# Fringe Benefits and Import Competition

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**Abstract**

In the United States fringe benefits are now more than 30% of compensation. While many studies have focused on the impact of trade with developing countries on U.S. wages, not much attention has been given to the impact of such trade on other components of compensation. But if trade affects the share of benefits in compensation, the studies which focus on wages and ignore fringe benefits likely give us biased estimates of the effect of trade on workers' total compensation and consumption. I use data about individual workers' fringe benefits from the NLSY79. I focus on workers who worked in manufacturing in 1991 and I follow them up to 2006. I then combine this individual level dataset with a measure of exposure to Chinese imports at the industry level and with an instrument for it, as in Autor et al. (2014). I estimate the effect of Chinese import competition on fringe benefits to be positive and economically and statistically significant. The results are robust to the inclusion of several individual and industry

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level control variables. Differently from previous studies, my results suggest a more optimistic view of the effect of trade with China on U.S. workers' overall compensation.

**Keywords:** Fringe Benefits, Trade Flows, Compensation.

**JEL Classification:** F16, I13, J32

# 1 Introduction

While many studies have focused on the impact of trade with developing countries on U.S. wages, not much attention has been given to the impact of trade on other components of compensation. This is remarkable given that in the U.S. benefits are now more than 30% of compensation (Bureau of Labor Statistics (2015, Table A)). Moreover, benefits do not necessarily change over time at the same rate as wages. Indeed, for the 1987-2007 period, Pierce (2010) finds that the employer costs for hourly wage, health insurance benefits and retirement benefits increased, respectively, by 4.5%, 76% and 4.2%.[1] If the share of benefits in compensation is not constant, the studies which focus on wages and ignore fringe benefits may miss an important margin of adjustment of compensation in response to a trade shock. This paper aims at filling this gap in the literature by studying how imports of manufacturing from China affects employer-provided fringe benefits.[2]

The growth of trade between U.S. and China since the 1990s has been well documented. The increase in U.S. imports, as a fraction of GDP, is mainly due to the increase in U.S. imports from developing countries, with in turn this increase been mainly due to China

[1] My calculations from Table 2.1 in Pierce (2010).

[2] Note that some fringe benefits, such as Social Security and unemployment insurance, are *legally required* and so they cannot be adjusted without violating the law. The focus here is on *non*-legally required fringe benefits: arguably, at least in U.S., these benefits can more easily be adjusted in response to a shock. At the end of 2006, the last year in my sample, benefits were 30.1% of compensation and legally required benefits were 8% of compensation (Bureau of Labor Statistics (2007)).

(Krugman (2008, Figure 3) and Autor et al. (2014)). The difference in labor compensation between the U.S. and China is also large.[3] This offers both challenges and opportunities for U.S. workers. On one hand, competition from China may undercut the compensation of U.S. workers. On the other hand, as in Melitz (2003), trade may bring productivity increases which allow the compensation of U.S. workers to increase.

Trade may not only affect overall compensation but also its *composition*. In particular, trade may change the share of benefits in compensation through several channels. For example, if benefits are a luxury good for workers, then a trade-induced change in overall compensation will also affect the wage-benefits mix. Even if benefits are not a luxury good, trade may affect the size of the firm a worker works at.[4] In turn, this may change the share of benefits in compensation because larger firms are more likely to offer fringe benefits to workers (Bureau of Labor Statistics (2015, Table 8)).

To empirically explore the impact of trade on benefits, I use individual workers data from the National Longitudinal Survey of Youth 1979 (NLSY79). Similarly to Autor et al. (2014), I focus on workers who worked in manufacturing in 1991 and I follow them up to 2006. I then combine this individual level dataset with a measure of Chinese import competition at the industry level and with an instrument for it. To preview the results, suppose that a worker works in 1991 in manufacturing industry $j$. I find that, on average, the higher the Chinese import competition for $j$ between 1991 and 2006, the higher the total number of years the worker is covered by employment-sponsored health insurance (EHI hereafter) and participates in an employment-sponsored retirement plan (ERP hereafter) during the 1992-

[3] In 2008 the hourly compensation costs in China's manufacturing sector were only 4 percent of those in the United States (Banister and Cook (2011)).

[4] As in Melitz (2003), trade may affect the size of a worker's current firm and trade may also reallocate workers from, say, smaller firms to larger firms.

2006 period.[5] Chinese import competition also increases the total number of other fringe benefits (such as life insurance and maternity leave) available to the worker during the period. The results are robust to the inclusion of several individual and industry level controls. These results cast a more positive light on trade with China than what was previously found in other studies such as Autor et al. (2014).

There is now a large literature on the effect of Chinese imports on the U.S. labor market. Some studies find overall negative effects. For example, Autor et al. (2013) find that wages decrease and unemployment increase in local labor markets which are more exposed to import competition from China. Other studies report more mixed results. For example, Kemeny et al. (2015) find that Chinese import competition is associated with an increase in job loss for lower skill workers but it is not significantly related to job losses for workers with at least a college degree. Lake and Millimet (2015) find that Chinese import penetration destroys bad jobs but also creates good jobs. I find that Chinese imports are positively associated with fringe benefits, an important characteristic of a good job.

A more recent strand of literature looks at the effect of trade on the *non-monetary* components of compensation. McManus and Schaur (2014) show that Chinese imports are associated with increased injury rates in the competing U.S. manufacturing industries, especially at smaller establishments. McManus and Schaur (2015) and Pierce and Schott (2015) report a negative effect of Chinese imports on health insurance coverage but their focus is mainly on the effect of Chinese imports on health across local labor markets. They also do not distinguish health insurance coverage *provided by the employer* from other forms of health insurance coverage. Instead, my focus is on the effect of Chinese trade on *non-*

[5]It is more common to say that a worker is *covered* by EHI and *participates* in an ERP. For convenience in what follows I use *coverage* and *participation* interchangeably to refer to both benefits.

*wage monetary* components of compensation.[6] Finally, Autor et al. (2013) study how trade with China affects the transfer of *public* benefits to workers such as Medicare and disability payments.

One of the main focuses of the literature is to identify how trade affects an individual's income, where income is taken as a proxy for overall compensation, ignoring fringe benefits. But even if a worker does not receive any fringe benefits, her consumption, rather than her income, is arguably a better indicator of her welfare ((Goldberg and Pavcnik, 2007, p. 45)). If trade affects the relative prices of consumer goods, then focusing only on the effect of trade on income may miss other important effects of trade on welfare. For this reason another literature studies the effect of trade on consumption (see e.g. Porto (2006) and Fajgelbaum and Khandelwal (2014)). Like income, fringe benefits are a component of an individual's overall compensation but, being in-kind and so non-monetary, they are also part of an individual's consumption bundle. By studying the effect of trade on fringe benefits, this paper straddles the two literatures on the effect of trade on income and on consumption.

Methodologically, this paper is most closely related to the seminal works of Kosteas (2008) and of Autor et al. (2014). Kosteas (2008) also uses the NLSY79 to study the effect of trade with less-developed countries but he focuses on wages and on an earlier period. Autor et al. (2014) use instead Social Security data and focus on the impact of Chinese trade on a variety of labor market outcomes. I follow these papers in using the variation of trade *across industries* to identify the effect of trade on the outcome of interest.[7] Autor

[6]The risk of injury studied in previous work is a *non-wage and non-monetary* component of compensation as opposed to fringe benefits which are a *non-wage but monetary* component of compensation (Hamermesh (1999)). While fringe benefits are a large component of compensation in a developed country such as the United States, they can be important in developing countries too. For example, during China's transformation to a more market-oriented economy, when many state owned enterprises closed, their employees lost the pension and health insurance benefits associated with their jobs (Barber and Yao (2010) and Naughton (2007)).

[7]Alternative strategies consist in using the geographical variation of trade across distinct geographic

et al. (2014) are also the first to instrument the change in Chinese imports to U.S. with the change in Chinese imports to other rich countries, a strategy I follow here.

Section 2 discusses various mechanisms through which in theory trade may affect benefits. Section 3 presents the econometric model while Section 4 discusses the variables in the analysis and the data sources. Section 5 contains the results and Section 6 concludes.

# 2 Theoretical Motivation

The goal of this section is to argue that trade may affect the share of benefits in total compensation. If so, focusing on the effect of trade on wages, while ignoring benefits, may give us an incomplete picture of the effect of trade on workers' total compensation. A basic model used to study how the share of benefits in compensation is determined is the following (see e.g. Currie and Madrian (1999, p. 3364)). Suppose that the worker's utility function is $U(W, B)$ where $W$ are her wages and $B$ are her benefits, both expressed in dollars. The utility function is concave and monotonic. The overall cost of a worker to her employer is denoted with $C$, which is also expressed in dollars. This cost includes the wage and benefits cost of compensating a worker. The employer can "convert" C dollars into wages and benefits according to the offer curve $C = P_B B + W$ where $P_B$ is the "price" of a dollar of benefits in terms of a dollar of wages. This price captures in a simple way the fact that some employers may be more effective at providing benefits than others, i.e. their $P_B$ will be lower. The relationship $C = P_B B + W$ acts therefore as a budget constraint for the worker who will choose her preferred bundle out of those offered to her.

units, as e.g. in Autor et al. (2013) and Kovak (2013), or constructing a measure of trade exposure at the occupational level as e.g. in Liu and Trefler (2011) and Ebenstein et al. (2014).

A worker then solves:

$$\max_{W,B} U(W,B) \text{ s.t. } P_B B + W = C \tag{1}$$

This simple formulation shows that the equilibrium bundle $(W, B)$ is affected by changes in $C$ and/or $P_B$. Existing trade models provide some mechanism through which trade may affect $C$ and/or $P_B$.

At first, for the sake of exposition, let's assume that trade does not affect $P_B$ but possibly only $C$. For example, according to the model in Melitz (2003), trade increases workers' productivity and so it bids up the amount that firms are willing to pay for them, i.e. $C$. Suppose that, for workers, benefits are a luxury good relative to wage compensation, as found e.g. in Woodbury (1983). In this case, then trade will increase the ratio $B/W$: with the higher compensation, a worker increases benefits more than proportionally than wages. In this case, ignoring benefits under-estimates the beneficial effect of trade on compensation. Instead, according to the Ricardian specific factors model, a worker who has accumulated some industry-specific human capital will see her compensation go down with an increase in import competition (Attanasio et al. (2004)). In this case, with a lower total compensation offered, if benefits are a luxury good, the worker will reduce the share of benefits in compensation. In this scenario, ignoring benefits under-estimates the adverse effect of trade on the compensation of workers in import-competing industries.

Now, still for the sake of exposition, let's focus on the possible effect of trade on $P_B$, ignoring its effect on $C$. For example, according to the model in Melitz (2003), trade also reallocates workers toward larger firms. But the price of benefits $P_B$ is likely to be lower at larger firms. Indeed, there is evidence that larger employers offer more benefits than smaller

employers.[8] This could be due for example to the fixed costs of administering a retirement or an health insurance plan. When faced with a lower relative price of benefits, even with an unchanged $C$, workers will likely increase the share of benefits in compensation $B/W$.[9] In this case, a regression of wages on trade will miss the fact that benefits have increased more than proportionally than wages. Again, this point reiterates the need of studying the effect of trade on benefits.

It is also possible that trade instead increases the price of benefits faced by workers. For example, because of import competition, workers may move out of manufacturing and into services (see e.g. Ebenstein et al. (2014)). Henly and Sanchez (2009, Fig. 1) document that the average size of U.S. establishments in manufacturing is much larger than in the service sectors. Therefore, a worker who leaves manufacturing for the services sector may move to a smaller establishment where he will likely face a higher relative price of benefits.

The discussion above suggests that trade may affect the share of benefits in compensation. This is because trade may affect $P_B$ and/or $C$ and, when $C$ and/or $P_B$ change, the share of benefits in compensation may change as well. This observation motivates the empirical study of the effect of trade on benefits.[10]

[8] Woodbury (1983, p. 174) finds that $B/W$ is higher at larger employers. For specific evidence on pension benefits and health insurance benefits see, respectively, Kobe (2010) and Janicki (2013, Table 7). If one thinks that these fixed costs are prohibitive for small employers, then this can be modeled with $P_B$ being plus infinity for these employers. In this case, the offer curve degenerates to a single point, with the worker being able to "choose" only the point $W = C$, with $B = 0$.

[9] Note that this does not require that benefits are a luxury good, just that the worker reacts to the lower $P_B$ by substituting some wages for benefits.

[10] The simple model in (1) does not include the fact that in U.S. many fringe benefits are paid with pre-tax dollars. This lowers the effective price of benefits faced by workers. Because of trade, a worker's gross income could be pushed in a different tax bracket and this will affect her effective price of benefits. Because her price of benefits has changed, she may change her wage-benefits mix even if benefits are not a luxury good and the size of her firm has not changed. The possible interaction between trade and a worker's marginal tax rate provides an additional reason to study the effect of trade on benefits.

# 3 Empirical Model

For individual $i$ at year $t$, let $ehip_{i,t}$ and $erpp_{i,t}$ be a dummy for, respectively, participation in EHI and participation in ERP. Let $SY$ be the set containing years 1992, 1993, and every even year between 1994 and 2006, with extremes included. Let $SY94$ be the set containing every even year between 1994 and 2006, with extremes included. I define $Totehip_i$ as equal to $\sum_{t \in SY} ehip_{i,t}$, i.e. the *total* number of *survey* years individual $i$ participated in EHI since 1992 to 2006.[11] I also define $Toterpp_i$ as $\sum_{t \in SY94} erpp_{i,t}$, i.e. the total number of survey years $i$ participated in ERP, where the restriction to $SY94$ is due to the fact that information on participation on ERP is available only since 1994. Finally, let also $othf_{i,t}$ be equal to the total number of fringe benefits, other than EHI and ERP, *available* to $i$ at year $t$ through her employer. These are benefits such as dental insurance and childcare; the full list of benefits is reported in Section 4. I analogously define $Totothf_i$ as $\sum_{t \in SY} othf_{i,t}$, i.e. the total sum of other benefits available to the worker during the period of interest. The baseline model for these three fringe benefits is then the following:

$$Y_i = \alpha + \beta \Delta IP_{j(i,91)} + \gamma X_i + \delta K_{j(i,91)} + \epsilon_i \tag{2}$$

where $Y_i$ is in turn equal to $Totehip_i$, $Toterpp_i$ and $Totothf_i$; $\Delta IP_{j(i,91)}$ is defined below; $X_i$ is a vector of individual level variables which includes the number of survey years $i$ reported a job during the 1992-2006 period and other variables, most of which are measured in 1991; $j(i, 91)$ is the industry of individual $i$ in 1991; $K_{j(i,91)}$ is a vector of industry-level controls for $i$'s industry $j$ in 1991 (for simplicity, I will omit the arguments of the $j$ function hereafter); $\epsilon_i$ is an error term. This model is very similar to the one used in Autor et al. (2014) with the

[11] The restriction to years in $SY$ is due to the fact that the NLSY79 is available only biyearly since 1994.

main difference being that I study benefits while they focus on earnings. All the variables are discussed in more detail in section 4.

The main regressor of interest is $\Delta IP_j$, defined as the *change* in U.S. industry $j$'s imports from China between 1991 and 2006, normalized by U.S. consumption of industry $j$ in 1991. In symbols:

$$\Delta IP_j = \frac{M^{chn}_{j,06} - M^{chn}_{j,91}}{Y_{j,91} + M_{j,91} - EX_{j,91}} \tag{3}$$

where, for manufacturing industry $j$ in 1991, $M^{chn}_{j,91}$ are imports from China into U.S., $Y_{j,91}$, $M_{j,91}$ and $EX_{j,91}$ are, respectively, U.S. shipments, total imports and exports. Therefore, the denominator of (3) measures total U.S. consumption of industry $j$'s good in 1991. In what follows I refer to $\Delta IP_j$ as *change in U.S. exposure to Chinese imports*.

I work with the sums of the participation dummies $ehip_{i,t}$ and $erpp_{i,t}$ and with the sum of the total availability of the other benefits $othf_{i,t}$ because I do not have data on the dollar value of benefits for the period of interest.[12] So, the focus here is on the *extensive* margin of benefits adjustment, i.e. whether a worker is offered benefits and whether the worker actually participates in them. However, benefits can also be adjusted at the *intensive* margin, both by the employer and the worker. For example, an employer may change the deductibles for EHI or the matching contribution for ERP. Even if the employer does not change the benefits offered to the worker, the worker may e.g. decide to switch to a higher quality - and so more expensive - EHI plan or to change its contribution to a ERP plan. In order to somewhat account for this additional margin, I focus at first on EHI and ERP *participation* rather than on EHI and ERP *availability*. This choice is not without problems. Indeed, participation in benefits is driven by many more factors than benefits' availability: if my regressors do not

[12]The NLSY79 contains some questions about the employer and employee contributions to ERP plans only for the years since 1994 to 2000. Moreover, many respondents who participate in an ERP plan have missing information for these questions.

fully account for all of these other factors, it is possible that my estimate of the effect of $\Delta IP_j$ on participation in benefits will be biased. For this reason, in the robustness checks I also use EHI and ERP *availability* as dependent variables. Moreover, I also study how the availability of fringe benefits other than EHI and ERP is affected by $\Delta IP_j$.

Note that the regression in (2) is a *cross-sectional* one. A worker is assumed to be exposed to a Chinese imports shock via her industry affiliation in 1991, i.e. at the beginning of the increase in Chinese imports into U.S. (Autor et al. (2013)). Since 1991 the worker may, for example, switch industry in response to the shock or even stop working altogether. The dependent variable summarizes, in regard to fringe benefits, the whole worker's trajectory during the period of interest. The coefficient of interest is $\beta$. Consider the case of $\beta$ being positive. In this case, the higher the change in exposure to Chinese imports for an industry (since 1991 to 2006), then, other things being equal, the higher the number of years with benefits (in the 1992-2006 survey years) for those who worked in that industry in 1991. I cluster the standard errors at the industry level given that the independent variable of interest varies at the industry level, not at the individual one.

It is important to understand which variation is captured in the regressor in (3). A shift to the right of China's export supply of good $j$ to the U.S. will increase $\Delta IP_j$. This increase in supply may be due to an increase in China's productivity, to lower U.S. tariffs on Chinese goods or to lower transportation costs. While it may be interesting to estimate the effect of each channel separately, the focus here is on their aggregate effect as each of them will make U.S. industries more exposed to competition with China.

However, $\Delta IP_j$ may also increase because the U.S. import demand of good $j$ from China shifts to the right. In this case, the regressor captures factors which are internal to the U.S. and not related to China. To remove these factors, I follow Autor et al. (2014) and

use as instrument the *change* in the exposure of other wealthy countries to Chinese imports between 1991 and 2006, $\Delta IPO_j$, which is measured as:

$$\Delta IPO_j = \frac{M_{j,06}^{ow,chn} - M_{j,91}^{ow,chn}}{Y_{j,91} + M_{j,91} - EX_{j,91}} \tag{4}$$

where $M_{j,91}^{ow,chn}$ are industry $j$'s imports from China into other wealthy countries in 1991.[13] Notice that I do not have data on industry consumption for the other wealthy countries and so I use data on *U.S.* industry consumption in the denominator.

The rationale for this instrument is as follows. Suppose e.g. that productivity in China is increasing and that this increase is exogenous to the rest of the world. This increase in productivity shifts to the right China's export supply and makes Chinese goods more attractive to the rest of the world. For this reason we should expect exports to China to grow, not just in U.S., but also in other wealthy countries. The instrument captures this exogenous variation in U.S. exposure to Chinese imports, eliminating other possibly endogenous sources such as changes in demand for the industry's product. I also subject the results to a series of robustness checks which are discussed in Section 5.3.

# 4 Data

## 4.1 Dependent Variables and Sample Restrictions

The NLSY79 is a panel dataset of U.S. residents. Respondents were 14-22 years old in 1979, the first year of the sample. The survey has been conducted each year up to 1994 and then every even-numbered year since then. I focus on the 1991-2006 period for two reasons. First,

[13] These wealthy countries are Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland. These are the same countries used in Autor et al. (2014).

as Autor et al. (2014) document, U.S. imports from China were small in the 80s and began to rise fast in the 1990s and accelerate in the 2000s. Second, I also want to avoid the Great Recession which started at the end of 2007.[14] Given that the NLSY79 does not have data for 2007, I use data up to 2006.

While the NLSY79 covers only a cohort of workers, it has the advantage of having some information about the non-wage components of compensation. In particular, the NLSY79 contains information about the *availability* of EHI and ERP benefits to the respondent through her employer and about the actual *participation* of the respondent to the plans offered to her. The questions about EHI and ERP availability are asked in each survey year in the 1991-2006 period. The question about participation in an EHI plan is available in 1990 and since 1992 (but not in 1991) and the question about participation in a ERP plan is only available since 1994. As explained above, as dependent variable I compute $Totehip_i$, i.e. the total number of years since 1992 to 2006 in which the respondent participates in EHI. I do the same for participation in ERP (computing $Toterpp_i$) but using the 1994-2006 years because information on participation in ERP is only available since 1994. In robustness checks, I also use as dependent variables the *availability* of EHI and ERP in the 1992-2006 period and, for a falsification test, the *availability* of EHI and ERP in the 1988-1991 period.

The NLSY79 also has information on the availability of these other fringe benefits: life insurance, dental insurance, childcare, maternity and paternity leave, flexible hours or work schedule, availability of sick days, availability of vacation days, training, and profit sharing. For each respondent $i$ in each year $t$, I compute $othf_{i,t}$ i.e. the total number of fringe benefits, other than EHI and ERP, which are available to $i$ through her employer: note that $othf_{i,t}$ ranges from 0 (no other benefits available) to 9 (all the other benefits available). For

[14] This also allows me to avoid the period of the "trade collapse" - i.e. the sudden and sharp decline in international trade - which started in the third quarter of 2008 (Baldwin (2009)).

each respondent, I then sum $othf_{i,t}$ across survey years in the 1992-2006 period and obtain $Totothf_i$ which I also use as dependent variable in my regressions.

I construct the income dependent variable along the lines of Autor et al. (2014), with the limitations imposed by my data. In particular, I first sum the yearly real wage and salary income for a respondent over the 1992-2005 period.[15] I then divide this cumulative income over the 1992-2006 period by the average wage and salary income over the 1988-1991 period. My income dependent variable is then the cumulative income between 1992 and 2005 - for the years for which survey data is available - expressed as a multiple of initial average income in 1988-1991.

I impose the following sample restrictions. Similarly to Autor et al. (2014), I keep information only for those respondents who in 1991 reported being in manufacturing in their primary job. I also keep only respondents who in 1991 reported a job in the private sector as their primary job and who worked at least 20 hours a week in that job.[16] I also keep only those respondents who in 1991 reported a hourly wage higher than \$3.80, i.e. the 1990 Federal minimum wage. Finally, I keep only workers with at least one interview in the 1992-2006 period and with non-missing values of the dependent variables and the regressors.[17] Note that these restrictions eliminate only few observations. Most of those who in 1991 reported their primary job to be in manufacturing already satisfy these criteria.

[15] As explained in the Appendix, for my period of interest, the income data is available only for 1992 and every odd year between 1993 and 2005, with extremes included. I use the Personal Consumption Expenditures index (PCE) to express all the dollar amounts in terms of 2007 dollars.

[16] I impose this restriction because in 1991 the EHI and ERP availability questions are asked only to workers who are not self-employed and work at least 20 hours a week.

[17] I keep in the sample a respondent who, *for some years*, is in the universe of a EHI (or ERP) benefit question but has a missing value on that question. I simply treat that the missing value as a zero in the sum of benefits across years and control for the number of years with missing values in the regression. However, I drop from the sample the few respondents who, while being in the universe of a EHI (or ERP) benefit question, have missing values for that question *for all years*. In the estimation I control for the number of years with missing values on the question of interest.

I merge the NLSY79 data on workers in manufacturing in 1991 with the industry level information discussed below. The trade regressors are not available for few manufacturing industries and so I have to drop the workers who worked in those industries in 1991.[18] There are also three manufacturing industries in which no NLSY79 respondent was working in 1991 and so my sample contains no workers from those industries in 1991.[19] This leaves me with a sample of 989 workers in 70 different manufacturing industries.

## 4.2 Main Regressor and Other Control Variables

As to the main regressor in (3), data on $M^{chn}_{j,06}$, $M^{chn}_{j,91}$, $M_{j,91}$ and $EX_{j,91}$ are from the UN-Comtrade trade data while data on $Y_{j,91}$ is from the NBER-CES Manufacturing Industry Database dataset (NBER-CES hereafter).[20] Other industry level variables are also from the NBER-CES. I download the trade data at the 6-digit level using the Harmonized Commodity Description and Coding System for 1988 and 1992. I then use the crosswalk provided by David Dorn on his website to aggregate the UN-Comtrade data with the 4-digit level Standard Industry Classification 1987 (SIC1987 hereafter). This allows me to match the trade data with the industry shipment data $Y_{j,91}$ and other industry level controls which are both available at the SIC1987 from the NBER-CES dataset. The NLSY79 has information about the industry of the primary job of the respondent: the NLSY79 uses the 3-digit Census Industrial Classification. In order to merge the industry level variables with the NLSY79, I aggregate the data from the 4-digit SIC1987 level to the Census 3-digit level. I aggregate the

[18]The industries with missing trade data are: *Food industries, not specified*; *Dyeing and finishing textiles, except wool and knit goods*; *Newspaper publishing and printing*; *Logging*; *Metal industries, not specified*; *Machinery, not specified*; *Electrical machinery, equipment, and supplies, not specified*; *Manufacturing industries, not specified.*

[19]These industries are: *Agricultural chemicals*; *Leather tanning and finishing*; *Watches, clocks, and clockwork operated devices* .

[20]I download the trade data from the World Integrated Trade Solution website.

variables by summing them. So, for example, I obtain $M_{j,91}^{chn}$ for the 3-digit Census Industry Classification $j$ by summing the Chinese imports for all the 4-digit SIC1987 industries which are matched to industry $j$. When the sample restrictions are applied, this leaves me with data for 70 3-digit manufacturing industries. More details on the construction of the industry-level variables are contained in the Data Appendix.

I use very similar control variables to the ones used in Autor et al. (2014). Some of the individual level regressors - $X_i$ in regression (2) - are measured in 1991: age, dummies for female, Black, Hispanic, foreign born, work experience, tenure at current employer, education categories dummies (high-school drop-out, high-school diploma, some college, college diploma, post-graduate studies), employer size categories dummies (1-49, 50-499, 500+), and dummies for being covered by collective bargaining agreement, being married and being a married female.[21] I include marital status and its interaction with the female dummy, as a worker may not be interested in having health insurance through his own employer if he gets EHI coverage through the employer of his spouse. In all regressions I also control for the 1991 values of EHI availability, ERP availability and total of other fringe benefits available as these values could be correlated with fringe benefits in later years.

Some of the other individual level regressors $X_i$ come from more than one year of data. Given that the demand for benefits by workers may vary with income, I control for the log of average income between 1988 and 1991. Given that one has to work to participate in EHI and ERP, years of employment in the 1992-2006 period are almost mechanically correlated with the dependent variables. I control for years of employment during the period of interest

[21]The NLSY79 reports work experience in hours. I divide it by 2000 to transform it to years of work experience for someone who works 40 hours a week 50 weeks a year. Tenure at current employer is instead reported in weeks. I divide it by 50 to transform it to years of tenure for someone who works 50 weeks a year. The Data Appendix describes the education categories and the collective bargaining agreement variable more in detail.

in order to partial out the effect of Chinese imports on employment and so its mechanical effect on the dependent variable. Analogously, the total years with a EHI (ERP) benefit is likely to be lower if in some years one is not interviewed or has a missing value on the benefit dummy. To this end, I include the total number of interviews in the 1992-2006 period and I also include in the $Totehip_i$ ($Toterpp_i$) regression the total number of years with an invalid missing value on the $ehip_{i,t}$ ($erpp_{i,t}$) dummy and I include in the $Totothf_i$ regression the total number of invalid missing values on the benefits dummies used to compute $othf_i$.[22]

$K_{j,91}$ in regression (2) is a vector including several industry level controls. First, an industry may be exposed to trade shocks other than the Chinese imports one, which is the focus here. While the instrument should capture the variation which is unique to the Chinese imports shock, I also control for the industry's overall import penetration in U.S. in 1991, which includes imports not just from China but from all countries. To compute overall industry import penetration I also use the trade flows from UN-Comtrade data. Second, I include variables from the NBER-CES dataset. Classic alternatives to trade-based explanations of labor market outcomes are the ones based on technological change. Following Autor et al. (2014), I use the capital/value added ratio and the production workers share of employment, both measured in 1991, to proxy how much an industry is likely to be exposed to technological change. Working in an industry that pays well in 1991 may also predict how many years of benefits a worker will receive in the 1992-2006 period. For this reason, I also add as control the log of the average industry payroll in 1991. Finally, the Chinese imports shock may be correlated with secular industry trends which affect the benefits offered in an industry. Again, following Autor et al. (2014), I also control for the pre-1991 industry trends

[22] A question may have a missing value because it is *Validly Skipped* as the respondent is not in the universe of the question. For our dependent variables this usually happens because the respondent does not report any job when interviewed. I control for these valid skips by controlling for the total number of years with a job during the period of interest.

by including the change in industry employment share and the change in the log average industry wage during the 1976-1991 period. These variables are originally available at the SIC1987 4-digit level in the NBER-CES data. I aggregate the original variables by summing them across 4-digit industries within a single 3-digit Census 1990 industry.[23]

## 4.3 Descriptive Statistics

The descriptive statistics are contained in Table 1. Blacks and Hispanics are over-represented in this sample because the NLSY79 over-samples these groups. Following Chapter 2 of the NLSY79 User Guide, I do not weigh the regressions, but instead use dummy variables for Blacks and Hispanics (see Zagorsky and White (1999)). The workers in the sample are between 26 and 34 years old in 1991, because the NLSY79 follows a fixed cohort over time. The majority of the workers in the sample are male and non-foreign born. In 1991 the majority of the sample is married and with no more than high-school education; they have on average 10 years of work experience and more than 60% of them work for an employer who has at least 100 employees; only about 21% of them are covered by collective bargaining agreements.

The variables measured during the 1992-2006 period contain information on at most nine years (if a workers is always interviewed) because the NLSY79 is collected biennially since 1994. During this period many workers have EHI and ERP benefits available through their job but fewer workers also opt to participate in those benefits - on average, about five years out of nine for EHI and about three years out of seven for ERP.[24] On average, an individual in the sample has 38 other fringe benefits available during the 1992-2006 period. Note that,

[23]For fractions - such as the capital/value added ratio - I first aggregate capital and value added at the 3-digit level and then recompute the ratio at the more aggregate 3-digit level.

[24]Information for ERP participation is available only since 1994 and so the maximum possible amount of years with ERP benefits is seven.

as one could have available at most all the other nine benefits in all the nine survey years, the theoretical maximum of this variable is 81. Given our sample restrictions, the sample is composed of individuals with high labor force attachment: on average a respondent reports a job in eight out of nine survey years.

As Figure 1 shows, EHI availability and coverage are increasing in income. Table 1 in the Appendix confirms that this is the case also for ERP participation and the total of other fringe benefits available.[25] This is compatible with benefits being a luxury good for workers.

A worker in the sample is exposed on average to a change in the exposure to Chinese imports of about 9 percentage points between 1991 and 2006. However, there is a wide variation around this mean, with some industries being more highly exposed and other industries having no increase in Chinese imports in real terms (Figure 2 in the Appendix shows the five most, and least, exposed industries). The regressions below leverage this variation to estimate the effect of U.S. exposure to Chinese imports on fringe benefits.

# 5 Results

## 5.1 Employer-Sponsored Benefits

As dependent variables, I use $Totehip_i$, i.e the total number of years with participation in EHI, $Toterpp_i$, i.e total number of years with participation in ERP, and $Totothf_i$, i.e. the total number of other fringe benefits available. Table 2 contains the results from OLS and IV regressions of the model in (2).

[25] The graphs in Figure 1 and in the Appendix are obtained by using a Lowess smoothing. Loosely speaking, the Lowess smoothed value of health benefits availability (a 0-1 dummy) for e.g. the median income is obtained as a weighted average of the health benefits availability dummies for observations with income "close" to the median income, with closer observations receiving a higher weight. See the the discussion of the Lowess command in StataCorp (2013).

As to the OLS results, the coefficients on $\Delta IP_j$ are positive in all regressions and statistically significant for years with participation in EHI and ERP benefits. In terms of economic magnitude, consider that the inter-quartile range for $\Delta IP_j$ is 0.103 (i.e. 10.3 percentage points). So, a worker at the 75th percentile of $\Delta IP_j$ is expected, other things equal, to have a number of years with participation in EHI higher by about 0.3 than a worker who is at the 25th percentile. This effect is about 5.5% of the sample mean of the dependent variable.[26] The effect for years with ERP benefits is 4.9% of the sample mean.

As to the individual level variables, being foreign born is negatively correlated with years with ERP and with other benefits available. The coefficient on the *Married* dummy indicates that there is a marriage premium *for men* in terms of all benefits. The marriage premium is actually negative for women as it can be seen by adding the coefficients on the *Married* and *Married Female* dummies. The omitted education category is workers with less than high-school. The coefficients indicate that usually the higher the education, the higher the years with benefits, with the only exception being that the *Some College* dummy is not significant in the $Totehip_i$ regression.

Other coefficients indicate that more years with benefits can be expected for workers who, *in 1991*, worked for larger employers and had benefits available.[27] Having a higher income in the 1988-1991 period also increases the expected number of years with EHI participation. As expected, the number of years with a job increases the number of years with benefits through the worker's employer.

As for the industry level controls, working for an industry with a high employment share of production workers in 1991 is strongly associated with having fringe benefits in later years.

[26]The sample mean of the dependent variable from Table 1 is 5.49 and 2.94*0.103/5.49 is approximately equal to 0.055.

[27]Even and Macpherson (2012) also study the effect of employer size on benefits.

Similarly, being in 1991 in an industry with high industry payroll is also associated with more years with benefits. The coefficients on overall import penetration in 1991 are instead negative and significant in some specifications.[28] The variables capturing industry trends are not significant which suggests that our estimates on $\Delta IP_j$ do not capture pre-existing industry trends, a result confirmed by a falsification test in Section 5.3. The coefficients on the total number of interviews and the total number of invalid missing values for the dependent variable are not significant.

As to the IV results, all the coefficients on $\Delta IP_j$ are all positive and statistically significant even though the one in the $Toterpp_i$ regression only at the 10% level. The p-values of the C-statistic indicate that $\Delta IP_j$ is endogenous in the $Totehip_i$ and $Tototh f_i$ regressions and so that, at least for these two regressions, the use of an instrument is appropriate.[29] The Kleibergen-Paap F statistic is quite large indicating that our instrument is not weak (Stock and Yogo (2005)). In the IV regressions, the estimates on $\Delta IP_j$ are larger in absolute value than with OLS. Using the same calculations as above, a worker at the 75th percentile of $\Delta IP_j$ is expected, other things equal, to have $Totehip_i$, $Toterpp_i$ and $Tototh f_i$ higher by, respectively, 0.5, 0.22 and 1.84: these effects are, respectively, 9.2%, 6.9% and 4.8% of the respective sample means. The estimates on the other coefficients are very similar to the OLS regression both in magnitude and significance. Overall, both the OLS and IV results suggest that those who in 1991 work in an industry which is about to experience a larger Chinese imports shock are more likely to participate or have benefits available during the 1992-2006 period, even after controlling for their years of work and several other individual

[28]The results are robust to adding separately to the regression both Chinese import penetration in 1991 and non-Chinese import penetration in 1991, instead of just overall import penetration in 1991.

[29]I use the *ivreg2* command for the IV regression (Baum et al. (2003)). The C-statistic is analogous to the Durbin-Wu-Hausman test statistic with the difference that the C-statistic is robust to violations of conditional homoskedasticity. This is appropriate here as I am clustering the standard errors at the industry level.

and industry level controls.

## 5.2 Cumulative Income

To study the effect of Chinese imports on *monetary* compensation, I compute cumulative income over the period 1992-2005, normalized by average income in years 1988-1991 (see Section 4.1 for details on this variable). I then regress cumulative income on the same set of regressors used in the regressions in Table 2.[30] Table 3 reports the coefficient on the change in U.S. exposure to Chinese imports for the OLS and IV regressions (tables 1 and 2 in the Appendix report the estimated coefficients for all regressors). The effect of $\Delta IP_j$ is estimated to be negative in the OLS regression but positive in the IV regression: however, the coefficient is not statistically significant in either regression.

My income results are in contrast to Autor et al. (2014) who - by using Social Security data - find a negative and statistically significant effect of exposure to Chinese imports on earnings from labor. This discrepancy may arise for various reasons. First, because of data availability, my regressions use industry variation at the 3-digit level while Autor et al. (2014) have 4-digit data: the negative effect of Chinese imports may be lost with a more coarse industry classification like mine. Second, the NLSY79 is a survey and so it may contain more measurement error on labor income variable than administrative data. For example, differently from the Social Security data, the NLSY79 top codes income.

It is important to note that exposure to Chinese imports can, at least in theory, have a positive and significant effect on benefits but not on monetary compensation. The simple model in Section 2 illustrates different ways through which this can happen. For example, import competition may increase a worker's productivity which in turn likely increases the

[30]The only difference is that in the income regression I control for years with invalid missing values on income rather than on benefits.

total amount that an employer is willing to pay the worker. With a higher total compensation offered, if benefits are a luxury good, the worker may opt to increase benefits relatively more than wages. Then, empirically, we would expect a trade shock to increase both benefits and wages but to have a more pronounced effect on benefits. This mechanism is somewhat compatible with my results: the change in exposure to Chinese imports is associated with a statistically significant increase in benefits and with an increase in income (according to the IV results) which however is not statistically significant.

## 5.3 Robustness Checks

Table 4 reports a series of robustness checks of the previous results. Overall, the findings in Table 2 are confirmed: the change in U.S. exposure to Chinese imports is positively and significantly associated with an increase in fringe benefits. The effect is stronger on EHI and other fringe benefits and more tenuous for ERP benefits. The regressions also pass a falsification test similar to the one conducted in Autor et al. (2014). Note that in performing the robustness checks I use instrumental variable regressions using, as in Table 2, the change in exposure of other wealthy countries to Chinese imports as instrument for the change in U.S. exposure to Chinese imports. As regressors, for each dependent variable, I use the same regressors used in Table 2. I now discuss each robustness check more in detail.

First, as discussed in the Appendix, the wording of the NLSY79 question related to EHI and ERP participation change since 2002. To make sure that this change does not affect my results, I rerun the EHI and ERP participation regressions in Table 2 but keeping only data up to 2000 (column 1 of Table 4). For completeness, I also rerun the regression for the availability of other fringe benefits. Second, I restrict the sample only to those individuals who, during the period of interest, were interviewed each year and reported a job each year

(column 2 of Table 4). The results are similar to the ones in Table 2. The change in U.S. exposure to Chinese imports is positive and significantly associated with years with EHI participation and with the availability of other fringe benefits; the effect on years with ERP participation is positive in both columns but weakly significant only in column 2.

$Totehip_i$ and $Toterpp_i$ measure the total number of years with a given benefit during the period of observation. As such, they can only take integer values up to the maximum number of years a worker is observed. Due to this limited range, a linear regression model may be misspecified. As a robustness check, I also use an instrumental variable Poisson model.[31] According to the Poisson model, the dependent variable follows a Poisson distribution. Given this assumption, the instrumental variable Poisson model is estimated using the generalized method of moments. To apply these models to my data I also have to redefine the dependent variables. Indeed, $Totehip_i$ and $Toterpp_i$ are skewed to the left because most workers in the sample have EHI and ERP in all years. Since the Poisson distribution has always a positive skewness, Poisson models are usually applied to data which are skewed to the right. For this reason, I compute the number of years *without* EHI and the number of years *without* ERP and I use those as dependent variables instead.[32] I report the estimated coefficients after multiplying them by minus one. In this way, I obtain back the sign of the effect of the change in U.S. exposure to Chinese imports on years *with* benefits, rather than years without benefits: this facilitates the comparison of the sign of the coefficients with those in Table 2. Panel A and B of column 3 in Table 4 report the coefficients on $\Delta IP_j$ from such regressions: again, the results are in line with the ones from the baseline model. Note that $Totothf_i$ is a

[31] For a mathematical statement of the implemented instrumental variable Poisson model, see the *Methods and Formulas* sections for the *ivpoisson* Stata command in StataCorp (2013).

[32] More formally, I use as dependent variables $\#SY - Totehip_i$ for EHI participation and $\#SY94 - Toterpp_i$ for ERP participation where the operator # returns the cardinality of a set and $SY$ and $SY94$ have been defined above.

sum (across years) of sums (within year) of the other fringe benefits available to a worker. As such, it has a larger range and so it suffers less from the limited range that $Totehip_i$ and $Toterpp_i$ display. Nonetheless, for completeness, I estimate an instrumental variable Poisson model for $Totothf_i$ too.[33] The coefficient on $\Delta IP_j$ from this regression (Panel C, column 3) is positive and highly significant, confirming the findings in Table 2.

It is possible that the baseline regressions pick up some individual trends in benefits which were already ongoing in 1991 and which may be spuriously correlated with the change in the U.S. exposure to Chinese imports. To alleviate this concern, I compute the total years with the availability of, respectively, EHI, ERP and other fringe benefits for the years *since 1988 to 1991*, a period which *precedes* the Chinese imports shock. I then regress these dependent variables (column 4 of Table 4) on the same set of regressors as the baseline model (2). Notably, the coefficients are all negative and only the one for EHI is weakly significant. This result casts doubts on the possibility that our regressions pick up pre-existing trends in benefits.

Finally, I also run two regressions with the *availability* of, respectively, EHI and ERP as dependent variables (Panel A and B in column 5 of Table 4). The results are similar to the ones obtained using EHI and ERP *participation*. Note that the entry in Panel C of column 5 is empty because we have already studied the availability of other fringe benefits in Table 2.

[33] As $Totothf_i$ is not skewed, I do not need to redefine the dependent variable and so I use $Totothf_i$ as regressand.

# 6 Conclusion

While many studies have focused on the impact of trade with developing countries on U.S. wages, not much attention has been devoted to the impact of trade on other components of compensation. I argue that if trade affects the share of benefits in compensation, the studies which focus on wages and ignore fringe benefits likely give us biased estimates of the effect of trade on workers' total compensation and consumption.

I combine individual level data on fringe benefits from the NLSY79 with data on Chinese imports at the industry level. I estimate a positive and significant effect of Chinese imports on fringe benefits. Previous studies such as Autor et al. (2014) find a negative effect of trade with China on U.S. workers' wages. My results instead suggest a more optimistic view of the effect of trade with China on U.S. workers' overall compensation. However, relative to the previous literature, my results have some limitations due to the sample on which they are based. First, the NLSY79 only cover a specific cohort of workers; second, survey data likely contains more measurement error on income than Social Security data; third, I only have information at the 3-digit industry level and so I cannot exploit 4-digit industry variation in Chinese imports. Nonetheless, this paper offers a first step toward studying the effect of trade on employer-sponsored benefits which are a now large component of compensation of U.S. workers.

# References

Attanasio, O., P. K. Goldberg, and N. Pavcnik (2004). Trade Reforms and Wage Inequality in Colombia. *Journal of Development Economics 74*(2), 331–366.

Autor, D. H., D. Dorn, and G. H. Hanson (2013, October). The China Syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review 103*(6), 2121–68.

Autor, D. H., D. Dorn, G. H. Hanson, and J. Song (2014). Trade Adjustment: Worker Level Evidence. *Quarterly Journal of Economics 4*(129), 1799–1860.

Baldwin, R. (Ed.) (2009). *The Great Trade Collapse: Causes, Consequences and Prospects*. Centre for Economic Policy Research, London.

Banister, J. and G. Cook (2011). China's Employment and Compensation Costs in Manufacturing Through 2008. *Monthly Labor Review 134*(3), 39–52.

Barber, S. L. and L. Yao (2010). Health Insurance Systems in China: a Briefing Note. World Health Report Background Paper 37, World Health Organization.

Baum, C. F., M. E. Schaffer, S. Stillman, et al. (2003). Instrumental Variables and GMM: Estimation and Testing. *Stata Journal 3*(1), 1–31.

Bureau of Labor Statistics (2007, March). Employer Costs For Employee Compensation. Technical Report USDL-07-0453.

Bureau of Labor Statistics (2015, June). Employer Costs For Employee Compensation. Technical Report USDL-15-1756.

Currie, J. and B. C. Madrian (1999). Health, Health Insurance and the Labor Market. *Handbook of Labor Economics 3*, 3309–3416.

Ebenstein, A., A. Harrison, M. McMillan, and S. Phillips (2014, October). Estimating the Impact of Trade and Offshoring on American Workers Using the Current Population Surveys. *Review of Economics and Statistics 96*(4), 581–95.

Even, W. E. and D. A. Macpherson (2012). Is Bigger Still Better? The Decline of the Wage Premium at Large Firms. *Southern Economic Journal 78*(4), 1181 – 1201.

Fajgelbaum, P. D. and A. K. Khandelwal (2014, July). Measuring the Unequal Gains from Trade. Technical report, National Bureau of Economic Research, Cambridge, MA.

Goldberg, P. and N. Pavcnik (2007). Distributional Effects of Globalization in Developing Countries. *Journal of Economic Literature 45*(1), 39–82.

Hamermesh, D. (1999). Changing Inequality in Markets for Workplace Amenities. *Quarterly Journal of Economics 114*(4), 1085–1123.

Henly, S. E. and J. M. Sanchez (2009). The U.S. Establishment-Size Distribution: Secular Changes and Sectoral Decomposition. *FRB Richmond Economic Quarterly 95*(4), 419–454.

Janicki, H. (2013). Employment-based Health Insurance: 2010. *Current Population Reports, U.S. Census Bureau P70-134*.

Kemeny, T., D. Rigby, and A. Cooke (2015). Cheap Imports and the Loss of U.S. Manufacturing Jobs. *The World Economy 38*(10), 1555–1573.

Kobe, K. (2010). *Small Business Retirement Plan Availability and Worker Participation*. Small Business Administration, Office of Advocacy.

Kosteas, V. (2008). Manufacturing Wages and Imports: Evidence from the NLSY. *Economica 75*(298), 259–279.

Kovak, B. (2013). Regional Labor Market Effects of Trade Policy: Evidence from Brazilian Liberalization. *American Economic Review 103*(5), 1960–1976.

Krugman, P. R. (2008). Trade and Wages, Reconsidered. *Brookings Papers on Economic Activity*, 103–154.

Lake, J. and D. L. Millimet (2015). Good Jobs, Bad Jobs: What's Trade Got To Do With It? Working Paper, Midwest International Trade Economics Conference Fall.

Liu, R. and D. Trefler (2011). A Sorted Tale of Globalization: White Collar Jobs and the Rise of Service Offshoring. *National Bureau of Economic Research Working Paper 17559*.

McManus, T. C. and G. Schaur (2014). The Effects of Import Competition on Worker Health. Working Paper, Midwest International Trade Conference Fall.

McManus, T. C. and G. Schaur (2015). The Effects of Import Competition on Health in the Local Economy. *Working Paper, Midwest International Trade Economics Conference Fall*.

Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica 71*(6), 1695–1725.

Naughton, B. (2007). *The Chinese Economy: Transitions and growth*. MIT press.

Pierce, B. (2010). *Recent Trends in Compensation Inequality*, pp. 63–98. Chicago: University of Chicago Press.

Pierce, J. R. and P. K. Schott (2015, December). Trade Liberalization and Mortality: Evidence from US Counties. Working Paper.

Porto, G. G. (2006). Using Survey Data to Assess the Distributional Effects of Trade Policy. *Journal of International Economics 70*(1), 140–160.

StataCorp (2013). *Stata Base Reference Manual*. College Station, TX: Stata Press.

Stock, J. H. and M. Yogo (2005). Testing for Weak Instruments in Linear IV Regression. In *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*, pp. 80–108. Cambridge and New York: Cambridge University Press.

Woodbury, S. A. (1983). Substitution Between Wage and Nonwage Benefits. *American Economic Review 73*(1), 166–182.

Zagorsky, J. and L. White (1999). NLSY79 User's Guide: A Guide to the 1979-1998 National Longitudinal Survey of Youth Data. *Washington, DC: US Department of Labor*.

Table 1: Summary Statistics

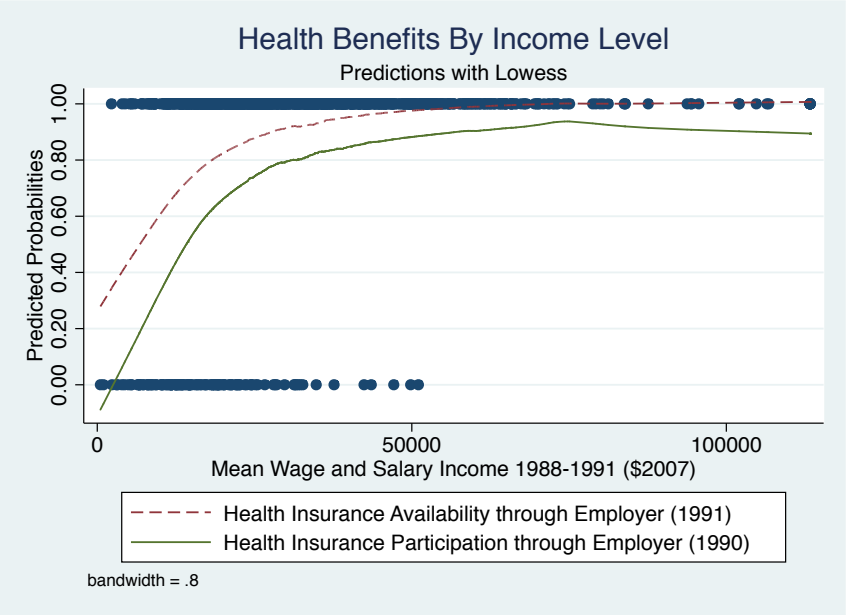
| Variable | Mean | Std. Dev. |
|---|---|---|
| Total Years with EHI Available, 1992-2006 | 6.57 | 2.63 |
| Total Years with Participation in EHI, 1992-2006 | 5.49 | 2.93 |
| Total Years with ERP Available, 1992-2006 | 5.62 | 2.94 |
| Total Years with Participation in ERP, 1992-2006 | 3.23 | 2.42 |
| Total Other Fringe Benefits Available, 1992-2006 | 38.29 | 17.77 |
| Total Income (1992-2005)/Mean Income (1988-1991) | 9.27 | 7.66 |
| Change U.S. Exposure to Chinese Imports, 1991-2006 | 0.09 | 0.13 |
| Change Wealthy Countries Exposure to Chinese Imports, 1991-2006 | 0.06 | 0.08 |
| Age (1991) | 29.5 | 2.23 |
| Female | 0.35 | 0.48 |
| Hispanic | 0.18 | 0.38 |
| Black | 0.26 | 0.44 |
| Foreign Born | 0.06 | 0.25 |
| Married (1991) | 0.6 | 0.49 |
| Married Female (1991) | 0.2 | 0.4 |
| Less Than High-School (1991) | 0.14 | 0.34 |
| High-School (1991) | 0.54 | 0.5 |
| Some College (1991) | 0.17 | 0.38 |
| College or More (1991) | 0.15 | 0.36 |
| Employer Size, 1-49 (1991) | 0.27 | 0.44 |
| Employer Size, 50-499 (1991) | 0.43 | 0.5 |
| Employer Size, 500+ (1991) | 0.3 | 0.46 |
| Work Experience (2000s hours) (1991) | 10.17 | 3.41 |
| Years worked with Current Employer (1991) | 4.68 | 4.04 |
| Covered by Collective Bargaining Agreement (1991) | 0.21 | 0.41 |
| Log Mean Wage and Salary Income 1988-1991 ($2007) | 10.21 | 0.63 |
| Health Insurance Available through Employer (1991) | 0.88 | 0.33 |
| Retirement Plan Available through Employer (1991) | 0.68 | 0.47 |
| Number of Other Fringe Available (1991) | 4.77 | 2.2 |
| Years Reported a Job 1992-2006 (max=9) | 7.94 | 1.7 |
| Import Penetration (All Countries) in U.S. (1991) | 0.16 | 0.13 |
| Capital/Value Added (1991) | 0.95 | 0.49 |
| Employment Share of Production Workers (1991) | 0.70 | 0.13 |
| Log Average Industry Payroll (1991) | 10.53 | 0.28 |
| Change in Industry Employment Share, 1976-1991 | 0 | 0.01 |
| Change in Log Average Industry Wage, 1976-1991 | 0.83 | 0.09 |

*Continued on next page...*

*... table 1 continued*

| Variable | Mean | Std. Dev. |
|---|---|---|
| Total Interviews 1992-2006 (max=9) | 8.35 | 1.4 |
| Years with Invalid Missing on EHI Available | 0.01 | 0.12 |
| Years with Invalid Missing on EHI Participation | 0.01 | 0.1 |
| Years with Invalid Missing on ERP Available | 0.08 | 0.32 |
| Years with Invalid Missing on ERP Participation | 0 | 0.06 |
| Invalid Missing Values on Other Fringe Benefits | 1.58 | 2.23 |
| Years with Invalid Missing Income | 0.58 | 1.08 |
| N | 989 | |

Figure 1: Employer-Sponsored Health Benefits Availability and Participation by Income




Data from main analysis sample described in Table 1. Information about employer-provided health insurance participation is from 1990 as this information is not available in 1991. Source: NLSY79

Table 2: The Effect of Change in U.S. Exposure to Chinese Imports on the Total Years With Participation in Employer-provided Health Insurance (Totehip), With Participation in Retirement Plan (Toterpp) and on Total of Other Fringe Benefits (Totothf) Available, 1992-2006. OLS and IV Estimates. *Continued on next page...*

| | OLS | | | IV | | |
|---|---|---|---|---|---|---|
| | Totehip | Toterpp | Totothf | Totehip | Toterpp | Totothf |
| | b/se | b/se | b/se | b/se | b/se | b/se |
| Δ U.S. Exposure to Chinese Imports | 2.94*** | 1.54* | 5.51 | 4.90*** | 2.17* | 17.91** |
| | (0.79) | (0.79) | (5.66) | (1.34) | (1.21) | (7.71) |
| Age (1991) | -0.05** | -0.05 | -0.19 | -0.05** | -0.05 | -0.20 |
| | (0.02) | (0.03) | (0.17) | (0.02) | (0.03) | (0.17) |
| Hispanic | 0.06 | -0.06 | 1.19 | 0.08 | -0.05 | 1.32 |
| | (0.21) | (0.22) | (1.32) | (0.20) | (0.21) | (1.29) |
| Black | 0.14 | -0.11 | 1.96* | 0.15 | -0.10 | 2.04* |
| | (0.18) | (0.15) | (1.10) | (0.18) | (0.15) | (1.08) |
| Foreign Born | -0.10 | -0.89*** | -3.10** | -0.11 | -0.89*** | -3.14** |
| | (0.27) | (0.23) | (1.24) | (0.27) | (0.22) | (1.24) |
| Female | 0.29 | 0.16 | 3.19*** | 0.34 | 0.17 | 3.51*** |
| | (0.25) | (0.18) | (1.14) | (0.24) | (0.18) | (1.11) |
| Married (1991) | 0.35** | 0.48*** | 1.96* | 0.36** | 0.48*** | 2.01** |
| | (0.16) | (0.14) | (1.03) | (0.15) | (0.14) | (1.01) |
| Married Female (1991) | -1.05*** | -0.72*** | -2.43 | -1.08*** | -0.73*** | -2.65 |
| | (0.29) | (0.24) | (1.71) | (0.28) | (0.24) | (1.67) |
| High-School (1991) | 0.54*** | 0.48** | 3.46*** | 0.55*** | 0.48** | 3.51*** |
| | (0.20) | (0.20) | (1.15) | (0.19) | (0.19) | (1.12) |
| Some College (1991) | 0.36 | 0.71*** | 5.04*** | 0.36 | 0.71*** | 5.07*** |
| | (0.28) | (0.22) | (1.32) | (0.28) | (0.22) | (1.33) |
| College or More (1991) | 0.89*** | 1.04*** | 6.95*** | 0.90*** | 1.05*** | 7.01*** |
| | (0.31) | (0.26) | (1.67) | (0.31) | (0.26) | (1.65) |
| Employer Size, 50-499 (1991) | 0.21 | 0.27* | 1.64** | 0.18 | 0.26* | 1.50** |
| | (0.16) | (0.15) | (0.72) | (0.15) | (0.14) | (0.72) |
| Employer Size, 500+ (1991) | 0.50*** | 0.39** | 2.22** | 0.50*** | 0.38*** | 2.16** |

*... table 2 continued*

| | OLS | | | IV | | |
|---|---|---|---|---|---|---|
| | Totehip | Toterpp | Totothf | Totehip | Toterpp | Totothf |
| | b/se | b/se | b/se | b/se | b/se | b/se |
| | (0.19) | (0.15) | (1.07) | (0.18) | (0.15) | (1.07) |
| Work Experience (1991) | 0.03 | 0.02 | 0.10 | 0.03 | 0.02 | 0.11 |
| | (0.03) | (0.02) | (0.18) | (0.03) | (0.02) | (0.17) |
| Years with Employer (1991) | 0.04** | 0.02 | 0.10 | 0.04** | 0.02 | 0.09 |
| | (0.02) | (0.02) | (0.12) | (0.02) | (0.02) | (0.12) |
| Collective Bargaining (1991) | 0.28* | -0.14 | -0.94 | 0.27* | -0.14 | -1.02 |
| | (0.17) | (0.16) | (0.67) | (0.16) | (0.15) | (0.67) |
| Log Mean Income 1988-1991 | 0.83*** | 0.58*** | 3.01*** | 0.83*** | 0.58*** | 2.96*** |
| | (0.19) | (0.14) | (1.00) | (0.19) | (0.14) | (0.97) |
| Years Reported a Job 1992-2006 | 0.88*** | 0.52*** | 5.45*** | 0.88*** | 0.52*** | 5.42*** |
| | (0.06) | (0.05) | (0.41) | (0.06) | (0.05) | (0.40) |
| Employer Health Insurance Avail. (1991) | 1.75*** | 0.43** | -0.71 | 1.79*** | 0.44** | -0.51 |
| | (0.29) | (0.20) | (1.43) | (0.29) | (0.20) | (1.38) |
| Employer Retirement Plan Avail. (1991) | 0.03 | 0.65*** | 1.51* | 0.04 | 0.65*** | 1.59** |
| | (0.19) | (0.15) | (0.80) | (0.19) | (0.14) | (0.77) |
| Number of Other Fringe Available (1991) | 0.03 | 0.06 | 2.69*** | 0.03 | 0.06 | 2.67*** |
| | (0.05) | (0.04) | (0.22) | (0.04) | (0.04) | (0.22) |
| Import Penetration in U.S. (1991) | -1.52** | -0.94 | -2.88 | -2.91*** | -1.39 | -11.67* |
| | (0.71) | (0.76) | (4.88) | (1.09) | (1.02) | (7.00) |
| Capital/Value Added (1991) | -0.15 | -0.14 | -1.83 | -0.28 | -0.18 | -2.63** |
| | (0.19) | (0.16) | (1.20) | (0.20) | (0.16) | (1.27) |
| Prod. Workers Empl. Share (1991) | 2.72** | 1.86** | 4.25 | 3.83*** | 2.22** | 11.28* |
| | (1.04) | (0.81) | (5.33) | (1.25) | (0.97) | (6.08) |
| Log Average Industry Payroll (1991) | 1.25*** | 1.10** | 6.86*** | 1.90*** | 1.31*** | 10.97*** |
| | (0.43) | (0.42) | (2.46) | (0.59) | (0.50) | (3.09) |
| Change in Employment Share 1976-1991 | -5.14 | -1.82 | -89.21 | -10.45 | -3.54 | -122.82* |
| | (11.22) | (9.35) | (58.49) | (11.89) | (9.42) | (70.12) |
| $\Delta$ Log Average Industry Wage 1976-1991 | 0.21 | 0.50 | -0.03 | -0.16 | 0.38 | -2.35 |

*... table 2 continued*

| | OLS | | | IV | | |
|---|---|---|---|---|---|---|
| | Totehip | Toterpp | Totothf | Totehip | Toterpp | Totothf |
| | b/se | b/se | b/se | b/se | b/se | b/se |
| | (1.05) | (0.72) | (4.53) | (1.07) | (0.71) | (4.83) |
| Total Interviews 1992-2006 (max=9) | -0.11 | 0.06 | -0.16 | -0.11 | 0.06 | -0.13 |
| | (0.07) | (0.05) | (0.44) | (0.07) | (0.05) | (0.43) |
| Total Invalid Missing Values on Totehip | 0.35 | | | 0.36 | | |
| | (0.54) | | | (0.53) | | |
| Total Invalid Missing Values on Toterpp | | -0.60 | | | -0.58 | |
| | | (0.75) | | | (0.73) | |
| Total Invalid Missing Values on Totothf | | | -0.02 | | | -0.02 |
| | | | (0.17) | | | (0.17) |
| Constant | -25.84*** | -21.26*** | -123.99*** | -32.90*** | -23.54*** | -168.67*** |
| | (5.21) | (4.59) | (30.40) | (6.81) | (5.50) | (35.28) |
| Observations | 989 | 989 | 989 | 989 | 989 | 989 |
| Adjusted $R^2$ | 0.51 | 0.43 | 0.59 | 0.50 | 0.43 | 0.59 |
| Kleibergen-Paap F | | | | 43.06 | 42.82 | 42.81 |
| C-Statistic p-value | | | | 0.03 | 0.42 | 0.03 |

Source: NLSY79, UN-Comtrade, NBER-CES. Clustered s.e. at the industry level.

* p<0.10, ** p<0.05, *** p<0.01

Table 3: Effect of Δ U.S. Exposure to Chinese Imports on Total Income (1992-2005)

| | OLS | IV |
|---|---|---|
| | b/se | b/se |
| Δ U.S. Exposure to Chinese Imports | -1.03 | 3.88 |
| | (1.99) | (2.81) |
| Observations | 989 | 989 |
| Adjusted $R^2$ | 0.28 | 0.28 |
| Kleibergen-Paap F | | 43.26 |
| C-Statistic p-value | | 0.05 |

The measure of total income is defined in Section 4.1. The regressions also include all the independent variables of the regressions reported in Table 2. Appendix Tables 1 and 2 report the coefficients for all these other independent variables. Standard errors are clustered at the industry level. Source: NLSY79, UN-Comtrade, NBER-CES.

Table 4: Effect of Δ U.S. Exposure to Chinese Imports: Robustness Checks. IV regressions.

| 1992-2000 Data | Always Working And Interviewed 1992-2006 | IV Poisson 1992-2006 | Benefits Availability 1988-1991 | Benefits Availability 1992-2006 |
|---|---|---|---|---|
| b/se | b/se | b/se | b/se | b/se |
| | A: Employer-Sponsored Health Insurance | | | |
| 3.05*** | 6.03*** | 1.84*** | -0.73* | 2.79** |
| (0.92) | (1.49) | (0.66) | (0.43) | (1.26) |
| | B: Employer-Sponsored Retirement Benefits | | | |
| 1.10 | 3.32* | 0.73 | -0.53 | 2.31 |
| (0.75) | (1.85) | (0.48) | (0.47) | (1.45) |
| | C: Employer-Sponsored Other Fringe Benefits | | | |
| 14.15*** | 15.36* | 0.74*** | -1.07 | |
| (4.94) | (8.98) | (0.24) | (2.01) | |

Each entry in the table reports the coefficient and the standard error of the change in U.S. exposure to Chinese imports - as measured in equation (3) - from an instrumental variable regression with the instrument defined in equation (4). All the regressions in Panel A, B and C also include all the other regressors in the corresponding columns in Table 2. I first compute the dependent variables in Table 2, i.e. $Totehip_i$, $Toterpp_i$ and $Totothf_i$, for the survey years since 1992 to 2000 and use these as dependent variables: the results are in column 1. Column 2 contains the results from the same IV regressions as in Table 2 but keeping only respondents who are interviewed in all survey years in the 1992-2006 period and always work in these years. Column 3 re-runs the corresponding regressions in Table 2 but using an IV Poisson model (see the text for the model specification). In column 4, Panel A, B and C use as dependent variables the total years with *availability* through the employer of, respectively, health insurance, retirement benefits and other fringe benefits where these totals are computed for the *pre-shock* 1988-1991 years. Panel A and B in Column 5 use as dependent variables the total years with *availability* through the employer of, respectively, health insurance and retirement benefits. Note that Table 2 already reports the results for the availability of other fringe benefits for this period and so the entry in column 5, Panel C is omitted. In column 1, N=989, 976 and 988 in, respectively, Panel A, B and C. In column 4 N=972, 968 and 972 in, respectively, Panel A, B and C. For all panels, N=609 in column 2 and N=989 in column 3 and 5. Source: NLSY79, UN-Comtrade, NBER-CES. Standard errors are clustered at the industry level. * p<0.10, ** p<0.05, *** p<0.01

# Appendix for *Fringe Benefits and Import Competition*

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# I More Information on Worker-Level Variables

## I.1 Benefits Variables

Let $B_{i,t}$ indicate either $EHIP_{i,t}$ or $ERPP_{i,t}$, the dummies for, respectively, participation in EHI and participation in ERP. To construct the dependent variables $Totehip_i$ and $Toterpp_i$ in regression (2) in the text we need to sum $B_{i,t}$ over time. To this end, we need information on $B_{i,t}$ which is consistent over the 1992-2006 period. The NLSY79 contains questions related to these dummies. The answers to these questions are coded in different NLSY79 variables. As discussed below, these variables need further processing to be used in the construction of the $B_{i,t}$ dummies.

In order to obtain consistent information over time on the $B_{i,t}$ dummies, we need to address the fact that the universe and wording of some of these questions change over time. I first describe the wording and universe of the questions more in detail below. Finally, a given individual may have a missing value for a certain $B_{i,t}$ dummy in a certain year and so I then turn to discuss how to handle these cases.

### I.1.1 Availability of Health, Pension Benefits and Other Fringe Benefits

As to the EHI *availability*, the NLSY79 asks: "Does/Did your employer make available to you medical, surgical, or hospital insurance that covers injuries or major illnesses off the job?". As to the ERP *availability*, the NLSY79 asks: "(Does/Did) your employer make available to you a retirement plan other than Social Security?". As to the other fringe benefits, the NLSY79 also asks whether the employer makes available to the respondent: life insurance; dental benefits; maternity/paternity leave; flexible hours or work schedule; profit sharing; training or educational opportunities; company provided or subsidized childcare; sick days;

vacation days.[1]

These questions have been asked during each survey year except 1981. As to the universe of the questions, note that these questions were asked only about the primary job from 1980-93; they have been asked about all jobs beginning in 1994. In my data I keep information only on the primary job for all years.[2] These questions are asked in the Section 5 of the questionnaire for the years 1991-1992, Section 6 in 1993, and in the *Employer Supplement* (Section 7) for the years 1994-2012. These questions are asked in a fairly consistent way over time. The only issue with them is the change in the universe of the question in 1994 which, as argued in the *Missing Values* section below, affects only few observations in my sample.

### I.1.2 Participation in Health Benefits

The EHI and ERP availability questions are asked in the *Employer Supplement* of the survey and so they can be associated to a specific job. On the other hand, the questions with information on health insurance coverage are contained in the *Health* section of the questionnaire and not in the *Employer Supplement*. For this reason they cannot be directly tied to a specific job. However, note that this issue does not affect my main regressions as I use as dependent variable the total EHI coverage over time, independently from information on the employer over time.

The wording of the EHI *participation* questions changes over time. The questions with information on health insurance coverage are asked in 1990 and the period 1992-2006. As to the health insurance coverage, in 1990 and the period 1992-2006, the NLSY79 asks: "Are

[1] Since 1991 the NLSY79 asks about the number of sick and about the number of vacation days. For these two benefits I create two $B_{i,t}$ dummies which are equal to 1 if the number of sick, respectively, vacation days are positive and zero otherwise.

[2] Documentation on the universe of the question about availability of EHI and ERP is available here: $http://nlsinfo.org/content/cohorts/nlsy79/topical-guide/employment/fringe-benefits$

you covered by any kind of private or government health or hospitalization plans or health maintenance organization (HMO)? Examples of health and hospitalization insurance plans include Blue Cross, Blue Shield (Medicaid/Medi-Cal/Medical Assistance/Welfare/Medical Services". Because this question is in the Health section of the questionnaire, it is asked virtually to everybody.[3]

If the interviewee answers that he is covered, then he is asked about the source of the coverage, his current employer being an option. The question about the source of coverage varies through the years. Since 1992 to 2000 the questions asks: "What is the source of your health or hospitalization plan? Is it from a policy from your current or previous employer, (a policy from (your) [Spouse/partner's name]'s current or previous employer), a policy bought directly from a medical insurance company, is it (Medicaid or an alternative Medicaid [name of state Medicaid Program]/Welfare/Medi-Cal/Medical Assistance/Medical Services), or is it from some other source? (SELECT ALL THAT APPLY.)".

For the years up to 2000, I set the EHI participation dummy equal to 1 if the respondent answers that he is covered and that his current employer is the source of the coverage. I set the EHI participation dummy equal to 0 if the respondent answers that he is *not* covered at all or if he answers that he is covered and he indicates that the current employer is *not* the source.

The question is asked differently in 2002, 2004 and 2006. In these years the interviewee is first asked the same question reported below for the 1992-2006 period. If he answers yes, then he is asked if he has had any employment since the last interview. If he answers yes, he is then asked if he is currently employed (notice that these screening questions were not asked before 2002). If he still answers yes, then finally he is asked if his current employer pays for

[3]Hence, the corresponding NLSY79 variable has very few missing observations, except, obviously, for those who are not interviewed.

*any* part of the cost of this plan. If he also answers yes, then he is asked: "Does your current employer pay the *total* cost of the premiums for this health plan, or do you also have to contribute toward the cost?" (italics mine) with the choices being "Employer pays total cost of premiums" and "Employer pays part of costs and employee pays the rest". So for 2002, 2004 and 2006 we have the option of considering somebody covered with employer-sponsored health insurance when her employer pays any part, or the total, of the premium. I choose the first option because in this way the mean for this variable across different years is more uniform and avoids "jumps". In other words, it is likely that when the NLSY79 asks about health coverage in other years, without distinguishing the two options above (employer pays any or all of the premium), respondents answer as if they were asked whether the employer pays any part of the premium and not necessarily the whole premium.

Second, in the 1992-2000 period when the NLSY79 asks the EHI participation question, the current and the former employer are distinct answers. But in the 2002-2006 period the respondent's former employer is grouped with the spouse former's employer as a possible answer. For this reason, throughout the 1992-2006 period, I set the EHI participation dummy to 1 only if the respondent indicates the *current* employer as the provider of EHI. This will miss the case of those who get EHI coverage through a former employer.

### I.1.3 Participation in Pension Benefits

The ERP participation questions are available since 1994 only and their wording does change over time.

As to the participation in retirement plan through an employer, up to 2000 the NLSY79 asks: "Many employers have pensions or retirement plans, and some employers provide tax-deferred plans such as thrift, savings, 401Ks, profit-sharing, or stock ownership plans.

(Are/Were) you included in any pension or retirement plans on your job with [employer]? Do NOT include Social Security, IRA or Keogh plans." I set the ERP participation dummy to 0 if the respondent answers negatively to this question. However, this question is ambiguous because one can answer it affirmatively if the employer just offers ERP to the worker or if the worker actually participates in the ERP. The NLSY79 then asks "How many plans [does/did] [Name of employer(1)] have for which you [are/were] eligible?". I set the ERP participation dummy to 0 if the respondent answers negatively to this question. Finally, the respondent is asked "How many (of these) plans (are/were) you participating in?". I set the ERP participation dummy to 1 if the respondent answers that he is participating in one or more ERP plans and I set the dummy to 0 if he reports zero plans.

The wording and ordering of the questions is slightly different in the 2002-2006 period but I construct the ERP dummy according to the same logic: I set it to 1 if the respondent answers to participate in at least one ERP plan and I set it to 0 if the respondent answers that he is participating in zero ERP plans or if he answers negatively to one of the questions that precede the "How many (of these) plans [are/were] you participating in? " question.

### I.1.4 Missing Values

In discussing missing values it is important to understand how they affect my results. To construct my dependent variables I sum dummies across years for a respondent. If one has missing information on these dummies this could affect the total sum. The NLSY79 distinguishes five types of missing values: "Refusal"; "Don't Know"; "Invalid Skip"; "Valid Skip"; "Non-interview". I group the first three together, I count the total number of years in which $B_{i,t}$ is missing for these reasons and I add this variable to the regression. I also add

the total number of interviews to the regression.[4]

As to the Valid Skip cases, a question is validly skipped because the respondent is not in the universe of the question. We need to discuss these cases separately for the EHI participation question. Indeed, we have seen above that the EHI participation question is asked in the *Health* section of the NLSY79 and so it is asked virtually to everybody. The only exception is for the years 2002-2006 where the question is validly skipped if somebody is not currently employed. For this reason in the robustness checks I also run the regression keeping only information up to year 2000 and in other specification keeping only those who reported a job in each survey year. As to the questions related to ERP and to the availability of other fringe benefits, a question can be validly skipped for different reasons. I list here the main ones, indicating in parentheses the years for which each reason applies:

- The respondent did not work since the last interview (this issue affects all survey years in the 1992-2006 period and the baseline 1991 year). Obviously, if somebody does not work, he will not get benefits through her employer. As explained in the paper, in my regressions I control for total years of work to account for the lower total years of benefits of somebody who is not working.

- The respondent works less than 20 hours a week at her primary job or is self-employed in an unincorporated business (this issue affects survey years 1991 and 1992). Note that this affects only few observations due to the sample restrictions I impose.[5]

- The respondent works less than 20 hours a week at her primary job and he answers

[4]There is even a more subtle way through which missing values affect my results. Suppose that in each year a respondent has a missing value on the $B_{i,t}$ dummy of interest. In this case, I set the across-years sum of $B_{i,t}$ to zero. Indeed, I do not want to include in my sample a respondent with missing values on $B_{i,t}$ for all years. However, there are only few cases where this occurs.

[5]E.g. I keep only workers who worked at least 20 hours a week in 1991. So only few of them work less than 20 hours a week in 1992

negatively when asked if his primary job offers any benefits (every survey year since 1993). In this case the interviewer stops and does not ask about specific benefits. The respondents in my sample, almost each year, when they work, they work more than 20 hours a week.

- Missing information on the questions which determine the universe of the question (all survey years in the 1992-2006 period). E.g. if the respondent does not know if the job offers any benefits, then it is possible that the benefit questions are not asked.

## I.2 Other Worker-Level Variables

Let $SY93$ be the set containing years 1993, and every even year between 1994 and 2006, with extremes included. Let $SY93_{-1}$ be the set including the years in $SY93$ minus one, i.e. 1992 and every odd year between 1993 and 2005, with extremes included. In each year in $SY93$ the respondent is asked about the total income from wages and salary that he earned in the past calendar year.[6] Let $W_{i,t}$ be total income and salary for year $t$ for respondent $i$. My income dependent variable is then $(\sum_{t \in SY93_{-1}} W_{i,t})$ divided by $\frac{1}{4}(W_{i,1988} + W_{i,1989} + W_{i,1990} + W_{i,1991})$. In words, the cumulative income between 1992 and 2005, for the years for which survey data is available, expressed as a fraction of average income in 1988-991. This definition is similar to the one of cumulative earnings in Autor et al. (2014). In my data the income values are top coded. Instead, Autor et al. (2014) use Social Security data and so their earnings data is not top coded. The NLSY79 income data are top coded as follows: up to 1994, all income values above $100,000 are replaced with the average of the incomes above $100,000; since 1996, all income values above the 98th percentile are replaced with the average of the

[6]This is the wording of the question: During the past calendar year, "how much did you receive from wages, salary, commissions, or tips from all (other) jobs, before deductions for taxes or anything else?"

incomes above the 98th percentile.[7]

The categories of the education variable are constructed based on the highest grade completed as of May 1 of the survey year. The categories are created as follows: those with less than grade 12 completed are *High-School Drop-outs* (the omitted category in the regression); those with exactly grade 12 completed are in the *High-School* category; those with more than grade 12, but less than grade 16, completed are in the *Some College* category; those with at least grade 16 completed are in the *College or More* category. The NLSY79 computes the hours worked since the last interview. The experience variable is given by the sum of those hours, divided by 2000. The division converts the variable to an yearly rate, using as reference a job with 40 hours a week and 50 weeks a year. The NLSY79 does not ask consistently about being in a union. In any event it is possible that a worker is not in a union but that her benefits are affected by a union because her job is covered by a collective bargaining agreement. I follow Booth et al. (2010) in the construction of this variable.

# II More Information on Industry-level Variables

## II.1 Measure of Chinese Import Competition

Our measures of exposure to Chinese competition are similar to the ones in Autor et al. (2013). Our regressor of interest and our instrument are described in, respectively, equation (3) and equation (4) in the text. In our estimation sample we use data for 70 distinct manufacturing industries at the 3-digit level. The construction of the measures and the data sources are discussed below.

For the trade flows - i.e. the terms $M^{chn}_{j,06}$, $M^{chn}_{j,91}$, $M_{j,91}$ and $EX_{j,91}$ in equations (3) and

[7] See here: $http://nlsinfo.org/content/cohorts/nlsy79/topical-guide/income/income$

(4) - I use UN Comtrade data at the 6-digit level using the HS1988/92 classification; for industry shipments (i.e. $Y_{j,91}$ in equations (3) and (4)), I use the NBER-CES data at the 4-digit level with the SIC1987 classification; the NLSY data uses instead 3-digit Census industry classification codes. I aggregate the trade data at the 4-digit level using a slightly aggregated version of SIC1987 as in Autor et al. (2013). This allows me to merge the trade data with the industry variables from the NBER-CES data. I then aggregate the data at the 3-digit 1990 Census industry classification code and merge with the NLSY. I describe these steps more in detail below.

## II.2 UN-Comtrade Trade Data

We obtain trade data from the WITS website of the World Bank which in turn gets the data from UN-Comtrade. For the 1991-2006 period and each available HS 6-digit industry, we download: U.S. imports from the rest of the world; U.S. exports to the rest of the world; U.S. imports from China; other wealthy countries' imports from China. All the data are converted to real 2007 dollars.[8]

In some years, for some of these industries one trade flow (e.g. U.S. exports) is non-missing but another is missing (e.g. imports from China): in this case we set the flow with a missing value to zero. In doing so, we follow the WITS User Manual, section B.2.1 which, regarding the WITS data, states that the "data is reported by statistical offices of each country to relevant international organizations. As a rule, missing country/period data means that the reporting country had not reported data for that specific year. *No trade information for any given product (or product category) indicates a non-traded product according to the reporting country*" [italics, mine] World Bank (2011).

[8] All flows above are available in current dollars in the UN Comtrade data, even the imports from China into other wealthy countries.

In order to compute the expressions in (3) and (4), I need to merge the trade flows with the NBER-CES data on shipments. To do so, I aggregate the UN Comtrade data from the HS 1988/92 6-digit code to the SIC1987dd 4-digit code. The SIC1987dd slightly aggregates the 4-digit industries in the SIC1987 used by the NBER. In this way every industry in SIC1987dd can be associated to an industry in HS 1988/92. I use the crosswalk provided on David Dorn's website: the crosswalk indicates what share of a HS 6-digit industry should be allocated to a SIC1987dd 4-digit industry. I then aggregate the NBER data at the SIC1987dd level from the original SIC1987. Again, David Dorn's website provides the file for such recode.

The UN Comtrade data uses some special industry codes for oil-related trade flows.[9] These codes are not in Dorn's HS-SIC1987dd crosswalk. I aggregate these codes to the HS 1988/92 code 271000 which is instead contained in the crosswalk. Industry 3273 is in the NBER-CES dataset but there is no trade flow for it in any years: this makes sense given that 3273 is ready-mixed concrete. I impute the trade flows to 0 for this industry in all years. Industry 2992 (Lubricating oils and greases) is in the NBER-CES dataset but it has no trade flow for many years since 2000. I drop all the observations for this industry. The value of shipments in NBER is missing for some years for some industries.[10] We drop these industries from our dataset. This leaves us with a balanced panel of 395 SIC1987dd industries for 17 years.

[9]These codes are: 271012, 271013, 271014, 271016, 271021, 271022, 271025, 271026, 271027, 271029, 271093, 271095 and 271096.

[10]These industries are SIC 2411, 2711, 2721, 2731, 2741, 2771, 3292, 3732.

## II.3 Merging Industry Data with NLSY

The NLSY has information about the industry of the main job of the respondent. The NLSY uses the 3-digit 1980 Census industrial codes (CIC1980) since 1982 to 2000. I recode the CIC1980 codes to *ind1990*, which is the version of the 3-digit 1990 Census manufacturing recode (CIC1990) which was developed by IPUMS. The IPUMS documentation on the variable *ind1990* contains some information on the relevant crosswalk. The full recode is available here: https://usa.ipums.org/usa/vols_4_5_index.shtml (click on the *ind1990* link).

In order to recode the 4-digit SIC1987 to 3-digit CIC1990, we rely on the crosswalk in Appendix A of the Census Technical Paper 65, October 2003.[11] Due to the different level of aggregation, a given CIC1990 industry may be matched to more than one SIC1987 industry (but a given SIC1987 industry will be matched to only a CIC1990 industry). We aggregate the trade flows and the shipment variable at the CIC1990 level by adding them up across SIC1987 industries: e.g. the imports from China for CIC1990 industry 111 will be given by the sum of the imports from China for the SIC1987 industries associated to 111 in the crosswalk, i.e. SIC1987 industries 2051, 2052 and 2053. We then compute the expressions in (3) and (4) using these aggregated values.

# References

Autor, D. H., D. Dorn, and G. H. Hanson (2013, October). The China Syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review 103*(6), 2121–68.

[11] This crosswalk, with minor differences, can also be found on Jon Haveman's concordances webpage. It is the file called *4 digit usSIC (1987) to 3 digit CIC (1983+)*.

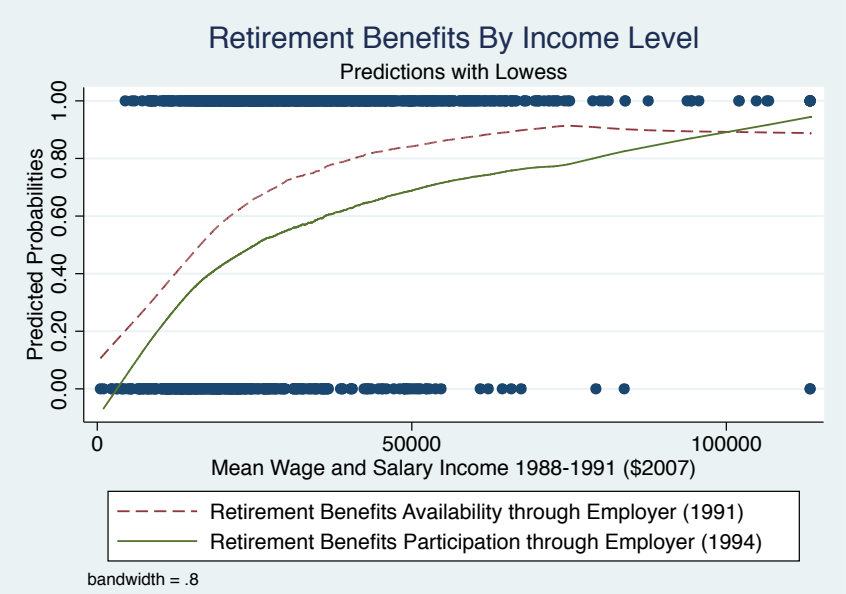
Autor, D. H., D. Dorn, G. H. Hanson, and J. Song (2014). Trade Adjustment: Worker Level Evidence. *Quarterly Journal of Economics 4*(129), 1799–1860.

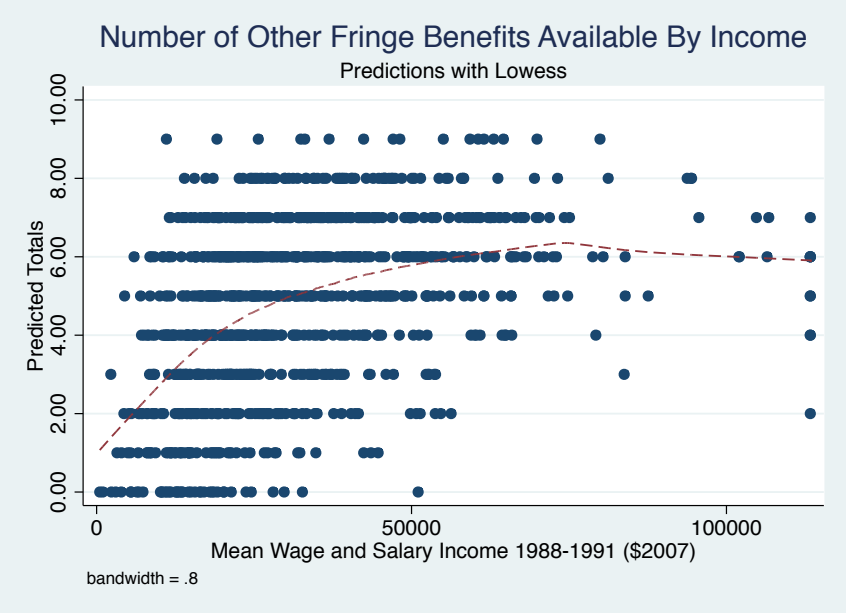
Booth, J. E., J. W. Budd, and K. M. Munday (2010). Never Say Never? Uncovering the Never-Unionized in the United States. *British Journal of Industrial Relations 48*(1), 26–52.

World Bank (2011). *WITS User's Manual* (2.01 ed.). World Bank.

# III Supplementary Figures and Tables

Figure 1: Employer-Sponsored Retirement Benefits and Other Fringes by Income




Main analysis sample described in Table 1. Top panel: Employer-sponsored retirement benefits availability (1991) and participation (1994) by mean income in 1988-1991; information about participation in employer-provided retirement plan is from 1994 as this information is not available before then. Bottom panel: all other *available* fringe benefits, other than health insurance and retirement, by mean income in 1988-1991. Source: NLSY79

Figure 2: Most and Least Exposed Industries to U.S. Chinese Imports

**Most and Least Exposed Industries to Chinese Imports**

| Industry | Change in Exposure to Chinese Imports (1991-2006) |
|---|---|
| **Most Exposed Industries** | |
| Office and accounting machines | 0.96 |
| Toys, amusement, and sporting goods | 0.68 |
| Leather products, except footwear | 0.65 |
| Footwear, except rubber and plastic | 0.51 |
| Computers and related equipment | 0.49 |
| **Least Exposed Industries** | |
| Dairy products | 0 |
| Beverage industries | 0 |
| Tobacco manufactures | 0 |
| Petroleum refining | 0 |
| Guided missiles, space vehicles, and parts | 0 |

Change in Chinese import penetration between 1991 and 2006, as measured in equation (3). Industries aggregated at the 3-digit Census 1990 level. Source: UN-Comtrade and NBER-CES.

Table 1: The Effect of Chinese Imports on Total Income (1992-2005), I (**Continues**)

| | OLS | IV |
|---|---|---|
| | b/se | b/se |
| Δ U.S. Exposure to Chinese Imports | -1.03 | 3.88 |
| | (1.99) | (2.81) |
| Age (1991) | -0.20 | -0.20 |
| | (0.13) | (0.13) |
| Hispanic | -0.42 | -0.37 |
| | (0.45) | (0.43) |
| Black | -0.46 | -0.43 |
| | (0.38) | (0.37) |
| Foreign Born | -0.11 | -0.12 |
| | (0.51) | (0.50) |
| Female | -2.03* | -1.91* |
| | (0.90) | (0.85) |
| Married (1991) | 1.27 | 1.29 |
| | (0.81) | (0.80) |
| Married Female (1991) | -0.00 | -0.09 |
| | (0.69) | (0.68) |
| High-School (1991) | -0.16 | -0.13 |
| | (0.81) | (0.78) |
| Some College (1991) | 1.81** | 1.82** |
| | (0.63) | (0.61) |
| College or More (1991) | 4.95*** | 4.97*** |
| | (1.03) | (1.03) |
| Employer Size, 50-499 (1991) | -0.63 | -0.68 |
| | (0.69) | (0.67) |
| Employer Size, 500+ (1991) | 0.02 | -0.00 |
| | (0.62) | (0.61) |
| Work Experience (1991) | 0.13 | 0.14 |
| | (0.13) | (0.13) |
| Years with Employer (1991) | -0.04 | -0.05 |
| | (0.07) | (0.07) |
| Collective Bargaining (1991) | 0.17 | 0.14 |
| | (0.33) | (0.32) |
| Log Mean Income 1988-1991 | -6.69* | -6.71** |
| | (2.57) | (2.51) |
| Years Reported a Job 1992-2006 | 1.04*** | 1.02*** |
| | (0.14) | (0.13) |
| Observations | 989 | 989 |

Table 2: The Effect of Chinese Imports on Total Income (1992-2005), II (**Continued**)

| | OLS | IV |
|---|---|---|
| | b/se | b/se |
| Employer Health Insurance Avail. (1991) | -0.27 | -0.19 |
| | (1.29) | (1.24) |
| Employer Retirement Plan Avail. (1991) | 0.79* | 0.82** |
| | (0.41) | (0.41) |
| Number of Other Fringe Available (1991) | 0.12 | 0.11 |
| | (0.17) | (0.17) |
| Import Penetration in U.S. (1991) | 1.95 | -1.54 |
| | (2.12) | (2.58) |
| Capital/Value Added (1991) | -0.79 | -1.11** |
| | (0.48) | (0.51) |
| Prod. Workers Empl. Share (1991) | -0.91 | 1.87 |
| | (2.35) | (2.25) |
| Log Average Industry Payroll (1991) | 1.17 | 2.80* |
| | (1.12) | (1.52) |
| Change in Employment Share 1976-1991 | -22.56 | -35.89 |
| | (27.94) | (28.79) |
| $\Delta$ Log Average Industry Wage 1976-1991 | 1.15 | 0.23 |
| | (2.94) | (3.05) |
| Total Interviews 1992-2006 (max=9) | 0.51*** | 0.53*** |
| | (0.17) | (0.17) |
| Years with Invalid Missing Income | -1.59*** | -1.59*** |
| | (0.11) | (0.11) |
| Observations | 989 | 989 |
| Adjusted $R^2$ | 0.28 | 0.28 |
| Kleibergen-Paap F | | 43.26 |
| C-Statistic p-value | | 0.05 |

Standard errors are clustered at the industry level. Source: NLSY79, UN-Comtrade, NBER-CES.
* p<0.10, ** p<0.05, *** p<0.01