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Income effect of labor market participation by married women in Japan

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[*] This article uses resampled microdata of the Employment Status Survey (ESS) made available by National Statistics Center. The resampled microdata were prepared from the microdata of the Employment Status Survey (Statistics Bureau, Ministry of Internal Affairs and Communication of Japan). The results reported in this article are based on the analysis by the author, and thus could be different from the statistics published by the Statistics Bureau, Ministry of Internal Affairs and Communication. Remaining errors are my own. This research is supported by the Japan Society for Promotion of Science Grant-in-Aid for Scientific Research (Grant Numbers 15H03358 and 19K01691).
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Abstract

Does the high income of the husband explain the low labor market participation by highly-educated women in Japan? In this paper, I examine the income effect gradient of participation using the Employment Status Survey. Negative income effect –the pattern that a high income of the husband decreases labor market participation by the wife– is present for the employment-to-population ratio for annual income above 4 million yen. Negative income effect becomes much weaker when I separate regular and non-regular employment. When I separate regular and non-regular employment, the income effect and other supply variables explain only a small fraction of the differences between participation rates of college graduates and high school graduates.

1. Introduction

In Japan, college graduate women participated less in the labor market than did high school graduate women. This pattern was rare in OECD countries: in 1999, the labor force participation rates of college graduate and non-college graduate women are at a similar level in Japan, whereas highly educated women participate more than less-educated women in most OECD countries (OECD 2002). In 2007, the employment-to-population ratio of married women aged 25-49 was 60.9 percent for high school graduate women, whereas it was 55.2 percent for college graduate women, a difference of 5.7 percentage points.[1] At the same time, the income of the husbands are higher for college graduate women than for high school graduate women: in 2007, the mean income of the husbands was 6.63 million yen for college graduate wives, whereas it was 5.01 million yen for high school graduate wives, a 32.5 percent difference.[2] Did highly educated women in Japan stayed away from the labor market because of the high income of the husbands?

In this paper, I estimate how much married women's participation was affected by husband's income (income effect), and whether the income effect explains the lower participation by college graduate women than high school graduate women in the 1990s and 2000s. The paper mainly reports the results from year 2007, and supplements results from years 1992, 1997, and 2002. In doing so, the income effects are estimated separately at different levels of husband's income, which allows me to examine the non-linear impacts of husband's income on participation.

Nagase (2018) estimates women's labor supply function in Japan using data from

[1] This statistic is from author's calculation based on the resampled microdata of the Employment Status Survey in 2007.
[2] Author's calculation from the resampled microdata of the Employment Status Survey in 2007.

the Labour Force Survey and finds a small negative income effect: assuming linearity, she obtains estimates of −0.0002 for the employment-to-population ratio (EPR) and −0.0001 for regular employment.[3] Kuroda and Yamamoto (2008) estimate wage elasticities of labor supply, but their data do not contain detailed demographic information (such as spousal income or presence of children).[4] In this study, I estimate income effects separately at different levels of husband's income. As measures of labor market participation, four different participation margins (working, working as wage/salary earners, working as regular employees, and working as non-regular employees) are used.

I find that income effects indeed differ at different income levels. Negative income effect is present for the employment-to-population ratio for annual income above 4 million yen. The size of income effect differs across different participation margins. Income gradient is negative for regular employment of college graduate women at high income levels. In contrast, they are almost zero at low incomes for regular employment of high school graduate women, and small in absolute values for non-regular employment of both education levels. A decomposition analysis reveals that, while the college-high school difference in the employment-to-population ratio seems to be "explained" by husband's income and other labor supply variables, it is a coincidence. When regular and non-regular employment ratios are separately examined, the differences between high school and college graduates are mostly unexplained by labor supply variables. Since the unexplained differences have opposite signs with a similar magnitude (in absolute value),

[3] They are the gradient of a 10,000 yen increase.

[4] Blau and Kahn (2007) use data from US CPS to estimate income and wage effects. Their focus is whether married women's own wage elasticity and cross wage elasticity (elasticity with respect to husband's hourly wage) has changed from 1980 to 2000. They find that women's own wage elasticity and cross elasticity fell over time. Juhn and Murphy (1997) point out that married women's labor supply increased for wives of high-income men, suggesting the declining importance of husband's income on married women's labor supply. Bertrand et al. (2015) estimate labor supply functions of married women including the polynomials of husband's income.

they offset each other in the employment-population ratio (an aggregated participation measure). Specifically, income and other supply variables do not explain higher participation in regular employment by college graduates than by high school graduates, nor do they explain lower participation in non-regular employment by college than by high school graduates.

Because regular and non-regular employment are considered different in the Japanese labor market, I prefer to separate these two employment types in understanding the income effect. Once they are separated, the income effect explains little of the college-high school differences in participation.

2. Data and summary statistics

The data used in this article are from the Employment Status Survey (ESS), which is a large-scale cross-sectional survey that includes family and demographic characteristics.[5] The version I use here is the resampled one provided by Statistics Center. The years of the survey used in this paper are 1992, 1997, 2002, and 2007. The sample is restricted to married women aged 25–49 who were not attending school.

Four measures are used for gauging participation choices: they are (1) Employment-to-population ratio (EPR); (2) Wage or salary earner (Wage/Salary); (3) Regular employment ratio (the number of regular employees divided by the population); and (4) Non-regular employment workers (divided by the population). Of these, (1) is standard and used intensively in labor economics studies. The regular employment ((3)) and non-regular employment ((4)) are examined separately since the differences in wages,

[5] The ESS is conducted every five years by the Ministry of Internal Affairs and Communications of Japan. In 2007, the survey was conducted for adults in 450,000 households; the size of the original sample was 1 million persons aged 15 and over.

benefits, and the relative growth in their numbers, have attracted attention and are the source of concern.[6]

In the subsequent analysis, I classify micro data observations into cells defined by age group (five-year interval), education, urbanity (three large metropolitan area or not), presence of children (children aged 0-6 are present or not in the household, children aged 7-14 are present or not), and income range of the husband. Then, the cell averages are used to estimate income gradient. All the explanatory variables are categorical: in the ESS, income variables are asked to choose from income intervals, therefore the husband's income is available as the interval value. Given that these covariates are all categorical, and because the dependent variables (participation measures of (1) to (4) listed above) are all binary variables, there is no strong reason to preserve the original micro-level observations to estimate income gradient. The estimation equation is expressed as:

$$y_j = \beta Inc + Z_j\gamma + \varepsilon_j, \qquad (1)$$

where j is the index of cells defined by wife's education, urbanity (of residence), age category, presence of children aged younger than 6, and husband's income. y_j is the participation proportion at cell-*j*.[7] The participation measures include: (1) working; (2) working as wage/salary earners; (3) employed as regular employee, and (4) employed as non-regular employee. Inc consists of 14 dummy variables for the husband's earnings from work.[8] Z_j is the set of dummy variables for urbanity, the wife's age group, and the presence of children. Eq. (1) is estimated separately for senior high school graduates (12 years of education) and college graduates (16 years of education). Regressions are

[6] A similar definition is used in Nagase (2018) and Abe (2011, 2013).
[7] I employ this cell-based approach since the decomposition in the next section is easier to understand with this approach.
[8] Annual earnings interval 2-2.5 million yen is the base category.

weighted by the sum of sampling weights for each cell. Using the estimated coefficients of β and γ, I examine whether the low participation by college graduate women is due to high income of their husbands and other labor supply variables.

The summary statistics of the participation measures and explanatory variables are reported in Table 1. In 2007, the EPR and the participation as wage/salary earner are indeed lower for college graduates (55.2%) than for high school graduates (60.9%). Participation in regular employment and non-regular employment shows a stark contrast across education lines. The regular employment ratio is 13.6 percentage points higher for college than for high school graduates. In contrast, non-regular employment ratio is 19.1 percentage points lower for college than for high school graduates. The magnitudes of regular and non-regular participation are almost reversed for the two education groups, yet the non-regular employment by high school graduates is slightly higher than regular employment of college graduates in year 2007. The high non-regular participation by high school graduate women makes their EPR higher than that of college graduate women.

3. Income gradient profiles and decomposition

3.1 Graphical evidence: income effects at different income levels

I estimate income effects at each of the income intervals using income intervals of the ESS. In Figures 1, the regression coefficients and confidence intervals of Inc dummy variables in Eq. (1) are plotted against husband's income category, separately for two education levels, for four different participation measures. The regression results are reported in Table 2.[9] In the Appendix, results for years 1992, 1997, and 2002 are reported

[9] I experimented with several different combinations of X variables to create cells. The ones reported in Table 2 uses the cell defined by husband's income category, 5-year age intervals, urbanity (resides in the three large metropolitan areas or not), and the presence of children of different ages (ages 0-6 and ages 7-14). I also estimated probit models using microdata. The income effect coefficients are generally similar in all these different specifications.

(summary statistics are in Tables A1-1 to A1-3, regression estimates are in Tables A2-1 to A2-3, and coefficient figures are in Figures A1-1 to A1-3).

I begin with the two combined participation measures: EPR and Wage/Salary earner. For these, the high income of the husband discourages participation (negative coefficient). The income gradients are not constant at different income levels. For senior high school graduates, the coefficients are close to zero husband's annual income up to 5 million yen. For college graduates, the magnitude differs between EPR and Wage/Salary earners. High husband's income reduces EPR more than it does Wage/Salary earner participation. The income coefficients for college graduates decreases sharply around 7 million yen and 10 million yen.

That picture changes significantly when regular and non-regular employment are separated. For regular employment of high school graduates, the income gradient is close to zero and flat. For regular employment of college graduates, although there are positive coefficients at low income levels, the coefficients are close to zero at most income levels below 10 million. Overall, income effects are close to zero for income levels below 10 million yen, for both education groups (Fig. 1).

For non-regular employment of high school graduates, there are ups and downs, but the magnitude is smaller than the coefficients for EPR. For college graduates, high income of the husbands reduces non-regular employment by wives, though again, the magnitude of the income effect is smaller than EPR or Wage/Salary participation. Taken together, the income effects are much smaller in magnitude when I separate regular employment and non-regular employment, for each education group.

The estimates from 1992, 1997, and 2002 indicate that income effects are small when regular and non-regular employment are separated. The degree to which husband's

income reduces participation of college graduate women has weakened from 1992 to 2007. For EPR, the coefficients on income between 5-7 million is -0.242 in 1992 but are -0.096 (5-6 million) and -0.190 (6-7 million) in 2007; the coefficient on income between 7-10 million is -0.396 in 1992 but are −0.203 (7-8 million), −0.199 (8-9 million) and −0.353 (9-10 million) in 2007. The absolute values of negative coefficients are smaller in 2007 than in 1992.

3.2 Oaxaca decomposition

Finally, I examine whether the relatively low participation of college graduate women is driven by high income of their husbands. To that end, I use the regressions from cell-mean data reported in Section 3.1. Then, Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973) is used to see how much of the differences in participation between college graduates and high school graduates are explained by differences in husband's income and other *X*s (all of them are labor supply variables).

The decomposition results for year 2007 are reported in Table 3. The results for other years are in Appendix Table A3. In the first specification, I include the categorical variables of husband's income only; in the second specification, demographic covariates (age group, region of residence, and presence of children) are added to income variables.

Income variable results indicate that, about half of the differences of EPR and Wage/Salary earner participation are explained by the income. However, when demographics are added, they "over-explain" the differences: that is, the income and demographics predict greater differences in participation rates by between high-school and college graduates.

The decomposition results change sharply when the participation measures are

separated into regular and non-regular employment. The income variables explain almost nothing: that is, husband's income predict similar participation levels for high school and college graduates, in both regular and non-regular employment. Yet, large differences exist in participation in regular and non-regular employment across education lines, which are unexplained by husband's income. Even when demographics are added, the explained portion remains small, leaving most of the differences unexplained. Therefore, if we accept the view that participation in regular and non-regular employment are different and should be examined separately, then the income effect and other supply factors explain little of the college-high school differences in participation. The pattern that much of the difference in regular and non-regular employment are not explained by husband's income are similar in other years (1992, 1997, and 2002), as shown in Appendix Table A3.

4. Conclusions

I use the data of the Employment Status Survey from 1992 to 2007 to examine whether high income of the husbands explains low labor market participation by married college graduates. To do so, I estimate income gradient separately at different income levels. The degree to which husband's income reduces participation of college graduate women has weakened from 1992 to 2007. The income gradient is flat at many income ranges, once I separate regular and non-regular employment. Naturally, the decomposition results indicate that husband's income does not explain the difference in participation by college and high school graduates, when regular and non-regular employment rates are examined separately. In year 2007, less-educated women participate more than did highly educated women because less-educated women worked slightly more in non-regular employment than did highly educated women in regular

employment.

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Table 1

Summary Statistics for 2007

	High School Grads		College grads	
	Mean	Std. dev.	Mean	Std. dev.
EPR	0.609	0.130	0.552	0.214
Wage/Salary earner	0.553	0.171	0.497	0.203
Regular employment	0.187	0.088	0.322	0.158
Non-regular employment	0.366	0.138	0.175	0.122
Income 0-0.5m	0.007	0.083	0.004	0.064
Income 0.5-1m	0.007	0.084	0.003	0.050
Income 1-1.5m	0.016	0.125	0.007	0.085
Income 1.5-2m	0.022	0.147	0.007	0.085
Income 2.5-3m	0.072	0.259	0.029	0.168
Income 3-4m	0.194	0.396	0.104	0.306
Income 4-5m	0.198	0.399	0.163	0.369
Income 5-6m	0.147	0.355	0.161	0.368
Income 6-7m	0.101	0.302	0.136	0.343
Income 7-8m	0.072	0.259	0.106	0.308
Income 8-9m	0.044	0.206	0.077	0.266
Income 9-10m	0.024	0.153	0.048	0.214
Income 10-15m	0.029	0.167	0.103	0.304
Income 15m-	0.005	0.069	0.032	0.177
Age 30-34	0.186	0.390	0.278	0.448
Age 35-39	0.251	0.434	0.230	0.422
Age 40-44	0.252	0.434	0.201	0.401
Age 45-49	0.222	0.416	0.173	0.379
Three Large Metro	0.432	0.496	0.638	0.481
Kid aged 0-6 present	0.336	0.473	0.438	0.497
Kid aged 7-14 present	0.433	0.496	0.322	0.468
N	528		450	

Notes: Income refers to husband's income in the previous year.

Source: Author's calculation from the ESS resampled data (2007).

Table 2

Regression results for 2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High School Grads				College grads			
	EPR	Wage/Salary earner	Regular employment	Non-regular employment	EPR	Wage/Salary earner	Regular employment	Non-regular employment
Income 0-0.5m	0.001	-0.147**	0.086*	-0.233***	0.047	0.072	0.283**	-0.211**
	(0.048)	(0.048)	(0.035)	(0.046)	(0.105)	(0.109)	(0.100)	(0.075)
Income 0.5-1m	-0.042	-0.106*	0.036	-0.142**	0.021	-0.032	0.159	-0.191*
	(0.048)	(0.047)	(0.035)	(0.046)	(0.130)	(0.134)	(0.124)	(0.093)
Income 1-1.5m	0.034	-0.017	0.080**	-0.097**	0.086	-0.028	-0.031	0.003
	(0.034)	(0.034)	(0.025)	(0.033)	(0.084)	(0.087)	(0.081)	(0.061)
Income 1.5-2m	-0.002	-0.037	0.026	-0.063*	0.031	0.002	0.101	-0.099
	(0.030)	(0.030)	(0.022)	(0.029)	(0.084)	(0.087)	(0.080)	(0.060)
Income 2.5-3m	-0.007	0.006	0.022	-0.016	-0.051	-0.035	0.000	-0.035
	(0.021)	(0.021)	(0.015)	(0.020)	(0.056)	(0.058)	(0.054)	(0.040)
Income 3-4m	-0.009	0.015	0.015	0.000	-0.078	-0.030	0.040	-0.071*
	(0.018)	(0.018)	(0.013)	(0.017)	(0.047)	(0.049)	(0.045)	(0.034)
Income 4-5m	-0.064***	-0.026	-0.005	-0.021	-0.105*	-0.044	0.045	-0.090**
	(0.018)	(0.018)	(0.013)	(0.017)	(0.046)	(0.047)	(0.044)	(0.033)
Income 5-6m	-0.099***	-0.055**	-0.014	-0.041*	-0.096*	-0.031	0.070	-0.101**
	(0.019)	(0.018)	(0.014)	(0.018)	(0.046)	(0.047)	(0.044)	(0.033)
Income 6-7m	-0.144***	-0.096***	-0.031*	-0.065***	-0.190***	-0.131**	-0.010	-0.121***
	(0.020)	(0.020)	(0.015)	(0.019)	(0.046)	(0.048)	(0.044)	(0.033)
Income 7-8m	-0.130***	-0.070**	-0.021	-0.048*	-0.203***	-0.147**	-0.036	-0.110**
	(0.021)	(0.021)	(0.016)	(0.020)	(0.047)	(0.049)	(0.045)	(0.034)
Income 8-9m	-0.168***	-0.108***	-0.017	-0.092***	-0.199***	-0.134**	-0.039	-0.095**
	(0.024)	(0.024)	(0.018)	(0.023)	(0.049)	(0.051)	(0.047)	(0.035)
Income 9-10m	-0.217***	-0.156***	-0.050*	-0.106***	-0.353***	-0.262***	-0.162**	-0.100**
	(0.029)	(0.029)	(0.022)	(0.028)	(0.052)	(0.054)	(0.050)	(0.037)
Income 10-15m	-0.193***	-0.150***	-0.005	-0.145***	-0.359***	-0.300***	-0.152***	-0.148***
	(0.028)	(0.028)	(0.020)	(0.027)	(0.048)	(0.049)	(0.046)	(0.034)
Income 15m-	-0.099	-0.059	0.147***	-0.206***	-0.313***	-0.277***	-0.057	-0.220***
	(0.058)	(0.057)	(0.042)	(0.055)	(0.056)	(0.058)	(0.053)	(0.040)
Age 30-34	0.048**	0.028	0.035**	-0.006	0.041	0.031	0.019	0.012
	(0.016)	(0.016)	(0.011)	(0.015)	(0.022)	(0.023)	(0.021)	(0.016)
Age 35-39	0.090***	0.061***	0.040***	0.022	0.081***	0.058*	0.044	0.014
	(0.016)	(0.016)	(0.011)	(0.015)	(0.024)	(0.025)	(0.023)	(0.017)
Age 40-44	0.135***	0.099***	0.042***	0.057***	0.126***	0.061*	0.060*	0.001
	(0.017)	(0.016)	(0.012)	(0.016)	(0.026)	(0.027)	(0.025)	(0.019)
Age 45-49	0.182***	0.128***	0.043***	0.085***	0.141***	0.084**	0.068**	0.016
	(0.017)	(0.017)	(0.012)	(0.016)	(0.026)	(0.027)	(0.025)	(0.019)
Three Large Metro	-0.080***	-0.077***	-0.064***	-0.012	-0.046***	-0.050***	-0.074***	0.024*
	(0.008)	(0.008)	(0.006)	(0.008)	(0.013)	(0.014)	(0.013)	(0.010)
Kid aged 0-6 present	-0.234***	-0.238***	-0.074***	-0.163***	-0.272***	-0.260***	-0.114***	-0.146***
	(0.010)	(0.010)	(0.007)	(0.009)	(0.014)	(0.015)	(0.014)	(0.010)
Kid aged 7-14 present	0.041***	0.029***	-0.055***	0.085***	-0.021	-0.019	-0.049***	0.031**
	(0.008)	(0.008)	(0.006)	(0.008)	(0.016)	(0.016)	(0.015)	(0.011)
	528	528	528	528	450	450	450	450

Notes: Income refers to husband's income in the previous year.

* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests); ***at the 0.1% level (two-tailed tests)

Source: Author's calculation from the ESS resampled data (2007).

Table 3
Oaxaca-Blinder decomposition results

Covariates		EPR	Wage/Salary earner	Regular employment	Non-regular employment
HS grads		0.609	0.553	0.187	0.366
College grads		0.552	0.497	0.322	0.175
Difference		0.057	0.056	-0.136	0.191
Income only	Explained	0.028	0.022	0.016	0.006
	Unexplained	0.029	0.033	-0.153	0.185
Income & Demographics	Explained	0.098	0.085	0.034	0.050
	Unexplained	-0.042	-0.029	-0.171	0.142

Source: Author's calculation from the ESS resampled data (2007).

Table A1-1

Summary Statistics for 1992

	High School Grads		College grads	
	Mean	Std. dev.	Mean	Std. dev.
EPR	0.556	**0.197**	0.466	**0.211**
Wage/Salary earner	0.434	0.160	0.377	0.197
Regular employment	0.185	0.091	0.287	0.171
Non-regular employment	0.248	0.110	0.090	0.080
Income 0-0.5m	0.002	0.045	0.004	0.067
Income 0.5-1m	0.003	0.054	0.002	0.040
Income 1-1.5m	0.009	0.093	0.006	0.075
Income 1.5-2m	0.014	0.120	0.006	0.079
Income 2.5-3m	0.051	0.220	0.018	0.132
Income 3-4m	0.158	0.365	0.089	0.285
Income 4-5m	0.199	0.400	0.154	0.361
Income 5-7m	0.295	0.456	0.311	0.464
Income 7-10m	0.175	0.380	0.225	0.418
Income 10-15m	0.050	0.218	0.129	0.336
Income 15m-	0.011	0.103	0.044	0.204
Age 30-34	0.167	0.374	0.274	0.447
Age 35-39	0.196	0.398	0.250	0.434
Age 40-44	0.289	0.454	0.192	0.394
Age 45-49	0.218	0.413	0.117	0.322
Three Large Metro	0.515	0.500	0.673	0.470
Kid aged 0-6 present	0.293	0.456	0.422	0.495
Kid aged 7-14 present	0.419	0.494	0.363	0.481
N	439		321	

Notes: Income refers to husband's income in the previous year.

Source: Author's calculation from the ESS resampled data (1992).

Table A1-2

Summary Statistics for 1997

	High School Grads		College grads	
	Mean	Std. dev.	Mean	Std. dev.
EPR	0.587	0.196	0.524	0.190
Wage/Salary earner	0.479	0.164	0.447	0.176
Regular employment	0.215	0.098	0.337	0.155
Non-regular employment	0.264	0.112	0.111	0.083
Income 0-0.5m	0.003	0.054	0.003	0.055
Income 0.5-1m	0.003	0.058	0.002	0.046
Income 1-1.5m	0.009	0.096	0.004	0.066
Income 1.5-2m	0.012	0.109	0.005	0.073
Income 2.5-3m	0.047	0.212	0.014	0.119
Income 3-4m	0.154	0.361	0.081	0.273
Income 4-5m	0.203	0.403	0.157	0.364
Income 5-7m	0.293	0.456	0.294	0.456
Income 7-10m	0.189	0.392	0.280	0.450
Income 10-15m	0.046	0.210	0.115	0.320
Income 15m-	0.008	0.090	0.036	0.186
Age 30-34	0.184	0.388	0.242	0.429
Age 35-39	0.186	0.390	0.234	0.424
Age 40-44	0.209	0.407	0.214	0.411
Age 45-49	0.284	0.451	0.150	0.358
Three Large Metro	0.447	0.498	0.621	0.486
Kid aged 0-6 present	0.296	0.457	0.388	0.488
Kid aged 7-14 present	0.359	0.480	0.344	0.476
N	429		328	

Notes: Income refers to husband's income in the previous year.

Source: Author's calculation from the ESS resampled data (1997).

Table A1-3

Summary Statistics for 2002

	High School Grads		College grads	
	Mean	Std. dev.	Mean	Std. dev.
EPR	0.576	**0.196**	0.529	**0.211**
Wage/Salary earner	0.499	0.174	0.465	0.202
Regular employment	0.187	0.090	0.316	0.164
Non-regular employment	0.312	0.132	0.149	0.115
Income 0-0.5m	0.007	0.083	0.004	0.066
Income 0.5-1m	0.005	0.068	0.003	0.051
Income 1-1.5m	0.015	0.121	0.005	0.072
Income 1.5-2m	0.022	0.145	0.009	0.095
Income 2.5-3m	0.064	0.245	0.019	0.138
Income 3-4m	0.174	0.380	0.099	0.299
Income 4-5m	0.196	0.397	0.145	0.353
Income 5-6m	0.156	0.363	0.145	0.352
Income 6-7m	0.112	0.315	0.143	0.351
Income 7-8m	0.085	0.279	0.117	0.322
Income 8-9m	0.052	0.223	0.093	0.291
Income 9-10m	0.026	0.159	0.051	0.221
Income 10-15m	0.031	0.174	0.117	0.322
Income 15m-	0.005	0.070	0.030	0.170
Age 30-34	0.209	0.407	0.247	0.432
Age 35-39	0.222	0.416	0.214	0.410
Age 40-44	0.225	0.418	0.211	0.409
Age 45-49	0.229	0.421	0.190	0.393
Three Large Metro	0.429	0.495	0.604	0.490
Kid aged 0-6 present	0.346	0.476	0.396	0.490
Kid aged 7-14 present	0.415	0.493	0.340	0.474
N	541		452	

Notes: Income refers to husband's income in the previous year.

Source: Author's calculation from the ESS resampled data (2002).

Appendix Table A2-1
Regression results for 1992

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High School Grads				College grads			
	EPR	Wage/Salary earner	Regular employment	Non-regular employment	EPR	Wage/Salary earner	Regular employment	Non-regular employment
Income 0-0.5m	0.073	-0.191*	-0.036	-0.155*	0.145	0.171	0.313**	-0.143*
	(0.080)	(0.077)	(0.056)	(0.064)	(0.121)	(0.121)	(0.112)	(0.068)
Income 0.5-1m	0.015	-0.124	-0.015	-0.108*	0.262	-0.009	0.096	-0.105
	(0.068)	(0.066)	(0.047)	(0.054)	(0.186)	(0.186)	(0.172)	(0.104)
Income 1-1.5m	-0.011	-0.083*	-0.041	-0.042	-0.259*	-0.331**	-0.141	-0.190**
	(0.042)	(0.041)	(0.029)	(0.034)	(0.112)	(0.112)	(0.104)	(0.062)
Income 1.5-2m	0.005	-0.047	-0.016	-0.032	-0.070	-0.205	-0.094	-0.111
	(0.035)	(0.034)	(0.024)	(0.028)	(0.107)	(0.107)	(0.099)	(0.060)
Income 2.5-3m	-0.032	0.032	-0.010	0.042*	-0.079	-0.090	-0.080	-0.010
	(0.025)	(0.024)	(0.017)	(0.020)	(0.080)	(0.080)	(0.075)	(0.045)
Income 3-4m	-0.056**	0.028	-0.002	0.030	-0.042	0.001	0.085	-0.083*
	(0.021)	(0.020)	(0.015)	(0.017)	(0.065)	(0.065)	(0.061)	(0.036)
Income 4-5m	-0.098***	0.019	-0.012	0.031	-0.104	-0.029	0.033	-0.062
	(0.021)	(0.020)	(0.014)	(0.017)	(0.064)	(0.064)	(0.059)	(0.036)
Income 5-7m	-0.165***	-0.009	-0.043**	0.035*	-0.242***	-0.150*	-0.096	-0.054
	(0.020)	(0.020)	(0.014)	(0.016)	(0.063)	(0.063)	(0.058)	(0.035)
Income 7-10m	-0.229***	-0.046*	-0.087***	0.041*	-0.392***	-0.294***	-0.206***	-0.088*
	(0.021)	(0.021)	(0.015)	(0.017)	(0.064)	(0.063)	(0.059)	(0.035)
Income 10-15m	-0.313***	-0.132***	-0.062***	-0.070***	-0.494***	-0.386***	-0.264***	-0.121***
	(0.025)	(0.024)	(0.017)	(0.020)	(0.065)	(0.065)	(0.060)	(0.036)
Income 15m-	-0.206***	-0.056	0.138***	-0.194***	-0.413***	-0.409***	-0.258***	-0.151***
	(0.039)	(0.038)	(0.027)	(0.031)	(0.070)	(0.070)	(0.065)	(0.039)
Age 30-34	0.069***	0.029*	-0.009	0.037***	0.058*	0.024	0.023	0.001
	(0.013)	(0.013)	(0.009)	(0.011)	(0.023)	(0.023)	(0.021)	(0.013)
Age 35-39	0.154***	0.067***	0.012	0.055***	0.104***	0.058*	0.066**	-0.008
	(0.014)	(0.014)	(0.010)	(0.011)	(0.026)	(0.025)	(0.024)	(0.014)
Age 40-44	0.229***	0.115***	0.023*	0.092***	0.149***	0.051	0.064*	-0.013
	(0.014)	(0.013)	(0.010)	(0.011)	(0.028)	(0.028)	(0.026)	(0.016)
Age 45-49	0.257***	0.115***	0.044***	0.071***	0.188***	0.076*	0.078**	-0.002
	(0.014)	(0.014)	(0.010)	(0.011)	(0.030)	(0.030)	(0.028)	(0.017)
Three Large Metro	-0.054***	-0.047***	-0.057***	0.010	-0.059***	-0.061***	-0.069***	0.008
	(0.007)	(0.007)	(0.005)	(0.006)	(0.015)	(0.015)	(0.014)	(0.009)
Kid aged 0-6 present	-0.246***	-0.252***	-0.113***	-0.139***	-0.191***	-0.190***	-0.116***	-0.074***
	(0.010)	(0.009)	(0.007)	(0.008)	(0.017)	(0.017)	(0.016)	(0.009)
Kid aged 7-14 present	0.028***	0.009	-0.037***	0.046***	0.017	0.008	-0.010	0.018
	(0.008)	(0.008)	(0.006)	(0.006)	(0.018)	(0.018)	(0.016)	(0.010)
	439	439	439	439	321	321	321	321

Notes: Income refers to husband's income in the previous year.
* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests); ***at the 0.1% level (two-tailed tests)
Source: Author's calculation from the ESS resampled data (1992).

Appendix Table A2-2
Regression results for 1997

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High School Grads				College grads			
	EPR	Wage/Salary earner	Regular employment	Non-regular employment	EPR	Wage/Salary earner	Regular employment	Non-regular employment
Income 0-0.5m	0.076	-0.056	-0.009	-0.047	0.024	0.071	0.203	-0.133
	(0.062)	(0.067)	(0.048)	(0.058)	(0.121)	(0.125)	(0.120)	(0.077)
Income 0.5-1m	0.058	0.011	0.071	-0.060	-0.073	-0.004	-0.006	0.003
	(0.057)	(0.062)	(0.044)	(0.054)	(0.140)	(0.145)	(0.139)	(0.089)
Income 1-1.5m	0.082*	-0.022	0.008	-0.030	0.073	0.027	0.123	-0.096
	(0.038)	(0.041)	(0.029)	(0.035)	(0.106)	(0.110)	(0.105)	(0.067)
Income 1.5-2m	0.043	-0.047	-0.025	-0.022	0.051	-0.033	0.137	-0.170**
	(0.034)	(0.037)	(0.026)	(0.032)	(0.099)	(0.102)	(0.098)	(0.063)
Income 2.5-3m	0.012	0.040	0.018	0.021	-0.034	-0.023	0.047	-0.070
	(0.023)	(0.025)	(0.018)	(0.021)	(0.077)	(0.080)	(0.077)	(0.049)
Income 3-4m	-0.005	0.059**	0.027	0.032	-0.019	0.069	0.132*	-0.063
	(0.019)	(0.021)	(0.015)	(0.018)	(0.064)	(0.066)	(0.063)	(0.040)
Income 4-5m	-0.045*	0.050*	0.006	0.044*	0.001	0.101	0.179**	-0.078*
	(0.019)	(0.020)	(0.015)	(0.018)	(0.062)	(0.064)	(0.062)	(0.039)
Income 5-7m	-0.088***	0.033	-0.017	0.051**	-0.067	0.030	0.133*	-0.102**
	(0.019)	(0.020)	(0.014)	(0.017)	(0.061)	(0.063)	(0.061)	(0.039)
Income 7-10m	-0.155***	-0.002	-0.058***	0.055**	-0.200**	-0.080	0.020	-0.100*
	(0.019)	(0.021)	(0.015)	(0.018)	(0.061)	(0.063)	(0.061)	(0.039)
Income 10-15m	-0.243***	-0.100***	-0.081***	-0.019	-0.341***	-0.218***	-0.107	-0.111**
	(0.023)	(0.025)	(0.018)	(0.022)	(0.063)	(0.065)	(0.062)	(0.040)
Income 15m-	-0.092*	-0.056	0.115***	-0.171***	-0.277***	-0.233***	-0.054	-0.179***
	(0.039)	(0.043)	(0.030)	(0.037)	(0.068)	(0.070)	(0.067)	(0.043)
Age 30-34	0.081***	0.034**	0.013	0.021	0.016	-0.009	-0.010	0.001
	(0.012)	(0.013)	(0.009)	(0.011)	(0.019)	(0.020)	(0.019)	(0.012)
Age 35-39	0.170***	0.090***	0.027**	0.063***	0.094***	0.029	0.004	0.025
	(0.013)	(0.014)	(0.010)	(0.012)	(0.021)	(0.022)	(0.021)	(0.013)
Age 40-44	0.231***	0.127***	0.030**	0.097***	0.148***	0.073**	0.059*	0.014
	(0.013)	(0.014)	(0.010)	(0.012)	(0.023)	(0.024)	(0.023)	(0.015)
Age 45-49	0.266***	0.130***	0.037***	0.092***	0.211***	0.100***	0.083***	0.017
	(0.012)	(0.013)	(0.009)	(0.012)	(0.024)	(0.024)	(0.023)	(0.015)
Three Large Metro	-0.102***	-0.090***	-0.097***	0.007	-0.093***	-0.089***	-0.112***	0.023**
	(0.007)	(0.007)	(0.005)	(0.006)	(0.012)	(0.013)	(0.012)	(0.008)
Kid aged 0-6 present	-0.231***	-0.238***	-0.115***	-0.123***	-0.193***	-0.182***	-0.091***	-0.091***
	(0.009)	(0.009)	(0.007)	(0.008)	(0.014)	(0.014)	(0.013)	(0.009)
Kid aged 7-14 present	0.030***	0.018*	-0.041***	0.060***	-0.020	-0.027	-0.030*	0.003
	(0.008)	(0.008)	(0.006)	(0.007)	(0.015)	(0.015)	(0.015)	(0.009)
	429	429	429	429	328	328	328	328

Notes: Income refers to husband's income in the previous year.
* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests); ***at the 0.1% level (two-tailed tests)
Source: Author's calculation from the ESS resampled data (1997).

Appendix Table A2-3
Regression results for 2002

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High School Grads				College grads			
	EPR	Wage/Salary earner	Regular employment	Non-regular employment	EPR	Wage/Salary earner	Regular employment	Non-regular employment
Income 0-0.5m	0.068	-0.087	0.024	-0.111*	0.077	-0.018	0.166	-0.184**
	(0.047)	(0.048)	(0.033)	(0.044)	(0.104)	(0.108)	(0.101)	(0.070)
Income 0.5-1m	-0.025	-0.089	-0.057	-0.032	0.141	-0.053	-0.026	-0.027
	(0.056)	(0.057)	(0.040)	(0.052)	(0.130)	(0.135)	(0.127)	(0.087)
Income 1-1.5m	0.000	-0.079*	-0.022	-0.057	0.149	0.067	0.052	0.016
	(0.034)	(0.035)	(0.024)	(0.032)	(0.097)	(0.100)	(0.095)	(0.065)
Income 1.5-2m	-0.010	-0.052	-0.011	-0.041	0.076	0.009	0.061	-0.052
	(0.030)	(0.030)	(0.021)	(0.028)	(0.079)	(0.082)	(0.077)	(0.053)
Income 2.5-3m	-0.012	0.017	0.010	0.007	-0.028	-0.045	0.032	-0.077
	(0.022)	(0.022)	(0.015)	(0.020)	(0.063)	(0.066)	(0.062)	(0.043)
Income 3-4m	-0.040*	0.007	0.011	-0.004	0.016	0.079	0.107*	-0.028
	(0.018)	(0.019)	(0.013)	(0.017)	(0.049)	(0.051)	(0.048)	(0.033)
Income 4-5m	-0.082***	-0.011	-0.007	-0.003	-0.028	0.050	0.079	-0.029
	(0.018)	(0.019)	(0.013)	(0.017)	(0.048)	(0.050)	(0.047)	(0.032)
Income 5-6m	-0.123***	-0.036	-0.030*	-0.006	-0.030	0.054	0.100*	-0.047
	(0.019)	(0.019)	(0.013)	(0.017)	(0.048)	(0.050)	(0.047)	(0.032)
Income 6-7m	-0.144***	-0.051*	-0.044**	-0.008	-0.070	0.018	0.068	-0.049
	(0.020)	(0.020)	(0.014)	(0.018)	(0.048)	(0.050)	(0.047)	(0.032)
Income 7-8m	-0.204***	-0.095***	-0.063***	-0.032	-0.094	0.002	0.069	-0.067*
	(0.021)	(0.021)	(0.015)	(0.019)	(0.049)	(0.051)	(0.048)	(0.033)
Income 8-9m	-0.174***	-0.070**	-0.059***	-0.011	-0.180***	-0.074	-0.003	-0.071*
	(0.023)	(0.024)	(0.016)	(0.021)	(0.050)	(0.052)	(0.049)	(0.033)
Income 9-10m	-0.230***	-0.117***	-0.082***	-0.035	-0.246***	-0.160**	-0.067	-0.093**
	(0.028)	(0.029)	(0.020)	(0.026)	(0.053)	(0.055)	(0.052)	(0.036)
Income 10-15m	-0.244***	-0.150***	-0.077***	-0.073**	-0.306***	-0.216***	-0.129**	-0.087**
	(0.027)	(0.027)	(0.019)	(0.025)	(0.049)	(0.051)	(0.048)	(0.033)
Income 15m-	-0.099	-0.112*	0.095*	-0.207***	-0.209***	-0.218***	-0.026	-0.192***
	(0.055)	(0.056)	(0.039)	(0.051)	(0.058)	(0.060)	(0.057)	(0.039)
Age 30-34	0.017	-0.006	-0.006	-0.000	0.041	0.015	0.050*	-0.035*
	(0.014)	(0.014)	(0.010)	(0.013)	(0.022)	(0.022)	(0.021)	(0.015)
Age 35-39	0.105***	0.053***	0.005	0.048***	0.132***	0.085***	0.103***	-0.018
	(0.015)	(0.015)	(0.010)	(0.014)	(0.024)	(0.025)	(0.023)	(0.016)
Age 40-44	0.154***	0.089***	0.013	0.077***	0.173***	0.104***	0.100***	0.004
	(0.015)	(0.016)	(0.011)	(0.014)	(0.026)	(0.027)	(0.025)	(0.017)
Age 45-49	0.186***	0.097***	0.021	0.076***	0.171***	0.101***	0.100***	0.000
	(0.015)	(0.016)	(0.011)	(0.014)	(0.026)	(0.026)	(0.025)	(0.017)
Three Large Metro	-0.086***	-0.073***	-0.068***	-0.006	-0.099***	-0.093***	-0.112***	0.019*
	(0.008)	(0.008)	(0.005)	(0.007)	(0.013)	(0.013)	(0.013)	(0.009)
Kid aged 0-6 present	-0.239***	-0.244***	-0.089***	-0.155***	-0.236***	-0.226***	-0.098***	-0.129***
	(0.010)	(0.010)	(0.007)	(0.009)	(0.015)	(0.015)	(0.014)	(0.010)
Kid aged 7-14 present	0.040***	0.028**	-0.043***	0.071***	-0.042**	-0.050**	-0.071***	0.021*
	(0.008)	(0.008)	(0.006)	(0.008)	(0.016)	(0.016)	(0.015)	(0.011)
	541	541	541	541	452	452	452	452

Notes: Income refers to husband's income in the previous year.
* Statistically significant at the 5% level; ** at the 1% level (two-tailed tests); ***at the 0.1% level (two-tailed tests)
Source: Author's calculation from the ESS resampled data (2002).

Appendix Table A3

1992

Covariates		EPR	Wage/Salary earner	Regular employment	Non-regular employment
HS grads		0.556	0.434	0.185	0.248
College grads		0.466	0.377	0.287	0.090
Difference		0.090	0.057	-0.102	0.159
Income only	Explained	0.021	0.011	0.009	0.003
	Unexplained	0.069	0.045	-0.111	0.156
Income & Demographics	Explained	0.113	0.079	0.041	0.038
	Unexplained	-0.023	-0.023	-0.143	0.120

1997

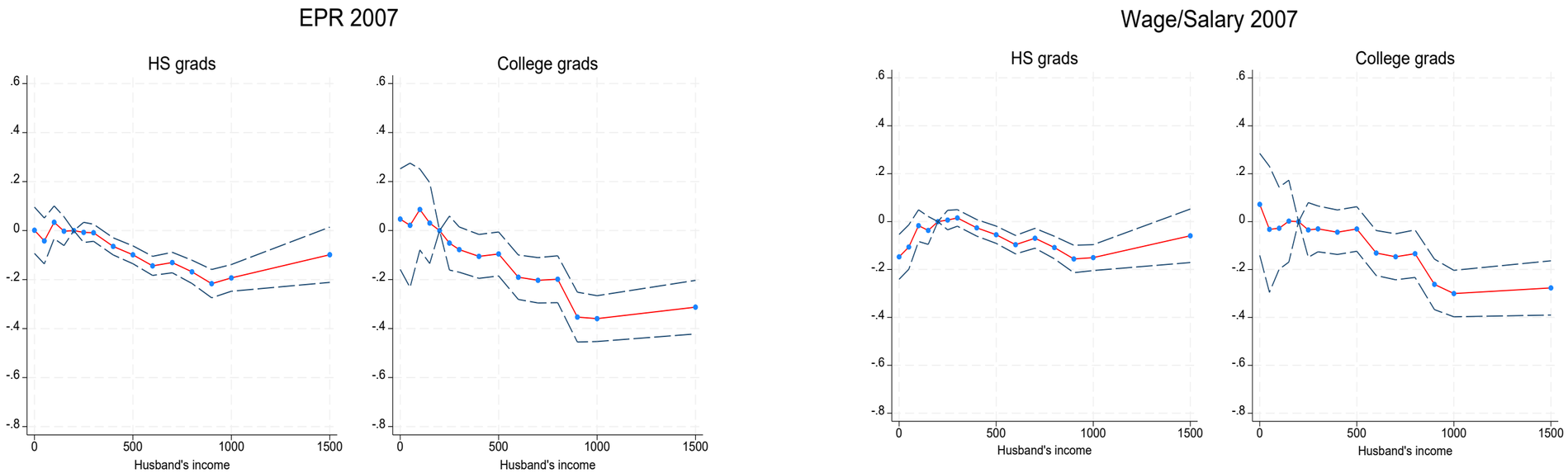
Covariates		EPR	Wage/Salary earner	Regular employment	Non-regular employment
HS grads		0.587	0.479	0.215	0.264
College grads		0.524	0.447	0.337	0.111
Difference		0.062	0.032	-0.122	0.153
Income only	Explained	0.018	0.009	0.016	-0.006
	Unexplained	0.044	0.022	-0.137	0.160
Income & Demographics	Explained	0.098	0.070	0.048	0.022
	Unexplained	-0.035	-0.038	-0.169	0.132

2002

Covariates		EPR	Wage/Salary earner	Regular employment	Non-regular employment
HS grads		0.576	0.499	0.187	0.312
College grads		0.529	0.465	0.316	0.149
Difference		0.048	0.034	-0.130	0.163
Income only	Explained	0.013	0.008	0.012	-0.004
	Unexplained	0.034	0.025	-0.142	0.167
Income & Demographics	Explained	0.065	0.050	0.028	0.021
	Unexplained	-0.017	-0.016	-0.158	0.142

Source: Author's calculation from the ESS resampled data (1992, 1997, & 2002).

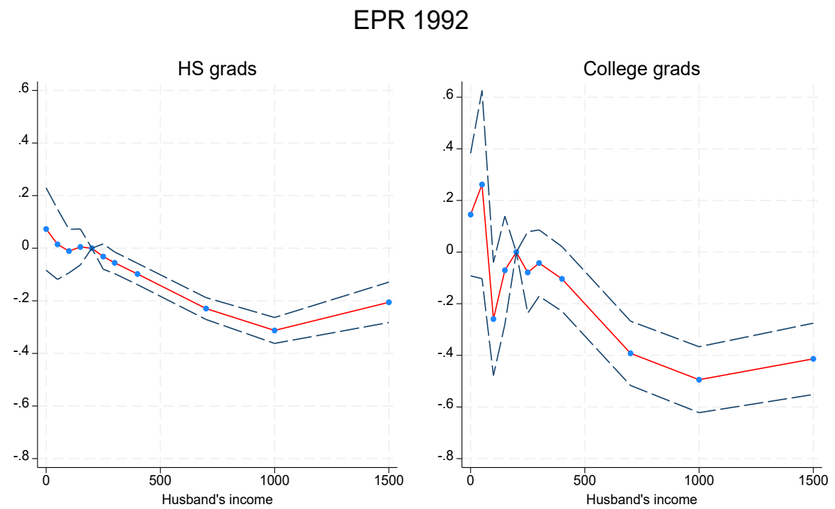
Figure 1　Income coefficient estimates

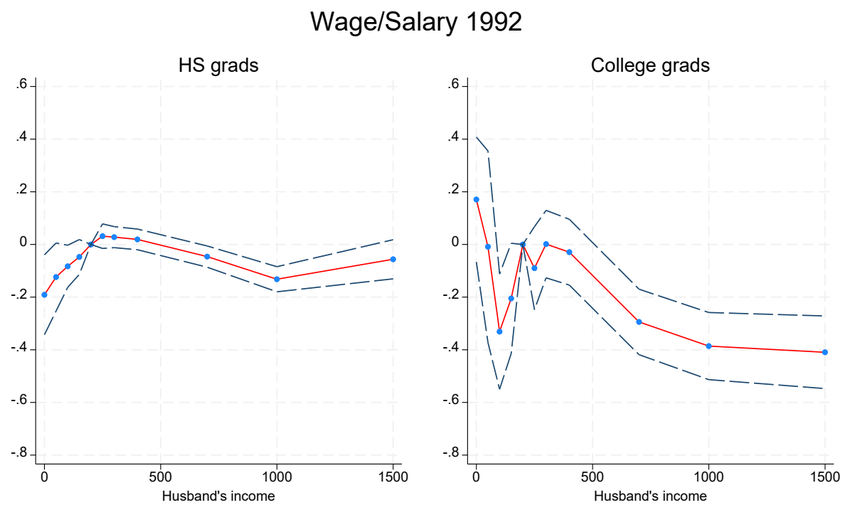


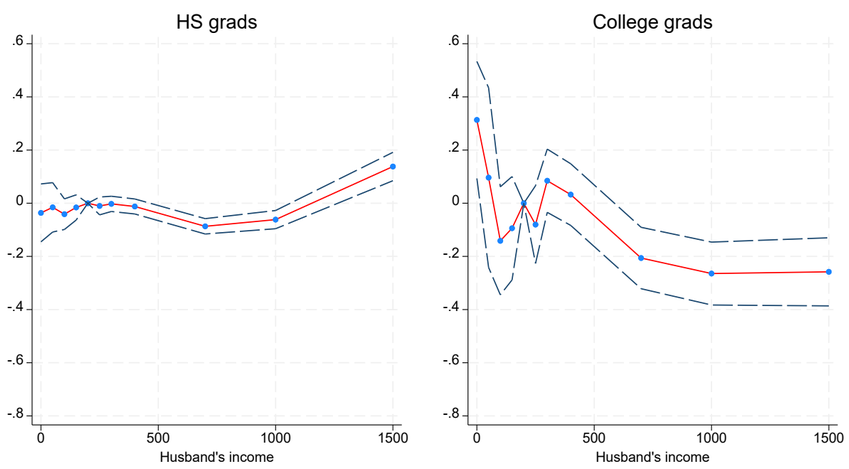
Source: Author's calculation from the ESS resampled data (2007). The coefficient and the confidence interval for the base group of husband's income (income of 2-2.5 million yen per year) is set to zero.

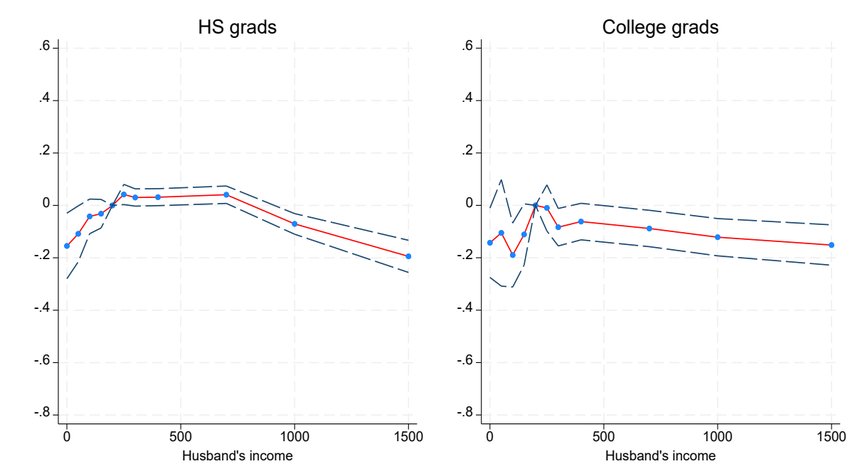
Appendix Figure A1-1

Income coefficient estimates in 1992



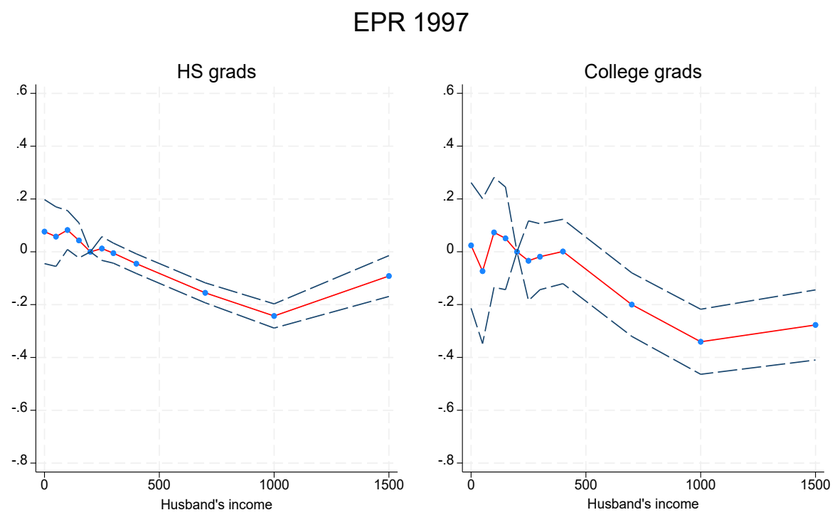


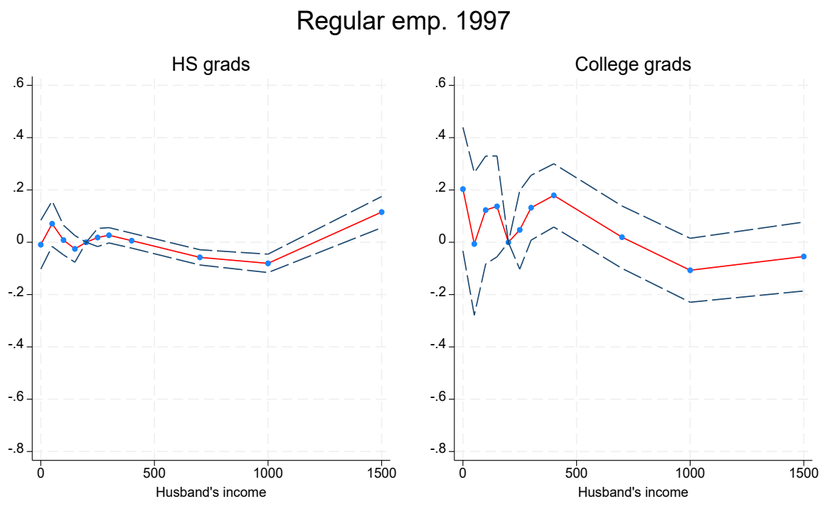


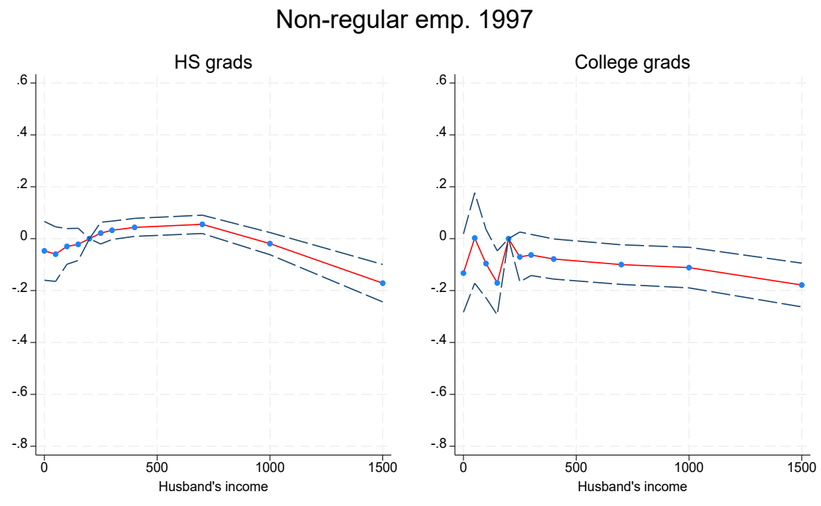


Appendix Figure A1-2

Income coefficient estimates in 1997







Appendix Figure A1-3

Income coefficient estimates in 2002