The Effects of Offshoring on Postdisplacement Wages: Evidence from the United States^{*}

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Abstract

In recent years, a growing empirical literature has studied the consequences of offshoring for the labor market outcomes of individual employees in the developed countries. This paper contributes to that literature by analyzing the effects of offshoring on the reemployment wages of displaced workers in the U.S.. Results show that offshoring significantly lowers postdisplacement wages. The effects are economically important and widespread across individuals of different race, gender, occupation and educational level. The empirical results are mostly driven by workers who change industry upon reemployment, suggesting that the earning loss reflects a substantial devaluation of human capital.

JEL codes: F1.

Keywords: Offshoring; Job Displacement; Reemployment Wages; Individual-Level Data.

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1. INTRODUCTION

Since the early 1990s, the implications of offshoring for the developed countries' labor markets have gained central stage in media coverage and political debates, and have become the object of a large empirical literature.¹ After an initial interest in the consequences for aggregate employment, attention has recently shifted to the economic costs potentially borne by individual employees, in terms of wage losses, higher job instability and greater risk of job displacement. Very little is still known, however, about whether, and how, offshoring affects individual labor market outcomes *after* displacement. This paper aims to provide new evidence on this issue, by studying the effects of offshoring on the reemployment wages of displaced workers in the U.S..

The analysis builds on individual-level data from the Displaced Workers Supplements (DWS) to the Current Population Surveys for the period 1994-2002. The DWS are biannual surveys containing pre- and postdisplacement information on workers who lost their jobs in the three years before the interview, and constitute the only large and nationally representative sample of displaced workers in the U.S.. Exploiting information on the predisplacement industry and on the year of displacement of each individual, I match the DWS with industry-level proxies for offshoring, measured by the share of imported intermediate inputs in total non-energy input purchases (Feenstra and Hanson, 1996, 1999). Then, using the empirical framework developed by Kandilov (2006), I run Mincerian regressions of individual reemployment

¹ Following Helpman (2006), offshoring refers to the foreign relocation of production stages, through both arm's length contracts and foreign direct investments. Summaries of the media and political debate on offshoring can be found in Baldwin (2006), Mankiw and Swagel (2006), and The Economist (2007).

wages on offshoring, plus a large set of controls for individual, job and industry characteristics.

To preview the results, I find that rising offshoring in the predisplacement industry significantly lowers the reemployment wages of displaced workers. In terms of economic magnitude, my preferred specifications show that a 1 percentage point increase in offshoring reduces postdisplacement wages by about 0.29-0.58 percent. These estimates imply that the rise in offshoring over the sample period induced a loss of 110-330 dollars in the yearly reemployment wages of U.S. displaced workers. The effects are widespread across individuals of different race, gender, occupation and educational level, but are mostly borne by workers who exited the manufacturing sector or switched to a different manufacturing industry upon reemployment.

These findings are broadly consistent with the predictions of existing theoretical models on offshoring. On the one hand, higher offshoring lowers labor demand in the predisplacement industry, because firms substitute domestic workers with intermediate inputs imported from abroad: *ceteris paribus*, this worsens employment opportunities and reduces average wages in that industry (Feenstra and Hanson, 2003). On the other hand, offshoring raises labor productivity through specialization, and makes it possible to produce the same level of output with fewer, but more rewarded employees (Grossman and Rossi-Hansberg, 2009). As a result, the fraction of workers who are reemployed in the old industry face no appreciable change in wages. The remaining workers who are forced to switch industry lose instead a substantial fraction of their human capital and incur a large wage loss (Neal, 1995).

The paper makes contact with, and aims to contribute to, two different streams of research. First, and as already mentioned, it is related to the vast empirical literature

studying the labor market implications of offshoring in the developed countries. Motivated by an unprecedented increase in trade in intermediate inputs since the mid-1980s,² this literature has initially analyzed the consequences of offshoring for total employment and for the skill composition of the workforce. In most developed economies, offshoring has been found to produce little effects on total employment, and to change the skill composition of the workforce in favor of high skilled labor.³ Being based on aggregate industry-level data, this literature was however unable to unveil and quantify the effects on individual employees. More recent contributions have therefore exploited individual-level data to study the consequences of offshoring for workers' wages (Geishecker and Gorg, 2005, 2008; Munch and Skaksen, 2009), transitions across industries (Egger et al., 2007), and risk of job displacement (Geishecker, 2008; Munch, 2008). None of these latter contributions has however analyzed the impacts of offshoring after displacement. Hence, this paper adds to the individual-level literature new empirical evidence on this issue.

The second stream of research to which the paper is related analyzes the characteristics of displaced workers and assesses the consequences of job displacement. In particular, the paper comes close to the set of studies explaining and quantifying the

² See Campa and Goldberg (1997), Hummels et al. (1998), Hummels et al. (2001) and Feenstra and Hanson (2003) for studies documenting the rise of offshoring in the developed countries.

³ See, in particular, Feenstra and Hanson (1996, 1999), Morrison and Siegel (2001), Falk and Koebel (2002), Ekholm and Hakkala (2005), Gorg and Hanley (2005), Hijzen et al. (2005), and OECD (2007). Recent and updated surveys of this literature can be found in Feenstra and Hanson (2003), Hijzen (2005) and Crinò (2009).

wage losses incurred by displaced workers upon reemployment.⁴ According to most contributions, the losses are substantial, tend to persist even many years after reemployment, and reflect the devaluation of industry- and firm-specific human capital. Yet, notwithstanding the large interest in the topic, only a few contributions have so far tried to link the losses with events occurring in the predisplacement industry. Namely, Carrington and Zaman (1994) found that the wage losses in the U.S. are larger for workers displaced from high wage and large industries. More recently, Addison et al. (1995), Kletzer (2000, 2001, 2002) and Kandilov (2006) used the DWS to show that the losses depend also on the level of import penetration in the predisplacement industry.⁵ I am however unaware of any study that has linked the wage losses to offshoring. Hence, the contribution of this paper to the job displacement literature is to provide new evidence on how postdisplacement wages respond to offshoring. My empirical analysis is especially inspired by the work of Kandilov (2006), and proceeds along the same lines followed by the author. The results show that offshoring is an important determinant of postdisplacement earning losses, and that its effects are complementary to those of import penetration documented by Kandilov (2006).

The remainder of the paper is organized as follows. Section (2) describes the data and provides some stylized facts. Section (3) introduces the empirical model and

⁴ See Flaim and Sehgal (1985), Hamermesh (1987), Podgursky and Swaim, (1987), Topel (1990), Farber et al. (1993), Jacobson et al. (1993), Farber et al. (1997), Stevens (1997), and Farber (2005). Detailed surveys of the literature can be found in Fallick (1996), Kletzer (1998) and Farber (2008).

⁵ These studies complement with the vast and broader literature on the effects of trade and import penetration on total employment and individual job instability. See, in particular, Grossman (1987), Kruse (1988), Revenga (1992), Hungerford (1995), Goldberg et al. (1999), Kletzer (2004), and Davidson and Matusz (2005).

discusses the main estimation issues. Section (4) presents the results, and Section (5) briefly concludes.

2. DATA AND STYLIZED FACTS

2.1 Data

Individual-level data on displaced workers come the biannual Displaced Workers Supplements (DWS) to the January or February Current Population Surveys (CPS). I use the DWS for the period 1994-2002, because those for earlier and later years are not directly comparable, due to substantial differences in some relevant survey questions and in the industrial classification.⁶ I use the CEPR Uniform Extracts of the DWS (CEPR, 2006), which work out the original data set to homogenize the survey questions across years.

To each individual older than 20 at the time of the survey, the DWS ask whether she lost her job in the three years before the interview, due to (1) plant closing, (2) insufficient work, (3) position abolished. If the answer is affirmative, the individual is then asked a number of questions about the lost job (e.g., industry and occupation, tenure, weekly wage, year of displacement, whether or not displacement was notified in advance), about the intervening spell of unemployment (e.g., time without a job), and if reemployed at the time of the interview, about the current job (e.g., industry and occupation, weekly wage, worked hours per week).⁷ Information from the DWS is

⁶ See Farber et al. (1997) and Kandilov (2006) for a discussion of comparability issues.

⁷ In the DWS, industries are defined according to the 1980 Census Industrial Classification (CIC80), and are available at the 3-digit level. Occupations are instead defined according to the 1980 Census Occupational Classification (COC80). Note that after displacement workers may also temporarily leave

complemented by basic CPS data on individual characteristics, such as age, education, gender, race, marital status, and state of residence. Panel a) of Table 1 reports details on names and definitions for all individual-level variables used below in the empirical analysis.

Following previous studies (e.g., Addison and Portugal, 1989), I restrict the sample to individuals displaced from a full-time manufacturing job, who aged 20 to 65 and were still in the labor force at the time of the interview.⁸ As a result, the final sample includes 3586 individuals displaced between 1991 and 2001; of these, 2743 were reemployed at the time of the interview. I report nominal figures for wages on both current and lost jobs at constant 1987 dollars using the Consumer Price Index of the Bureau of Labor Statistics (BLS). Moreover, as suggested by Angrist and Krueger (1999), I "winsorize" the wages by replacing values in the lower and upper 1 percent tails with the those of the 1th and 99th percentiles.

The DWS have become widely used in the job displacement literature because they contain a large and nationally representative sample of displaced workers, and this makes them preferable to other alternatives like the Panel Study of Income Dynamics. Yet, the DWS have a number of potential limitations, which have been widely discussed in previous studies. First, they only contain information on one episode of job displacement, i.e. that involving the loss of the longest job; in the event of more than one displacement, it is only possible to retrieve the number of jobs held by the individual before the interview, but not their characteristics: as a result, variables like

the labor force. Hence, I somewhat loosely refer to the period after displacement as a spell of unemployment. A more precise, but less synthetic definition would be spell of non-employment.

⁸ Following the convention for the U.S., full-time jobs are those requiring more than 35 hours per week.

the labor market experience after displacement may be measured with error (Kletzer, 1989). Second, the DWS do not follow workers over time, and therefore do not allow to control for unobserved individual heterogeneity (Addison and Portugal, 1989). Third, the DWS are based on retrospective data, which makes likely that individuals report only the most costly episodes of displacement, especially for those occurred long before the interview (Evans and Leighton, 1995). Fourth, the sample of displaced workers may not be random, because firms are more likely to fire the least productive employees (Neal, 1995). Fifth, reemployment wages are reported only for individuals employed at the time of the interview, who may not constitute a random sample drawn from the stock of the unemployed (Addison and Portugal, 1989). I devote Section (3) to discuss how the empirical strategy deals with these issues.

Exploiting information on the predisplacement industry and on the year of displacement of each worker, I match the DWS data with industry-level proxies for offshoring.⁹ Following a well established line of empirical research initiated by Feenstra and Hanson (1996, 1999), I proxy offshoring with the share of imported intermediate inputs in total non-energy input purchases. The idea underlying this measure is that, because intermediate inputs produced abroad have to be imported in the U.S. to enter the production process with other factors, the more intense offshoring is, the higher this indicator will be. Feenstra and Hanson (1996, 1999) have been the first to estimate imported intermediate inputs at the industry-level for the U.S.. Their methodology

⁹ The offshoring proxies and the other industry variables described below are defined at the 3- or 4-digit level of the 1987 Standard Industrial Classification (SIC87). They are converted into CIC80 codes using the correspondence table of the BLS. Due to data availability, after matching I lose the industry "Dyeing and finishing textiles, except wool and knit goods", and remain with a total of 76 CIC industries for the econometric analysis.

consists in combining Input-Output Matrixes and economy-wide data on import penetration rates. I will strictly follow the Feenstra and Hanson's approach to construct my first proxy for offshoring below.

Input-Output tables are released every five years by the Bureau of Economic Analysis (BEA) and provide detailed information on the value of inputs purchased by each industry to produce 1 dollar worth of output. I use the six matrixes spanning the period 1977-2002, because those for earlier and later years are not directly comparable due to the change in industrial classification. Call the purchases of input k by industry j in each of the six years t as α_{jkt} . Multiplying α_{jkt} by industry output (Y_{jt}) yields the total value of input k purchased by industry j .¹⁰ The fraction of the input coming from abroad can be estimated by multiplying this value with the economy-wide import penetration rate for input k , defined as imports (M) over apparent consumption, i.e. output plus imports minus exports (X).¹¹ Summing over all inputs k yields the total value of imported inputs by industry j ($IMPINT_{jt}$):

$$IMPINT_{jt} = \sum_{k=1}^K \left[(\alpha_{jkt} \cdot Y_{jt}) \cdot \frac{M_{kt}}{Y_{kt} + M_{kt} - X_{kt}} \right], \quad (1)$$

where $t = 1977, 1982, 1987, 1992, 1997, 2002$.

Following, among others, Ekholm and Hakkala (2005), the values of the missing years are imputed through linear interpolation. Due to the matching with the DWS, only data for the period 1991-2001 are used in this paper, although values for previous years will be exploited to form instruments for current offshoring as explained in the next section.

¹⁰ Data on industry output come from the NBER Productivity Database up to 1996, and from the Annual Survey of Manufactures for later years.

¹¹ Detailed data on imports and exports come from Feenstra et al. (2002).

Although widely used, the indicator in (1) is subject to strong assumptions, which may raise concerns about its ability to capture the true size and time behavior of the imports of intermediate inputs. First, the indicator assumes that each industry imports the same share of a given input as the economy as a whole, due to the use of economy-wide import penetration rates in (1). Second, the indicator uses interpolation to retrieve the values of the missing years. In order to make sure that the results are not driven by measurement error, I will therefore use throughout all the analysis a complementary measure that relaxes both assumptions. This measure has been constructed by Schott (2004) using highly detailed import data at the product-level. For each industry, Schott (2004) estimated imported intermediate inputs by the foreign purchases of products whose name includes either the word "parts" or the word "components". I call this measure $IMPINT_Sc$.¹² Note that this measure relaxes both the assumptions underlying $IMPINT$, because it is based on official import data available for the whole period of analysis. As a drawback, it includes only inputs produced within the industry, and not also those produced by different industries. Hence, the scope of $IMPINT_Sc$ is narrower than that of $IMPINT$.

The last step to obtain the proxies for offshoring (OS_{jt} and OS_Sc_{jt}) consists in normalizing $IMPINT$ and $IMPINT_Sc$ by the total value of non-energy inputs purchased by each industry (NE_{jt}):¹³

$$OS_{jt} = \frac{IMPINT_{jt}}{NE_{jt}}, \quad OS_Sc_{jt} = \frac{IMPINT_Sc_{jt}}{NE_{jt}}. \quad (2)$$

¹² Data are available on Peter Schott's web site, at http://www.som.yale.edu/faculty/pks4/sub_international.htm.

¹³ Sourced from the NBER Productivity Database and the Annual Survey of Manufactures.

Despite the wide use in the literature (see, in particular, Feenstra and Hanson, 1996, 1999), this normalization may be problematic, especially for industries that substitute their own production of inputs with foreign purchases: in these cases, in fact, both the numerators and the denominators of (2) will increase by the same amount and the change in offshoring will be underestimated.¹⁴ Following, among others, Hijzen et al. (2005), I will thus perform robustness checks using industry output as an alternative normalization for both indicators in (2).

Finally, I construct a number of other variables to be used in the econometric analysis as controls for other relevant characteristics of the predisplacement industry and of the local labor markets. Namely, exploiting data from Feenstra et al. (2002) I compute the ratio of imports over apparent consumption (*IMPEN*) to control for the degree of import penetration in the predisplacement industry. As in Berman et al. (1994), I use the share of capital stock accounted for by Information and Communication Technologies (*ICT*, sourced from the BEA) to account for technical progress. Using the NBER Productivity Database and the Annual Survey of Manufactures, I construct labor productivity (value added per worker, *LABPROD*) to control for productivity shocks, real output (real value of shipments, *Y*) to account for differences in industry size, skill intensity (the employment share of non-production workers, *SKINT*) and capital intensity (the capital stock per worker, *CAPINT*) to control for differences in factor intensities. Finally, I use state-level unemployment rates (*URATE*, sourced from the BLS) to account for differences in economic conditions

¹⁴ See Horgos (2009) for a discussion of measurement issues involved in the construction of offshoring indicators.

across local labor markets.¹⁵ Details on names, sources and definitions for these variables are in panel b) of Table 1.

2.2 Stylized Facts

Table 2 reports descriptive statistics on the industry- and state-level variables. Focusing on panel a), note that the offshoring proxy based on Input-Output data (*OS*) averages at 9 percent over the sample period, while the proxy based on imports of parts and components (*OS_Sc*) averages at 5 percent: as expected, the scope of *OS_Sc* is narrower than that of *OS*. Both measures have grown between 1991 and 2001, the increase being larger for *OS* (6 percentage points) than for *OS_Sc* (1 percentage point): in line with previous evidence, therefore, offshoring has become an increasingly common phenomenon in the U.S. during the 1990s. Interestingly, the table also shows that the rise in offshoring has been accompanied by a surge in the exposure of manufacturing industries to import penetration: *IMPEN* has in fact increased by 9 percentage points between 1991 and 2001.

Table 3 contains summary statistics on displaced workers. The first three columns refer to the whole sample and the next three columns to the sub-sample of reemployed workers. Note that more than three-fourths of individuals are reemployed at the time of the interview. Unreported figures show that the percentage of reemployed

¹⁵ The DWS does not contain information on the state of residence before displacement. The state unemployment rates are therefore matched to the individual-level data using the information on current state of residence contained in the basic CPS. Note, however, that workers' geographic mobility after displacement is very limited: in the sample, only 13 percent of workers changed city (but not necessarily state) after losing their job.

individuals increases steadily with time since displacement, although the largest increase occurs when moving from one to two years after the job loss: 62 percent of workers displaced one year before the interview are reemployed at the time of the survey, while the fraction rises to 87 and 90 percent, respectively, for workers displaced two and three years before the interview.

Compared to the whole sample, reemployed workers are more likely to be male, white, married, highly educated and U.S. born, and they earn more on the lost job. They also change a higher number of jobs after displacement and have longer labor market experience (proxied, as in Kletzer (1989), by the difference between year of the survey, year of displacement and time spent before finding the first new job), although this latter result may reflect the fact that displacement occurs longer before the interview for the reemployed individuals than for the whole sample. Finally, reemployed workers are more likely to be displaced by plant closing and position abolished, and less so by insufficient work; they also receive advance notice of displacement more often than the whole sample of individuals.

The remaining columns of Table 3 confront reemployed workers displaced from high-offshoring and low-offshoring industries, respectively defined as industries above and below the median percentage change in offshoring between 1991 and 2001. Note that workers displaced from high-offshoring industries tend to have lower reemployment wages than those displaced from low-offshoring industries. The difference ranges from 9 dollars per week (468 dollars per year) in the case of *OS* to 43 dollars per week (2236 dollars per year) in the case of *OS_Sc*.¹⁶ Note also, however, that workers displaced from high-offshoring industries are more likely to be female, foreign

¹⁶ The annual figures are estimated by considering an average of 52 weeks per year.

born and non-white, they earned already less on the lost job, have shorter experience after displacement, and work fewer hours on the new job. These factors may partly explain the lower reemployment wages. In the next section, I will therefore attempt to isolate the effects of offshoring by conditioning the analysis on individual and job characteristics, as well as on a large set of industry- and state-level controls. Moreover, I will exploit the whole time variability of offshoring in each industry, rather than just the change between the endpoints of the sample.

3. EMPIRICAL MODEL AND ESTIMATION ISSUES

I use the empirical approach developed by Kandilov (2006) following a large empirical literature on the determinants of postdisplacement wages.¹⁷ In particular, I estimate the following Mincerian regression by Ordinary Least Squares:

$$\ln w_{ijst\tau} = \beta_0 + \beta_1' INDIV_{it} + \beta_2' CURRJ_{it} + \beta_3' PASTJ_{it} + \beta_4' STATE_{st} + \beta_5' INDUS_{jt} + \beta_6' TIME_{it} + \varepsilon_{ijst\tau}, \quad (3)$$

where w is the real weekly reemployment wage of worker i , displaced from industry j in year t , living in state s and reemployed in period τ (where $\tau \neq t$, and $1 \leq \tau - t \leq 3$). The vector $INDIV$ contains standard controls for individual characteristics, namely age and age squared, dummies for gender, marital status, citizenship and metropolitan area residence, a dummy equal to 1 if the individual is white and a dummy equal to 1 if she holds at least a bachelor degree. $CURRJ$ and $PASTJ$ contain, respectively, variables for current job (the log number of worked hours per week) and variables for past job

¹⁷ See, e.g., Addison and Portugal (1989), Kletzer (1989) and Ruhm (1990, 1991).

(industry and occupation dummies).^{18, 19} *STATE* contains state-level controls, namely the unemployment rate and a full set of state dummies, while *TIME* includes year-of-displacement and year-of-survey dummies that control for macroeconomic shocks at the time of displacement and of the interview. Finally, *INDUS* contains industry-level variables, including offshoring and the controls presented in Section (2); ε is a white-noise disturbance. Note that, because the specification includes dummies for the predisplacement industry, the coefficients of offshoring are identified only by within-industry variation over time.

A first problem with equation (3) is that the combination of individual- and industry-level data may give rise to contemporaneous correlation in the error terms, and bias the standard errors (Moulton, 1990). As conventional, I will therefore adjust the standard errors for clustering within 3-digit industries. A second estimation issue is the potential endogeneity of offshoring, which arises if wages and offshoring are chosen simultaneously or if there are unobserved time-variant industry characteristics that jointly influence the two variables. As discussed by Geishecker and Gorg (2008), simultaneity should not be crucial when combining individual wage data with industry-

¹⁸ I control for hours on current job to clean the results from changes in labor supply after displacement, and in particular from the effects of switching to part-time jobs. This is necessary because the only comparable wage variable reported by the DWS for both current and lost job is measured weekly, and may therefore reflect changes in worked hours upon reemployment. Results are qualitatively the same if an indicator for full-time jobs is used instead, or if the sample is restricted to workers reemployed full-time; in this latter case, however, the loss of degrees of freedom is substantial, due to the lower number of observations.

¹⁹ Predisplacement industry dummies are 75 binary indicators for the CIC80 3-digit industries, while occupation dummies are 11 binary indicators for the COC80 major occupational groups.

level offshoring proxies; this argument should be even more compelling in this case, because offshoring is observed with one- to three-year lags relative to the reemployment wages. Similarly, omitted unobserved characteristics should not play a large role, because equation (3) is conditioned on a large set of industry controls. Nevertheless, I will formally test for the exogeneity of offshoring, by reporting the *C*-statistics obtained with Instrumental Variable estimation of (3) using the first two lags of offshoring as instruments (as in Geishecker and Gorg, 2008).

Additional bias may arise from the aforementioned limitations of the DWS. The first issue is that the DWS do not allow for proper measurement of the labor market experience after displacement. This variable may be negatively correlated with offshoring, as workers displaced from high-offshoring industries may face more difficulties in finding a new job, and positively correlated with the reemployment wages, as the latter usually grow with postdisplacement experience (Kletzer, 1989). Omitting this variable from (3) may thus induce a negative bias in the offshoring coefficients, while including it may bias the results due to measurement error. I will follow Neal (1995), and report a separate set of estimates obtained by augmenting equation (3) with labor market experience after displacement, while controlling for the number of jobs held by the individual before the interview to partly account for the effects of additional displacement episodes.

The lack of longitudinal information in the DWS prevents from controlling for individual unobserved heterogeneity (e.g., ability). Previous studies have however shown that wage and tenure on the lost job convey substantial information on unobserved individual abilities: these variables represent in fact important predictors of reemployment wages, suggesting that they reflect innate characteristics that the worker

carries on across jobs (Addison and Portugal, 1989; Kletzer, 1989). Following these studies, I will therefore show separate estimates of an augmented model that also includes wage, tenure and tenure squared on the lost job.

The retrospective nature of the DWS implies that individuals are more likely to report costly episodes of displacement, especially if the latter occurred long before the interview. In these circumstances, reemployment outcomes may be worse than after less painful episodes. Following the usual approach in the literature (see, e.g., Kletzer, 2000), I will perform robustness checks by keeping only individuals displaced no more than two years before the survey, for whom the recall bias is more limited. An additional problem with the DWS is that the sample of displaced workers may be endogenously determined by firms firing less productive employees, who then face worse reemployment outcomes. The conventional approach in the literature is to restrict the sample to individuals displaced by plant closing, whose displacement is usually considered as exogenous (Topel, 1990; Neal, 1995). I will follow the same approach in some robustness checks of the main results.

A last estimation issue is raised by the fact that the reemployed workers may not represent a random sample drawn from the stock of unemployed individuals. In particular, reemployed workers may have lower reservation wages, and therefore, *ceteris paribus*, their postdisplacement earnings may be lower than those of individuals who are still unemployed (Addison and Portugal, 1989). To account for the sample selection, I will report robustness checks using the Heckman's (1979) two-step estimator. In practice, the wage equation (3) will be augmented by the inverted Mills ratio from a probit reemployment equation. Identification of the model requires that some variables enter the probit equation, but are excluded from the wage equation.

Following Addison and Portugal (1989), I will exclude the year-of-displacement dummies, which are intrinsically associated with the selection mechanism since workers displaced more recently have less chances of finding a new job, as shown in Section (2).²⁰ Moreover, following results in Ruhm (1992) and Fallick (1993), I will include in the selection equation (but not in the wage equation) dummies for reason of displacement and for whether displacement was notified in advance to the worker. Finally, hours worked on the current job will enter the wage equation but not the probit equation, because they are observed only for reemployed individuals.

4. RESULTS

OLS estimates of equation (3) are reported in Table 4. Columns (1) and (6) refer to the baseline model with no control for labor market experience and individual heterogeneity; in column (1) offshoring is proxied by *OS*, while in column (6) it is proxied by *OS_Sc*. Note that all coefficients on the individual-level variables are precisely estimated and have the expected sign. In particular, weekly reemployment wages are increasing and concave in age, and are lower for female, foreign born, non-white, unskilled and non-married individuals, as well as for those living outside a metropolitan area. Moreover, weekly reemployment wages rise with the number of worked hours, suggesting that this control is important to isolate true wage changes from adjustments in labor supply.

The state unemployment rate enters the specifications with a large negative coefficient, although the parameters are imprecisely estimated. Consistent with

²⁰ Note that the difference between the survey year and the displacement year measures time since displacement.

expectations and with results from previous studies (Kandilov, 2006), bad economic conditions in the local labor markets are therefore associated with lower reemployment wages. As for the industry-level controls, note that their coefficients are generally imprecisely estimated, probably because much of the effects of these variables is already absorbed by the industry- and time-dummies. The pattern of sign suggests however that reemployment wages are positively affected by labor productivity and skill intensity in the predisplacement industry, and negatively affected by industry size and ICT intensity.

Turning to offshoring, the estimated coefficients are negative and precisely estimated at the 5 percent level in both column (1) and column (6). Hence, higher offshoring in the predisplacement industry significantly lowers individual reemployment wages. The point estimates imply that a one percentage point increase in offshoring reduces postdisplacement earnings by about 0.37 percent in the case of *OS* and 0.62 percent in the case of *OS_Sc*. The bottom part of the table contains test statistics obtained from Instrumental Variable estimation of (3) using the first two lags of the offshoring proxies as instruments for their current levels. Note that the Hansen *J*-statistics for overidentifying restrictions are low, while the *F*-statistics for excluded instruments are high: overall, this suggests that lagged values of offshoring are valid and relevant instruments for current levels.²¹ Importantly, the *C*-statistics do not reject the null hypothesis that offshoring is exogenous in equation (3).

²¹ The *F*-statistics are corrected for arbitrary heteroskedasticity and within-cluster correlation in the error terms, as suggested by Baum et al. (2003). As a rule of thumb, an *F*-statistic higher than 10 indicates that instruments are relevant (Staiger and Stock, 1997).

In the following columns, the baseline model is progressively augmented with other control variables. To start with, columns (2) and (7) include industry- and state-specific time trends, to control for changes in economic conditions that are not fully captured by the variables already present in the baseline specifications. Results are qualitatively unaffected, and the offshoring coefficients actually increase in absolute terms. Columns (3) and (8) control for labor market experience after displacement and for the number of jobs held by the individual before the interview. Consistent with results in Kletzer (1989), reemployment earnings rise with experience. The positive effect of this variable is however mitigated by an increase in the number of jobs held before the interview. The coefficients of offshoring remain negative and precisely estimated and show only minor changes in their absolute size. This suggests that controlling for labor market experience does not make a large difference in practice.

Columns (4) and (9) include log wage, tenure and tenure squared on the lost job, in order to control for unobserved individual heterogeneity. Note that reemployment wages are positively affected by these variables, whose coefficients are remarkably close to those estimated by previous studies (see, e.g., Addison and Portugal, 1989). As already mentioned, one possible explanation for this finding is that wages and tenure on the lost job capture unobserved individual characteristics that are valued also by the new employers. After including these controls, the offshoring coefficients remain negative and significant, but drop in absolute terms: this suggests that workers displaced from high-offshoring industries have unobserved characteristics that negatively affect their reemployment wages.

Finally, columns (5) and (10) control for import penetration. This variable enters with the negative sign and its coefficient is precisely estimated: consistent with

Kandilov (2006), higher import penetration in the predisplacement industry lowers wages upon reemployment. The coefficients of *IMPEN* show that a one percentage point increase in import penetration reduces postdisplacement wages by about 0.50 percent. The magnitude of the effect is larger than in Kandilov (2006), where the same increase in import penetration was found to lower reemployment wages by about 0.20 percent. Because the sample used by the author starts in 1979, this probably suggests that the impact of import penetration has become stronger over time.²² More importantly, both offshoring proxies continue to enter with the negative sign, and their coefficients remain statistically significant. Hence, offshoring represents a complementary determinant of postdisplacement earning losses, and its effects worsen those of import penetration.

How large is the impact of offshoring on postdisplacement wages? To answer this question, I perform a simple back-of-the-envelope calculation of the change in real wages induced by the increase in offshoring over the sample period. Multiplying the coefficients in columns (5) and (10) of Table 4 with the percentage changes in the offshoring proxies reported in Table 2 yields a reduction in the real weekly reemployment earnings of about 1.75 percent for *OS* and 0.60 percent for *OS_Sc*. Given a mean reemployment wage of 361 dollars per week in 1991, these figures imply, respectively, a weekly loss of 6.3 and 2.1 dollars. Finally, considering an average of 52 weeks per year, the annual loss ranges between 328 and 109 dollars.

²² Kandilov (2006) found stronger effects, of the same order of magnitude as those of *IMPEN*, when using import penetration from low-income countries instead of overall import penetration.

4.1 Robustness Checks

Table 5 contains robustness checks of the previous results, using the same specifications as in columns (5) and (10) of Table 4. For the sake of space, the table reports only the coefficients of offshoring. To begin with, panel a) replaces *OS* and *OS_Sc* with equivalent indicators normalized by real output rather than non-energy inputs. While the precision of the estimates falls somewhat, coefficients remain negative and are even larger than in previous specifications, suggesting that the main results are not just an artifact of the chosen normalization.

In panel b), the sample is restricted to workers displaced no more than two years before the interview, in order to mitigate the potential recall bias in the DWS. Reassuringly, coefficients maintain the negative sign and are precisely estimated at the 5 percent level. Interestingly, point estimates are larger than those obtained on the whole sample. This suggests that, although relevant in theory, recall bias is not a crucial issue for the main results of the paper. Panel c) restricts the sample to workers displaced after plant closing. The offshoring coefficients remain negative and statistically significant, indicating that the previous findings are not driven by the potential endogeneity of the DWS sample due to firms firing less productive employees.

Panel d) contains results obtained with the Heckman's (1979) two-step estimator, which corrects for selection bias in the sample of reemployed individuals. Estimates of the probit reemployment equation are reported separately in Table 6, and are broadly consistent with previous studies (e.g., Addison and Portugal, 1989; Kandilov, 2006): in particular, the probability of reemployment is higher for white, married and skilled individuals, increases when displacement is notified in advance, and is negatively affected by bad economic conditions in the local labor markets. Coming back to panel

d) of Table 5, note that the Mills ratio enters the wage equation with the negative sign, pointing to negative selection: *ceteris paribus*, reemployed individuals have lower postdisplacement wages compared to those who are still unemployed at the time of the interview. Nevertheless, selection is not strong enough to undermine the main results on offshoring.

4.2 Individual Characteristics and Industrial Mobility

I now extend the model to study whether the previous results mask heterogeneity across different subsets of displaced workers. I focus on four characteristics: education, occupation, race and gender. In practice, I augment the richest specifications in columns (5) and (10) of Table 4 with interaction terms between the offshoring proxies and dummies for high-skilled, white-collar, female and white individuals.²³ Results are reported in Table 7. Interestingly, none of the interaction terms is statistically different from zero. This suggests that the effects of offshoring are independent of individual characteristics, of the type of occupation, and of the level of educational attainment.

At a first glance, the result for high-skilled and white-collar employees may seem surprising, given the robust finding in the previous literature that offshoring raises the relative earnings of more educated and white-collar workers. More recent contributions suggest however that this effect is mostly driven by an increase in the relative wages of skilled workers who remain continuously employed (Geishecker and

²³ The white-collar dummy takes value 1 if before displacement the worker performed one of the following occupations: executive, administrative and managerial occupations; professional specialty occupations; technical and related support occupations; sales occupations; administrative support occupations; other service occupations.

Gorg, 2008), and by longer periods of unemployment for unskilled workers who lose their jobs due to offshoring (Geishecker, 2008).

Next, I study whether the effects of offshoring are related to the sectorial and industrial mobility of workers after displacement. In my sample, a large fraction of workers (53 percent) are reemployed outside the manufacturing sector, and even among the individuals who are reemployed in manufacturing a substantial share (60 percent) switch to a different 3-digit industry. Does offshoring affect these workers differently from those who find a new job in the old industry? To answer this question, I augment the richest specifications in Table 4 with interaction terms between the two offshoring proxies and dummies for whether the individual is reemployed outside the manufacturing sector or in a different manufacturing industry.

Results are in Table 8. Columns (1) and (3) analyze the effects of exiting the manufacturing sector, while columns (2) and (4) those of switching to a different 3-digit manufacturing industry. Strikingly, all coefficients of the interaction terms are negative, large, and precisely estimated at the 1 percent level. The coefficients of the linear terms, on the other hand, are always small and generally insignificant. These results suggest that the wage losses documented before crucially depend on the sectorial and industrial mobility of workers after displacement: individuals who exit the manufacturing sector or change industry upon reemployment bear the bulk of the earning loss; for the remaining workers, there is no sensible change in wages.

Can this evidence be reconciled with existing theories of offshoring? Although, to the best of my knowledge, there is still no model studying explicitly how offshoring shapes worker mobility across industries and how this feeds back into individual wages, some broader theories of offshoring may probably help rationalize these facts.

According to a first set of models, offshoring should reduce labor demand in the industry, because firms are allowed to substitute domestic workers with imported intermediate inputs: *ceteris paribus*, this should worsen reemployment opportunities in the predisplacement industry and drive down the average wage (Feenstra and Hanson, 2003). Other models stress instead that offshoring raises labor productivity, because firms can exploit a more efficient allocation of production across national borders: other things being equal, this allows the predisplacement industry to produce the same level of output with less employment at higher wages (Grossman and Rossi-Hansberg, 2009). Combining the two effects imply that only a fraction of workers will find new jobs in the old industry, while the others will be forced to switch to different industries. This is consistent with the figures on postdisplacement mobility mentioned above. Moreover, for the workers who stay in the old industry, there may not be any appreciable change in wages, due to the offsetting effects of a lower labor demand and a higher labor productivity. For the other workers, instead, wages may substantially decline, because by changing industry they loose a large fraction of human capital (Neal, 1995). The pattern of wage changes emerging from Table 8 is broadly consistent with these predictions.

5. CONCLUSION

This paper studied the effects of offshoring on the reemployment wages of U.S. displaced workers over the 1990s. The empirical results showed that offshoring implies a substantial earning loss, which ranges between 110 and 330 dollars per year and is independent of individual characteristics such as gender and age, occupation and educational level. The effects are driven by the large share of individuals who are forced

to change industry upon reemployment, suggesting that the earning loss reflects a substantial devaluation of human capital.

These findings point to a new, and so far rather overlooked channel through which offshoring may impose economic costs on individual employees. Not only can it raise job instability and the risk of job loss as recently suggested by a number of empirical studies, it can also worsen labor market outcomes after displacement. Overall, this brings about two implications for the redesign of government intervention programs aimed to assist workers against negative trade shocks. First, these programs should be extended to industries experiencing upsurges in offshoring, and not just limited to those exposed to import penetration and foreign competition. Second, they should be broadened so as to support individual income not only during unemployment, but also in the initial period after reemployment, when workers' skills usually do not match with those required on the new job.

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Table 1 - Variables

Label	Definition	Sources
<i>a) Individual-Level Variables</i>		
EMPL	<i>Employed Dummy</i> : Equal to 1 if employed at the survey date	Displaced Workers Supplements (1994-2002).
CURRENT JOB WAGE	<i>Real Weekly Wage on Current Job</i> : Constant 1987 U.S. dollars	Displaced Workers Supplements (1994-2002).
CURRENT JOB HOURS	<i>Weekly Hours on Current Job</i>	Displaced Workers Supplements (1994-2002).
EXPERIENCE	<i>Years of Labor Market Experience after Displacement</i> : (Year of Survey-Year of Displacement-Duration of Unemployment)	Displaced Workers Supplements (1994-2002).
# JOBS	<i>Number of Jobs Held after Displacement</i>	Displaced Workers Supplements (1994-2002).
LOST JOB WAGE	<i>Real Weekly Wage on Lost Job</i> : Constant 1987 U.S. dollars	Displaced Workers Supplements (1994-2002).
LOST JOB TENURE	<i>Years of Tenure on Lost Job</i>	Displaced Workers Supplements (1994-2002).
FEMALE	<i>Female Dummy</i> : Equal to 1 if female	Displaced Workers Supplements (1994-2002).
MARRIED	<i>Married Dummy</i> : Equal to 1 if married	Displaced Workers Supplements (1994-2002).
FORBORN	<i>Foreign Born Dummy</i> : Equal to 1 if born outside the U.S.	Displaced Workers Supplements (1994-2002).
WHITE	<i>White Dummy</i> : Equal to 1 if white	Displaced Workers Supplements (1994-2002).
METRO	<i>Metropolitan Area Dummy</i> : Equal to 1 if lives in metropolitan areas	Displaced Workers Supplements (1994-2002).
AGE	<i>Age</i> : Years	Displaced Workers Supplements (1994-2002).
HIGHSKILLED	<i>High Skilled Dummy</i> : Equal to 1 if holds at least a bachelor degree	Displaced Workers Supplements (1994-2002).
REASON 1	<i>Reason for Displacement Dummy</i> : Equal to 1 if displaced by plant closing	Displaced Workers Supplements (1994-2002).
REASON 2	<i>Reason for Displacement Dummy</i> : Equal to 1 if displaced because of insufficient work	Displaced Workers Supplements (1994-2002).
REASON 3	<i>Reason for Displacement Dummy</i> : Equal to 1 if displaced because of position abolished	Displaced Workers Supplements (1994-2002).
NOTICE	<i>Advance Notice Dummy</i> : Equal to 1 if displacement was notified in advance	Displaced Workers Supplements (1994-2002).
<i>b) Industry- and State-Level Variables</i>		
OS	<i>Offshoring</i> : (Imported intermediate inputs)/(total non-energy input purchases). Proxy based on Input-Output data and economy-wide import penetration rates	BEA Input-Output Matrices for years 1977, 1982, 1987, 1992, 1997, 2002. NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
OS_Sc	<i>Offshoring</i> : (Imported intermediate inputs)/(total non-energy input purchases). Proxy based on imports of parts and components from product-level data	Schott (2004). NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
IMPEN	<i>Import Penetration</i> : Imports/(Production+Imports-Exports)	Feenstra et al. (2002). NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
Y	<i>Real Output</i> : Value of shipments at constant 1987 U.S. dollars	NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
LABPROD	<i>Labor Productivity</i> : (Value Added)/(Total Employment)	NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
SKINT	<i>Skill Intensity</i> : (Non-Production Workers)/(Total Employment)	NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
CAPINT	<i>Capital Intensity</i> : (Capital Stock)/(Total Employment)	NBER Manufacturing Industry Productivity Database. Annual Survey of Manufactures.
ICT	<i>High-Tech Share of Capital Stock</i> : (High-Tech Capital)/(Total Capital Stock)	Bureau of Economic Analysis.
URATE	<i>State-Level Unemployment Rate</i>	Bureau of Labor Statistics.

Table 2 - Descriptive Statistics on Offshoring and Control Variables

	Obs.	Mean	Std. Dev.	Change 91-01
<i>a) Offshoring and Import Penetration</i>				
OS	836	0.09	0.02	0.06
OS_Sc	836	0.05	0.01	0.01
IMPEN	836	0.19	0.03	0.09
<i>b) Industry-Level Controls</i>				
Y	836	45060761	77616068	-
LABPROD	836	121	125	-
CAPINT	836	102	120	-
SKINT	836	0.29	0.13	-
ICT	836	0.05	0.03	-
<i>c) State-Level Controls</i>				
URATE	561	0.05	0.02	-

Author's calculations on a sample of 11 years and 76 industries (panels a) and b)), and 11 years and 51 states (panel c)). Reported figures are fractions, except for the change between 1991 and 2001 (in percentage points) and for the variables *Y*, *LABPROD*, and *CAPINT* (in thousands of U.S. dollars, at constant 1987 prices). Variable names, definitions and sources are reported in Table 1.

Table 3 - Descriptive Statistics on Displaced Workers

	Whole Sample			Reemployed Workers						
				All			Displaced from:			
							High OS	Low OS	High OS_Sc	Low OS_Sc
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Mean	Mean	Mean	Mean
EMPL	3586	0.77	0.42	2743	1.00	-	1.00	1.00	1.00	1.00
CURRENT JOB WAGE	-	-	-	2743	389.03	293.52	385.55	394.65	364.55	407.12
CURRENT JOB HOURS	-	-	-	2743	40.40	9.26	40.27	40.61	40.04	40.79
EXPERIENCE	3586	1.30	1.22	2743	1.42	1.18	1.37	1.50	1.40	1.45
# JOBS	3586	1.25	1.06	2743	1.50	0.95	1.46	1.56	1.50	1.50
LOST JOB WAGE	3586	576.78	497.08	2743	581.89	495.99	581.55	582.29	541.27	620.61
LOST JOB TENURE	3586	6.72	7.78	2743	6.70	7.65	6.53	6.96	6.05	7.01
FEMALE	3586	0.35	0.48	2743	0.34	0.47	0.39	0.27	0.39	0.31
MARRIED	3586	0.62	0.49	2743	0.64	0.48	0.63	0.65	0.61	0.65
FORBORN	3586	0.13	0.33	2743	0.12	0.32	0.13	0.10	0.16	0.11
WHITE	3586	0.77	0.42	2743	0.80	0.40	0.78	0.82	0.77	0.83
METRO	3586	0.76	0.43	2743	0.75	0.43	0.78	0.71	0.76	0.76
AGE	3586	39.66	10.75	2743	39.45	10.57	39.22	39.77	38.98	39.81
HIGHSKILLED	3586	0.19	0.39	2743	0.21	0.41	0.24	0.17	0.17	0.22
REASON 1	3586	0.42	0.49	2743	0.44	0.50	0.44	0.43	0.45	0.41
REASON 2	3586	0.36	0.48	2743	0.33	0.47	0.32	0.34	0.35	0.35
REASON 3	3586	0.22	0.42	2743	0.24	0.42	0.24	0.22	0.20	0.24
NOTICE	3543	0.40	0.49	2713	0.41	0.49	0.42	0.40	0.41	0.42

Author's calculations based on DWS (1994-2002). The sample includes individuals displaced from a full-time manufacturing job between 1991 and 2001, who aged 20-65 and were still in the labor force at the time of the interview. High-offshoring industries are those above the median change in the offshoring proxy between 1991 and 2001. Variable names, definitions and sources are reported in Table 1.

Table 4 - Main Results

Dependent Variable: Log of Real Weekly Reemployment Wage

<i>Coefficient</i>	<i>Offshoring Proxy</i>	OS					OS_Sc				
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OFFSHORING		-0.371**	-0.386**	-0.361**	-0.298*	-0.291*	-0.623**	-0.644**	-0.674**	-0.653**	-0.579**
		[0.165]	[0.166]	[0.172]	[0.162]	[0.165]	[0.250]	[0.259]	[0.261]	[0.287]	[0.245]
IMPEN						-0.544*					-0.502*
						[0.282]					[0.262]
<i>ln</i> LABPROD		0.200	0.218	0.211	0.240*	0.258*	0.322**	0.340**	0.332**	0.350***	0.359***
		[0.146]	[0.153]	[0.152]	[0.130]	[0.134]	[0.136]	[0.144]	[0.143]	[0.124]	[0.128]
<i>ln</i> Y		0.006	-0.006	-0.002	-0.006	-0.006	-0.006	-0.016	-0.011	-0.013	-0.013
		[0.042]	[0.045]	[0.043]	[0.040]	[0.042]	[0.046]	[0.047]	[0.045]	[0.042]	[0.045]
CAPINT		-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
		[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
SKINT		0.700*	0.759*	0.712*	0.527	0.732*	0.371	0.398	0.353	0.201	0.414
		[0.408]	[0.418]	[0.421]	[0.427]	[0.373]	[0.401]	[0.414]	[0.412]	[0.415]	[0.371]
ICT		-1.051	-1.167	-1.313	-0.868	-1.352	-1.225	-1.319	-1.454	-0.978	-1.424
		[2.006]	[2.006]	[1.946]	[1.788]	[1.842]	[1.986]	[1.986]	[1.926]	[1.763]	[1.809]
FEMALE		-0.219***	-0.218***	-0.218***	-0.181***	-0.181***	-0.219***	-0.218***	-0.218***	-0.181***	-0.181***
		[0.027]	[0.027]	[0.027]	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]	[0.026]
MARRIED		0.055**	0.056**	0.052**	0.045*	0.045*	0.055**	0.056**	0.052**	0.045*	0.045*
		[0.024]	[0.024]	[0.024]	[0.023]	[0.023]	[0.024]	[0.024]	[0.024]	[0.023]	[0.023]
FORBORN		-0.101**	-0.102**	-0.105**	-0.086*	-0.086*	-0.101**	-0.102**	-0.105**	-0.086*	-0.086*
		[0.049]	[0.050]	[0.050]	[0.045]	[0.045]	[0.050]	[0.051]	[0.051]	[0.045]	[0.045]
WHITE		0.126***	0.127***	0.122***	0.109***	0.108***	0.125***	0.126***	0.121***	0.108***	0.108***
		[0.036]	[0.036]	[0.036]	[0.033]	[0.033]	[0.036]	[0.036]	[0.035]	[0.032]	[0.032]
METRO		0.124***	0.124***	0.125***	0.101***	0.100***	0.122***	0.122***	0.123***	0.099***	0.099***
		[0.023]	[0.023]	[0.024]	[0.024]	[0.025]	[0.024]	[0.024]	[0.024]	[0.025]	[0.025]
AGE		0.040***	0.040***	0.040***	0.028***	0.028***	0.040***	0.040***	0.040***	0.027***	0.027***
		[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
AGE ² / 100		-0.047***	-0.046***	-0.047***	-0.034***	-0.034***	-0.046***	-0.046***	-0.047***	-0.034***	-0.034***
		[0.009]	[0.009]	[0.008]	[0.008]	[0.008]	[0.009]	[0.009]	[0.008]	[0.008]	[0.008]
HIGHSKILLED		0.263***	0.262***	0.261***	0.224***	0.223***	0.263***	0.263***	0.261***	0.225***	0.224***
		[0.032]	[0.032]	[0.031]	[0.029]	[0.030]	[0.033]	[0.033]	[0.032]	[0.030]	[0.030]
<i>ln</i> CURRENT JOB HOURS		0.964***	0.964***	0.956***	0.937***	0.937***	0.965***	0.965***	0.956***	0.937***	0.937***
		[0.067]	[0.067]	[0.066]	[0.066]	[0.066]	[0.067]	[0.067]	[0.065]	[0.066]	[0.066]
URATE		-0.788	-0.761	-0.689	-0.429	-0.467	-0.737	-0.730	-0.643	-0.374	-0.421
		[1.752]	[1.765]	[1.785]	[1.680]	[1.690]	[1.728]	[1.739]	[1.762]	[1.651]	[1.661]
EXPERIENCE				0.088**	0.095**	0.096**			0.091**	0.098**	0.099**
				[0.041]	[0.042]	[0.042]			[0.041]	[0.042]	[0.042]
# JOBS				-0.046***	-0.047***	-0.047***			-0.046***	-0.047***	-0.047***
				[0.010]	[0.009]	[0.009]			[0.010]	[0.009]	[0.009]
<i>ln</i> LOST JOB WAGE					0.176***	0.177***				0.176***	0.177***
					[0.015]	[0.016]				[0.015]	[0.016]
LOST JOB TENURE					0.012***	0.012***				0.013***	0.013***
					[0.005]	[0.005]				[0.005]	[0.005]
LOST JOB TENURE ² / 100					-0.047**	-0.046**				-0.047***	-0.046**
					[0.018]	[0.018]				[0.018]	[0.018]
Industry- and State-Specific Time Trends		NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
Obs.		2743	2743	2743	2743	2743	2743	2743	2743	2743	2743
R-squared		0.52	0.52	0.52	0.55	0.55	0.52	0.52	0.52	0.55	0.55

IV Statistics and Exogeneity Tests for Offshoring (separate regressions)

<i>F</i> -statistic	15.29	14.48	14.89	14.74	14.60	28.90	29.40	29.43	29.61	28.02
Hansen <i>J</i> -statistic	0.49	0.48	0.34	1.19	0.91	0.27	0.19	0.13	0.04	0.31
Hansen <i>J</i> -statistic (<i>p</i> -value)	0.48	0.49	0.56	0.28	0.34	0.61	0.66	0.72	0.85	0.58
<i>C</i> -statistic	1.67	1.84	1.19	1.51	1.99	0.00	0.02	0.00	0.49	0.29
<i>C</i> -statistic (<i>p</i> -value)	0.20	0.18	0.28	0.22	0.16	0.96	0.89	0.99	0.48	0.59

OLS regressions with standard errors clustered by industry of displacement in brackets. ***, **, * = significant at 1, 5, and 10 percent level respectively. All specifications include full sets of dummies for predisplacement industry and occupation, state of residence, year of displacement and year of the survey. Variable names, definitions and sources are reported in Table 1.

Table 5 - Robustness Checks

Dependent Variable: Log of Real Weekly Reemployment Wage

<i>Coefficient</i>	<i>Offshoring Proxy</i> OS	OS_Sc
	(1)	(2)
<i>a) Normalizing Offshoring by Industry Output</i>		
OFFSHORING	-0.415 [0.347]	-0.885** [0.443]
Obs.	2743	2743
R-squared	0.55	0.55
<i>b) Accounting for Recall Bias</i>		
OFFSHORING	-0.387** [0.188]	-0.748** [0.352]
Obs.	1886	1886
R-squared	0.54	0.54
<i>c) Accounting for Endogeneity of Displacement</i>		
OFFSHORING	-1.633** [0.651]	-1.073** [0.498]
Obs.	1198	1198
R-squared	0.59	0.59
<i>d) Heckman Selectivity-Adjusted Estimates</i>		
OFFSHORING	-0.266* [0.162]	-0.463** [0.230]
MILLS RATIO	-0.100 [0.069]	-0.107 [0.068]
Obs.	2713	2713
R-squared	0.55	0.55

OLS regressions with standard errors clustered by industry of displacement in brackets. ***, **, * = significant at 1, 5, and 10 percent level respectively. In panel a), offshoring is normalized by industry output, in panel b) the sample is restricted to workers displaced no more than two years before the interview, in panel c) only workers displaced by plant closing are included. The Mills Ratio reported in panel d) is obtained from separate probit reemployment equations, shown in Table 6. All specifications except panel d) include the same control variables as in columns (5) and (10) of Table 4; panel d) excludes the year-of-displacement dummies.

Table 6 - Probit Reemployment Equation

Dependent Variable: Dummy for Reemployed Workers

<i>Coefficient</i>	<i>Offshoring Proxy</i>	OS	OS_Sc
		(1)	(2)
OFFSHORING		-0.272 [0.463]	-2.577** [1.024]
IMPEN		0.162 [0.862]	0.341 [0.863]
<i>ln</i> LABPROD		0.767* [0.438]	1.111** [0.459]
<i>ln</i> Y		-0.313** [0.137]	-0.340** [0.137]
CAPINT		0.000 [0.002]	-0.001 [0.002]
SKINT		-0.963 [1.514]	-1.987 [1.567]
ICT		5.125 [5.045]	5.114 [5.000]
FEMALE		0.018 [0.069]	0.017 [0.069]
MARRIED		0.208*** [0.064]	0.211*** [0.064]
FORBORN		0.236** [0.102]	0.240** [0.102]
WHITE		0.335*** [0.086]	0.334*** [0.086]
METRO		0.134 [0.086]	0.135 [0.086]
AGE		0.002 [0.021]	0.002 [0.021]
AGE ² / 100		-0.011 [0.025]	-0.011 [0.025]
HIGHSKILLED		0.214** [0.090]	0.209** [0.090]
EXPERIENCE		1.146*** [0.096]	1.152*** [0.097]
# JOBS		0.819*** [0.095]	0.820*** [0.095]
<i>ln</i> LOST JOB WAGE		0.065 [0.043]	0.064 [0.043]
LOST JOB TENURE		0.021* [0.013]	0.022* [0.013]
LOST JOB TENURE ² / 100		-0.071* [0.043]	-0.072* [0.043]
REASON 2		0.018 [0.070]	0.016 [0.070]
REASON 3		0.038 [0.087]	0.038 [0.087]
NOTICE		0.138** [0.063]	0.141** [0.063]
URATE		-10.278** [4.663]	-9.679** [4.673]
Industry- and State-Specific Time Trends	YES	YES	YES
Obs.		3491	3491
Pseudo R-squared		0.39	0.39
Log-likelihood		-1177.02	-1174.57

Probit regressions with robust standard errors in brackets. ***, **, * = significant at 1, 5, and 10 percent level respectively. All specifications include full sets of dummies for predisplacement industry and occupation, state of residence, year of displacement and year of the survey. Variable names, definitions and sources are reported in Table 1.

Table 7 - Worker Heterogeneity

Dependent Variable: Log of Real Weekly Reemployment Wage

<i>Coefficient</i>	<i>Offshoring Proxy</i>	OS				OS_Sc			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OFFSHORING		-0.272*	-0.324*	-0.335*	-0.594***	-0.631***	-0.652**	-0.556**	-0.677**
		[0.160]	[0.181]	[0.175]	[0.193]	[0.217]	[0.247]	[0.250]	[0.286]
OFFSHORING*HIGHSKILLED		-0.088				0.148			
		[0.215]				[0.202]			
OFFSHORING*WHITECOLLAR			0.068				0.133		
			[0.178]				[0.099]		
OFFSHORING*FEMALE				0.108				-0.099	
				[0.163]				[0.106]	
OFFSHORING*WHITE					0.369				0.139
					[0.229]				[0.167]
Obs.		2743	2743	2743	2743	2743	2743	2743	2743
R-squared		0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55

OLS regressions with standard errors clustered by industry of displacement in brackets. ***, **, * = significant at 1, 5, and 10 percent level respectively. All specifications include the same control variables as in columns (5) and (10) of Table 4. *WHITECOLLAR* is a dummy equal to 1 if before displacement the worker performed one of the following occupations: executive, administrative and managerial occupations; professional specialty occupations; technical and related support occupations; sales occupations; administrative support occupations; other service occupations.

Table 8 - Sectorial and Industrial Mobility after Displacement

Dependent Variable: Log of Real Weekly Reemployment Wage

<i>Coefficient</i>	<i>Offshoring Proxy</i>	OS		OS_Sc	
		(1)	(2)	(3)	(4)
OFFSHORING		-0.042 [0.210]	0.334** [0.159]	0.128 [0.144]	0.225 [0.288]
OFFSHORING*NEWSECTOR		-0.625*** [0.159]		-0.671*** [0.137]	
OFFSHORING*NEWINDUSTRY			-0.766*** [0.158]		-0.785*** [0.262]
Obs.		2743	2743	2743	2743
R-squared		0.55	0.55	0.55	0.55

OLS regressions with standard errors clustered by industry of displacement in brackets. ***, **, * = significant at 1, 5, and 10 percent level respectively. All specifications include the same control variables as in columns (5) and (10) of Table 4. *NEWSECTOR* is a dummy equal to 1 if the individual is reemployed outside the manufacturing sector. *NEWINDUSTRY* is a dummy equal to 1 if the individual is reemployed in a different 3-digit manufacturing industry.