

Changing Levels of Spousal Education and Labor Force Supply*

Rebecca Chenevert**

Working Paper 2012-22

The purpose of this paper is to describe the labor force behavior of married couples where the woman is more educated than her husband, as well as study how this relates to breadwinner status. We see that the fraction of couples where the wife is more educated than the husband is increasing over the time studied, and that labor force participation rates of women more educated than their husbands increase as well. Next, I study female breadwinner status by education level of the spouses by replicating Winkler, McBride and Andrews,¹ and extending their work using the SIPP Gold Standard Completed Data and the SIPP Synthetic Beta (SSB). This helps us create a more complete picture of the interaction of household and labor market dynamics.

* Many thanks to Al Gottschalck, Dave Hedengren, Graton Gathright, Holly Monti, Marina Vornovytsky, Martha Stinson, and Stephanie Ewert for assistance, discussion, and helpful comments along the way. All remaining errors are my own.

** Economist, U.S. Census Bureau. This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress. The views expressed are those of the author and not necessarily those of the U.S. Census Bureau. We also acknowledge the use of resources provided through NSF Grant [#1042181](#).

¹ Winkler, Anne, Timothy McBride and Courtney Andrews. 2005. "Wives Who Outearn their Husbands: A Transitory or Persistent Phenomenon for Couples?" *Demography*, Vol. 42 (3): pg 523-535.

Introduction

The role of women in the labor force, particularly married women, has changed greatly in the last few decades. Women have become increasingly more present working outside the home as well as in institutions of higher education at all levels. As of 2008, women graduated high school at a higher rate than men (51 percent vs 49 percent), and women began graduating with Bachelor's degrees at a higher rate than men in the 1980s (National Center of Education Statistics [NCES] Publications, 2009 a, 2010). As these two outcomes are intertwined, this study seeks to describe the interaction between education of married spouses, labor force participation of each spouse, and breadwinner status.

Winkler, McBride and Andrews consider the prevalence and persistence of female breadwinners. This study will build on their work by including data from a longer time period, and so allowing persistence to be defined more broadly as well as looking at changes over time in many different aspects of labor supply. While studying the decisions of married individuals to supply labor is an interesting question in it's own right,² studying the factors associated with breadwinner status within a couple have particular implications for policy makers in terms of social security benefit projections (again, see Winkler et al., 2005). Further, as breadwinner status is likely tied to human capital investment, this study also seeks to describe the changes in educational attainment of married spouses over the last fifteen years and the link in changes in educational attainment to labor force attachment and breadwinner status.

The purpose of this paper is threefold. The first is to answer the basic questions of whether we see a change in the fraction of married couples where the wife is the more educated spouse, and to describe the labor supply characteristics of husbands and wives of different types of couples at points in time.³ The second is to examine how differences in education are associated with breadwinner status. This study executes this goal by replicating and extending relevant portions of Winkler et al. (2005) by focusing on married couples in the late 1990s and using administrative earnings data linked to the Survey

² See Blau and Kahn (2000), Goldin (2006), and Blundell and MaCurdy (1999), among many others.

³ While Chenevert (2010) postulates that there is likely an increase in the fraction of married couples with a more educated wife during this period, that study does not show the empirical support presented here.

of Income and Program Participation (SIPP).⁴ In the future, I would like to extend this by also looking at other time periods in a similar fashion and looking for differences across time periods. The final purpose of this paper is to compare results obtained using the SIPP Synthetic Beta, which is a public use version of the linked survey and administrative data, to the results obtained using the confidential data.

This study finds that there has been an increase in the number of married couples where the wife is the more educated spouse, and that (unconditional on other variables) wives who are more educated than their husbands are more likely to participate in the labor force. These couples are more likely to be nontraditional at a point in time, in the sense that the wife earns more annually than her husband, and they are also more likely to be nontraditional persistently.

The rest of this paper will proceed as follows: Section 2 below will describe the data used for the different pieces of this analysis and the sample used. Section 3 discusses the results from the SIPP regarding the relative levels of education of spouses over time and the labor force behaviors associated with different education levels. Section 4 discusses the replication and extension of Winkler et al. studying breadwinner status and using the linked survey and administrative data, and Section 5 concludes.

2. Data

The data used for this paper come from the Survey of Income and Program Participation (SIPP)⁵. SIPP is a longitudinal panel survey where respondents are interviewed every four months for a panel lasting approximately three to four years (this four-month period is referred to as a wave). While the survey has existed since the mid-1980s, there was a major re-design in 1996. In order to maintain comparability of the data between panels, I consider individuals who were part of the 1996, 2001, 2004, and 2008 SIPP panels. The survey collects information on a number of different topics, including demographic information, labor force participation and earnings, participation in government programs, health insurance and other sources of income. The survey consists of a set of core questions, which are

⁴ The portions relevant to this analysis consider total annual earnings in the SIPP.

⁵ For technical information about the SIPP, see <http://www.census.gov/sipp/source.html>.

asked every wave, and topical modules which are asked once per panel or otherwise less frequently than the core.⁶

For this study, the relevant SIPP variables will come from the core and the marital history topical module, which were administered in the second wave of the survey. The statistics presented in Tables 1-5 all use only core variables. The sample is only subset such that respondents are married with spouse present; there are no age restrictions placed on the sample when creating these tables. Further, the marital status and labor force status variables are defined as of September of the relevant year. Individuals are considered employed in the month if they worked for at least one week of the month, and are in the labor force for the month if they were working or looking for work at least one week in the month.

In order to study the persistence of breadwinner status and its association with education, it is beneficial to use panel data that cover a long period of time. As mentioned above, the SIPP surveys respondents for a period of three to four years. However, as part of a project with the Internal Revenue Service (IRS) and Social Security Administration (SSA), the Census Bureau has been able to link administrative record data to survey respondents. One of the exciting features of this link is that there is now data available for the respondents outside of the reference period where they were in the SIPP survey. In particular, for this study we have administrative earnings data from 1951 through 2006 for both spouses assuming they were married and living together at the time of the SIPP interview.

When using survey data linked to administrative data, there are several caveats of which one must be aware. For example, errors in amounts from the administrative data are likely not from the same sources that we think are typical for survey responses, such as regression to the mean. However, there are still likely to be systematic differences between those for whom data are available and those for whom they are not. This study focuses on the 1996 SIPP panel linked with administrative earnings data, and the rate of matching a Social Security number (SSN) was roughly 82 percent. We expect that those with

⁶ For example, questions about asset account balances are asked once per year or every third wave.

missing SSN information are different than those without, in ways that are observable to the researcher as well as ways that may not be.⁷

There are three different data products that are important for the second piece of this study, two of which are available to the public in some way. The first is the SIPP Gold Standard File, or the GSF. The GSF is created by standardizing many of the variables available in all SIPP panels to a common metric and linking them to the administrative data.⁸ Relevant administrative records for this study are the Summary Earnings Record (SER) and Detailed Earnings Record (DER) which come from tax data provided by the SSA. This file is only available to internal researchers. The second data product is the SIPP Gold Standard Completed file, also referred to as the Completed data. The Completed data are created using Bayesian multiple imputation techniques to impute all missing data, and in particular missing administrative data. This process creates a set of four implicates which are identical to the GSF except for where there are missing values. These data are confidential, but external researchers who wish to validate results from the publicly available synthetic data (described below) are able to do so. The final data product used in this analysis is the SIPP Synthetic Beta, or SSB. As its name implies, the SSB is a synthetic dataset created to allow access by outside researchers which aims to “preserve the relationships amongst variables on the file while, at the same time, changing the data in a way that would protect the identity of individual respondents” (Masken and Stinson, 2010). Each of the four implicates of the Completed data spawn four new implicates of synthetic data, and so there are sixteen implicates in the SSB.⁹

⁷ For information about the creation of these data, see Abowd, Benedetto and Stinson (2006). This study uses Version 5.0, but the methodology for generating the data is the same as is described in this report.

⁸ For information about how this matching is done, see Masken and Stinson (2010) or Abowd, Benedetto and Stinson (2006).

⁹ For more information about the SSB Project, or for instructions on how to use these data, see http://www.census.gov/sipp/synth_data.html

3. Results from the SIPP: Changes in Education of Spouses over Time

The first question asked is whether there is a time trend to the levels of education for spouses during the time period I study. To address this question, I separate out each year in the SIPP data from the 1996 panels through the most current wave of the 2008 panel (currently Wave 8 which covers the end of calendar year 2010). Because marital status can change over the course of a year, and to avoid potential problems with seasonal variation in marital status,¹⁰ the results presented in Tables 1 and 2 are the fractions of married couples in each spousal education category each year at a single point in time.^{11,12}

The first point of interest is that while others have shown a steady increase in the fraction of couples with the same education levels over the last half of the 21st century (see Mare, 1991, and Schwartz and Mare, 2005), we do not see this over the period from 1996 through 2010. However, we do see a rather large increase in the fraction of married couples where the wife is the more educated spouse (2.0 percentage points, or 8.4 percent) and a decrease in the fraction of married couples where the husband is the more educated spouse (2.2 percentage points, or 7.5 percent). The proportion of married couples with the same (or nearly the same) levels of education has remained statistically unchanged during this period at approximately 47 percent.

When looking more finely at the levels of education obtained, we find that almost all couples where one spouse had less than a high school diploma have decreased over the fifteen year period.¹³ This is consistent with patterns of the less educated becoming less likely to marry as well as rising overall education levels (see Snyder, 1993 and Goldstein and Kenney, 2001). We also see that the pairs where both spouses have at least some college have increased over the time period, which is also reflective of these trends. Recall here that these are point in time estimates about all married couples, so continuing

¹⁰ See Tejada-Vera and Sutton (2010).

¹¹ The estimates in this report are based on responses from a sample of the population. As with all surveys, estimates may vary from the actual values because of sampling variation or other factors. All comparisons made in this report have undergone statistical testing and are significant at the 90-percent confidence level unless otherwise noted.

¹² Marital status is measured here as of the end of September in the reference year in order to have maximum data availability.

¹³ Two categories were statistically unchanged; these were categories where the wife had less than a High School Diploma and the husband had a college degree, and where the wife had a college degree and the husband had less than a High School Diploma.

marriages may be different from new marriages in many ways. For ease of comparison, Table 2 shows the same information as Table 1 except the categories have been aggregated to describe which spouse has more education instead of showing all categories.

Tables 3-5 show information about the labor supply of these married individuals over a ten-year span, in 1999, 2004 and 2009. We see that the labor force participation of wives who are less educated than their husbands has fallen by 2.9 percentage points (5.1 percent) and that the participation rates of wives who are more educated than their husbands increased by 2.3 percentage points (3.3 percent).¹⁴ One should also note that this increase is in spite of the exceptionally high unemployment rates of 9.8 percent in September of 2009 (BLS, 2012) while there is also evidence of a very high rate of discouraged workers relative to recent history (BLS, 2011). It also appears that married women who are working have shown a small increase in hours of work and decrease in the probability of working part time if they were more or less educated than their spouses, although the magnitudes are quite small. In Tables 3A-5B, the hours worked and part-time statuses of both spouses are conditional on working in these tables.

Married men with more education than their wives appear to exhibit a decrease in their labor force participation rate over this time, which is consistent with the hypothesis that this is a cohort effect and that older couples are more likely to have a more educated husband than younger couples as they age into retirement. It is also consistent with the evidence that men experienced higher unemployment during the most recent recession (Hartman, English and Hayes, 2010), and so may be more likely to be discouraged workers. This is further supported by the decline in the employment rate of all married men over the 1999-2009 period, regardless of which spouse is more educated and the relatively flat employment levels between 1999 and 2004.

¹⁴ The overall female labor force participation rate has decreased very slightly over this time, from 60.0% in 1999 to 59.5% in 2008 (Bureau of Labor Statistics(BLS), 2009).

4. Results from the Gold Standard Completed Data and the SIPP Synthetic Beta

The discussion until this point has all been of a cross sectional nature, and could have been performed with another data source such as the Current Population Survey (CPS). However, the SIPP has unique properties that make it well suited to study the interaction between labor force supply, earnings, and education level for married partners. In particular, the SIPP surveys all members of a household and has detailed questions about marital history and we can merge this information with administrative records. This allows us to look at persistence of labor force participation and breadwinner status of spouses for the duration of their marriage, not just for the period where they are survey respondents. In this section, I address the second and third goals of this research mentioned in the introduction. In order to begin this work, I first replicate research in Winkler et al. using the SIPP Gold Standard Completed File and the SIPP Synthetic Beta. This comparison is an important first step because of differences in both the measurement of earnings (administrative as opposed to respondent reported) and as an evaluation of the quality of the SSB.

An important difference in the calculation of the statistics in the Completed data and the public use SIPP used in Winkler et al. is the issue of weights. While we would normally use weights to calculate population statistics, such as those presented in Tables 6 and 7 which compare to Tables 1 and 2 in Winkler et al., weights are not currently available in the Completed data. The analysis presented here is based on a single SIPP panel, but the next obvious step is to look over time and across different cohorts. When SIPP panels are combined, as they are in the Gold Standard and the Completed data, the computing of weights and decision of what weight to use is not trivial, as weights are meant to be used to calculate statistics representative of a population at a point in time. However, the magnitudes of the un-weighted statistics calculated here are comparable to what we see in Winkler et al., and so perhaps this issue is not as severe as it may seem at first blush. Still, the issue is an important concern that future versions of this

research will address using the Gold Standard File.¹⁵ This issue also implies that we cannot interpret the statistics reported in Tables 6-9 as population characteristics.

In order to try to replicate the sample restrictions reported in Winkler et al., in all the analyses reported in Section 4 I use the 1996 panel and include individuals who were married prior to 1997. Both spouses must have been born between 1942 and 1972 (therefore they were between 25 and 55 years old in 1997), and they must have remained married through 1999. There was no distinction made between first marriages and subsequent marriages, although that is a possibility in future research. The most important distinction is that the earnings data come from the Detailed Earnings Record (DER) between 1978 and 1999, and the Summary Earnings Record (SER) between 1951 and 1977.¹⁶ As hours of work are not collected for tax purposes, wages cannot be calculated from these data. In order to approximate the wage cutoffs in Winkler et al. for comparison with their calculation of persistence, respondents were dropped if they earned more than \$625,000 between 1997 and 1999 and were recoded to zero earnings if they earned less than \$780. These cutoffs were chosen based on a wage greater than \$200/hour (which was the cutoff used in Winkler et al.) for a 60 hour work week year-round, and a wage less than \$2/hour for a 15 hour work week for half the year.

Table 6 shows the fraction of couples in different types of earning arrangements as of 1999. To compare the administrative earnings in the Completed data to the reported earnings data of the public use SIPP, the appropriate estimates from Table 1 in Winkler et al. are reprinted in the first column of Table 6. The standard categorization defines a couple as traditional if the husband earns more than 50 percent of the couple's earnings, and nontraditional if the wife earns 50 percent or more. As you can see, the overall statistics are comparable in magnitude.¹⁷ We also see that it is less likely to find traditional couples when

¹⁵ Even using the population weights available on the gold standard file may not completely solve the problem because some respondents are missing the information to link to administrative records. Weights currently available do not account for this problem.

¹⁶ While this will only effect individuals married prior to 1977, the SER is capped at the FICA taxable maximum. Therefore, couples where both spouses earn above the taxable maximum will be misclassified as equal earners in the analysis below. This can be remedied in the future by either imputing actual earnings or considering these couples separately.

¹⁷ As in Masken and Stinson (2010), all estimates are combined using Rubin's Formulae following Reiter (2004).

the wife is more educated than the husband relative to the entire sample, and more likely to find traditional couples when the husband is more educated than the wife. The alternative categorization is defined in the same way as in Winkler et al., where a couple is considered “traditional” if the husband earns more than 60 percent of total household earnings, “egalitarian” if both spouses earn between 40 and 60 percent, and “nontraditional” if the wife earns more than 60 percent of earnings. Here too, we find that those couples where the wife is more educated are more likely to be nontraditional relative to the entire sample.

Table 7 again shows the comparison of the SIPP linked to administrative earnings relative to the reported data used in Winkler et al. in 1997-1999. Again, we find that the magnitudes are comparable, even though the un-weighted results from the Completed data are sample characteristics and we cannot interpret them as population characteristics. Similar to what we found in Table 6, we find that those couples where the wife is more educated than the husband are more likely to be persistently nontraditional than the overall sample, whether the standard or alternative classification for two or three years.

Table 8 considers a different measure for classifying traditional or nontraditional couples, and a different kind of persistence. In the upper panel, we look at a single year (1999) and consider the distribution of the fraction of earnings attributed to the wife and the distribution of the difference in earnings. We find that on average, in this sample the wife earns 33 percent of the household’s earned income and that the median difference in earnings between husbands and wives is \$17,246. Because the labor force participation rate is lower for females than for males, when we restrict our attention to dual-earner households we find that the average wife in a dual-earner household earns 37 percent of household income and that the median difference in earnings between husbands and wives is \$15,278. The lower panel of Table 8 examines the distribution of the fraction of years of a marriage spent in a female breadwinning household. This is broken down separately by the educational attainment of the spouses and by the length of the marriages. Consistent with the patterns shown in earlier tables, we find that on average, households where the wife is more educated than the husband tend to spend a larger fraction of their marriages in a state with a female breadwinner than those where the husband is more educated.

While a proper cohort analysis is not within the scope of this paper, we also find that “young” marriages (those married less than ten years, but at least the three required to be in sample) tend to have more years of female breadwinning than do “older” marriages (those twenty years or longer).¹⁸ In the future, it would also be informative to look at the breadwinner status by presence of children as well.

Finally, an analysis of predicted and actual earnings is conducted in much the same way as in Winkler et al. I first regress log earnings on indicator variables for education, race, and Hispanic ethnicity, as well as age squared and potential experience.¹⁹ These variables were chosen to be as comparable to Winkler et al. as possible; however, there are no indicators for geography on the Completed data or the SSB due to concerns regarding disclosure. Because the SSB was created with the preservation of relationships between variables in mind, this seems to be the natural place to begin the comparison of the synthetic and confidential data. For that reason, I include Table 9, which has the regression coefficients from both datasets separately for husbands and wives.²⁰ It is comforting that the point estimates from the Gold Standard Completed data are within the 95 percent confidence intervals predicted by the SSB. We also see that the signs and significance levels are the same in the two datasets, with the exception of the Hispanic variable for wives. This coefficient is negative and significant in the earnings regressions using the synthetic data, but not the Completed data.

The results in Table 9 do not compare to the results obtained by Winkler et al. (regression results are not reported in their publication) because the dependent variable here is the log of annual earnings, not the log of wages. Nonetheless, I also look at the average percentage difference between actual and predicted earnings and the percentage of cases where the actual wage is greater than the predicted wage as is done in Table 4 of Winkler et al. However, these results are quite preliminary and therefore not

¹⁸ To see characteristics of individuals married for different lengths of time at a single point in time, see Kreider and Fields, 2002 (<http://www.census.gov/prod/2002pubs/p70-80.pdf>).

¹⁹ Potential experience was calculated as age-years of education-6 where years of education were 10, 12, 14, 16 or 18 years for the appropriate education categories. Although actual experience may be an endogenous variable, there is likely less measurement error in actual experience because actual education is not observed, only the aggregated categories. In future versions of this research I would like to compare the use of both actual and potential experience.

²⁰ As with the Completed data, the estimates and estimated variances from the SSB have also been combined using Rubin’s formulae.

reported. Largely, I find that the SSB predicts the same direction of the difference between actual and predicted wages as the Gold Standard Completed data, and that both largely predict the same directions as found in Winkler et al. The exceptions are the low education traditional couples and high education nontraditional couples. However, the magnitudes of the differences between what is found in this paper and in Winkler et al. are striking. This warrants further investigation. Winkler et al. use the log of the wage as the dependent variable while this paper is using earnings. Those two measures are quite different, although I am unable to replicate their analysis of wages given the administrative data do not contain measures for hours of work. We also see that the percentage of cases where actual earnings are larger than those predicted for wives are quite large relative to Winkler et al. There are many other potential reasons that we see these differences, and the investigation of these issues will be a part of future research.

5. Conclusions

This paper studies the changes over the last fifteen years in the levels of education of married couples and the associated labor force supply behaviors and breadwinner status. While this work is still preliminary, some of the results show relatively large changes over a short period. The number of couples where the wife is the more educated spouse has increased 8.3 percent. The analysis of 1999 shows that female breadwinning is more common in couples where the wife is more educated than her husband, so the natural next step is to look at a later time and see if there is an increase in female breadwinning associated with the increase in more highly educated wives.

This paper answers some of the questions that were set out, but also raises some new questions. In order to improve this analysis in the future, I think it is necessary to use the Gold Standard File without the imputed administrative data, and both with and without survey weights to see how imputation procedures affect the results and how survey weights change the sample characteristics reported here. Also, given the rich earnings history available in the linked survey and administrative data, we can

measure the persistence of breadwinning arrangements in many ways and get a more complete picture of the types of couples that are more and less egalitarian over time.

While the idea that ‘younger’ marriages and ‘older’ marriages may be different was briefly touched on in the analysis in Table 8, this question lends itself very naturally to a cohort analysis. Whether due to changing social norms, declining costs of education for women relative to men or another reason, we expect that much of the change in the mix of education among spouses is due to new marriages and changes in who is likely to get married in younger cohorts. However, this needs to be tested empirically, which was beyond the scope of this paper.

References

- Abowd, John, Gary Benedetto and Martha Stinson. 2006. “Final Report to the Social Security Administration of the SIPP/SSA/IRS Public Use File Project.”
<http://www.census.gov/sipp/FinalReporttoSocialSecurityAdministration.pdf>.
- Blau, Francine D. and Kahn, Lawrence M. 2000. “Gender Differences in Pay,” *The Journal of Economic Perspectives*, 14 (4): 75-99.
- Blundell, Richard and MaCurdy, Thomas. 1999. “Labor Supply: A Review of Alternative Approaches,” In O. Ashenfelter and D. Card (Eds.) *The Handbook of Labor Economics*, Vol. 3 pp. 1559-1618. Amsterdam: Elsevier.
- Bureau of Labor Statistics. 2009. “Labor Force Participation of Women and Mothers, 2008.”
http://www.bls.gov/opub/ted/2009/ted_20091009.htm.
- Bureau of Labor Statistics. 2011. “Alternative Measures of Labor Underutilization for States, Third Quarter of 2009 through Second Quarter of 2010 Averages.”
<http://www.bls.gov/lau/stalt10q2.htm>.
- Bureau of Labor Statistics. 2012. “Labor Force Statistics from the Current Population Survey.”
<http://data.bls.gov/timeseries/LNS14000000>
- Chenevert, Rebecca. 2010. “Evolving Labor Force Outcomes Associated with Gender Trends in Education.” SEHSD Working Paper 2011-02.
http://www.census.gov/hhes/www/laborfor/LFOutcomes_Draft_March2011.pdf.
- Goldin, Claudia. 2006. “The Quiet Revolution That Transformed Women’s Employment, Education and Family,” *The American Economic Review*, 96(2): 1-21.
- Goldstein, Joshua R. and Kenney, Catherine T. 2001. “Marriage Delayed or Marriage Forgone? New Cohort Forecasts of First Marriage for U.S. Women.” *American Sociological Review*, 66 (4): 506-519.

- Hartmann, Heidi, English, Ashley and Hayes, Jeffrey. 2010. "Women and Men's Unemployment in the Great Recession." IWPR Publication C373.
- Kreider, Rose M. and Fields, Jason M. 2002. "Number, Timing and Duration of Marriages and Divorces: Fall 1996." Current Population Reports, P70-P80. U.S. Census Bureau, Washington, DC. <http://www.census.gov/prod/2002pubs/p70-80.pdf>.
- Mare, Robert D. 1991. "Five Decades of Educational Assortative Mating," *American Sociological Review*, 56 (1): 15-32.
- Masken, Karen and Stinson, Martha. 2010. "What Influences a Woman's Decision to Work: The Changing Role of a Husband's Earnings." Social, Economic, and Housing Statistics Division Working Paper Series, forthcoming.
- National Center for Education Statistics. June, 2010. *Public School Graduates and Dropouts From the Common Core of Data: School Year 2007-2008*. Washington, DC. http://nces.ed.gov/pubs2010/graduates/tables/table_08.asp.
- National Center for Education Statistics. 2009a. *Bachelor's degrees conferred by degree granting institutions, by race/ethnicity and sex of student: Selected years, 1976-77 through 2007-08.* Washington, DC. http://nces.ed.gov/programs/digest/d09/tables/dt09_285.asp.
- National Center for Education Statistics. 2009b. *Master's degrees conferred by degree-granting institutions, by race/ethnicity and sex of student: Selected years, 1976-77 through 2007-08.* Washington, DC. http://nces.ed.gov/programs/digest/d09/tables/dt09_288.asp.
- National Center for Education Statistics. 2009c. *Doctor's degrees conferred by degree-granting institutions, by race/ethnicity and sex of student: Selected years, 1976-77 through 2007-08.* Washington, DC. http://nces.ed.gov/programs/digest/d09/tables/dt09_291.asp.
- Reiter, Jerome. P. 2004. "Simultaneous Use of Multiple Imputation for Missing Data and Disclosure Limitation." *SurveyMethodology*, 30. 235-242.
- Schwartz, Christine R. and Mare, Robert D. 2005. "Trends in Educational Assortative Marriage from 1940-2003," *Demography*, 42(4): 621-646.
- Snyder, Thomas, ed. January 1993. *120 Years of American Education: A Statistical Portrait*. National Center for Education Statistics. Washington, DC. <http://nces.ed.gov/pubs93/93442.pdf>.
- Tejada-Vera B., and Sutton, P.D. Births, marriages, divorces, and deaths: Provisional data for 2009. National vital statistics reports; Vol 58, no 25. Hyattsville, MD: National Center for Health Statistics. 2010. http://www.cdc.gov/nchs/data/nvsr/nvsr58/nvsr58_25.pdf.
- Winkler, Anne, Timothy McBride and Courtney Andrews. 2005. "Wives Who Outearn their Husbands: A Transitory or Persistent Phenomenon for Couples?" *Demography* , Vol. 42 (3): pg 523-535.

Table 1: Fraction of Married Couples of Each Type Over Time

		Year													
		1996	1997	1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Wife LTHS															
Husband	LTHS	0.085	0.083	0.080	0.080	0.077	0.074	0.070	0.056	0.046	0.041	0.036	0.064	0.062	0.056
	HS Grad	0.040	0.039	0.039	0.038	0.034	0.033	0.031	0.020	0.021	0.019	0.020	0.022	0.022	0.021
	Some College	0.015	0.014	0.013	0.012	0.015	0.015	0.015	0.014	0.012	0.009	0.009	0.015	0.013	0.013
	College Grad	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.003	0.002	0.003
	Grad Deg	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001
Wife HS Grad															
Husband	LTHS	0.055	0.054	0.052	0.051	0.044	0.041	0.040	0.028	0.023	0.020	0.020	0.029	0.029	0.027
	HS Grad	0.161	0.160	0.157	0.156	0.156	0.152	0.148	0.136	0.147	0.149	0.153	0.113	0.116	0.116
	Some College	0.085	0.084	0.083	0.083	0.077	0.075	0.072	0.092	0.093	0.094	0.091	0.077	0.078	0.078
	College Grad	0.026	0.025	0.025	0.024	0.030	0.028	0.027	0.026	0.026	0.025	0.024	0.023	0.022	0.022
	Grad Deg	0.009	0.009	0.009	0.009	0.009	0.010	0.009	0.008	0.007	0.007	0.007	0.007	0.007	0.008
Wife Some College															
Husband	LTHS	0.020	0.019	0.019	0.018	0.018	0.017	0.018	0.016	0.013	0.012	0.011	0.021	0.020	0.016
	HS Grad	0.077	0.075	0.076	0.077	0.073	0.073	0.077	0.086	0.088	0.089	0.096	0.076	0.078	0.082
	Some College	0.125	0.127	0.128	0.127	0.123	0.127	0.129	0.161	0.162	0.158	0.153	0.159	0.156	0.155
	College Grad	0.050	0.051	0.051	0.051	0.054	0.054	0.057	0.052	0.053	0.052	0.052	0.055	0.055	0.054
	Grad Deg	0.038	0.039	0.040	0.041	0.042	0.042	0.045	0.043	0.043	0.050	0.050	0.047	0.047	0.047
Wife College Grad.....															
Husband	LTHS	0.003	0.002	0.002	0.002	0.004	0.004	0.003	0.002	0.002	0.001	0.002	0.003	0.003	0.002
	HS Grad	0.016	0.018	0.019	0.019	0.021	0.021	0.021	0.018	0.018	0.019	0.019	0.020	0.021	0.022
	Some College	0.035	0.037	0.038	0.040	0.043	0.046	0.047	0.046	0.048	0.047	0.047	0.048	0.050	0.051
	College Grad	0.067	0.068	0.070	0.072	0.072	0.075	0.077	0.078	0.078	0.084	0.085	0.085	0.086	0.090
	Grad Deg	0.038	0.039	0.040	0.041	0.042	0.042	0.045	0.043	0.043	0.050	0.050	0.047	0.047	0.047
Wife Grad Degree															
Husband	LTHS	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001
	HS Grad	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.007	0.007	0.006
	Some College	0.010	0.010	0.010	0.011	0.012	0.013	0.014	0.016	0.017	0.019	0.020	0.018	0.018	0.019
	College Grad	0.017	0.018	0.018	0.019	0.024	0.025	0.026	0.027	0.029	0.030	0.030	0.030	0.032	0.032
	Grad Deg	0.032	0.033	0.034	0.034	0.040	0.041	0.042	0.042	0.043	0.041	0.044	0.051	0.052	0.054

Source: 1996, 2001, 2004 and 2008 SIPP Panels

Table 2: Fraction of Married Couples of Each Type Over Time

	1996	1997	1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Panel A: Estimates														
Husband has More Education than Wife	0.292	0.290	0.289	0.287	0.287	0.284	0.282	0.282	0.279	0.281	0.278	0.273	0.271	0.270
Husband and Wife have Same Level of Education	0.470	0.470	0.470	0.470	0.468	0.470	0.466	0.473	0.476	0.474	0.472	0.473	0.472	0.472
Wife has More Education than Husband	0.238	0.239	0.242	0.243	0.244	0.246	0.252	0.245	0.245	0.244	0.250	0.254	0.257	0.258
Panel B: Standard Errors														
Husband has More Education than Wife	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.005	0.005	0.003	0.003	0.004
Husband and Wife have Same Level of Education	0.004	0.004	0.005	0.005	0.004	0.004	0.005	0.004	0.004	0.005	0.005	0.003	0.004	0.005
Wife has More Education than Husband	0.003	0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.005	0.005	0.003	0.003	0.004

Source: 1996, 2001, 2004 and 2008 SIPP Panels

Table 3A: Differences in Labor Force Variables by Educational Attainment of Husbands and Wives in 1999

			Wives' LFPR	Husbands' LFPR	Wives' Empl. Rate	Husbands' Empl. Rate	Wives' Avg. Hours (Main Job)	Husbands' Avg. Hours (Main Job)	Wives' PT Percentage	Husbands' PT Percentage
Wife LTHS.....										
	Husband	LTHS	0.34418	0.56473	0.3317	0.55595	35.3067	40.7197	0.30411	0.09247
		HS Grad	0.40107	0.65306	0.38663	0.62334	34.3733	40.361	0.33261	0.11142
		Some College	0.43743	0.72493	0.41631	0.70753	33.3149	42.1525	0.34279	0.09748
		College Grad or More	0.37714	0.69334	0.37714	0.69334	35.6684	42.8638	0.42403	0.08448
Wife HS Grad.....										
	Husband	LTHS	0.48664	0.58904	0.47988	0.57507	35.4573	40.7652	0.26869	0.11058
		HS Grad	0.62744	0.77263	0.62099	0.76039	35.3995	42.1276	0.27823	0.07486
		Some College	0.60112	0.7934	0.58937	0.78781	34.798	42.3925	0.29197	0.07276
		College Grad	0.55544	0.77418	0.54907	0.76256	32.8134	42.8792	0.40048	0.08978
		Grad Deg	0.48505	0.74399	0.48505	0.74399	34.9679	42.1955	0.28612	0.14021
Wife Some College.....										
	Husband	LTHS	0.6117	0.66719	0.60126	0.65125	35.5629	42.3046	0.23464	0.1012
		HS Grad	0.71214	0.84362	0.69571	0.83434	35.5193	42.8449	0.25826	0.06131
		Some College	0.72574	0.84931	0.71794	0.84304	35.239	43.5435	0.29176	0.05472
		College Grad	0.66597	0.87303	0.66017	0.86937	32.9661	43.3794	0.38638	0.07614
		Grad Deg	0.55234	0.80982	0.54678	0.8071	32.5396	42.4951	0.39945	0.1187
Wife College Grad.....										
	Husband	HS Grad or Less	0.84201	0.82872	0.82901	0.82872	37.8795	43.9504	0.18213	0.04174
		Some College	0.80968	0.91463	0.80363	0.90692	37.4623	43.5123	0.19686	0.05585
		College Grad	0.72364	0.91239	0.71967	0.9031	36.8456	43.9362	0.24715	0.05924
		Grad Deg	0.64555	0.87258	0.63986	0.86505	35.243	45.1707	0.31318	0.08024
Wife Grad Degree.....										
	Husband	HS Grad or Less	0.74777	0.81996	0.74777	0.81996	40.7922	42.7979	0.22591	0.05839
		Some College	0.82272	0.82897	0.82272	0.81659	41.4174	41.9704	0.12825	0.12429
		College Grad	0.81524	0.88979	0.81495	0.88165	38.6289	43.9427	0.19283	0.06681
		Grad Deg	0.73704	0.88465	0.73516	0.87733	38.9436	44.6395	0.25577	0.07818

Source: 1996 SIPP Panel

Table 4A: Differences in Labor Force Variables by Educational Attainment of Husbands and Wives in 2004

			Wives' LFPR	Husbands' LFPR	Wives' Empl. Rate	Husbands' Empl. Rate	Wives' Avg. Hours (Main Job)	Husbands' Avg. Hours (Main Job)	Wives' PT Percentage	Husbands' PT Percentage
Wife LTHS.....										
	Husband	LTHS	0.39086	0.67029	0.34543	0.65084	35.1903	40.7703	0.29491	0.0675
		HS Grad	0.39786	0.67041	0.36912	0.6572	34.2527	41.6808	0.38672	0.05054
		Some College	0.40066	0.63474	0.34418	0.62341	35.034	41.8501	0.34892	0.07814
		College Grad or More	0.28203	0.62285	0.24636	0.62285	33.704	40.9065	0.35409	0.08743
Wife HS Grad.....										
	Husband	LTHS	0.48298	0.55275	0.45502	0.53213	36.0433	40.4344	0.2563	0.08417
		HS Grad	0.56694	0.71176	0.53739	0.69487	35.9504	41.7023	0.25125	0.0808
		Some College	0.56875	0.72154	0.54146	0.70961	35.4703	42.4102	0.28318	0.07322
		College Grad	0.55846	0.74691	0.54082	0.74406	33.8286	42.6875	0.3376	0.08451
		Grad Deg	0.43559	0.67876	0.41981	0.67006	34.9966	41.38	0.33687	0.13068
Wife Some College.....										
	Husband	LTHS	0.66716	0.69331	0.63734	0.66329	37.15	42.1222	0.18132	0.07739
		HS Grad	0.71638	0.81777	0.69349	0.79916	35.851	42.2743	0.22872	0.05811
		Some College	0.72334	0.82947	0.69882	0.81504	36.3583	42.7699	0.24467	0.06365
		College Grad	0.63314	0.83346	0.61149	0.81922	33.6663	43.8623	0.34666	0.06217
		Grad Deg	0.53651	0.79663	0.51193	0.78958	31.2398	43.9566	0.42673	0.08334
Wife College Grad.....										
	Husband	HS Grad or Less	0.80977	0.8308	0.78566	0.81082	37.6981	42.2378	0.2161	0.05025
		Some College	0.82171	0.86927	0.80364	0.85793	38.0453	43.384	0.20501	0.05781
		College Grad	0.73516	0.89137	0.71633	0.8765	36.6938	44.1312	0.25335	0.04837
		Grad Deg	0.60146	0.87168	0.57036	0.86472	36.6082	44.1632	0.28388	0.08148
Wife Grad Degree.....										
	Husband	HS Grad or Less	0.76266	0.73024	0.73907	0.69719	39.6989	43.0738	0.1004	0.05463
		Some College	0.83041	0.82463	0.82613	0.80185	39.6733	41.91	0.13043	0.11093
		College Grad	0.80923	0.88756	0.79703	0.8696	38.7229	44.5229	0.191	0.03696
		Grad Deg	0.73683	0.85087	0.71401	0.84455	39.2087	45.384	0.2217	0.06211

Source: 2004 SIPP Panel

Table 5A: Differences in Labor Force Variables by Educational Attainment of Husbands and Wives in 2009

			Wives' LFPR	Husbands' LFPR	Wives' Empl. Rate	Husbands' Empl. Rate	Wives' Avg. Hours (Main Job)	Husbands' Avg. Hours (Main Job)	Wives' PT Percentage	Husbands' PT Percentage
Wife LTHS.....										
	Husband	LTHS	0.38927	0.69446	0.33842	0.62348	33.5393	39.2079	0.39301	0.16305
		HS Grad	0.41527	0.66497	0.37171	0.62738	34.697	39.0023	0.26502	0.14944
		Some College	0.42356	0.59254	0.36276	0.54247	36.2608	41.3279	0.27925	0.05982
		College Grad or More	0.34972	0.55564	0.32766	0.51152	29.5547	38.1866	0.51946	0.19397
Wife HS Grad.....										
	Husband	LTHS	0.46616	0.60573	0.40857	0.54256	36.9194	40.2894	0.20009	0.11738
		HS Grad	0.56693	0.69216	0.52533	0.64735	35.9708	39.6776	0.26657	0.13509
		Some College	0.5509	0.68297	0.51267	0.63824	35.5797	40.6144	0.26911	0.09629
		College Grad	0.5508	0.70894	0.52744	0.69428	36.6415	41.7197	0.21771	0.07206
		Grad Deg	0.35108	0.70292	0.32585	0.69817	34.5695	39.4865	0.32373	0.1259
Wife Some College.....										
	Husband	LTHS	0.59526	0.68934	0.55066	0.57883	35.3253	40.892	0.27902	0.1077
		HS Grad	0.72366	0.78434	0.66775	0.73115	36.2248	41.1057	0.24887	0.07809
		Some College	0.69843	0.80146	0.65254	0.75567	35.707	41.7484	0.28004	0.08957
		College Grad	0.61133	0.80454	0.59323	0.77868	34.9476	42.4827	0.31081	0.06811
		Grad Deg	0.5538	0.75903	0.53311	0.73622	33.1438	42.2098	0.36725	0.10253
Wife College Grad.....										
	Husband	HS Grad or Less	0.81242	0.83128	0.769	0.78413	37.8767	41.0026	0.19134	0.09782
		Some College	0.78386	0.82889	0.75382	0.79043	37.6933	42.046	0.20525	0.06528
		College Grad	0.72474	0.8691	0.69322	0.83655	36.5413	43.1145	0.2341	0.06119
		Grad Deg	0.57466	0.8423	0.5554	0.82478	34.0301	44.4155	0.35872	0.07167
Wife Grad Degree.....										
	Husband	HS Grad or Less	0.82381	0.81725	0.80761	0.7892	40.5729	40.8993	0.16138	0.07992
		Some College	0.81696	0.76888	0.80342	0.74166	39.8786	40.8286	0.16746	0.10443
		College Grad	0.78872	0.85838	0.77577	0.81758	39.29	42.1396	0.17496	0.08025
		Grad Deg	0.70846	0.85091	0.69503	0.82438	38.9742	44.3487	0.21893	0.0726

Source: 2008 SIPP Panel

Table 3B: Differences in Labor Force Variables by Educational Attainment of Husbands and Wives in 1999

	Wives' LFPR	Husbands' LFPR	Wives' Empl. Rate	Husbands' Empl. Rate	Wives' Avg. Hours (Main Job)	Husbands' Avg. Hours (Main Job)	Wives' PT Percentage	Husbands' PT Percentage
Husband has More Education than Wife	0.57163	0.79484	0.56254	0.78563	34.0672	42.8077	0.33864	0.087314
Husband and Wife have Same Level of Education	0.62846	0.78752	0.62133	0.7783	35.8968	42.9022	0.2774	0.068485
Wife has More Education than Husband	0.69918	0.79008	0.68965	0.78055	36.8707	42.7715	0.22452	0.072066

Source: 1996 SIPP Panel

Table 5B: Differences in Labor Force Variables by Educational Attainment of Husbands and Wives in 2009

	Wives' LFPR	Husbands' LFPR	Wives' Empl. Rate	Husbands' Empl. Rate	Wives' Avg. Hours (Main Job)	Husbands' Avg. Hours (Main Job)	Wives' PT Percentage	Husbands' PT Percentage
Husband has More Education than Wife	0.54259	0.73719	0.51345	0.70676	34.9402	41.8927	0.30207	0.087366
Husband and Wife have Same Level of Education	0.63141	0.77838	0.59213	0.73405	36.1991	41.6421	0.26777	0.098946
Wife has More Education than Husband	0.72255	0.77931	0.68293	0.72813	37.59	41.3434	0.21195	0.084261

Source: 2008 SIPP Panel

Table 6: Percentage of Couples in Different Types of Earnings Arrangements in 1999

		Winkler et al.*	Estimates from Gold Standard Completed Data			
			All	Wife Education > Husband Education	Wife Education = Husband Education	Wife Education < Husband Education
All Married Couples						
	Standard Categorization ¹					
	Traditional	77.7	73.65	62.56	74.31	81.78
	Nontraditional	21.2	24.26	35.69	23.46	16.10
	Neither with Earnings	1.2	2.09	1.75	2.23	2.13
	Alternative Categorization ²					
	Traditional	62.1	61.81	48.69	62.14	72.17
	Egalitarian	25.4	19.89	25.23	20.30	14.74
	Nontraditional	11.3	16.22	24.33	15.33	10.96
	Neither with Earnings	1.2	2.09	1.75	2.23	2.13
Dual Earner Married Couples						
	Standard Categorization					
	Traditional	75.9	74.33	63.17	75.30	82.87
	Nontraditional	24.1	25.67	36.83	24.70	17.13
	Alternative Categorization					
	Traditional	55.6	58.34	45.51	58.79	69.36
	Egalitarian	33.1	26.84	32.12	27.53	20.73
	Nontraditional	11.3	14.82	22.37	13.68	9.91

Source: SIPP Gold Standard Completed Data, 1996 Panel. Sample is couples married for the duration of the panel where earnings are less than \$625,000 and both spouses were born between 1942 and 1974.

*Winkler, Anne, Timothy McBride and Courtney Andrews. 2005. "Wives Who Outearn their Husbands: A Transitory or Persistent Phenomenon for Couples?" *Demography*, Vol. 42 (3): pg 523-535. Reproduced with permission.

¹The standard categorization defines traditional couples as those where the husband earns more than 50% of the couple's total earnings. Nontraditional couples are where the wife earns more than 50% of earnings.

²The alternative categorization defines traditional couples as those where the husband earns more than 60% of the couple's total earnings. Egalitarian are where both spouses earn between 40 and 60%, and nontraditional couples are where the wife earns more than 50% of earnings.

Table 7: Replication of Winkler et al. Persistence Analysis

	Winkler et al.*	Gold Standard Completed Data				
		All	Wife Education > Husband Education	Wife Education = Husband Education	Wife Education < Husband Education	
Persistent over Two Years (1998-1999)						
Standard Categorization						
	Persistently Traditional	71.2	69.42	57.97	69.88	78.18
	Persistently Nontraditional	16.4	19.24	29.52	18.15	12.55
	Other/Not Persistent	12.4	11.33	12.51	11.96	9.28
Alternative Categorization						
	Persistently Traditional	55	56.58	43.40	56.52	67.66
	Persistently Egalitarian	17.2	13.66	17.17	14.06	10.02
	Persistently Nontraditional	7.7	7.11	12.08	6.45	4.09
	Other/Not Persistent	20.1	22.66	27.35	22.97	18.23
Persistent over Three Years (1997-1999)						
Standard Categorization						
	Persistently Traditional	67.8	66.07	54.25	66.28	75.58
	Persistently Nontraditional	13	16.77	26.60	15.66	10.49
	Other/Not Persistent	19.2	17.15	19.15	18.06	13.94
Alternative Categorization						
	Persistently Traditional	51.4	52.93	39.91	52.51	64.51
	Persistently Egalitarian	13.1	10.45	12.90	10.93	7.59
	Persistently Nontraditional	5.8	4.87	8.79	4.31	2.55
	Other/Not Persistent	29.7	31.75	38.41	32.25	25.35

Source: SIPP Gold Standard Completed Data, 1996 Panel. Sample is couples married for the duration of the panel where earnings are less than \$625,000 and both spouses were born between 1942 and 1974.

*Winkler, Anne, Timothy McBride and Courtney Andrews. 2005. "Wives Who Outearn their Husbands: A Transitory or Persistent Phenomenon for Couples?" *Demography*, Vol. 42 (3): pg 523-535. Reproduced with

¹The standard categorization defines traditional couples as those where the husband earns more than 50% of the couple's total earnings. Nontraditional couples are where the wife earns more than 50% of earnings.

²The alternative categorization defines traditional couples as those where the husband earns more than 60% of the couple's total earnings. Egalitarian are where both spouses earn between 40 and 60%, and nontraditional couples are where the wife earns more than 50% of earnings.

		Mean	25th Percentile	Median	75th Percentile
All Couples					
	Percentage of Earnings Attributed to the Wife in 1999	33.099	5.363	30.237	49.790
	Husband Earnings-Wife Earnings in 1999	\$25,327	0	\$17,246	40145
Dual Earners					
	Percentage of Earnings Attributed to the Wife in 1999	36.671	19.198	35.378	50.378
	Husband Earnings-Wife Earnings in 1999	\$21,260	-398	\$15,278	35074
Fraction of Years Married with Female Breadwinner					
	All	0.216	0.000	0.07692	0.333
	Wife Education > Husband Education	0.313	0	0.183	0.5418124
	Wife Education = Husband Education	0.207	0	0.07632	0.32479165
	Wife Education < Husband Education	0.151	0	0.03448	0.207800375
	Married <10 Years	0.265	0	0	0.5
	Married 10-19 Years	0.226	0	0.08333	0.36767345
	Married 20+ Years	0.166	0	0.07407	0.245344825

Source: SIPP Gold Standard Completed Data, 1996 Panel. Sample is couples married for the duration of the panel where earnings are less than \$625,000 and both spouses were born between 1942 and 1974.

Table 9: Regression Coefficients

LABEL	Wives				Husbands			
	SIPP Synthetic Beta		Gold Standard Completed Data		SIPP Synthetic Beta		Gold Standard Completed Data	
	Log Earnings		Log Earnings		Log Earnings		Log Earnings	
High School Graduate	0.5366 (0.073)	***	0.5102 (0.085)	***	0.6123 (0.047)	***	0.4866 (0.046)	***
Some College, Associate's Degree or Vocational	0.7251 (0.105)	***	0.8333 (0.110)	***	0.8399 (0.092)	***	0.8897 (0.065)	***
Bachelor's Degree	1.0207 (0.108)	***	1.2304 (0.152)	***	1.2516 (0.121)	***	1.4441 (0.088)	***
Graduate Degreee	1.4046 (0.145)	***	1.7189 (0.184)	***	1.6714 (0.152)	***	1.8773 (0.121)	***
Potential Experience	0.0453 (0.022)	**	0.0500 (0.020)	**	0.0745 (0.020)	***	0.0934 (0.014)	***
Race=Black	-0.0502 (0.063)		0.0760 (0.048)		-0.3976 (0.051)	***	-0.2656 (0.039)	***
Race=Other	-0.0068 (0.068)		0.0891 (0.067)		-0.3046 (0.071)	***	-0.3250 (0.065)	***
Hispanic	-0.0851 (0.048)	*	0.0028 (0.062)		-0.1811 (0.023)	***	-0.1613 (0.038)	***
Age Squared	-0.0005 (0.000)		-0.0005 (0.000)	*	-0.0009 (0.000)	***	-0.0011 (0.000)	***
Constant	8.5702 (0.105)	***	8.5568 (0.105)	***	9.3627 (0.114)	***	9.4474 (0.076)	***
Observations	9316		9753		9316		9753	

Source: SIPP Gold Standard Completed Data, 1996 Panel. Sample is couples married for the duration of the panel where earnings are less than \$625,000 and both spouses were born between 1942 and 1974.
***p<0.01, **p<0.05, *p<0.1