Appendix for Online Publication

"Do Robots Increase Wealth Dispersion?"

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Abstract

This Online Appendix includes tables and figures referred to but not included in the main body of the paper *Do Robots Increase Wealth Dispersion?* by Francisco Gomes, Thomas Jansson and Yigitcan Karabulut, that provide robustness checks and additional findings.

A. Variable Definitions

Outcome Variables:

- *Net Wealth Rank* is the net wealth percentile rank of a household in the corresponding birth cohort-year distribution across all households with available wealth information in the LINDA database. This variable is based on household net wealth at the end of the sample period. We calculate net wealth by subtracting household debt from total household assets, which is the sum of all financial and real assets.
- *Net Wealth Level* is the (inverse hyperbolic sine) of the sum of all financial assets (direct and indirect stocks, bonds, and cash) and real assets (value of primary residence and other real estate holdings) net of any household debt (mortgage loans, student debt, and consumer credit) at the end of the sample period. Inverse hyperbolic sine transformation is analogous to a standard log transformation with the difference that it is defined for both zero and negative values, which are common in wealth data.
- *Change in Net Wealth* is the change in the net wealth rank of a household within the corresponding birth cohort distribution between 1999 and 2007.
- *Income Growth* reflects changes in household income, which is defined as the log differences in earnings (net of any transfers or capital gains) at the household level from 1999 to 2007.
- *Unemployment Risk* is an indicator variable that takes the value of 1 if a given household was employed in 1999 and unemployed in 2007. We define unemployment status at the household level using information on whether the household head receives any unemployment benefits. In other words, we estimate the transition probability of the household head from employment to unemployment during the observation period.
- *Stockholding Status* is an indicator variable of whether the household invests in the stock market, either directly or indirectly through mutual funds, excluding investments through retirement accounts. Since the wealth data were collected to assess wealth taxes, stockholdings under the mandatory first pillar of social security and in tax-deferred retirement accounts are not included in our data since they were not part of the tax base.
- *Stock Market Exit* is an indicator variable of whether the household participate in the stock market in 1999 but liquidate all stock investments by 2007. By definition, we restrict the sample to stock market participants in 1999, which reduces the sample size by approximately 8,250 to 22,125 households.
- *Change in Risky Share* is defined as the differences in the ratio of direct and indirect stock holdings to the total financial assets of households from 1999 to 2007.
- *Change in Financial Wealth* is defined as the log difference in financial wealth from 1999 to 2007. We define financial wealth as the sum of the value of direct and indirect stocks, bonds, bond and mixed mutual funds, and cash holdings in savings and checking accounts. We winsorize this variable at the 1 percent level.
- *Wealth to Income* refers to the ratio of household financial wealth in 2007 to household earnings net of any transfers and capital gains. We winsorize this variable at the 1 percent level.

- *Income Growth (1995-98)* reflects a change in household income, which is defined as the log difference in earnings (net of any transfers or capital gains) from 1995 to 1998.
- *Active Savings Rate (2000)* is the active savings rate of a household in 2000. To calculate it, we make use of an auxiliary dataset provided by Statistics Sweden, which includes individual-level security information on the portfolio holdings of each individual in the LINDA dataset. Using standard financial databases (*inter alia*, *Bloomberg*, *Thomson Reuters Datastream*, *Factset*, *Compustat*, *Thomson Reuters Mutual Funds*), we collect end-of-year adjusted prices for (sampled) single stocks and mutual funds and calculate the annual raw returns. We then compute the one year value-weighted buy-and-hold returns for each household's equity portfolio using the weighted sum of the portfolio share for each stock or mutual fund from the prior year and the annual returns. Here, we assume that all portfolio inflows and outflows occur at the end of each year. Using this information, we then break down the changes in financial wealth into two components: (*i*) active changes (i.e., due to new savings) and (*ii*) passive changes (i.e., due to returns on risky investments). Finally, we calculate the active savings rate of a given household in a given year by dividing the active changes in financial wealth by the contemporaneous disposable household income. To alleviate concerns about outliers, we winsorize this variable at the 1 percent level. Even though our household panel dataset allows us to decompose the changes in wealth into passive and active changes, we recognize that our savings measures have some limitations. For example, when calculating capital gains, we assume that households rebalance their portfolios at the end of each year because we do not observe intra-year transactions. Finally, we include wealth transfers (e.g., inter vivos and inheritances) in the active change in the savings rates.
- *Homeowner (1999)* is an indicator variable of whether the household owns its primary residence in 1999.
- *Risky Share (1999)* is measured by the ratio of direct and indirect stock holdings to total financial wealth in 1999.
- *Change in Household Debt* refers to the log difference in total household debt from 1999 to 2007. Household debt includes outstanding mortgages, consumer credits, and student loans.
- *Change in Disposable Income* refers to the change in household disposable income, which is defined as the log differences in household income including transfers from the government from 1999 to 2007.
- *Stock Market Entry* is an indicator variable of whether the household participates in the stock market by 2007, conditional on being a non-participant in 1999. By definition, we restrict the sample to non-participants in 1999, which reduces the sample size by 22,125 to 8,250 households.
- *Homeownership Status* is an indicator variable of whether the household owns its primary residence in 2007.
- *Buying a House* is an indicator variable that takes the value of 1 if the households buys a house by 2007, conditional on being a renter in 1999. By definition, we restrict the sample to renters in 1999, which reduces the sample size by 23,024 to 7,351 households.
- *Selling a House* is an indicator variable that takes the value of 1 if the household sells a house by 2007, conditional on being a homeowner in 1999. By definition, we restrict the sample to homeowners in 1999, which reduce the sample size by 7,351 to 23,024 households.

- *Total Savings Rate (2000)* is calculated in the following way: We first calculate the annual differences in household net wealth, scaled by current household income. Following Bach, Calvet, and Sodini (2017), we only consider households with non-zero or non-negative net wealth. We winsorize the savings rate variable at the 1 percent level.
- *Average Active Savings Rate (2000-2007)* is the average active savings rate of a household from 2000 to 2007. See above for the definition of active savings rate.

Control Variables:

- *Age* refers to the age of the household head.
- *Male* is an indicator variable that takes the value of 1 if the household head is male, and 0 otherwise.
- *College* is an indicator variable that takes the value of 1 if the household head has attended college, and 0 otherwise.
- *High school* is an indicator variable that takes the value of 1 if the household head graduated from high school, and 0 otherwise.
- *Number of adults* is the number of household members of age >= 18.
- *Number of children* is the number of household members of age < 18.
- *Immigrant* is an indicator variable of whether the household head is an immigrant.
- $\Delta Chinese\_Import^{99\rightarrow 07}$ refers to the change in exposure to Chinese imports per thousand employees from 1999 to 2007. The import data (in ten millions of SEK) are collected from Statistics Sweden and information on employment levels is from the EU KLEMS database.
- $\Delta EU\_Import^{99\rightarrow 07}$ refers to the median change in import exposure to eleven developed Western European countries (*Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, Portugal*, and *the United Kingdom*) per thousand employees from 1999 to 2007. The import data (in ten millions of SEK) are collected from Statistics Sweden and information on employment levels is from the EU KLEMS database.
- Δ*No of Employees (1993-98)* refers to the change in nationwide employment level from 1993 to 1998 in a given industry. The information on employment levels is from the EU KLEMS database.
- $\Delta Profits$ refers to the log difference in industry level profits from 1999 to 2007. We normalize this variable by the number of employees in the base year of 1995. The data on gross operating surplus and mixed income to proxy for profits are from the OECD STAN database, and the information on employment levels is from the EU KLEMS database.
- $Labor\_Intensity$ (1999) refers to the labor-to-capital ratio of a given industry in 1999. The information for industry-level labor costs (compensation of employees) is obtained from the OECD STAN database. The data on capital stock (i.e., net capital stock volume in millions) for each industry are from the OECD STAN database.
- Δ*Capital Intensity* refers to the log difference in the net capital stock of an industry from 1999 to 2007. The data on capital stock (i.e., net capital stock volume in millions) for each industry are from the OECD STAN database.

- Δ*ICT Capital* refers to the log difference in ICT capital of an industry from 1999 to 2007. The data on ICT capital are acquired from the EU KLEMS database.
- *Initial Robot Density (1995)* refers to the robot stock divided by the number of employees in an industry in 1995. Information on robot stock at the industry level is provided by IFS 2007, and the information on employment levels is from the EU KLEMS database.

B. Causal Mediation Analysis

The mediation analysis allows to disentangle the average causal effect of a treatment variable (automation growth) on an outcome variable (changes in net wealth) running through an observed intermediate outcome (realized income growth), i.e., indirect effects and through other mechanisms (portfolio channel), i.e., direct effects (Imai, Keele, and Yamamoto, 2010; Imai et al., 2011; Heckman and Pinto, 2015). Recent applications of this method to quantify the empirical importance of different mechanisms (underlying a causal effect) include Heckman et al. (2013), Fagereng et al. (2020), and Dippel et al. (2017, 2019).

To do this, we use the identification framework of Pinto et al. (2019) that enables, given some assumptions, such a decomposition in IV settings, where both treatment and intermediate outcome are endogenous. A novel property of the identification framework of Pinto et al. (2019) is that it requires a single instrument for identification, whereas earlier methods require separate instruments for treatment and mediator.

Specifically, the estimation framework of Pinto et al. (2019) uses three separate 2SLS regressions to decompose the average causal effect of increased automation on household wealth into direct and indirect effects. The second stage of these three equations are described as follows:

$$\Delta Net\_Wealth_{ijk}^{99\to07} = \beta_1 \cdot \Delta \widehat{Robot\_Density}_j^{99\to07} + \beta_2 \cdot \Delta X_{ij} + \delta_k + \epsilon_{ijk}, \tag{O.A.1}$$

$$\Delta Income_{ijk}^{99\to07} = \gamma_1 \cdot \Delta \widehat{Robot\_Density}_j^{99\to07} + \gamma_2 \cdot \Delta X_{ij} + \delta_k + \theta_{ijk}, \tag{O.A.2}$$

$$\Delta Net\_Wealth_{ijk}^{99\to07} = \lambda_1 \cdot \Delta \widehat{Income}_{ijk}^{99\to07} + \lambda_2 \cdot \Delta Robot\_Density_j^{99\to07} + \lambda_3 \cdot \Delta X_{ij} + \delta_k + \eta_{ijk} \tag{O.A.3}$$

where $\Delta Income_{ijk}^{99\to07}$ is the mediator variable of interest, that is, the realized income growth of household i between 1999 and 2007, $\Delta Net\_Wealth_{ijk}^{99\to07}$ is the outcome vari-

able, which is the change in the net wealth rank of household i within the corresponding birth cohort-year distribution, and finally, $\Delta Robot\_Density_j^{99\to07}$ represents the changes in industrial robots per thousand workers in industry j (the treatment variable). Equations (O.A.1-3) are the second-stage of three separate 2SLS regressions where we use the median changes in robot density across the European countries as an instrument. Accordingly, $\Delta\widehat{Robot\_Density}_j^{99\to07}$ and $\widehat{Income}_{ijk}^{99\to07}$ are estimated values from the corresponding first-stage regressions. It is important to note that the parameters, β_1 and γ_1, can be estimated using standard 2SLS regressions. As shown in Pinto et al. (2019), the identification of λ_1 and λ_2 is achieved by the identifying assumption that any potential confounders that bias the relationship between the treatment and outcome variable are primarily due to the confounders that jointly affect the treatment and intermediate outcome variable. This uncorrelatedness assumption generates a new exclusion restriction to identify the causal effect of the treatment on the outcome variable running through the mediator variable. Analogous to our base regressions, we also account for all the relevant household and industry controls, as denoted by vector ΔX_{ij}, as well as regional fixed effects, and cluster the standard errors at the industry level.

The point estimate, $\hat{\beta}_1$, in Equation (O.A.1) is the total effect of increased automation on the net wealth percentile rank and changes in the net wealth rank, as presented in Columns (1)-(2) and (5)-(6) of Table 3, respectively. Using the parameter estimates of $\hat{\gamma}_1$, $\hat{\lambda}_1$ and $\hat{\lambda}_2$ from Equations (O.A.2) and (O.A.3), we are able to quantify how much of the effect of increased automation on the net wealth rank of households (i.e., $\hat{\beta}_1$) is explained by the effect of automation on the wage growth of households. Put differently, product $\hat{\gamma}_1 \times \hat{\lambda}_1$ yields the indirect effect and $\hat{\lambda}_2$ is the direct effect of increased robotization that affects household wealth accumulation through channels other than income growth. Note that the sum of the indirect and direct effects (i.e., $\hat{\gamma}_1 \times \hat{\lambda}_1 + \hat{\lambda}_2$) is equal to $\hat{\beta}_1$, that is, the total effect of robots on household wealth.

C. Details about the Life-cycle Model

C.1 Numerical Solution

We solve the model using the same approach as in Gomes and Michaelides (2005) and Cocco, Gomes, and Maenhout (2005), for example. We use dynamic programming, iterating on the value function with backward induction starting from the last period, for which the solutions are trivial. We use grid search methods to find the optimal solutions, and integrate over normal distributions using Gaussian quadrature. The grid for wealth is equally spaced in logs, while the grid for income is equally spaced in levels. We interpolate the value function using cubic splines along the wealth dimension, and linear splines along the income dimension. The other two state variables (age and lagged unemployment indicator) are discrete, and therefore do not require interpolation.

C.2 Labor Income Calibration

We use income data at the household level from 1993 to 2007 when estimating the income profiles. We define the 1993-1998 period as the pre-robotization period, while the 1999-2007 period refers to the post-robotization period. We use a broad definition of income that is defined as the sum of labor income and government transfers (e.g., unemployment compensation, child support, other welfare, etc.) net of taxes. We deflate household income measures to 2007 prices using the Consumer Price Index obtained from Statistics Sweden.

When constructing the sample, we impose several restrictions that are standard in the literature. First, we eliminate households with less than SEK 10,000 in broad income in any year (basically, to exclude households that reside outside of Sweden), and exclude retirees, students, self-employed, and homemakers from the sample. Next, we restrict our attention to households who work in industries for which the International Federation of Robotics (IFR) provides information on the number of robot stock. We classify house-

holds based on the industry of employment of the household head in the initial year of pre-/post-robotization periods when assigning them to groups with different levels of exposure to robot risk: *low*, *medium* and *high* ($\Omega = L$, M and H, respectively). Finally, we focus on households whose head is between 20 and 65 years of age.

We regress the logarithm of real income on marital status, age dummies, and household fixed effects. We then fit a third-order polynomial to the age dummies to obtain the labor income profiles. We allow the income profiles to differ between high, medium and low robot exposure industries, and between pre- and post-robotization shock. The results are presented in Panel A of Table 9.

Panel A of Table O.A.26 reports the mean, median, and standard deviation for the labor income estimates for the pre-robotization (i.e., 1993-1998) and post-robotization (i.e., 1999-2007) periods for three groups of households with low ($\Omega = L$), medium ($\Omega = M$), and high ($\Omega = H$) exposure to robot risk, respectively. In Panel B, we report summary statistics for the differences in labor income between the post-robotization and pre-robotization periods for these three groups of households.

When estimating the error structure of the labor income process, we follow the variance decomposition as in Carroll and Samwick (1997) and Cocco, Gomes, and Maenhout (2005). The variance decompositions for each group both in pre- and post-robotization periods are reported in Panel B of Table 9. Note that we estimate the permanent-transitory decomposition on the full sample (i.e., 1993-2007) as we have a short time-series for the post-robotization period.

D. Additional Tables and Figures

Table O.A.1. Mathcing the LINDA, IFR, and EU KLEMS Data

This table presents the correspondence list that we use to match industry-level information from the International Federation of Robotics (IFR), EU KLEMS database, and LINDA dataset from Statistics Sweden.

SNI Code	EU-KLEMS Code	IFR Code	Industry Name (IFR)
01-05	A-B	A-B	Agriculture, forestry, fishing
C	C	C	Mining and quarrying
15 -16	10-12	10-12	Food and beverages; tobacco
17-18-19	13-15	13-15	Textiles
20-21-22	16-18	16-18	Wood and furniture; Paper
23-24	19-21	19-21	Pharmaceuticals, cosmetics; Other chemical products n.e.c.
25-26	22-23	22-23	Rubber and plastic products; Chemical products; Mineral products
27-28	24-25	24-25	Basic metals; Metal products (non-automotive)
29	28	28	Industrial machinery
30-31-32-33	26-27	26-27	Electrical/electronics
34-35	29-30	29-30	Automotive; Other vehicles
E	E	E	Electricity, gas, water supply
F	F	F	Construction
M	M	P	Education/research/development

Table O.A.2. First-Stage Relationship for Wealth and Labor Market Regressions

This table presents coefficient estimates from from the first-stage of the IV regressions from the household financial behavior ((1)) and net wealth and analysis ((2)), respectively. In all specifications, the dependent variable is the change in robot density in the Swedish industries. The excluded instrument is the contemporaneous median changes in robot density in the corresponding industries across eleven other developed Western European countries that are Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain, Portugal, and the United Kingdom. In all regressions, we account for changes in observable household variables, contemporaneous industry characteristics, and municipality dummies. Standard errors are clustered at the industry level. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	$\Delta\ Robot\_Density^{99\rightarrow07}$	
	(1)	(2)
$\Delta Robot\_Density_{EU}^{99\rightarrow07}$	16.4622***	16.4861***
	(3.6909)	(3.5858)
Observations	22,125	30,375
R-squared	0.8879	0.8860
F-statistics	47.16	20.60
Clustering	Industry	Industry
Industry Controls	Yes	Yes
Household Controls	Yes	Yes
Income Deciles (1999)	Yes	No
Wealth Deciles (1999)	Yes	No
Municipality FE	Yes	Yes

Table O.A.3. Addressing Industry-level Trends

Panel A reports pairwise correlation coefficients between robotization measures and other observable industry characteristics. In (1) and (2) we consider the changes in robot density in the European and Swedish industries, respectively. See Data Appendix for detailed variable definitions. Panel B reports the coefficient estimates from a difference-in-difference type analysis. Specifically, we first compute the cumulative income growth at the household level for 1995-98 (i.e., pre-period) and 1999-2007 (i.e., post-period), respectively. We then regress income growth on the interaction term between a post-period indicator, that equals to 1 in the post-1999 period, and a high robotization dummy, which takes the value 1 if changes in robot density in the industry is above the sample mean. We use a balanced sample of households and include industry fixed effects in both specifications. Standard errors are clustered at the household and industry level in (1) and (2), respectively.

Panel A: Pairwise Correlations

	$\Delta Robot\_Density_{EU}^{99\rightarrow 07}$	$\Delta Robot\_Density^{99\rightarrow 07}$
	(1)	(2)
$\Delta Robot\_Density_{EU}^{99\rightarrow 07}$	1.000	
$\Delta Robot\_Density^{99\rightarrow 07}$	0.715	1.000
ΔNo of Employees (1993-98)	0.517	0.404
ΔNo of Employees (1999-07)	-0.234	-0.285
Income Growth (1995-98)	0.408	0.241
Income Growth (1999-07)	-0.344	-0.309
$\Delta Chinese\_Import^{99\rightarrow 07}$	-0.132	-0.136
$\Delta EU\_Import^{99\rightarrow 07}$	0.217	0.243
ΔCapital Intensity	0.190	0.041
ΔICT Capital	0.063	-0.219
$Labor\_Intensity$ (1999)	-0.008	0.004
$\Delta Profits^{99\rightarrow 07}$	-0.207	-0.170

Panel B: Income Growth Regressions (1995-2007)

	Income Growth	
	(1)	(2)
Post-period	0.05342***	0.05342***
	(0.0031)	(0.0139)
Post-period x High_Robotization	-0.03347***	-0.03347**
	(0.0040)	(0.0143)
Constant	0.11005***	0.11005***
	(0.0011)	(0.0031)
Observations	29,056	29,056
R-squared	0.0174	0.0174
Clustering	Household	Industry
Industry FE	Yes	Yes

Table O.A.4. Educational Majors by Intersectoral Transferability

This table presents the top and bottom 10 educational majors-levels by the level of their intersectoral transferability. There is a total of 147 educational major-level groups. We compute the distribution of individuals within each category over their (2-digit) industry of employment, and construct a Herfindahl-Hirschman Index (HHI) of industry specialization for each major-level group. A higher (lower) HHI implies lower (higher) levels of intersectoral transferability of an educational major.

3-Digit Educational Orientation (SUN 2000)	Higher Education	HHI	Rank
Engineering and engineering industries, other / unspecified orientation	0	0.0539	1
Electronics, information technology and automation	0	0.0546	2
Engineering and engineering industries, other / unspecified orientation	1	0.0561	3
Engineering and Engineering Technology	0	0.0585	4
Broad, general education	0	0.0596	5
Business administration, commerce, administration, public educ.	0	0.0615	6
Business, trade and administration, other / unspecified educ.	0	0.0623	7
Energy and electrical engineering	1	0.0638	8
Production of wood, paper, glass / porcelain and plastic products	0	0.0658	9
Marketing	0	0.0667	10
...			
Therapy, rehabilitation and dietary treatment	1	0.7384	138
Medicine	1	0.7425	139
Teacher education for compulsory school ages	1	0.7805	140
Dentistry	1	0.8272	141
Therapy, rehabilitation and dietary treatment	0	0.8442	142
Nursing	1	0.8463	143
Security and Public Safety	1	0.8941	144
Personal services, other / unspecified education	1	1.0000	145
Fisheries and aquaculture	1	1.0000	146
Domestic services and cleaning	1	1.0000	147

Table O.A.5. Industry Switching and Intersectoral Transferability of Educational Majors

This table presents coefficient estimates from a linear probability model for industry switchers between 1999-2007 and 1993-1998, respectively. In both specifications, industry switcher dummy is regressed on the HHI of the educational major-level of a household and initial observable household characteristics, including age, age squared, gender, marital status, level of education, number of adults, number of children, immigrant dummy, and log earnings in the initial period. In (1) and (2), we also account for household wealth quartile dummies based on 1999 values. In (1) and (3), standard errors are clustered at the industry level. In (2) and (4), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively.

	Industry Switcher (1999 - 2007)		Industry Switcher (1993 - 1998)	
	(1)	(2)	(3)	(4)
HHI (of Education Major)	-0.11350**	-0.11350*	-0.30755***	-0.30755***
	(0.0566)	(0.0607)	(0.0628)	(0.0614)
Observations	29,655	29,655	80,169	80,169
R-squared	0.0522	0.0522	0.0874	0.0874
Household Controls	Yes	Yes	Yes	Yes
Clustering	Industry	Industry and Muni	Industry	Industry and Muni

Table O.A.6. Exposure to Robots and Household Net Wealth - Addressing Potential Sorting of Households

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We focus only on households who have been employed in the same industry since 1995 or earlier. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.52680***	-0.52680***	-0.20593***	-0.20593***	-0.49227***	-0.49227***
	(0.1976)	(0.1991)	(0.0501)	(0.0510)	(0.1826)	(0.1842)
Observations	19,178	19,178	19,178	19,178	19,178	19,178
R-squared	0.6201	0.6201	0.2734	0.2734	0.3068	0.3068
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.7. Exposure to Robots and Household Net Wealth - Controlling for Homeownership

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We include an indicator variable for being a homeowner in 1999 as an additional regressor in the regressions. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\to07}$	-0.49125**	-0.49125**	-0.14649***	-0.14649***	-0.45795*	-0.45795*
	(0.2496)	(0.2484)	(0.0513)	(0.0528)	(0.2370)	(0.2360)
Homeowner (1999)	7.19894***	7.19894***	4.90047***	4.90047***	6.83513***	6.83513***
	(0.2685)	(0.3867)	(0.1389)	(0.1698)	(0.2879)	(0.4070)
Observations	30,375	30,375	30,375	30,375	30,375	30,375
R-squared	0.5888	0.5888	0.2894	0.2894	0.3308	0.3308
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FEs	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.8. Exposure to Robots and Household Net Wealth - Controlling for Risk Exposure

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We include the initial risk exposure (i.e., share of risky assets in 1999) an additional regressor in the regressions. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\to07}$	-0.52213**	-0.52213**	-0.16750***	-0.16750***	-0.48727**	-0.48727**
	(0.2566)	(0.2556)	(0.0577)	(0.0592)	(0.2436)	(0.2427)
Risky Share (1999)	1.60238***	1.60238***	1.31759***	1.31759***	1.57141***	1.57141***
	(0.2492)	(0.2502)	(0.1316)	(0.1317)	(0.2468)	(0.2539)
Observations	30,375	30,375	30,375	30,375	30,375	30,375
R-squared	0.5798	0.5798	0.2586	0.2586	0.3175	0.3175
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.9. Exposure to Robots and Changes in Household Debt

This table presents coefficient estimates from the second-stage of the IV regressions for changes in household debt between 1999 and 2007. In all specifications, changes in debt are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. The dependent variable is the log differences in debt outstanding between 1999 and 2007. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), standard errors are clustered at the industry level. In (2), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Change in Household Debt	
	(1)	(2)
$\Delta Robot\_Density^{99\to07}$	0.00487	0.00487
	(0.0109)	(0.0123)
ΔMarried	0.43927***	0.43927***
	(0.0565)	(0.0566)
ΔCollege	0.12441	0.12441
	(0.2011)	(0.2181)
ΔHigh School	0.18815	0.18815
	(0.1785)	(0.1754)
ΔNumber of adults	0.55124***	0.55124***
	(0.0324)	(0.0349)
ΔNumber of children	0.61668***	0.61668***
	(0.0286)	(0.0317)
ΔNo of Employees (1993-98)	-0.00069	-0.00069
	(0.0041)	(0.0050)
$\Delta Chinese\_Import^{99\to07}$	0.00211	0.00211
	(0.0078)	(0.0079)
ΔCapital Intensity	-1.02089*	-1.02089**
	(0.5361)	(0.5157)
ΔICT Capitall	0.32476*	0.32476**
	(0.1699)	(0.1636)
Initial Robot Density (1995)	-0.00337	-0.00337
	(0.0059)	(0.0071)
$\Delta EU\_Import^{99\to07}$	0.01917***	0.01917***
	(0.0073)	(0.0067)
$Labor\_Intensity$ (1999)	0.46877	0.46877
	(0.3219)	(0.3153)
$\Delta Profits^{99\to07}$	-0.00016	-0.00016
	(0.0002)	(0.0002)
Constant	1.16116**	1.16116**
	(0.5601)	(0.4648)
Observations	30,375	30,375
R-squared	0.0620	0.0620
Clustering	Industry	Industry and Muni
Income Deciles (1999)	Yes	Yes
Wealth Deciles (1999)	Yes	Yes
Municipality FE	Yes	Yes

Table O.A.10. Exposure to Robots and Household Net Wealth - Excluding Automative Industry

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We exclude from the sample those individuals who are working in the automative industry, which has historically the highest robot density per thousand workers in Sweden. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-1.07644***	-1.07644***	-0.26087***	-0.26087***	-0.98348**	-0.98348**
	(0.4138)	(0.4149)	(0.0822)	(0.0869)	(0.3920)	(0.3935)
Observations	27,112	27,112	27,112	27,112	27,112	27,112
R-squared	0.5820	0.5820	0.2588	0.2588	0.3127	0.3127
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.11. Exposure to Robots and Household Net Wealth - Considering Full Sample

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We now consider the full set of industries (rather than focusing only on those that are directly affected by increased automation). We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.25487***	-0.25487***	-0.11047**	-0.11047**	-0.24358***	-0.24358***
	(0.0917)	(0.0918)	(0.0497)	(0.0505)	(0.0902)	(0.0902)
Observations	82,424	82,424	82,424	82,424	82,424	82,424
R-squared	0.5623	0.5623	0.2537	0.2537	0.3129	0.3129
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.12. Exposure to Robots and Household Net Wealth - Excluding Rubber and Plastic Industry

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We eliminate individuals working in the rubber and plastic industry that experienced the largest growth in robot use across industries in Sweden during the observation period. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.77470**	-0.77470**	-0.26604***	-0.26604***	-0.72344**	-0.72344**
	(0.3839)	(0.3824)	(0.0699)	(0.0715)	(0.3662)	(0.3652)
Observations	29,195	29,195	29,195	29,195	29,195	29,195
R-squared	0.5798	0.5798	0.2556	0.2556	0.3180	0.3180
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.13. Exposure to Robots and Household Net Wealth - Excluding Commuter Households

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We exclude from the sample the commuter households who deduct high commuting costs (that are above the threshold) from their labor incomes in the tax form. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.67578**	-0.67578**	-0.21402***	-0.21402***	-0.64202**	-0.64202**
	(0.3247)	(0.3234)	(0.0767)	(0.0786)	(0.3125)	(0.3117)
Observations	20,510	20,510	20,510	20,510	20,510	20,510
R-squared	0.5881	0.5881	0.2665	0.2665	0.3023	0.3023
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.14. Exposure to Robots and Household Net Wealth - Verification of Statistical Inference

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1)-(3), we focus on the wealth rank of households within their birth cohort-year distributions. In (4)-(6), the dependent variable is the inverse hyperbolic sine of net wealth. In (7)-(9), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (4), and (7), we use bootstrap techniques, specifically the wild bootstrap procedure of Cameron, Gelbach, and Miller (2008), to deal with the issues arising from having too few clusters. We compute asymptotic standard errors clustered at the broad industry level, but report the associated p-values using this procedure in the bracket parentheses. In (2), (5), and (8) standard errors are clustered at the broader level of industry aggregation; and in (3), (6), and (9), standard errors are clustered at the industry level. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank			Net Wealth Level			Change in Net Wealth Rank		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.52219*	-0.52219*	-0.52219**	-0.16755***	-0.16755**	-0.16755***	-0.48734	-0.48734*	-0.48734**
		(0.2851)	(0.2558)		(0.0688)	(0.0577)		(0.2704)	(0.2428)
	[0.0771]			[0.000]			[0.0821]		
Observations	30,375	30,375	30,375	30,375	30,375	30,375	30,375	30,375	30,375
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.15. Exposure to Robots and Household Net Wealth - Using the 1999 Employment as the Base Value

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We use the 1999 employment numbers instead of 1995 values as the base year when calculating the $\Delta Robot\_Density^{99\rightarrow07}$ variable. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.75855**	-0.75855**	-0.27341***	-0.27341***	-0.70702**	-0.70702**
	(0.3436)	(0.3430)	(0.0636)	(0.0658)	(0.3269)	(0.3268)
Observations	30,375	30,375	30,375	30,375	30,375	30,375
R-squared	0.5785	0.5785	0.2549	0.2549	0.3155	0.3155
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.16. Exposure to Robots and Household Net Wealth - Accounting for Life-Cycle Effects and Preference Shifters

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We augment the base estimation model by allowing for additional life-cycle controls and preference shifters specific to the household. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		IHS of Net Wealth		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.35070*	-0.35070*	-0.08305**	-0.08305**	-0.31741*	-0.31741*
	(0.1944)	(0.1936)	(0.0329)	(0.0351)	(0.1822)	(0.1813)
Observations	26,504	26,504	26,504	26,504	26,504	26,504
R-squared	0.6615	0.6615	0.4049	0.4049	0.4122	0.4122
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Preference Shifters	Yes	Yes	Yes	Yes	Yes	Yes
Additional Life-cycle Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.17. Exposure to Robots and Income Growth - Including Transfers

This table presents coefficient estimates from the second-stage of the IV regressions for disposable income growth. In all specifications, income growth is regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the log changes in household disposable income between 1999 and 2007. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), standard errors are clustered at the industry level. In (2), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Change in Disposable Income	
	(1)	(2)
$\Delta Robot\_Density^{99\to07}$	-0.00547	-0.00547
	(0.0036)	(0.0037)
ΔMarried	0.04958***	0.04958***
	(0.0076)	(0.0078)
ΔCollege	-0.01280	-0.01280
	(0.0182)	(0.0201)
ΔHigh School	-0.03574**	-0.03574**
	(0.0148)	(0.0143)
ΔNumber of adults	0.23467***	0.23467***
	(0.0055)	(0.0054)
ΔNumber of children	0.08962***	0.08962***
	(0.0028)	(0.0029)
ΔNo of Employees (1993-98)	0.00003	0.00003
	(0.0012)	(0.0012)
$\Delta Chinese\_Import^{99\to07}$	-0.00095	-0.00095
	(0.0014)	(0.0014)
ΔCapital Intensity	-0.02379	-0.02379
	(0.0914)	(0.0922)
ΔICT Capital	0.04756	0.04756
	(0.0492)	(0.0490)
Initial Robot Density (1995)	-0.00001	-0.00001
	(0.0015)	(0.0015)
$\Delta EU\_Import^{99\to07}$	0.00032	0.00032
	(0.0020)	(0.0022)
$Labor\_Intensity$ (1999)	0.01457	0.01457
	(0.0468)	(0.0471)
$\Delta Profits^{99\to07}$	0.00001	0.00001
	(0.0000)	(0.0000)
Constant	0.43018***	0.43018***
	(0.0294)	(0.0270)
Observations	30,375	30,375
R-squared	0.2341	0.2341
Clustering	Industry	Industry and Muni
Municipality FE	Yes	Yes

Table O.A.18. Exposure to Robots and Stock Market Entry

This table presents coefficient estimates from the second-stage of the IV regressions for stock market entry. In all specifications, stock market entry is regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), standard errors are clustered at the industry level. In (2), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Stock Market Entry	
	(1)	(2)
$\Delta Robot\_Density^{99\rightarrow07}$	0.00122	0.00122
	(0.0018)	(0.0021)
ΔMarried	0.03373**	0.03373*
	(0.0166)	(0.0183)
ΔCollege	0.04733	0.04733
	(0.0396)	(0.0421)
ΔHigh School	-0.10778***	-0.10778***
	(0.0322)	(0.0307)
ΔNumber of adults	0.08777***	0.08777***
	(0.0064)	(0.0072)
ΔNumber of children	0.07134***	0.07134***
	(0.0056)	(0.0059)
ΔNo of Employees (1993-98)	-0.00639***	-0.00639***
	(0.0007)	(0.0009)
$\Delta Chinese\_Import^{99\rightarrow07}$	0.00480***	0.00480***
	(0.0014)	(0.0016)
ΔCapital Intensity	0.55189***	0.55189***
	(0.0962)	(0.1082)
ΔICT Capital	-0.09130***	-0.09130**
	(0.0293)	(0.0360)
Initial Robot Density (1995)	0.00702***	0.00702***
	(0.0007)	(0.0011)
$\Delta EU\_Import^{99\rightarrow07}$	0.01289***	0.01289***
	(0.0015)	(0.0030)
$Labor\_Intesity$ (1999)	-0.38756***	-0.38756***
	(0.0576)	(0.0736)
$\Delta Profits^{99\rightarrow07}$	0.00009**	0.00009*
	(0.0000)	(0.0001)
Constant	0.11944***	0.11944***
	(0.0459)	(0.0351)
Observations	8,250	8,250
R-squared	0.1591	0.1591
Clustering	Industry	Industry and Muni
Income Deciles (1999)	Yes	Yes
Wealth Deciles (1999)	Yes	Yes
Municipality FEs	Yes	Yes

Table O.A.19. Exposure to Robots and Housing Investments

This table presents coefficient estimates from the second-stage of the IV regressions for housing investments of households. In all specifications, outcome variables are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on homeownership status of households in 2007. In (3) and (4), the dependent variable is an indicator variable that takes the value of 1 if a renter household in 1999 purchases a house as of 2007, and 0 otherwise. In (5) and (6), the dependent variable is an indicator variable that takes the value of 1 if a homeowner household in 1999 sells her house as of 2007, and 0 otherwise. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Homeownership Status		Buying a House		Selling a House	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\to07}$	-0.00598***	-0.00598***	-0.00798**	-0.00798**	0.00161**	0.00161**
	(0.0021)	(0.0021)	(0.0035)	(0.0036)	(0.0006)	(0.0007)
Observations	30,375	30,375	7,351	7,351	23,024	23,024
R-squared	0.1852	0.1852	0.1909	0.1909	0.0426	0.0426
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FEs	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.20. Exposure to Robots and Financial Risk Taking Behavior - Controlling for Income Growth Expectations

This table presents coefficient estimates from the second-stage of the IV regressions for household risk taking. In all specifications, outcome variables are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on stockholding status of households in 2007. In (3) and (4), the dependent variable is an indicator variable that takes the value of 1 if a stockholder household in 1999 exits the stock market as of 2007, and 0 otherwise. In (5) and (6), the dependent variable is the changes in risky share between 1999 and 2007. In Panel A and B, we include realyied income growth between 1999-2007 and 1995-1998 as an additional regressor in the regressions, respectively. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

Panel A: Controlling for Income Growth Between 1999-2007

	Stockholding Status		Stock Market Exit		Change in Risky Share	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.00471**	-0.00471**	0.00351**	0.00351**	-0.00394**	-0.00394**
	(0.0022)	(0.0022)	(0.0016)	(0.0016)	(0.0017)	(0.0018)
Change in Income $(1999-2007)$	0.02270***	0.02270***	-0.01785***	-0.01785***	0.00431**	0.00431**
	(0.0017)	(0.0016)	(0.0026)	(0.0028)	(0.0019)	(0.0019)
Observations	30,375	30,375	22,125	22,125	22,125	22,125
R-squared	0.1766	0.1766	0.0777	0.0777	0.0802	0.0802
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Controlling for Income Growth Between 1995-1998

	Stockholding Status		Stock Market Exit		Change in Risky Share	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.00567**	-0.00567**	0.00417**	0.00417**	-0.00438***	-0.00438***
	(0.0024)	(0.0024)	(0.0019)	(0.0019)	(0.0016)	(0.0017)
Change in Income $(1995-1998)$	-0.00567	-0.00567	0.00411	0.00411	0.00531	0.00531
	(0.0062)	(0.0065)	(0.0039)	(0.0046)	(0.0064)	(0.0070)
Observations	26,103	26,103	18,928	18,928	18,928	18928
R-squared	0.1733	0.1733	0.0795	0.0795	0.0856	0.0856
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.21. Exposure to Robots and Household Net Wealth - Controlling for Past Income Growth and Average Income

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We include average income between 1995 and 1998 and realized income growth between 1995 and 1998 as additional regressors in the regressions (that corresponds to the reduced form of an IV regression where we instrument current income growth by lagged income growth). We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\to07}$	-0.53997**	-0.53997**	-0.19443***	-0.19443***	-0.50183**	-0.50183**
	(0.2433)	(0.2430)	(0.0667)	(0.0680)	(0.2283)	(0.2280)
Income Growth $(1995-1998)$	0.95365***	0.95365***	0.19552	0.19552	0.91644***	0.91644***
	(0.2039)	(0.2433)	(0.1264)	(0.1328)	(0.2020)	(0.2427)
Average Income $(1995-1998)$	11.18607***	11.18607***	4.17758***	4.17758***	11.10275***	11.10275***
	(1.0800)	(1.0936)	(0.3858)	(0.3799)	(1.0898)	(1.1040)
Observations	26,103	26,103	26,103	26,103	26,103	26,103
R-squared	0.5949	0.5949	0.2739	0.2739	0.2981	0.2981
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	No	No	No	No	No	No
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.22. Exposure to Robots and Household Net Wealth - Excluding Displaced Workers

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We exclude those households who become unemployed over the sample period. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\rightarrow07}$	-0.49260*	-0.49260*	-0.14928***	-0.14928***	-0.45472*	-0.45472*
	(0.2593)	(0.2581)	(0.0561)	(0.0573)	(0.2449)	(0.2438)
Observations	29,089	29,089	29,089	29,089	29,089	29,089
R-squared	0.5773	0.5773	0.2515	0.2515	0.3202	0.3202
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.23. Exposure to Robots and Household Net Wealth - Controlling for Initial Total Savings Rate

This table presents coefficient estimates from the second-stage of the IV regressions for household net wealth. In all specifications, wealth measures are regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. In (1) and (2), we focus on the wealth rank of households within their birth cohort-year distributions. In (3) and (4), the dependent variable is the inverse hyperbolic sine of net wealth. In (5) and (6), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. We include total savings rate (normalized by current income) in 2000 as an additional regressor in the regressions. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), (3) and (5), standard errors are clustered at the industry level. In (2), (4), and (6), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Net Wealth Rank		Net Wealth Level		Change in Net Wealth Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Robot\_Density^{99\to07}$	-0.47593**	-0.47593**	-0.07339***	-0.07339***	-0.41446**	-0.41446**
	(0.2289)	(0.2276)	(0.0252)	(0.0256)	(0.2031)	(0.2018)
Total savings rate (2000)	3.61482***	3.61482***	0.65422***	0.65422***	3.77462***	3.77462***
	(0.3912)	(0.4144)	(0.0902)	(0.0926)	(0.3773)	(0.4075)
Observations	20,933	20,933	20,933	20,933	20,933	20,933
R-squared	0.5656	0.5656	0.0889	0.0889	0.1723	0.1723
Clustering	Industry	Industry and Muni	Industry	Industry and Muni	Industry	Industry and Muni
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Income Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Wealth Deciles (1999)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Table O.A.24. Exposure to Robots and Savings Rates (2000-2007)

This table presents coefficient estimates from the second-stage of the IV regressions for average savings rate of household between 2000-2007. In both specifications, savings rate is regressed on changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics, and municipality dummies. We estimate IV regressions instrumenting for the change in robot density in Swedish industries using the median change in robot density across the (non-Swedish) 11 European countries. Note that our base model is defined and estimated in first differences. In (1), standard errors are clustered at the industry level. In (2), standard errors are double clustered by municipality and industry. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. See Data Appendix for detailed variable definitions.

	Average Active Savings Rates	
	(1)	(2)
$\Delta Robot\_Density^{99\to07}$	-0.00084	-0.00084
	(0.0008)	(0.0008)
ΔMarried	-0.00480***	-0.00480***
	(0.0011)	(0.0012)
ΔCollege	-0.01029*	-0.01029*
	(0.0061)	(0.0055)
ΔHigh School	-0.01313***	-0.01313***
	(0.0033)	(0.0035)
ΔNumber of adults	0.00668***	0.00668***
	(0.0010)	(0.0008)
ΔNumber of children	0.00448***	0.00448***
	(0.0008)	(0.0008)
ΔNo of Employees (1993-98)	0.00040	0.00040
	(0.0003)	(0.0003)
$\Delta Chinese\_Import^{99\to07}$	-0.00086**	-0.00086*
	(0.0004)	(0.0004)
ΔCapital Intensity	-0.07156***	-0.07156***
	(0.0264)	(0.0263)
ΔICT Capital	0.02540***	0.02540***
	(0.0093)	(0.0095)
Initial Robot Density $(1995)5$	-0.00045	-0.00045
	(0.0003)	(0.0003)
$\Delta EU\_Import^{99\to07}$	0.00045	0.00045
	(0.0005)	(0.0005)
$Labor\_Intensity\ (1999)$	0.03793***	0.03793***
	(0.0121)	(0.0116)
$\Delta Profits^{99\to07}$	0.00001	0.00001
	(0.0000)	(0.0000)
Constant	0.03977***	0.03977***
	(0.0124)	(0.0124)
Observations	30,375	30,375
R-squared	0.0829	0.0829
Clustering	Industry	Industry and Muni
Income Deciles (1999)	Yes	Yes
Wealth Deciles (1999)	Yes	Yes
Municipality FE	Yes	Yes

Table O.A.25. Quantifying the Relative Importance of Alternative Mechanisms

This table presents parameter estimates from causal mediation analysis. We decompose the total effect of increased robotization into direct and indirect effects that run through income channel. In all specifications, we account for changes in robot density between 1999 and 2007, changes in observable household variables, and contemporaneous industry characteristics and municipality dummies. In (1), the outcome variable is the net wealth rank of a household within her birth cohort distribution in 2007. In (2), the dependent variable is the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. M is the realized income growth between 1999 and 2007; Z represents the excluded instrument, and T is the endogenous automation growth variable. Standard errors are clustered at the industry level.

	Net Wealth Rank	Change in Net Wealth
	(1)	(2)
Total Effects ($\hat{\beta}_1$)	-0.52219**	-0.48733**
	(0.2557)	(0.2428)
Direct Effects ($\hat{\lambda}_2$)	-0.16828***	-0.15147***
	(0.06471)	(0.05791)
Indirect Effects ($\hat{\gamma}_1 \times \hat{\lambda}_1$)	-0.35390*	-0.33586*
	(0.2101)	(0.1995)
Observations	30,375	30,375
Clustering	Industry	Industry
Industry Controls	Yes	Yes
Household Controls	Yes	Yes
Income Deciles (1999)	Yes	Yes
Wealth Deciles (1999)	Yes	Yes
Municipality FE	Yes	Yes
First stage (T on Z) F-statistics	21.139	21.139
First stage (M on Z\T) F-statistics	12.574	12.574

Table O.A.26. Summary Statistics for Labor Income Estimates

In Panel A of this table, we report the mean, median, and standard deviation for the labor income estimates from the LINDA database for the pre-robotization (i.e., "NRS," which refers to the period 1993-1998) and post-robotization (i.e., "RS," which refers to the period 1999-2007) periods for three groups of households with low ($\Omega = L$), medium ($\Omega = M$), and high ($\Omega = H$) exposure to robot risk, respectively. In Panel B, we report the mean, median, and standard deviation for the differences in labor income between the post-robotization and pre-robotization periods for three groups of households with low ($\Omega = L$), medium ($\Omega = M$), and high ($\Omega = H$) exposure to robot risk, respectively. Labor income refers to the broad definition of income, which includes labor income and government transfers, but excludes any capital income. See section C.2 of the online appendix for details on the estimation procedure.

Panel A: Labor income estimates (in levels)

	Mean	Median	Std. Dev.	Obs.
H_RS	297,073.4	309,024.6	77,454.3	50
M_RS	312,911.1	317,993.8	90,568.4	50
L_RS	281,953.1	285,163.5	85,796.9	50
H_NRS	268,428.9	263,684.1	88,820.1	50
M_NRS	277,790.8	275,645	88,598.3	50
L_NRS	245,861.6	249,290.3	68,360.4	50

Panel B: Income differences between post- and pre-periods

	Mean	Median	Std. Dev.	Obs.
H_RS - H_NRS	28,644.6	33,595.7	17,895.2	50
M_RS - M_NRS	35,120.3	37,772.8	7,426.1	50
L_RS - L_NRS	36,091.5	42,572.6	18,710.8	50

Figure O.A.1. Kernel Density of Household Net Wealth (1999)

This figure shows the comparison of distribution of household net wealth in 1999 between treatment group (i.e., the HHI of household's educational major is above the median HHI across individuals working in the same industry) and the control group (i.e., the HHI of household's educational major is below the median HHI across individuals working in the same industry). Source: Author computations using household-level LINDA dataset from Statistics Sweden.

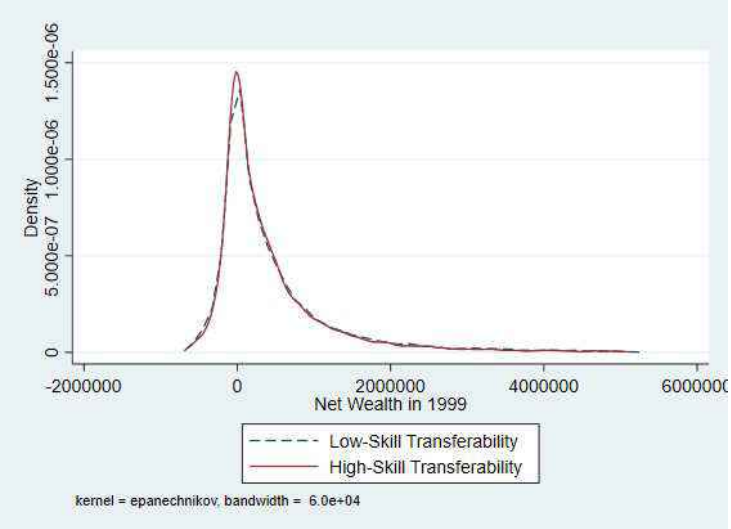


Figure O.A.2. Kernel Density of Annual Houehold Income (1999)

This figure shows the comparison of distribution of household income in 1999 between treatment group (i.e., the HHI of household's educational major is above the median HHI across individuals working in the same industry) and the control group (i.e., the HHI of household's educational major is below the median HHI across individuals working in the same industry). Source: Author computations using household-level LINDA dataset from Statistics Sweden.

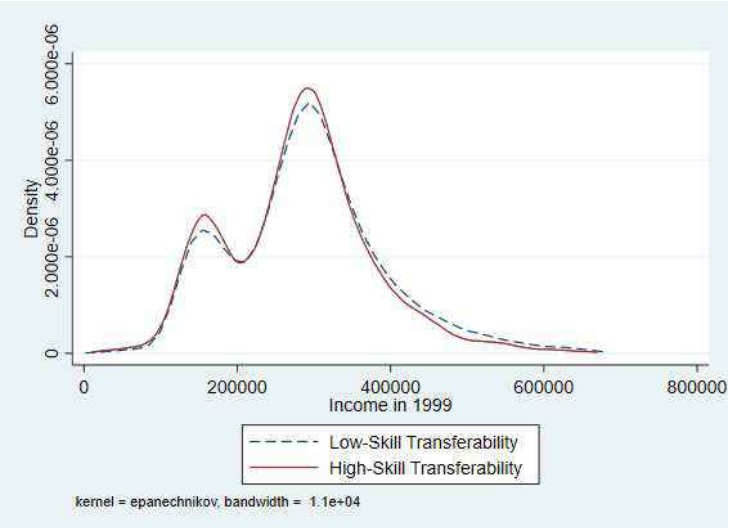
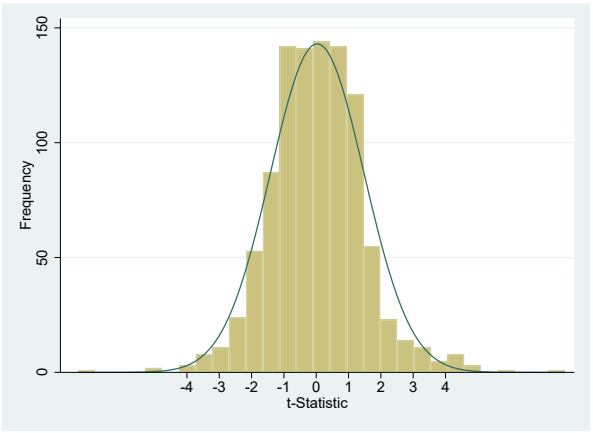
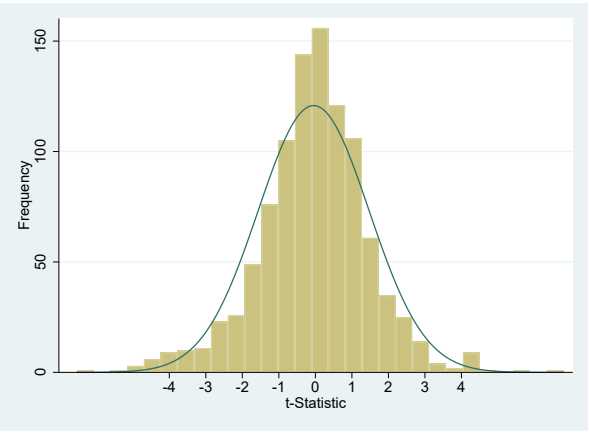


Figure O.A.3. Exposure to Robots and Household Net Wealth: Placebo Analysis

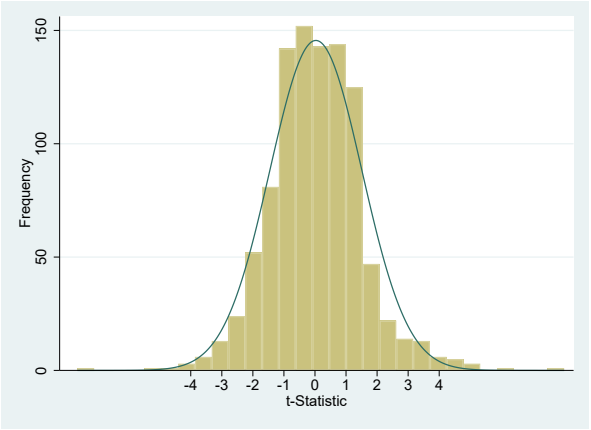
This figure plots the distribution of t-statistics of the main regression coefficient for the wealth regressions when the exposure to robotization variable is randomized at the industry level. We randomly assign different industry-level robot exposure to households. For example, households working in the automative industries are randomly allocated to a different industry. We construct 1,000 placebo samples that randomize households' exposure to robots at work. In Panel (a), we focus on the wealth rank of households within their birth cohort-year distributions. In Panel (b) and (c), the outcome variable is the inverse hyperbolic sine of net wealth and the change in the net wealth rank of a household within her birth cohort distribution between 1999 and 2007. The histogram plots the distribution of the resulting t-statistics of the key coefficient of interest ($\Delta Robot\_Density^{99\rightarrow07}$) and a normal distribution for reference. See Data Appendix for detailed variable definitions.



(a) Net Wealth Rank



(b) IHS of Net Wealth



(c) Change in Net Wealth Rank

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