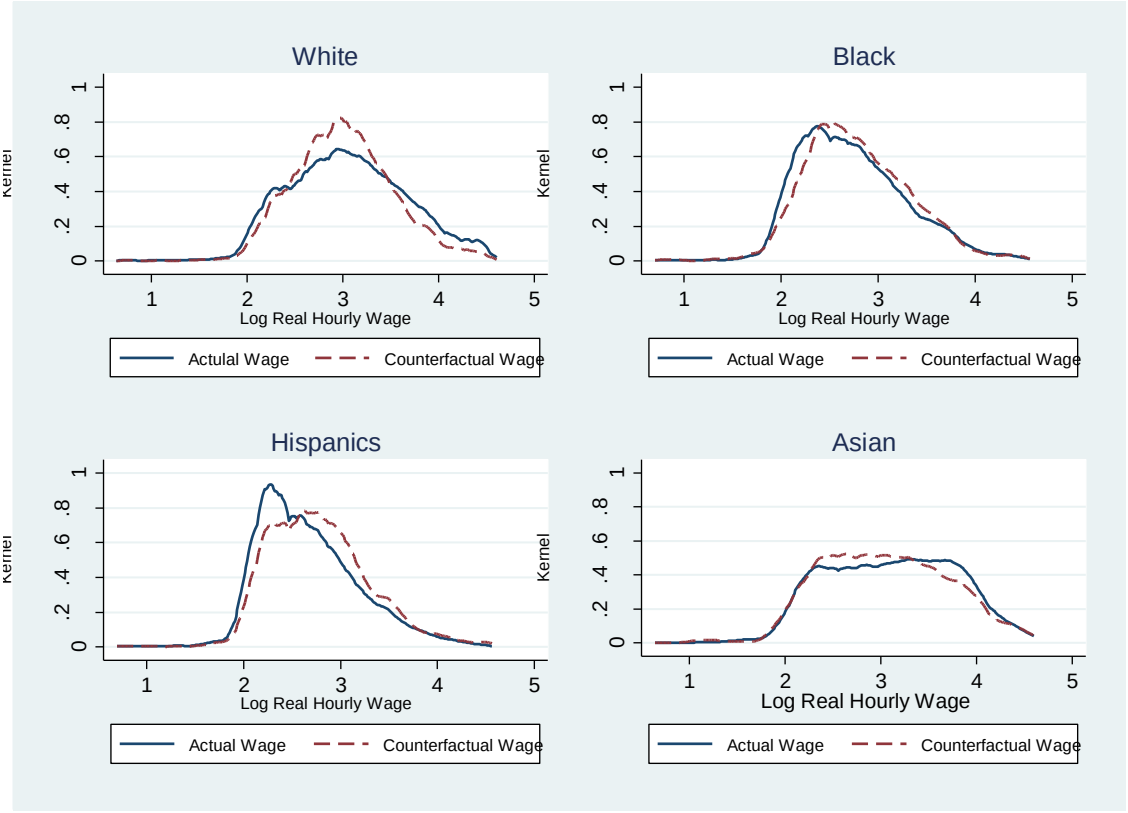
Figure 2: Actual and counterfactual real hourly wage of Hispanic non-unionized men

Notes: Based on ORG/CPS from 1994 to 2013. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

To investigate whether the effect of unions on wages of Hispanics would have been the same for other ethnic groups, Figure 3 compares the kernel density of the actual and counterfactual log of real hourly wages of non-unionized workers in 2013 for whites, Blacks, Hispanics and Asians. Figure 3 shows that had the non-unionized workers be unionized their wages would have been higher. The figure documents that unions affect wages differently, in fact while unions shift to

the right wages of Hispanics, with the taller hump decreasing and shifting to the right, and in a smaller magnitude Blacks, the effect of unions on wages of Whites mainly occurs by changing the concentration of workers in the "middle", and flattering of those in the right tail, suggesting a smaller wage higher paid workers being unionized.

Figure 3.Kernel density of log real hourly wage of actual and counterfactual wage, by Ethnic Group, 2013. Non-unionized workers.



Notes: Based on ORG/CPS. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

Having examined the role of unions on the average wage of Hispanics and other ethnic group, we now move the analysis to the role of unions on wage of workers located in different part of the distribution. This is particularly relevant analysis given that existing literature have shown

that unions raise wages more for lower-skilled workers (Lewis, 1986; Card, 2001). Moreover, previous descriptive statistics (Table 2a) have documented that the union-non union wage gap varies across ethnic groups, being higher for Hispanics (25%) compared to other ethnic groups. To analyze the role of unions across different part of the wage distributions, we compare the actual wage gap of unionized and non unionized workers, to the counterfactual one of unionized and non unionized workers, had they be instead unionized. This is depicted in Figure 4 that presents a clearer illustration of the contribution of unions across different ethnic groups. The solid line is the difference between unionized workers and non unionized at each point of the log hourly wage distribution. The dotted line represents the counterfactual union gap, reweighting the non unionized workers so that they resemble to the unionized ones. The figures reports results for the 2013 only[7].

The figure shows that both trends and levels of the actual and counterfactual gap are different across the ethnic groups. The counterfactual gap is below the actual for both Black and Hispanics, suggesting a lower union-non union wage gap for these workers. The situation is reversed for White and Asian, with the levels of the actual and counterfactual gap being particularly low for Asians.

For Whites the actual gap is rising only up to around the 20^{th} percentile and decreasing thereafter as one moves up the wage distribution. For the same workers the counterfactual line lies below the actual up to around the 40^{th} percentile suggesting potential gains of unionization only for workers located in the bottom part of the wage distribution, suggesting a minor role of unions for more paid workers. Moving up to the wage distribution the counterfactual line now

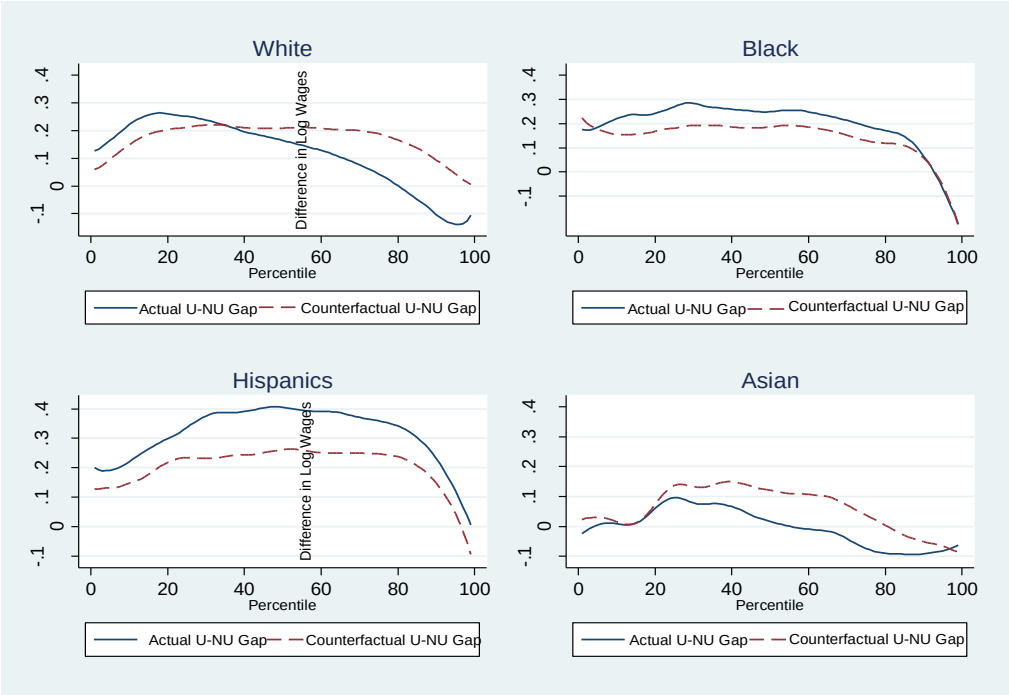
[7] Analysis run for the whole sample period is qualitatively similar to that of the 2013 only.

lies above the actual one implying and increase union-non union gap ad more workers being unionized.

The trend for Hispanics shows that the counterfactual gap lies below the actual throughout the wage distribution, implying a potential gain for non-unionized workers to be instead unionized. Both the actual and the counterfactual gap move along the wage distribution following a reversed U-shape pattern. The distance between the actual and the counterfactual gap increases as one moves up to around the median, while it decreases moving up the wage distribution being smaller for higher paid workers.

The distance between the more flatten actual and the counterfactual gap for Blacks is smaller than that of Hispanics then overlaps for higher paid worker. However the distance between the actual and the counterfactual gap is much smaller for Blacks compared to Hispanics, suggesting that amongst the four ethnic groups analyzed, Hispanics workers would benefit most from being Unionized, and this is the case for all workers in different part of the wage distribution, although the higher gain would occur for the lower paid workers.

Figure 4: Actual and Counterfactual Wage Gap along the wage distribution by ethnic Group, 2013



Notes: Based on ORG/CPS. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

These results reveal that unions may act differently for different ethnic groups. The variation of the union premium across ethnic groups may reflect not only their different level of skills, but also different bargaining power in the labor market, and therefore different "need" to be unionized, do amongst other things, to variations in employment protection.

The more striking effects for Hispanics suggest that relatively unskilled Hispanic workers would benefit the most from unionization, bringing their wages up.

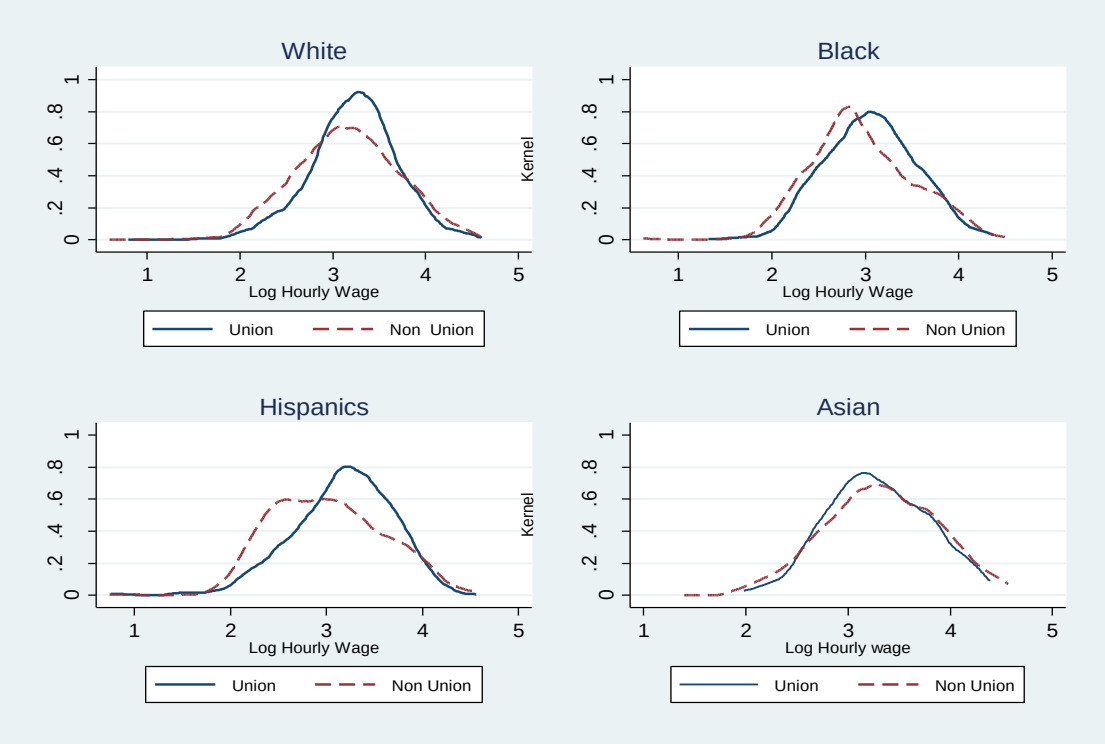
V. Public Sector

This section presents repeats the main results for the public sector motivated by the fact that, although the vast majority of the US labor force is employed in the private sector, the rate of unionization in the public sector has been growing over time and is now higher than that of the private sector. The analysis is carried out comparatively across the four ethnic groups considered.

To analyse whether the trends of the role of unions on wages in the public sector is similar in the public sector, in similar vein to Figure 1b, Figure 5 plots densities of log hourly wage for workers in the public sector. The unionisation rate of ethnic groups in the public sector is higher than that of the private sector and very similar (around 40%) across ethnic groups[8]. In line with results for the private sector, the current figure confirms that wages of unionised workers are shifted to the right, and that although the difference between unionised and non unionised workers in the public sector is less marked than that of the private sector, it still remains being more important for Hispanics, while showing very little difference for Asians. However, log hourly wage of non unionised workers is more normally distibuted compared to those in the private sector.

[8] In 2013 the unionisation rate for Hispanics, White, Black, and Asian was respectively 43%, 40%, 39% and 39%.

Figure 5: Kernel density real Hourly wage male workers, 2013 by ethnic group, Public sector only



Notes: Based on ORG/CPS. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

In Table 5 we report the main estimates of the OLS regression. Due to the smaller sample of workers unionized and being in the public sector we do not perform the PSM. The OLS analysis for the public sector (Table 5) shows some differences compared to the private sector. The unionization is associated with a higher and statistically significant increase in wages not only for Hispanics but also for Black, though the coefficients for Whites are not statistically significant. This may suggest that in the public sector, despite the higher unionization rate, unions have lower bargaining power for Whites and an overall influence over pay setting. In general, log hourly wage of non unionised workers is more normally distibuted compared to those in the private sector. A US citizenship is still associated positively with a wage increase

but the effect is not significant for Black. Moreover, when considering the effect of those non unionized but who are US citizens, unlike the private sector, the effect is positive and statistically significant for all ethnic groups except for Asian. The sign and significance for being foreign born and depending on the years of arrivals in the US are qualitatively similar to those in the private sector.

Table 5: OLS Impact of Unions on Log Hourly Wages Workers, by Race Public Sector

VARIABLES	(1) White	(2) Black	(3) Hispanics	(4) Asian
Union	0.008	0.187***	0.188***	0.069**
	(0.031)	(0.039)	(0.025)	(0.029)
Age	0.053***	0.036***	0.052***	0.052***
	(0.001)	(0.002)	(0.002)	(0.004)
age2	-0.001***	-0.000***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Forborn	-0.040**	0.058	0.048***	0.037
	(0.018)	(0.044)	(0.019)	(0.031)
Years of Schooling	0.015*	0.020	0.012	-0.074*
	(0.009)	(0.022)	(0.027)	(0.042)
Years of Schooling2	0.002***	0.002**	0.002**	0.004***
Years of arrival in the US				
	(0.000)	(0.001)	(0.001)	(0.001)
Before the 50s	0.095**		0.143**	-0.070
	(0.038)		(0.060)	(0.096)
Arrived in the 50s	0.001	0.170*	-0.014	0.033
	(0.018)	(0.101)	(0.026)	(0.053)
Arrived in the 60s	-0.006	-0.062	-0.019	0.008
	(0.018)	(0.054)	(0.022)	(0.036)
Arrived in the 70s	0.005	-0.052	-0.056***	-0.007
	(0.020)	(0.044)	(0.021)	(0.032)
Arrived in the 80s	-0.001	-0.086*	-0.124***	-0.060*
	(0.024)	(0.044)	(0.021)	(0.033)
Arrived in the 90s	-0.023	-0.064	-0.058**	-0.114***
	(0.024)	(0.049)	(0.024)	(0.036)
Arrived in the 2000s	-0.065**	-0.174***	-0.096***	-0.165***
	(0.032)	(0.055)	(0.031)	(0.043)
Arrived in the past 3 years	0.156*	-0.201*	-0.170*	-0.127*
	(0.091)	(0.112)	(0.093)	(0.073)
Married	0.057***	0.044***	0.048***	0.037***
	(0.003)	(0.006)	(0.009)	(0.014)
Ft	0.311***	0.259***	0.256***	0.250***
	(0.007)	(0.016)	(0.020)	(0.024)

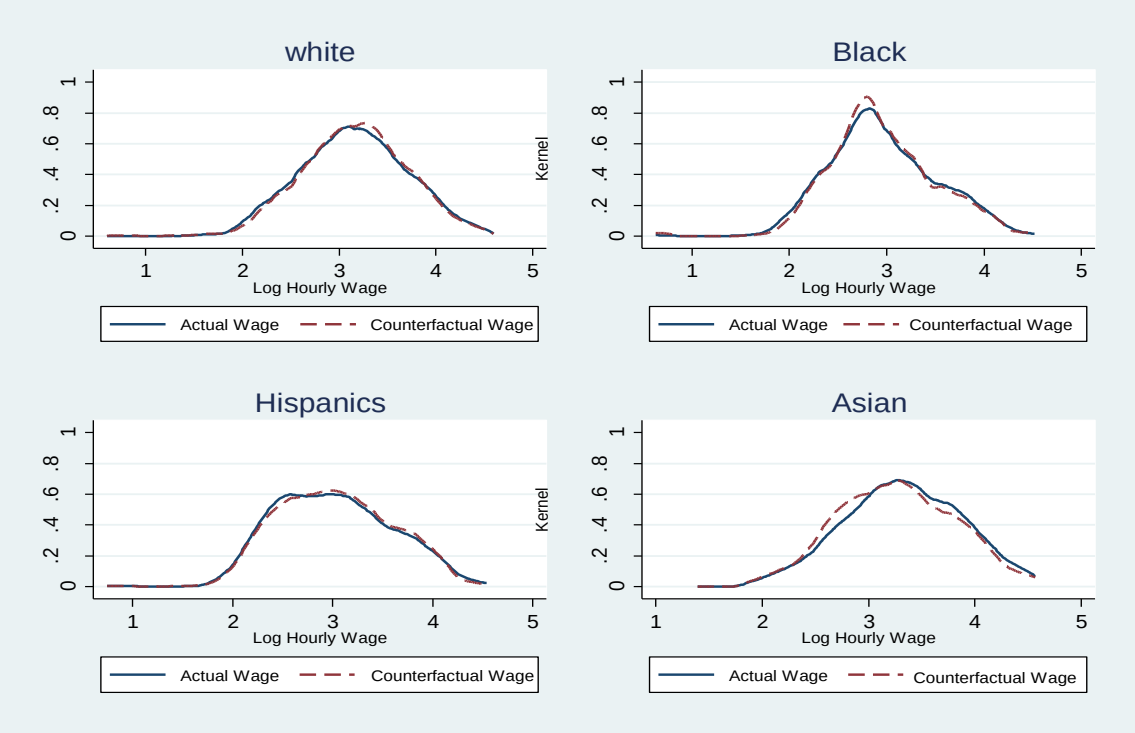
Citizen	0.066**	0.017	0.080***	0.071***
	(0.029)	(0.033)	(0.023)	(0.026)
Interaction terms				
NonUnion*Citizen	-0.072**	0.079**	0.059**	0.026
	(0.031)	(0.039)	(0.026)	(0.031)
Union*Non Citizen	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Union*Citizen	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Sector (Agriculture)				
Manufacturing	0.118***	0.043	0.132*	0.198
	(0.019)	(0.078)	(0.068)	(0.145)
Services	0.031**	0.024	0.082	0.167
	(0.014)	(0.070)	(0.051)	(0.133)
Constant	1.010***	1.100***	0.905***	1.461***
	(0.070)	(0.205)	(0.218)	(0.374)
Observations	175,063	24,444	15,373	9,670
R-squared	0.350	0.348	0.392	0.355

Notes: Data for 1994 to 2013. Sample is limited to male workers of working age who are employees (full time or part time) and reporting real hourly wage between $1 and $100. Additional controls not reported include dummies for years, State, occupation.

*** Significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Figure 6 compares the kernel density of the actual (solid line) and counterfactual (dotted line) log real hourly wages (mean) of real hourly wages of non-unionized workers in 2013 in the public sector for whites, Blacks, Hispanics and Asians. However, while in the private sector unions contributes to the shift of wages, in the public sector being unionized does not seem to change much the wage distribution for the four ethnic groups, suggesting a lower power of unions on pay setting.

Figure 3b. Kernel density of log real hourly wage of actual and counterfactual wage, by Ethnic Group



Notes: Based on ORG/CPS. Sample includes male, workers in the labor force age, employee only, working full time or part time, reporting real hourly wage between $1 and $100. A worker is defined unionized if he reports being a member of a union or being represented by a union in the workplace.

VI. Conclusion

This paper presented a recent analysis of the relationship between unions and wages, by exploring the role of unionization on wages of Hispanic workers in the US from 1994 to 2013. One contribution of this study is to provide a comprehensive analysis of the role of unions on wages on Hispanics in the private sector. However, we also analyze and compare results to other ethnic groups and in the public sector.

Our findings indicate that even after accounting for potential bias due to selection into observable characteristics, unionization is associated positively with wages of Hispanic workers. The re-weighting approach clearly illustrate that had non-unionized Hispanic workers be instead

unionized, the average real hourly wage of Hispanic workers in the US would have been from 6 to 13 percent higher in each year from 1994 to 2013.

We note the potential importance institutions -unionization- in improving work conditions of ethnic minorities in the US, especially those who have been traditionally exposed to poor conditions in the labor market and experienced little protection.

Results show that despite the decrease in union numbers, unionization has a substantial effect on the distribution of Hispanics' wages especially in the private sector. This is consistent with existing finding of literature. However, the role of unions on wages is less important for Whites, Blacks and Asians especially, while despite the higher unionization rate, in the public sector unions have a less important role compared to that of the private sector, suggesting a lower influence over the pay setting.

The analysis of the re-weighting approach along the wage distribution reveals that unions may act differently for different ethnic groups. The variation of the union premium across ethnic groups may reflect not only their different level of skills, but also different bargaining power in the labor market, and therefore different "needs" of being unionized. The more striking effects of unions on wages for Hispanics suggest that especially those relatively unskilled would benefit the most from unionization. Although we do not investigate here the reasons of the lower unionization rate of Hispanics, this may be related to the existence of spillover effect of unionization, as well as to the higher cost of being unionized for lower paid workers.

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