

The Impact of Changing Earnings Distributions and Household Characteristics on US Income Inequality Trends since 1967

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Abstract

While much of the research on the rise in inequality in the United States since the 1960s has focused on labor earnings inequality, there is little evidence regarding how closely these labor earnings inequality trends correlate to the broader measure of household income inequality. This paper first compares male and female labor earnings inequality to that of household income. It then uses a shift-share analysis to analyze the change in income inequality accounted for by changes in male and female labor earnings distributions and changing household characteristics. In doing so, it is evident that the factors contributing to the rapid rise in household income inequality in the 1970s and 1980s differ substantially from those contributing to the slower increase in the 1990s. In contrast to findings for the 1970s and 1980s, in more recent years increases in male earnings inequality largely account for the changes in household income inequality while assortative mating and changes in the correlation between male and female earnings have mitigated household income inequality growth.

1. Introduction

Since researchers first observed a dramatic rise in labor earnings and income inequality in the early 1980s, there has been a strong interest in understanding these trends. Much of this research has focused on labor earnings inequality among full-time workers and has been motivated by concerns regarding how labor is compensated in the labor market. Among other factors, researchers have explored how the relative wages of high and low skill workers changed due to increasing returns to post-secondary education (Lemieux 2006a), skill-biased technological change (Juhn, Murphy and Pierce 1993, Berman, Bound and Griliches 1994, Autor, Katz and Kearney 2008), the decline in the real minimum wage (Dinardo, Fortin, and Lemieux 1996, Lee 1999, Card and Dinardo 2002, Lemieux 2006b), and the decline in unionization (Dinardo, Fortin, and Lemieux 1996).

A smaller literature has considered the related question of how these changes in labor earnings inequality relate to changes in household income inequality.¹ The most naïve researchers believe that household income inequality and labor earnings inequality are equivalent. This would be true if all households contained only one worker, that worker worked full-time, and there were no non-labor earnings or government transfers. However, as illustrated by Stigler's (1946) research on minimum wage legislation, when there is more than one worker per household, when workers work different hours, or when there are other sources of income in a household, then all these factors must be considered in evaluating the impact of changes in earnings inequality on trends in income inequality.

Using a shift-share analysis, this paper explores this relationship and the extent to which changes in male and female labor earnings inequality have translated into changes in increases in

¹ The terms earnings and labor earnings are used interchangeably in this paper to refer to earnings from wages and salaries, self-employment, or farm-employment. The terms income and household income are used interchangeably to refer to all income within a household from any income source.

household income inequality. Additionally, it attempts to better estimate how shifts in employment rates, hours worked, marriage rates, and the correlation between spousal earnings, have influence household income inequality trends since 1967.

There is a small literature that has previously explored elements of this relationship between U.S. labor earnings inequality and household income inequality. Lerman and Yitzhaki (1985), Karoly and Burtless (1995), Cancian and Reed (1998), and Bayez and Couch (2008) decompose the Gini coefficient for family income into the contributions from component income sources using Fei et al.'s (1978) Gini decomposition. Burtless (1999) and Daly and Valetta (2006) use a shift-share analysis, comparing family income inequality across two years and observing how inequality changes would have differed had only certain income components changed over that time. In addition to the literature considering these questions in the United States, there is a somewhat more expansive literature using similar decomposition and shift-share methods considering the relationships between labor earnings inequality and household income inequality in an international context (see, for example, Mookherjee and Shorrocks 1982, Jenkins 1995, and Jenkins 1996 for the UK, Fournier 2001 for Taiwan, Del Boca and Pasqua 2003 for Italy, and Pasqua 2008 for Europe).

Such studies report mixed findings on the strength of the relationship between male earnings inequality and household income inequality. For example, Karoly and Burtless (1995) suggest that rising correlations between spouses' earnings is as important as rising male earnings inequality in explaining rising family income inequality. Burtless (1999) also finds that a minority of the rise in income inequality in the 1980s was due to male earnings inequality, with changes in marriage patterns and an increase in single-headed families contributing substantially to the increase in income inequality. In a later paper, Burtless (2009) notes that marriage patterns continue to be important although he also observes that they cannot explain periods of

rapid inequality growth because changes in marriage patterns occur slowly over time. Daly and Valetta (2006), on the other hand, place a higher importance on male earnings inequality changes, suggesting that they explain the majority of the rise in income inequality since 1979.

In contrast to the work by Daly and Valetta (2006), Burtless (1999), and Burtless and Karoly (1995) which evaluate inequality trends by looking at a single year per business cycle, Gottschalk and Danziger (2005) compares annual trends in male earnings inequality trends to those for income inequality. Using P90/P10 ratios, Gottschalk and Danziger observe that while the overall rise in male earnings inequality since 1975 is similar to the overall rise in income inequality, the timing of these increases are different. They therefore suggest that other factors are likely contributing to the observed income inequality increases. Their findings illustrate the importance of considering complete trends in inequality, rather than concentrating only on single years. Had Gottschalk and Danziger only considered the beginning and ending years of their sample period, the rise in income inequality and male earnings inequality would have seemed quite similar. By comparing the complete trends they reached a different conclusion.

One limitation of the work by Gottschalk and Danziger and other inequality researchers, however, is that they do not have access to the complete income distribution because the Census Bureau censors top incomes in the March CPS data. This topcoding makes it difficult to consistently observe changes at the top of the distribution. A common approach used by Gottschalk and Danziger to limit the influence of topcoding on inequality results is to measure inequality using the P90/P10 ratio. Since the P90/P10 ratio is unaffected by changes to the distribution above the 90th percentile, the distortionary effects of topcoding on P90/P10 ratios are limited when compared to most other inequality measures.²

² Although the P90/P10 ratio does reduce the impact of topcoding, Burkhauser, Feng, and Jenkins (2008) show that P90/P10 ratios do not completely overcome the problem because CPS topcoding is performed on each sources of

However, the features of the P90/P10 ratio that make it beneficial for limiting the distortionary effects of topcoding also make it an imperfect measure of inequality when compared to other inequality indices. As described by Jenkins (2009), there are four key properties that are desirable in an inequality index: scale invariance, replication invariance, symmetry (or anonymity), and satisfying the Pigou-Dalton transfer principle.³ While the P90/P10 ratio satisfies the first of these three principles, it does not satisfy the Pigou-Dalton transfer principle since a transfer of income will only impact the P90/P10 ratio if the transfer impacts the income of the individual at the 90th or 10th percentile. This is in contrast to other commonly used measures of inequality such as the Gini coefficient, the Generalized Entropy family of inequality indices including the Thiel index, and the Atkinson indices. Each of these inequality measures satisfy all four desirable properties for measuring inequality.

This distinction would be relatively innocuous if it did not influence inequality trends. However, this is not the case. Jenkins (2009) illustrates that cross-country rankings of income inequality are affected by the choice between a P90/P10 ratio and a Gini index. Furthermore, Burkhauser, Feng, and Jenkins (2008) show that even after correcting for topcoding the inequality trends using P90/P10 ratios are quite different from those found using the Gini coefficient – and this difference varies for labor earnings and household income. Therefore, using the P90/P10 ratio to analyze the contribution of male earnings inequality to household income inequality may lead to different results than those found using Gini coefficients.

income separately. Nevertheless, the effects of topcoding are smaller than for Gini coefficients or other measures of inequality that incorporate dispersion through the entire distribution.

³ Scale invariance states that the index is insensitive to a rescaling of the unit of income measurement, such as shifting from measuring income in dollars to measuring it in cents. Replication invariance states that the index is insensitive to a replication of all individuals and their incomes, thus making the index comparable for populations of different sizes. The symmetry axiom states that only the income of individuals, and not personal characteristics, impact the measure of inequality. Finally, the Pigou-Dalton transfer principle states that a small transfer of income from an arbitrarily chosen person to a person lower in the distribution, while keeping the transferor richer overall, reduces income inequality. For a further discussion of these properties see Jenkins (2009).

With access to the internal CPS data, I am able to lift these topcoding constraints and observe incomes in the distribution above those in the public use CPS. As a result, this paper examines the relationship between labor earnings and income inequality across the entire distribution using broad-based inequality metrics that satisfy all four desirable properties of inequality indices. Since it is one of the most commonly used measures of income inequality, this paper focuses on the Gini coefficient when analyzing trends in income inequality.⁴

Additionally, to further understand the relationship between changes in male earnings inequality changes and changes in household income inequality, the analysis in this paper goes beyond the comparison of trends performed by Gottschalk and Danziger and examines the extent to which increases in household income inequality are attributable to changes in each income source and changes in household characteristics. This additional analysis is performed using a shift-share procedure similar to that used by Burtless (1999) and Daly and Valetta (2005).

This paper further adds to the analysis by considering annual trends in inequality rather than just one year per business cycle, examining the entire income distribution rather than just the portion under the topcoding threshold, separately evaluating different types of changes occurring within income sources, and expanding the studied time-frame. Using this analysis, the results reconcile the varied results on the importance of each income component on household income found in the literature. They also show that different factors account for household income inequality changes in the 1990s than in earlier decades, indicating that the relationship between earnings inequality and household income inequality has evolved over time.

The results in this paper provide new information on the factors accountable for rises in income inequality, although this accounting should not be viewed in a causal sense due to the

⁴ Similar results can be obtained using the $I(I)$ Generalized Entropy measure (the Theil Index) which, like the Gini coefficient, is relatively sensitive to changes at the middle of the income distribution. Results based upon the $I(I)$ inequality index are available upon request from the author.

complex behavioral interactions occurring across the factors considered. For example, if increases in female wage rates empowered more women to live independently this could lead to a decline in marriage rates. Thus, from a causal perspective inequality changes accounted for by changing marriage rates may actually be caused by changes in female employment possibilities. Similarly, if increases in public transfers induce individuals to leave the labor market, then the public transfers – which in this strict accounting sense reduce inequality – could have behavioral implications that increase inequality through other channels. Nevertheless, given the relatively little research exploring factors contributing to household income inequality changes, it is valuable to first consider such an accounting approach to changes in income inequality which can then direct future research into the impact of these factors in a causal sense.

2. Data

Topcoding in the March CPS data.

This analysis derives from access to internal CPS data, which is identical to the data used by the Census Bureau for producing their official income statistics (Denavas-Walt, Proctor, and Smith 2009). These data measure top incomes much better than the data released in public-use CPS files. To protect the confidentiality of its respondents, the Census Bureau censors (“topcodes”) each of the income sources received by individuals in the public-use data and the extent of topcoding varies over time. As a result, the public-use CPS data traditionally allowed researchers to at-best consistently measure inequality for the 95 percent of the income distribution below the topcode thresholds and at-worst provide inconsistent estimates of inequality due to variations in topcoding (See Feng, Burkhauser, and Butler 2006 and Larrimore, et al. 2008 for comparisons of inequality results using various topcode correction procedures).

The internal CPS data does not have the same topcode constraints. While some censoring occurs in the internal CPS data, this censoring is much less extensive than that seen in the public-use CPS data. Less than 1 percent of the population has their household income censored in the internal data in any given year, while several recent years have upwards of 5 percent of individuals with household income topcoded in the public-use data. The limited internal censoring exists mainly to minimize the impact of recording errors and prevent volatility in annual statistics (Semega and Welniak, 2007). Furthermore, since the internal data is the same as that used by the Census Bureau for their official income statistics, this censoring is no more restrictive than that which is incorporated into the government's official inequality statistics.

One limitation in drawing inferences on long-term trends that cannot be corrected by using internal data is the potential for survey design changes to influence the results. While the March CPS data is largely consistent over time, there were substantial changes between 1992 and 1993 when the Census Bureau implemented computerized data collection along with several other data collection procedure changes (See Ryscavage, 1995 and Jones and Weinberg, 2000 for further discussion of these changes). These changes improved the Census Bureau's accuracy in recording incomes, particularly at the top of the distribution. However, this also led to a large artificial increase in inequality so the Census Bureau recommends against making comparisons over these years. Thus, 1992-1993 are separated in the results due to these data comparability problems.

Defining Income.

The results in this paper focus on the size-adjusted household income of persons, including both labor and non-labor earnings. This income measure is commonly used in US and cross-national studies of income inequality (see, for example, Atkinson, Rainwater and

Smeeding 1995, Gottschalk and Smeeding 1997, Atkinson and Brandolini 2001, and Burkhauser et al. 2008). It assumes that income is shared equally among all household members, so each individual in the household receives the same income. To account for economies of scale in household consumption, household income is divided by the square root of household size to obtain size-adjusted household income.⁵ This aggregation and size adjustment is performed at the level of the income source. For example, all individuals in a household are assigned the same male-head labor earnings, which is equal to the earnings received by the male household head divided by the square root of household size.⁶ Such a procedure is necessary to ensure that all income is accounted for when considering the impact of earnings source changes on income inequality.

As is common in the income inequality literature, individuals in group quarters or in a household containing a member of the military are excluded. Additionally, unlike in labor earnings analyses where the sample population is often restricted to working age individuals, analyses of household income inequality generally include all individuals regardless of age. When analyzing household income inequality, this paper will do the same.

3. Comparing trends in Gini coefficients for labor earnings and household income

There are several ways to examine the relationship between earnings inequality and household income inequality. One way is to simply compare the inequality levels and trends for

⁵ Dividing by the square-root of the household size is the most commonly used case of the economies of scale size-adjustments proposed by Buhmann, et al. (1988) where size-adjusted HH income = (total HH income) / (HH size) ^{α} , with $\alpha=1$ implying no economies of scale and $\alpha=0$ implying infinite economies of scale. Setting $\alpha=0.5$ closely matches the adjustments for household size implied by the Census Bureau poverty thresholds (Ruggles 1990).

⁶ The household head refers to the Census householder in years since 1980 and the Census household head prior to that time. The definition of the household head is the person (or people) in whose name the housing unit is owned or rented. In cases where there is no such person, it may refer to any adult member of the household excluding boarders (US Census Bureau 2008). In cases of married individuals, while the Census arbitrarily considers one person to be the householder, this paper refers to both as being household heads.

household income to those for labor earnings. This is the procedure used by Gottschalk and Danziger (2005) to explore inequality trends using P90/P10 ratios and similar comparisons are made here using Gini coefficients.

This comparison starts with a definition of labor earnings based off of those commonly used in the earnings inequality literature – personal, non-size-adjusted labor earnings among working age individuals who have positive earnings (Card and DiNardo 2002 and Gottschalk and Danziger 2005 use a similar definition, although restricting earnings to wage earnings rather than the more inclusive labor earnings definition). Working-age individuals are defined in this paper as those aged 22-62. This sample is divided by gender, reflecting the fact that the labor earnings distributions differ for men and women. The Gini coefficients using this income definition and cut of the population are provided in Columns 1 and 3 of Table 1 for the trough years of each business cycle since 1967.⁷ While there are valuable insights to be gained from more carefully analyzing the annual trends in inequality, which will be discussed in more detail in the sections below, such a comparison across trough years allows for a snapshot of inequality trends devoid of cyclical business-cycle variations.

Both male and female earnings inequality among working individuals has risen since 1975, although it increased more rapidly for men. However, while these series are informative for understanding inequality in labor market compensation, they do not necessarily reflect inequality in society as a whole. For example, both series exclude people with zero earnings. Including these individuals, but still analyzing personal, non-size adjusted labor earnings among working age individuals (Columns 2 and 4 of Table 1) leads to higher levels of inequality for

⁷ Trough years of business cycles are defined here based on troughs in income which generally lag macroeconomic growth. While not trough years, 1967 and 2007 are included in Table 1, and all tables of business cycle trough years, because they are the first and last years of data available. 1993 is also included along with the actual trough year of the 1990s business cycle, 1992, due to the Census redesign in 1993 that limits data comparability from 1992-1993. Thus, the inclusion of 1993 in the tables separates out any inequality changes due to the survey methods from actual changes in inequality that occurred during the 1980s and 1990s business cycles.

both sexes. Additionally, the choice to include or exclude individuals with no earnings impacts not just the levels of inequality but also their trends. This is most evident when comparing trends between the two female labor earnings series. Among working-age women who work, labor earnings inequality increased slightly since 1975, while labor earnings inequality among all working-age women declined dramatically as a result of increases in female employment rates.

Including individuals with no labor earnings is just one way that household income inequality trends could differ from those for labor earnings. Household income includes not just own-labor earnings, but also non-labor income such as public transfers, interest, dividend, and rental income. The inclusion of these additional income sources and assuming sharing of income across members of the household will further change levels and trends of inequality. This can be seen in column 5 of Table 1 which considers inequality of size-adjusted household income of individuals but still restricts the sample only those of working-age. Including these additional factors generates lower levels of inequality than that seen for either male or female labor earnings. Additionally, the growth in household income inequality for working-age individuals is moderately slower than that seen for labor earnings inequality among working-age men alone.

A final distinction in understanding the differences between household income and labor earnings inequality is the age-range of analysis. Researchers interested in household income inequality are interested in inequality across all age ranges including children and the aged, rather than just among working-age adults. Since children typically live with their parents and therefore are assumed to share the parents income for consumption, the inclusion of children mainly impact inequality only by increasing the importance of large households in the analysis. The income composition of the aged, however, is quite different from that of working-age individuals. As can be seen by comparing column 5 of Table 1, which considered size-adjusted household income for working-age individuals, to Column 6 of Table 1, which expands the

sample to include individuals of all ages, including the aged and children increases the levels of household income inequality when compared to that of working-age individuals.

A casual observer may compare column 1 – the labor-earnings inequality for working-age men who work – to Column 6 of Table 1 – the size-adjusted household income inequality for the entire US population and observe that since the levels are similar they must be measuring approximately the same things. However, as should be apparent through the discussion above, the underlying factors that can influence household income inequality extend well beyond just male labor earnings. Thus, the observation that levels of inequality are so similar for these two series is therefore largely coincidental.

Of course, while it is not a one-to-one relationship the changes in male labor earnings inequality can, and do, influence levels and trends in household income. To the extent that male earnings are an important component of household income, an increase in male earnings inequality may increase household income inequality. However, a basic comparison of inequality trends across series is limited in its ability to explain the extent to which a single income source accounts for the rise in household income inequality. This is because there are three ways that changes to an income source can influence household income inequality. The first is through changes to the level of inequality of the source. The second is through changes to the share of income coming from the source. And the third is through changes in the correlation between income from that source and income from other sources. Comparing the trends in source-level inequality to the trend in household income inequality only considers the first of these three contribution paths. Understanding the full impact of how male or female earnings changes account for household income inequality changes requires analyzing the other two pathways as well.

Additionally, comparing inequality trends cannot provide information about contributions to rising income inequality that are not due to changes in source-level income distributions but are instead due to changes in how individuals form households. Given these limitations, an alternate shift-share approach is used to further examine the income sources and household demographic shifts responsible for the increase in income inequality over the past 40 years.

4. Method of decomposing the increase in household income inequality

To decompose the change in household income inequality into that attributable to male earnings changes and to other income and demographic changes, the shift-share analysis starts with the March CPS sample from 1975.⁸ Changes that could impact inequality are then added one at a time and the resulting increase in income inequality is compared to the increase that would have occurred had the specified factor remained unchanged. This yields the inequality changes that can be accounted for by each factor. In this procedure, potential causes are divided into three categories: changes to the prevalence of population groups, changes to the distribution of incomes from a given source, and changes to the correlations of income across income sources. Each of these categories requires slightly different methods for capturing their relationships with household income inequality changes.

Changes in the prevalence of population groups.

The portion of household income inequality changes attributable to changes in population group size is determined using a shift-share approach commonly used to separate changes into

⁸ 1975 was chosen as a base-year both because it is commonly used as the initial year in studies of long-term income inequality trends (see, for example, Gottschalk and Danziger, 2005) and because a comparison of household-income and labor-earnings trends indicates that 1975 is the beginning of an era where the relationship between male-earnings inequality and household income inequality changed. Alternate base-years were tested and did not substantially impact the findings in this paper.

their factor components (Atkinson 1998, Burtless 1999). This procedure starts with the population in time t where the income distribution is described by the income frequency density function, $\varphi^t(y)$. The population in time t can be divided into K mutually exclusive subgroups where N_k^t the fraction of the population belonging to group k in time t is v_k^t . Each subgroup's income distribution is described by the income frequency density function $\varphi_k^t(y)$.

As noted by Jenkins (1996), the population income frequency, $\varphi^t(y)$, equals the weighted sum of the subgroup frequencies, $\varphi_k^t(y)$, with the weight equal to the population share of the subgroups, v_k^t . As a result, changes to group size can impact the population income distribution and the inequality metrics calculated based off of it even if the subgroup income distributions remain unchanged. This is because if one subgroup's population share increases over time then the population income distribution will increasingly approximate the growing group's income distribution as its weight increases in the population.

For this reason, changes to the prevalence in population groups have the potential to impact income inequality without changes to the underlying income distributions within those groups. For example, if a subgroup with relatively high inequality increases in size then, holding the subgroup income inequalities constant, then its larger subgroup size it will increase overall income inequality.

The importance of the relative size of these population groups can be analyzed by considering how income inequality trends would have differed if the income distributions of individuals within each group remained constant and only the size of the groups had changed. Thus, suppose that v_k^t percent of the population is in subgroup k in year t and $v_k^{t'}$ percent of the population is in the same subgroup in year t' . Then the impact of the change in the group size can be captured by reweighting observations from time t such that the fraction of the population

in group k is $v_k^{t'}$. This is accomplished by replacing the observation weight for each individual i in group k in year t , $W_{i,k}^t$, with:

$$\widehat{W}_{i,k}^{t'} = W_{i,k}^t \left(\frac{v_k^{t'}}{v_k^t} \right)$$

This increases the weight of individuals in groups that are more prevalent in year t' than in year t and reduces the weight of individuals in groups that are less prevalent in year t' than in year t .

Changes in source-level income distributions within population groups

In addition to changes in the prevalence of each population group, there have also been changes to the distribution of incomes of individuals within each subgroup. These changes can come from any one of the income sources received from individuals, including male labor earnings, female labor earnings, public transfers, or non-labor income. This is the second factor considered: changes to the source-level distribution of incomes.

The portion of household income inequality changes attributable to changes in population group size is determined using a rank-preserving income exchange. The procedure used is similar to that used by Burtless (1999) and Daly and Valetta (2005), although there are several important differences. First, the income exchange is a conditional on full-time or part-time employment status. This is in contrast to earlier work that either performed an unconditional income exchange, or only conditioned on having any employment rather than on intensity of employment. This conditioning allows me to separate the impact of changes to work-intensity from changes in earnings inequality among individuals with similar intensities of work. Additionally, in this paper the exchange is performed in two steps – first allowing the inequality of source-level incomes to vary while holding the conditional mean earnings levels constant and then allowing both the source-level inequality and real earnings level to vary. This two-step

process differentiates the impact of these two ways that source-level income distribution changes can influence income inequality.

In order to perform the conditional rank-preserving income exchange, individuals are ordered in each subgroup k from low to high based on their income from source f and assign them a source-level income rank, r_{ikf}^t , based on this ordering. Rank 1 represents the individual with the lowest income from source f among group k and rank N_k^t being the individual with the highest income from source f among group k . Note that an individual's rank will generally not be the same across two sources of income, so each individual has a separate rank for all income sources analyzed. The source-level income of the individual at any given rank in time t can therefore be denoted as y_{kfr}^t where $y_{kfr_1}^t \geq y_{kfr_2}^t$ for $r_1 > r_2$.

To understand how changes in the source-level distribution of incomes among individuals in group k relate to household income inequality, rank-correlations across income sources are assumed to remain unchanged. To observe the impact of changing the distribution of earnings from each source, starting with the income distribution of year t , each individual is assigned the income from source f of the individual in year t' with the same rank in the source-level distribution. Income from all other sources remains unchanged. This procedure preserves the conditional earnings rank of each individual but captures the change in the source-level income distribution among individuals of the group.

If there were the same number individuals in each group in all years, this process would be quite straightforward using a simple one-to-one replacement. Unfortunately, this is not the case. In general, $N_k^t \neq N_k^{t'}$, which means that individuals with the same numerical ranks are at different points in the income distribution in each year. Thus, an exact rank replacement would

truncate the top of the distribution when subgroup membership expands. Therefore, to avoid this problem ranks in year t are rescaled to match the number of observations in year t' :

$$\hat{r}_{ikf}^t = r_{ikf}^t \left(\frac{N_k^{t'}}{N_k^t} \right)$$

Since these new ranks are not restricted to integer values as necessary for replacement, they are rounded up or down randomly in proportion to the decimal value of the estimated rank. So, for example, if the rescaled rank of an individual is 100.2, he will be assigned a rank of 100 with probability of 0.8 and a rank of 101 with probability 0.2. Once the rescaled ranks from year t are determined, individuals are assigned the income from year t' corresponding to the rescaled rank, $y_{kf\hat{r}}^{t'}$. This income is then added to the individual's income from all other sources in year t to determine how income inequality would have changed had only income from source f changed and income from all other sources remained constant.

To separate the impact of changes to the source-level inequality from real earnings growth of the source, the rank-preserving income exchange described above is divided into two components: changes to the mean-preserving source-level income distribution and changes to the inflation-adjusted source mean incomes. First, the analysis is performed keeping the source-level mean incomes constant over time. This captures the impact of the change in dispersion of source-level income without capturing the change in real earnings levels. Second, the real earnings growth is included as well, capturing the additional impact on inequality of income from specific sources growing faster or slower than the rate of inflation over time.

Changes in income-source rank correlations within population groups

The previous two methods each assume that the rank correlation of income sources is unchanged over time. Thus, if the man at rank n in the conditional male earnings distribution is

married to the woman at rank m in the conditional female earnings distribution in year t , then the procedure described above assumed that the man at rank n in the male earnings distribution in all future years is also married to the woman at rank m in the female earnings distribution. The third area of analysis removes this assumption and considers how changes to the rank correlation of earnings sources impact household income inequality.

The procedure for incorporating changes to the rank correlation is as follows, using similar procedures to those used by Burtless (1999) and Fournier (2001). Taking the rescaled income source ranks described above, \hat{r}_{ikf}^t , each individual's ranks are observed to establish rank pairings across the income sources. The relationship between changes to rank correlations and changes to household income inequality can be captured by replacing the rank pairings from year t with the rank pairings from year t' - and rearranging the source incomes to correspond to the new rank pairings. This revised source-level income is then added to the income from all other income sources to calculate the estimated Gini coefficient and observe the change in income inequality attributable to the correlation change.

Robustness of results to changes in the order of analysis

A known limitation of this type of shift-share analysis is that the results are sensitive to the order in which the component factors are analyzed (Jenkins 1995, Fournier 2001, Daly and Valetta 2006). One approach for analyzing the factors is to add in the changes to factor components sequentially (Daly and Valetta 2006). Thus, for example, one would first observe how household income inequality changes since year t if nothing changes except for marriage rates. Then, one would observe how household income inequality changes since year t if nothing changes except for marriage rates *and* the male earnings distribution. The portion of the total

household income inequality change accounted for by each factor is therefore the additional change in inequality observed from the additional component – beyond the change accounted for in the previously analyzed factors. The advantage of this method is that it ensures that exactly 100 percent of the actual change in household income inequality is captured by the component factors. However, the disadvantage is that altering the order in which factors are analyzed has the potential to change the results.

An alternate method of performing the shift-share analysis is to always start with the income distribution in year t and only change a single factor (Burtless 1999). For example, using this approach one would observe how household income inequality differs from that seen in year t if nothing changes except for marriage rates. Then, one would observe how household income inequality differs from that seen in year t if nothing changes except for the male earnings distribution. The portion of the total household income inequality change accounted for by each factor is thus done in isolation with the same starting conditions. However, using this approach, the sum of the changes in household income inequality accounted for by all factors may overstate or understate the true change in inequality since that time.

While this paper uses the former approach, adding changes from factor components sequentially, the main results are consistent with those found using the approach of analyzing each factor in isolation. The choice between these methods alters the magnitude of some results but they both present a similar picture of the factors accounting for the rise in income inequality. The results in the following section focus exclusively on the primary sequential analysis, but the results using the alternate approach are provided in Appendix Table 1.

5. Results

In order to explain the causes of trends in household income inequality changes, it is necessary to first observe the trends being explained. The first row of Table 2 does just that – providing the average annual percentage change in Gini coefficients for each business cycle since 1967. From row 1 of Table 2, it is apparent that inequality fell slightly in the late 1960s business cycle (1967-1975), before rising dramatically in the late 1970s business cycle (1975-1983). It continued to rise, although at a somewhat moderated pace, in the late 1980s business cycle (1983-1992). The year from 1992-1993 showed a substantial 5.69 percent increase in the Gini coefficient due to data collection changes in that year. A comparison of this increase to preceding and subsequent years highlights the impact of these changes and the importance of separating this year from other periods in the analysis.⁹ In the remainder of the 1990s business cycle (1993-2004), the increase in inequality slowed even further compared to the periods of rapid growth in the early 1980s. Most recently, the beginning of the current business cycle (2004-2007) has then seen a fall in inequality – although the conclusions regarding the current business cycle are limited given that the complete business cycle cannot yet be observed.

The annual trends in income inequality can be observed in Figure 1 (with inequality in the base-year of 1975 normalized to 1). In this figure, it is apparent that income inequality trends are generally not steady over time. For example, the rapid rise in inequality from 1980-1983 was followed by a year of declining income inequality in 1984 before inequality continued to increase. The factors accounting for income inequality trends should explain not just the long-term trends but also these year-over-year fluctuations. Thus, it is valuable to consider both the long-term inequality changes, which will be done across trough years of the business cycles,

⁹ Further evidence that this one-year increase is artificial can be obtained by comparing March CPS results to other datasets. Burkhauser, et al. (2009) do so by showing that trends in top income shares for pre-tax, pre-transfer tax-unit income in the March CPS closely match Piketty and Saez's (2003) results using IRS tax records in most years. One year in which this comparison across datasets does not provide similar results is 1992-1993, where the top 1% income share increases substantially in the March CPS data due to the new Census Bureau procedures but are relatively constant in the IRS tax records.

along with these annual fluctuations in income inequality. Having observed the trends in inequality to be explained, it is now possible to explore the factors underlying these trends.

Changes to the marriage rates

The first factor considered is the change in the fraction of households headed by married couples. Marriage rates have changed rapidly over the past 40 years, as can be seen in Table 3 which provides the fraction of people living in households headed by a married couple in the trough year of each business cycle. In 1967, 82 percent of people lived in a household headed by a married couple. This percentage declined to just 63 percent in 2007.

This change could, in theory, increase or decrease income inequality depending on where unmarried individuals fall in the distribution. If unmarried individuals are concentrated near the middle of the distribution, the decline in marriage rates would decrease inequality. On the other hand, if they are more commonly found near either tail of the distribution, the reduction in marriage rates would increase inequality. In general, single individuals are more likely to be living in poverty than their married counterparts. As a result, one would expect the decline in marriage rates to increase income inequality as it expands the population in the lower tail.

Starting with the March CPS sample from 1975, by using the reweighting technique described above it is possible to determine how much of the change in household income inequality can be accounted for by this decline in marriage rates. In doing so, note that the estimated effect focuses exclusively on changes to how many people marry, rather than who marries since it assumes the income distribution of married and single individuals remain unchanged. If, for example, there is an increase in assortative mating with high-income individuals increasingly marrying other high-income individuals, then the impact of such changes are not included here. Instead these changes will be observed in the analysis of

changing correlations between male and female earnings. Thus, the impact of changing marriage rates measures exclusively the impact of the change in marriage rates across the population.

Row 2 of Table 2 shows the average-annual percentage change in household income inequality that is accounted for by marriage pattern changes in each business cycle. This can be compared to the actual changes in inequality observed for each business cycle presented in row 1 of Table 2. In the late 1960s business cycle, when household income inequality fell by an average rate of -0.16 percent-per-year, the decline in marriage rates holding incomes for married and single individuals constant accounted for inequality increases of 0.20 percent per year. This suggests that had marriage patterns been unchanged during this period, the decline in income inequality would have been even greater.

During each subsequent business cycle through 2007 there continued to be a fall in marriage rates. In the late 1970s business cycles, declines in marriage rates accounted for approximately 23 percent of the total rise in inequality, as marriage rate declines accounted for a rise in inequality of 0.20 percent point per year compared to the actual increase of 0.90 percent per year. An identical 23 percent of the total increase in inequality can be explained by declines in marriage rates in the late 1980s (0.12 percent per year increase due to marriage rates out of the total increase of 0.51 percent per year). During the 1990s the decline in marriage rates slowed, thus reducing the rise in income inequality accounted for by marriage changes. But since income inequality growth slowed even more the marriage rate changes accounted for 40 percent of the 0.13 average annual percentage change in income inequality over the business cycle.

Figure 1 provides a comparison of the annual income inequality changes accounted for by the marriage rate changes and compares them to the actual income inequality changes seen during that time. When considered on an annual basis, rather than by business cycle, it is clear that changes to income inequality due to marriage rates are extremely steady compared to the

actual changes in income inequality. There are wide fluctuations in the year-over-year changes in household income inequality, with inequality increasing or decreasing by as much as 3 percent in some years. In contrast, the inequality changes attributable to marriage rate changes are never more than 0.4 percent in any given year. This supports the view that while declines in marriage rates are contributing to the increase in income inequality, they generally cannot explain rapid shifts in inequality trends since they are a slow-moving factor.

Changes to the male employment rate

The second factor that may explain changes in household income inequality is the change in male employment rates. Previous studies that have considered the impact of changing employment rates on income inequality have only considered whether the individual is employed or not-employed (see, for example, Daly and Valetta 2006). However, not considering whether individuals work full time or part time will potentially miss important changes to work intensity over time. As such, this paper considers three potential employment statuses: working full time, working part time, and not-employed (both unemployed and not in the labor force).¹⁰ It follows the previous literature, however, in focusing on the employment status and earnings of just the household head and his or her spouse rather than the employment of all individuals in the household. Thus all subsequent references to male earnings refer to the size-adjusted labor earnings of the male household head and references to female earnings refer to the size-adjusted labor earnings of the female household head.

It is likely that employment decisions of the household head are made conditional on marital status, since married individuals with other available sources of income likely have

¹⁰ Full time work is considered working at least an average of 35 hours per week for 50 weeks or more during the year. Part time work is considered working at least 1 hour for one or more weeks during the year, but working less than 35 hours per week or less than 50 weeks during the year.

higher reservation wages and thus will enter the labor market at lower rates than single individuals. Therefore, to avoid confusing changes in income inequality resulting from changes in employment rates versus those resulting from changing marriage patterns, this analysis is performed conditional on marital status.

As was the case with the marital status of the head, employment rates of household heads have changed substantially over the past 30 years. The full-time and part-time employment rates for male household heads are provided in Table 4. Among married male household heads, the full-time employment rates fell substantially from 1967 through 1983 before recovering somewhat since then. Additionally, over the entire period there was an increase in non-working males as men shifted out of paid employment. Illustrating the importance of conditioning on marital status, the pattern for single males is quite different. The fraction of single-men not working in 2007 was very close to that seen in 1967. Among these men, most of the fluctuations in employment are in the form of shifts between full-time and part-time work.

The procedure for testing the impact of these changes in the employment rates is the same as that for evaluating the impact of changing marriage patterns, except that now a conditional rather than an unconditional reweighting procedure is used. Once again, the income of all individuals remains unchanged conditional on marriage rates and employment status.

In row 3 of Table 2, the additional impact of male employment rate changes are presented for each business cycle. Although male employment changes increased inequality in the late 1960s and late 1970s business cycles, these changes have had very little impact on inequality since that time.

This is further evidenced by comparing Series (b) of Figure 2, which presents inequality trends when both marriage rates and male employment rates change, to Series (a) of Figure 2 when only marriage rates changed. With the exception of the period from 1967 to 1975, where

the male employment changes clearly led to a further increase in inequality, the inequality trends in these two series are quite similar. Thus, male employment rate changes offer relatively little additional information regarding the changes in inequality seen since 1975. To the extent that changes in male earnings impacted household income inequality, it is evident that these changes have generally occurred among workers with a given employment status rather than due to shifts in intensity of employment.

Changes to the male labor earnings distribution¹¹

Given that the changes in male employment rates generally had little impact household income inequality, to what extent did changes to the male earnings distribution impact household income inequality? Since male earnings inequality rose substantially in the past 40 years, one would expect that male earnings changes had a large effect on household income inequality trends. Using the rank-preserving income exchange procedure previously described for testing the impact of changes to the income distribution, this section explores the extent to which this is the case. This is first done holding the conditional mean labor earnings constant at 1975 levels, concentrating only on changes to male earnings inequality and excluding the impact of the real wage growth.

In row 4 of Table 2, it can be seen that male earnings inequality explains only a fraction of the decline in income inequality between 1967 and 1975. These changes in male earnings inequality explain a 0.05 average annual percent decrease in inequality over this business cycle, which is less than one-fourth of the 0.22 average annual percent increase in inequality seen from

¹¹ References to the male and female earnings distribution refer to the combination of changes to male labor earnings inequality and to changes in the real level of male earnings.

male employment changes over the same period. Thus, male earnings and employment changes alone cannot account for the small decline in household income inequality before 1975.

The importance of male earnings inequality is very different after 1975, however. In the late 1970s business cycle male earnings inequality changes account for a 0.32 average annual percentage increase in inequality, 35 percent of the 0.90 actual average annual percentage increase. In both the late 1980s and 1990s business cycles it accounts for over 60 percent of the observed increases in inequality.

When the real male earnings growth is included along with the male earnings inequality changes, it is evident that complete shifts in the male earnings distribution are even more important for explaining household income inequality trends.¹² In the late 1980s and late 1990s business cycles, the inclusion of real male earnings growth explains an additional 0.14 and 0.13 percent per year of the inequality growth respectively (row 5 of Table 2).

Additionally, when considering the annual trends in income inequality explained by including male earnings inequality (Series (c) of Figure 2) and male real earnings growth (Series (d) of Figure 2) in addition to the marriage rate and male employment changes, one can observe that many of the year-over-year fluctuations in inequality can largely be explained by the inclusion of these factors. While the magnitude of inequality changes do not always match those actually observed, the years in which inequality increase and decrease are generally consistent with the actual income inequality series.

The combination of male employment rate changes, male earnings inequality changes, and male real earnings growth are clearly extremely important for understanding the long-term

¹² Real earnings are inflation adjusted using the CPI-U-RS series. This series is used by the Census Bureau for their historical income series (Denavas-Walt, Proctor, and Smith, 2009) and incorporates recent improvements in the CPI to provide a more consistent inflation series than that provided by the unadjusted CPI. For more details on the CPI-U-RS series, see Stewart and Reed (1999).

changes in inequality that have occurred over the past 40 years. However, it is also notable that the relationship between these male-earnings factors and household income inequality trends has changed over time. In the late 1970s business cycle, the sum of the contributions of these three factors explains a 0.43 average annual percentage increase in income inequality (rows 3 through 5 of Table 2). In the late 1980s business cycle, they combined to explain a 0.45 average annual percentage increase in income inequality, which is 88 percent of the actual income inequality growth observed in this business cycle.

By the 1990s business cycle, while the combined contribution of these factors slowed to explain a 0.19 average annual percentage increase, this slowdown is less substantial than the actual slowdown in income inequality that occurred. As a result, in the 1990s business cycle the male earnings and employment changes accounted for 143 percent of the actual increase in inequality. This suggests that had it not been for other factors mitigating the inequality growth from male employment and earnings changes, household income inequality growth would not have slowed to the extent that it did in the 1990s.

More broadly, had other changes beyond male employment and earnings changes not been occurring, household income inequality growth would have been slower in the late 1970s and 1980s business cycles but faster in the 1990s. Therefore, to reconcile the differences in the timing of the inequality increases, it is necessary to also consider the changes to the earnings distributions of other income sources and changes to the correlation between male and female earnings.

Changes to female employment rates and the female earnings distribution

It has been well documented that female employment rose dramatically over the past 40 years. Unlike the observation for male employment where married men exited the work force

while single men increased their employment rates, females in 2007 are both more likely to be employed and more likely to work full-time than they were in 1967 regardless of their marital status. This is clearly illustrated in Table 5, which shows a 23 percentage point increase in full-time employment among married women and a 13 percentage point increase in full-time employment among single women.

Using the same reweighting procedure as above for evaluating the impact of changing male employment rates on household income inequality, row 6 of Table 2 illustrates that the rise in female employment slowed the rise in income inequality over the past 40 years. During the late 1970s and 1980s business cycles this reduction in inequality growth was more substantial given the rapid growth in female employment during that period. If females entering the labor market have similar earnings profiles to those of women in 1975, increases in female employment account for a reduction in inequality growth of -0.15 and -0.19 percent per year in the 1970s and 1980s business cycles respectively. This is quite different from the impact of the male employment rate changes, which had very little impact on household income inequality.

The changes in female employment rates, however, did not greatly impact on the year-over-year variations in inequality. Series (a) of Figure 3 reproduces Series (d) of Figure 2 – the change in inequality that would have occurred if only marriage rates and the male employment rate and earnings distribution changed. Series (b) of Figure 3 then shows the change in inequality if marriage rates, the male employment rate and earnings distribution, and female employment rates changed. Considering the difference between Series (b) and Series (a), female employment changes reduced the increases in inequality – as expected from the business cycle results described above. However, the inclusion of this additional change did not have much effect on the years in which inequality increased and the years in which it decreased.

Of course, just as the distribution of earnings among male workers was changing, the conditional female earnings distribution changed as well. Series (b) of Figure 3 does not incorporate these changes to the female earnings distribution. To examine how changes to the female earnings distribution of working women contributed to household income inequality changes, the conditional rank-preserving income exchange procedure is used once again.

As can be seen in row 7 of Table 2, including the changes to female earnings inequality, but holding the conditional mean female incomes constant mitigates the household income inequality declines since 1975 that resulted from the increase in female employment. However, the increase in income inequality since 1975 is still smaller than it would have been had both female employment and female earnings inequality been unchanged at the 1975 levels. Prior to 1975, the contribution of changing female earnings inequality was different. During the late 1960s business cycle, the changes to female earnings inequality reinforced the slower inequality growth from women entering the labor market. However, the combination of factors considered thus far still suggest an increase in inequality from 1967-1975 rather than the slight decrease that actually occurred.

Unlike with the male earnings distribution where real earnings growth enhanced inequality growth, the additional inclusion of real female earnings growth had a relatively small additional impact on income inequality. Row 8 of Table 2 shows the increase in inequality from including the real female earnings growth in addition to the female earnings inequality changes. In each business cycle since 1975, the average annual percentage change in inequality attributable to real earnings growth of female earnings was less than 0.05 percent per year. Thus the combined effect of female employment and earnings distribution changes (rows 6 through 8 of Table 2) reduced inequality in each business cycle through the 1990s. In the 1970s and 1980s business cycles, these combined factors reduced inequality growth by approximately 10 percent

of the actual increase, and in the 1990s it reduced inequality growth by approximately 40 percent of the now slower actual increase.

The year-over-year changes in inequality including these factors (Series (c) and Series (d) of Figure 3) present a similar picture to that described above when female employment rates changed but the conditional female earnings distributions were held constant. The increase in inequality is slower than that seen when both female employment and earnings distributions were held constant but the year-over-year patterns in inequality are only slightly effected.

Changes to spouses' earnings correlations

Thus far the analysis has assumed that the rank correlation across income sources remains unchanged. However, this has not been the case. The correlation between male and female labor earnings has risen substantially over the past 30 years. In 1975, the correlation between the earnings of married male and female household head was 0.069. By 2007 this correlation had risen to 0.169. This change could occur for several reasons. It is possible that the way couples match has changed, and that assortative mating has increased with high-skill males increasingly marrying high-skill females. Or, perhaps matching based on skills has not changed but high-skill women who were married to high-earning men and thus chose not to work in the 1970s have entered the labor market at a disproportionately high rate and now have positive labor earnings. Regardless of whether the increased correlation is due to changes in marriage patterns or changes in employment decisions, the increase in the correlation between the earnings of male and female household heads has the potential to greatly increase household income inequality by concentrating wealth into a smaller number of households. Since correlation changes can result both from shifts in the correlation of spouses employment decisions and from shifts in the correlation of earnings when both spouses are employed, the

analysis of correlation changes only conditions on the household heads' marital status and not their employment status.

Previously, it was observed that almost all of the total increase in household income inequality could be explained by the combination of changes to the marital status of the household head and the employment status and earnings distributions of male household heads. However, these factors alone led to an understatement of the household income inequality increase in the late 1970s and 1980s business cycles and an overstatement of the increase in the 1990s. This was particularly noticeable during the late 1970s business cycle where income inequality was rising quite rapidly but male employment and earnings distribution changes could explain less than half of this increase.

As is evident in row 9 of Table 2, these timing differences can largely be explained by the change in earnings correlation. In the late 1970s and 1980s business cycles, the change in earnings correlations were positively associated with household income inequality changes. The increase in correlation accounted for a 0.24 percent-per-year increase in household income inequality in the 1970s business cycle and a 0.10 percent-per-year increase in the 1980s business cycle. As a result, the rise in household income inequality over these two business cycles outpaced the rise attributable to only male employment and earnings distribution changes.

This reversed in the 1990s business cycle. Starting in the 1990s, the effect of changes in spouses' rank correlation of labor earnings reversed. Rather than accounting for an increase in household income inequality, as occurred in the 1970s and 1980s, changes in spouses' earnings rank correlations mitigated the increase in household income inequality in the 1990s. Had earnings rank correlations been unchanged, the rise in household income inequality in the 1990s would have been 0.06 percent-per-year higher, a 39 percent increase over the observed inequality increase. Thus, as a result of changing earnings correlations and the reduction in household

income inequality attributable to female employment rate changes, the actual rise in household income inequality in the 1990s was slower than that attributable to only male earnings distribution and employment rate changes. In the beginning of the current business cycle, from 2004-2007, however, correlation between male and female earnings began growing slightly again so reductions in their correlations should not necessarily be expected to continue holding down inequality increases in the future.

The impact of these correlation changes can also be seen in Series (b) of Figure 4. When spouses' earnings correlations are changed along with marriage rates, male and female employment rates, and male and female earnings distributions, the explained inequality trend very closely matches the actual change in inequality since 1975. Thus, while there are other factors that could also influence household income inequality, such as changes in public transfers, non-labor income, or labor earnings for non-household heads, these other factors play only a small role in explaining inequality changes from 1975-2007.

However, it is also apparent in Figure 4 that the previously discussed factors are less successful at explaining inequality changes prior to 1975. Changing only these factors suggests that household income inequality would have increased by 3.1 percent over this 8 year period, when in fact, household income inequality declined by 1.3 percent. Therefore, there must be another factor that accounts for why household income inequality was not increasing. This factor is public transfers. Between 1967 and 1975 there were sizeable increases in public transfers for those near the bottom of the income distribution. As a result, excluding these changes to public assistance programs ignores a source of growing income for individuals at the bottom of the income distribution during the late 1960s business cycle.

It is possible that these increases in public transfers also induced individuals to reduce their levels of employment and contributed somewhat to the rise in inequality in the late 1960s

observed when only changes to employment, labor earnings, and marriage rates were considered. However, even if that is the case, focusing only on labor earnings changes and ignoring changes in public transfers income will lead to a misstatement of shifts in the well-being of individuals at lower-tail of the distribution and of changes in household income inequality.

Public Transfers

The impact of changes to the distribution of public transfers can be added by using a rank-preserving income exchange as was done for both male and female earnings. The changes in the inequality of public transfers distributions that occurred in the 1960s business cycle accounted for a -0.23 average annual percentage change in the Gini coefficient during this period (row 10 of Table 2). Furthermore, the increase in mean public transfers over this period accounted for an additional -0.23 average annual percentage change in the Gini coefficient (row 11 of Table 2). As a result, public transfers changes explain why the earlier analysis expected an increase in income inequality in the late 1960s business cycle while inequality actually decreased slightly.

The influence of including public transfers can be seen more clearly by comparing Series (b) of Figure 5, which includes these public transfers changes along with all previously discussed factors, to Series (a) of Figure 5 which excludes the public transfers changes. While changes to public transfers had very little additional impact on inequality after 1975, their inclusion largely reconciles the unexplained changes in income inequality prior to 1975.

6. Conclusion

Numerous studies have documented the rapid rise in male earnings inequality and household income inequality that occurred during the 1980s, and the slower growth in inequality

for each of these series in the 1990s. Despite the relative similarities in the overall increases in inequality using these two income definitions, the relationship between these series is not one-to-one and there are numerous other factors that should also be considered to understand trends in household income inequality.

When disaggregating the increase in household income inequality into its component sources, results for the 1970s and 1980s are consistent with those found in earlier studies by Burtless (1999) and Burtless and Karoly (1995). Male earnings and employment changes account for just 47 percent of the rise in household income inequality in the late 1970s business cycle – which also includes the early years of the 1980s. While male earnings inequality growth has slowed since that time, it has not slowed as markedly as household income inequality growth. As a result, the importance of male employment and earnings distribution changes have grown in importance for explaining household income inequality trends and accounted for 143 percent of the increase in household income inequality in the 1990s. This indicates that had it not been for other factors mitigating the increase in inequality from male earnings then household income inequality growth would not have slowed as substantially in the 1990s. The additional reduction in household income inequality growth in the 1990s was in large part due to changes in spouses' earnings correlations which reduced household income inequality growth during the decade by 39 percent. This is in marked contrast to the earlier business cycles when increasing correlations between male and female earnings accelerated the growth in income inequality.

An additional factor that changed dramatically over the past 40 years that influences income inequality is the rate of female employment. Consistent with the findings by Daly and Valetta (2006), the increase in female employment led to a reduction in household income inequality. However, this reduction was mitigated by increases in female earnings inequality

among working women. Nevertheless, the combined impact of female employment rate changes and female earnings distribution changes did slow the increase in household income inequality by 10 percent in the 1970s and 1980s business cycles and by 40 percent in the 1990s.

Income sources other than labor earnings also have influenced income inequality at times during the past 40 years. During the business cycle spanning the late 1960s and early 1970s, increases in public transfer income at the bottom of the income distribution were offsetting the rises in inequality accounted for by other factors. While changes in public transfers have had little influence on trends in income inequality since that time, their large effect during this early business cycle highlights the importance of considering income beyond just labor earnings when evaluating levels and trends of income inequality.

The remaining contributor to changing household income explored was the decline in marriage rates over the past 40 years. Other than changes to male earnings inequality, this decline was the most important factor contributing to the rise in household income inequality since 1975. This demographic change accounts for 20 percent of the rise in income inequality since that time. Thus, it is evident that demographic shifts play an important role alongside changes in labor-market compensation in explaining the long-term trends in income inequality in the United States.

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Table 1: Gini coefficients for male and female labor earnings and size-adjusted household income in business-cycle trough years since 1967.

	Male Labor Earnings		Female Labor Earnings		Size-Adjusted Household Income	
	Working-age with earnings	All Working-age	Working-age with earnings	All Working-age	All Working-age	All ages
	(1)	(2)	(3)	(4)	(5)	(6)
1967	0.328	0.358	0.433	0.690	0.343	0.363
1975	0.352	0.408	0.416	0.652	0.338	0.359
1983	0.385	0.454	0.416	0.604	0.366	0.386
1992	0.414	0.478	0.418	0.567	0.383	0.404
1993	0.444	0.510	0.437	0.579	0.407	0.427
2004	0.447	0.520	0.427	0.574	0.417	0.434
2007	0.439	0.511	0.425	0.568	0.412	0.431

Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: While not trough years, 1967 and 2007 are included in tables of trough years because they are the first and last years of data available. 1993 is also included to separate the large artificial increase in inequality that occurred between 1992-1993 due to changes in the March CPS data collection procedures from actual changes occurring before and after that time.

Table 2: Estimated average annual percentage change in the household income Gini coefficient attributable to factor components by business cycle

	1967-75	1975-83	1983-92	1992-93	1993-04	2004-07	1967-07
(1) Actual Gini Avg. Annual Pct. Change	-0.16	0.90	0.51	5.69	0.13	-0.23	0.42
Avg. Annual Pct. Change accounted for by:							
(2) Marriage Rates	0.20	0.20	0.12	0.20	0.05	0.08	0.13
(3) Male Employment Rates	0.22	0.09	0.00	-0.07	-0.02	-0.02	0.04
(4) Male Earnings Inequality	-0.05	0.32	0.31	4.10	0.09	-0.30	0.23
(5) Male Real Earnings Level	0.16	0.02	0.14	0.78	0.13	0.01	0.12
(6) Female Employment Rates	-0.04	-0.15	-0.19	-0.93	-0.08	0.00	-0.13
(7) Female Earnings Inequality	-0.20	0.05	0.08	0.81	0.02	0.12	0.03
(8) Female Real Earnings Level	0.06	0.01	0.04	-0.02	0.00	0.04	0.02
(9) Spouses' Earnings Correlation	0.03	0.24	0.10	0.01	-0.06	0.04	0.06
(10) Public Transfers Inequality	-0.23	0.06	0.02	0.06	0.03	0.01	-0.01
(11) Real Level of Public Transfers	-0.23	0.06	-0.08	-0.16	0.00	-0.02	-0.05
(10) Other Factors	-0.09	-0.01	-0.02	0.91	-0.03	-0.18	-0.02

Source: Authors calculations using Internal March CPS data (1967-2007)

Note: 1992-1993 is separated from the 1992-2004 business cycle to separate the large artificial increase in inequality that occurred between 1992-1993 due to changes in the March CPS data collection procedures from actual changes occurring before and after that time.

Table 3: Percent of individuals living in a household with married, single-male, and single-female householders by year

	Married	Single Male	Single Female
1967	82.5	4.1	13.4
1975	77.4	5.8	16.8
1983	72.6	7.9	19.5
1992	67.5	10.3	22.2
1993	66.9	10.3	22.8
2004	63.6	13.1	23.4
2007	62.6	13.6	23.9

Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: See Note to Table 1

Table 4: Percent of individuals living in a household with a male householder working full-time, part-time, and not-working, given the marital status of the householder

	Percent living in a household with a married male householders working			Percent living in a household with a single male householders working		
	Full time	Part-time	None	Full time	Part-time	None
1967	76.2	17.0	6.9	52.0	24.8	23.2
1975	68.2	20.7	11.1	45.8	30.5	23.7
1983	64.0	21.4	14.6	50.6	28.4	21.0
1992	66.1	17.4	16.5	52.6	26.0	21.4
1993	66.9	16.3	16.8	54.3	25.0	20.8
2004	70.2	13.3	16.5	55.2	21.6	23.1
2007	70.8	12.3	16.9	56.8	21.2	22.0

Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: See Note to Table 1

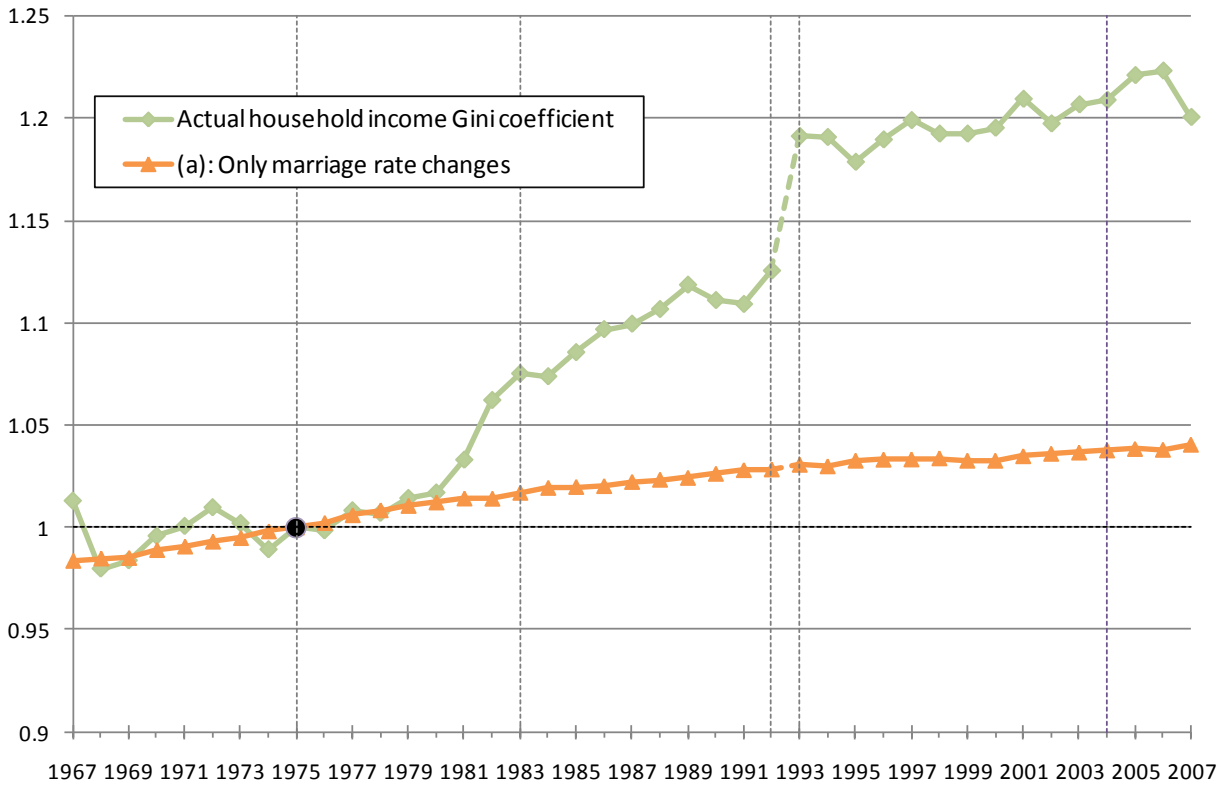
Table 5: Percent of individuals living in a household with a female-householder working full-time, part-time, and not-working, given the marital status of the householder

	Percent living in a household with a married female householders working			Percent living in a household with a single female householders working		
	Full time	Part-time	None	Full time	Part-time	None
1967	18.3	30.9	50.8	30.1	27.9	42.1
1975	20.2	32.0	47.8	28.6	26.0	45.4
1983	26.0	32.8	41.2	32.7	23.2	44.1
1992	35.4	30.5	34.2	36.9	22.5	40.6
1993	34.9	31.3	33.7	36.3	23.4	40.2
2004	38.9	26.2	35.0	42.7	23.1	34.2
2007	41.3	24.4	34.3	43.3	22.5	34.2

Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: See Note to Table 1

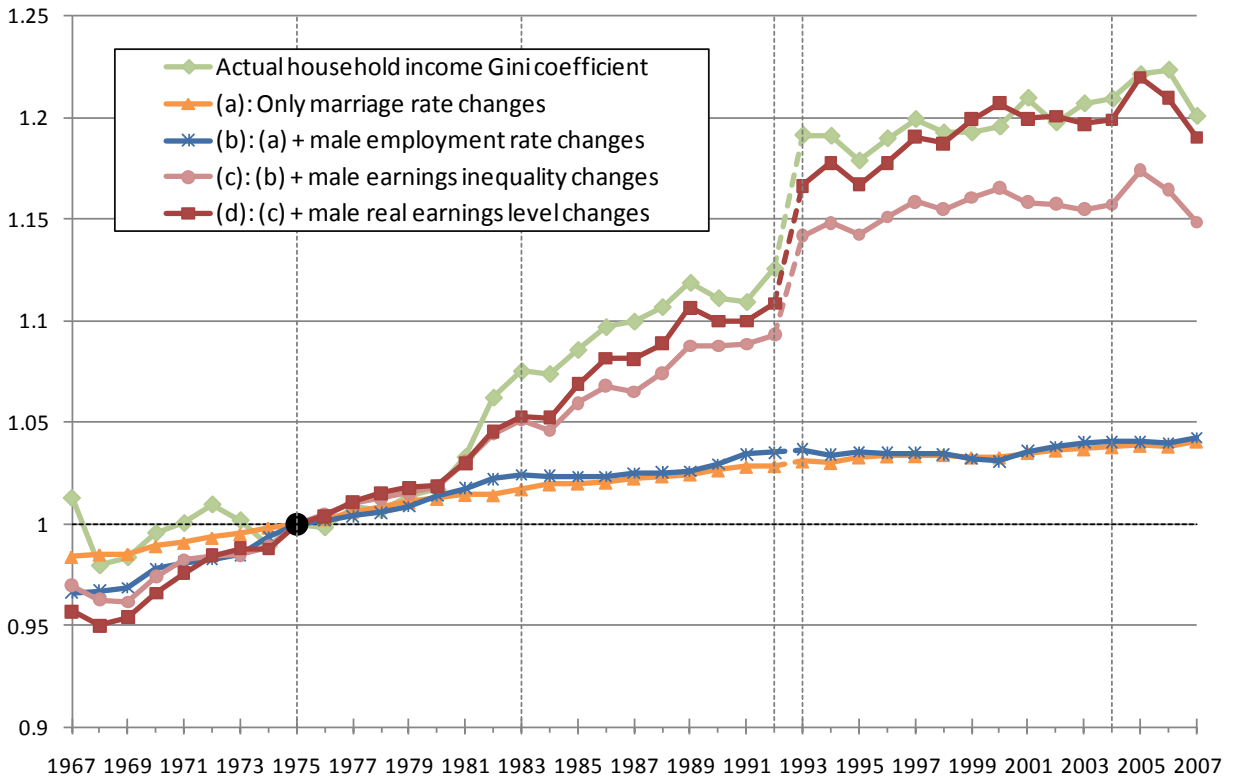
Figure 1: Estimated increase in Gini coefficient for household income when only marriage rates change and the income distribution is held constant (1967-2007), 1975 normalized to 1



Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: Dashed vertical lines represent trough-years of each business cycle. Each series is dashed from 1992-1993 due to the March CPS redesign of collection procedures that limits data comparability between 1992 and 1993. As a result of the redesign, comparisons of levels should not be made across years that span this period.

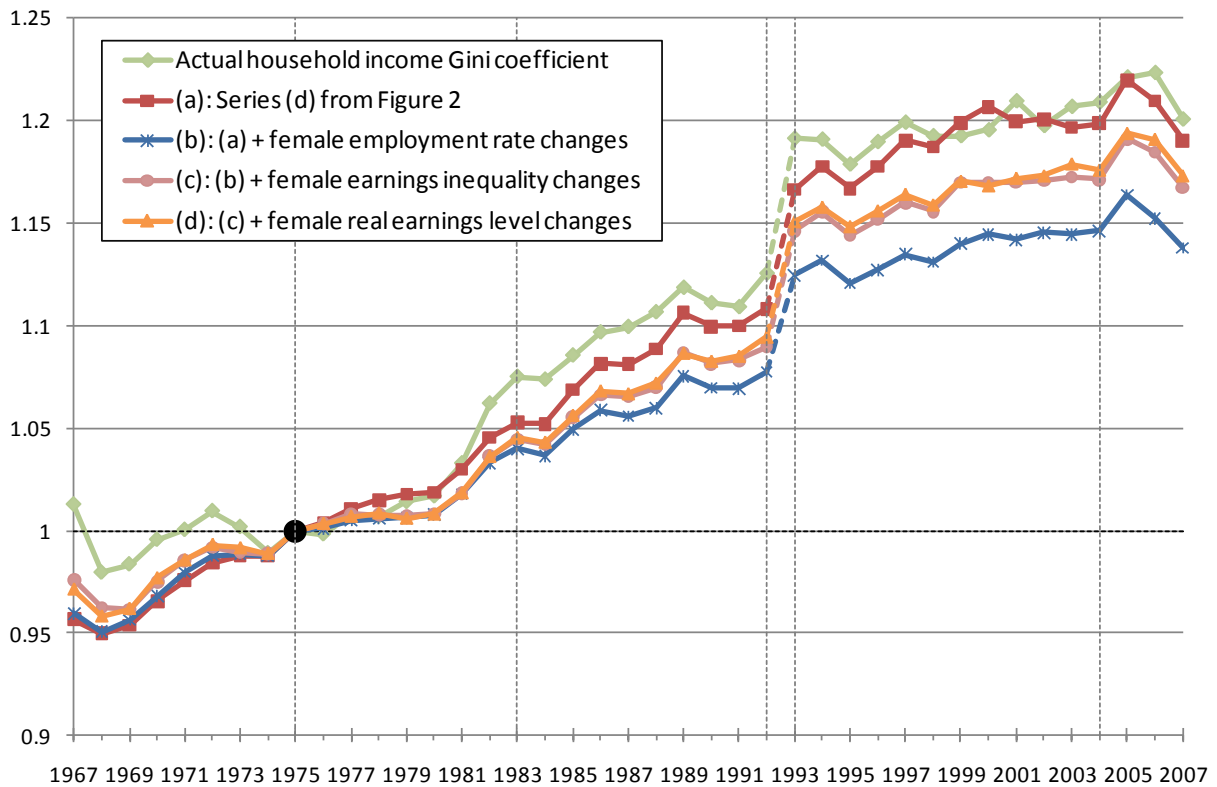
Figure 2: Estimated increases in income inequality resulting from male employment status and labor earnings changes (1967-2007), 1975 normalized to 1



Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: Dashed vertical lines represent trough-years of each business cycle. Each series is dashed from 1992-1993 due to the March CPS redesign that limits data comparability between 1992 and 1993. As a result of the redesign, comparisons of levels should not be made across years that span this period.

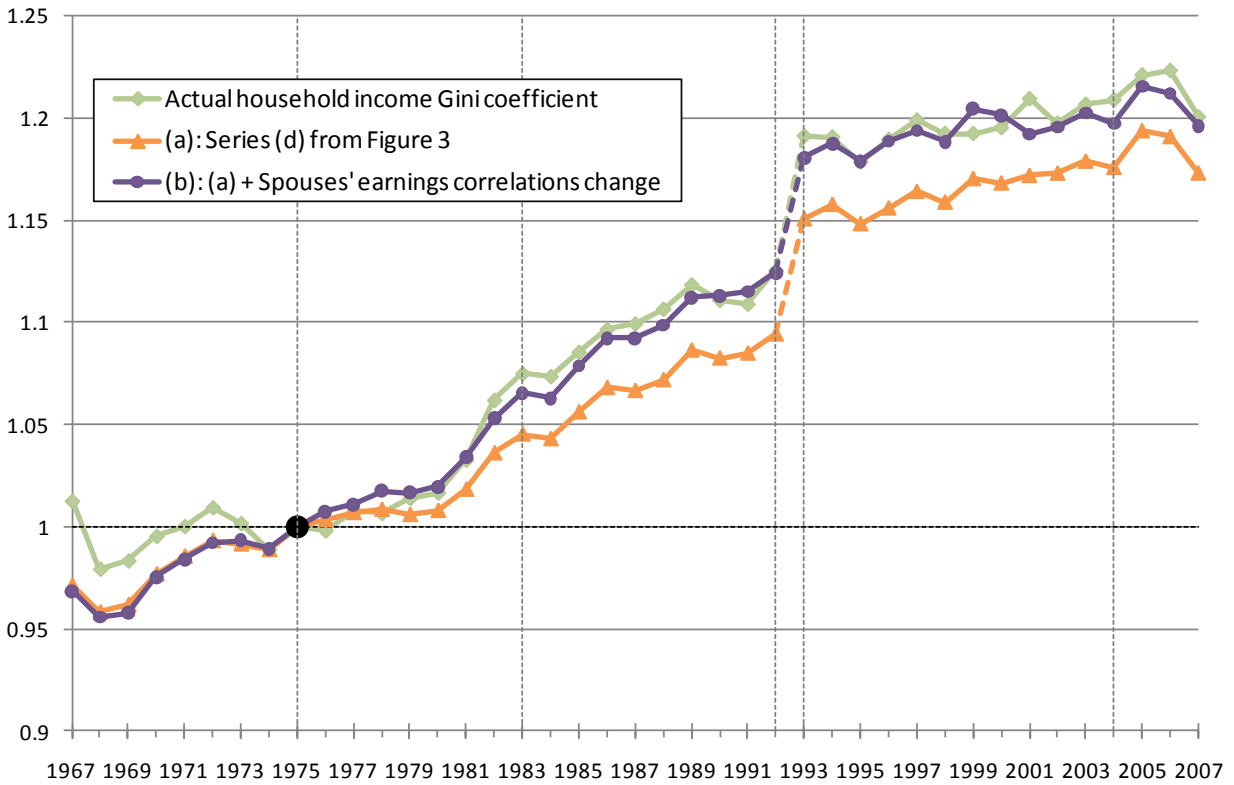
Figure 3: Estimated increases in income inequality resulting from female employment status and labor earnings changes (1967-2007), 1975 normalized to 1



Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: Dashed vertical lines represent trough-years of each business cycle. Each series is dashed from 1992-1993 due to the March CPS redesign that limits data comparability between 1992 and 1993. As a result of the redesign, comparisons of levels should not be made across years that span this period.

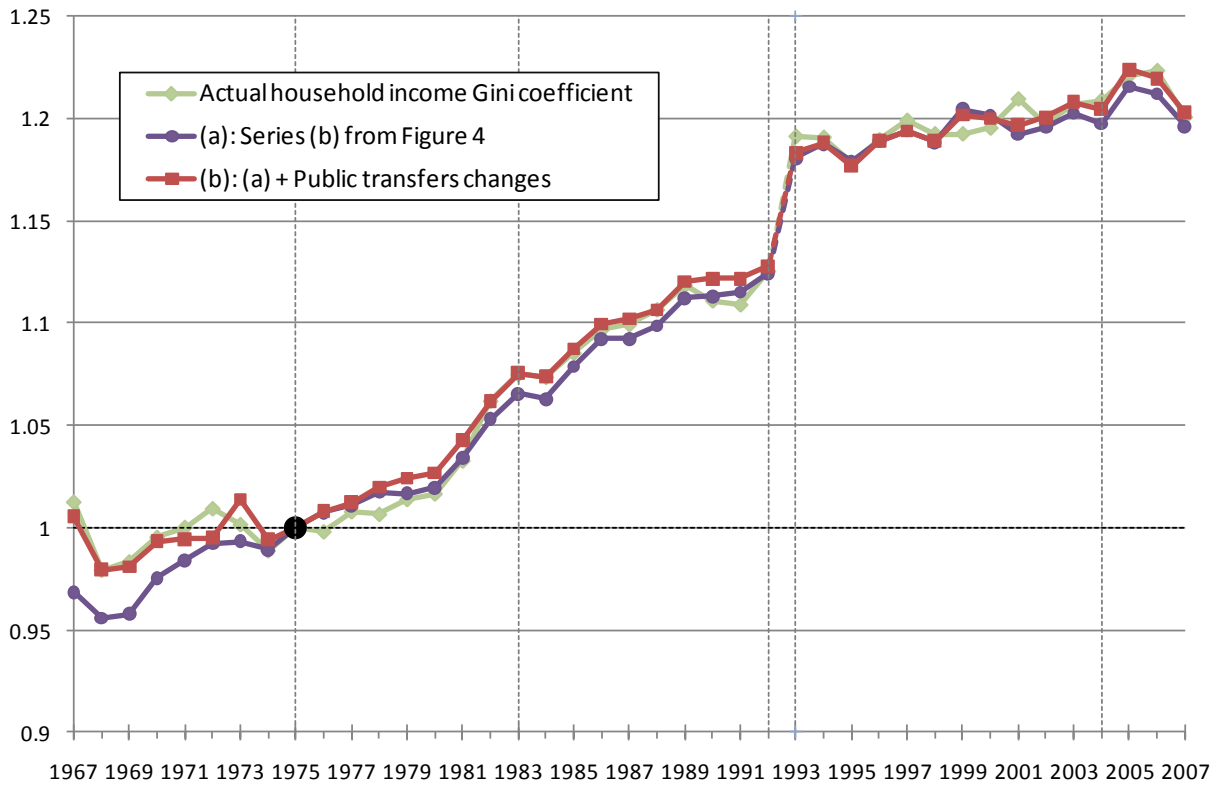
Figure 4: Estimated increases in income inequality resulting from male and female earnings rank-correlation change (1967-2007), 1975 normalized to 1



Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: Dashed vertical lines represent trough-years of each business cycle. Each series is dashed from 1992-1993 due to the March CPS redesign that limits data comparability between 1992 and 1993. As a result of the redesign, comparisons of levels should not be made across years that span this period.

Figure 5: Estimated increases in income inequality resulting from public transfers changes (1967-2007), 1975 normalized to 1.



Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: Dashed vertical lines represent trough-years of each business cycle. Each series is dashed from 1992-1993 due to the March CPS redesign that limits data comparability between 1992 and 1993. As a result of the redesign, comparisons of levels should not be made across years that span this period.

Appendix Table 1: Estimated Gini increase attributable to factor components by business cycle using the alternate method of analysis rather than analyzing components sequentially

	1967-75	1975-83	1983-92	1992-93	1993-04	2004-07	1967-07
(1) Actual Gini Avg. Annual Pct. Change	-0.16	0.90	0.51	5.69	0.13	-0.23	0.42
Avg. Annual Pct. Change accounted for by:							
(2) Marriage Rates	0.20	0.20	0.12	0.20	0.05	0.08	0.13
(3) Male Employment Rates	0.25	0.13	0.02	-0.04	-0.02	-0.01	0.07
(4) Male Earnings Inequality	-0.04	0.36	0.37	4.94	0.11	-0.24	0.28
(5) Male Real Earnings Level	0.21	0.03	0.13	0.49	0.05	-0.03	0.10
(6) Female Employment Rates	-0.06	-0.20	-0.17	-0.03	-0.04	-0.08	-0.10
(7) Female Earnings Inequality	-0.20	0.05	0.05	0.65	0.00	0.10	0.01
(8) Female Real Earnings Level	0.01	0.01	0.07	0.19	0.08	0.06	0.05
(9) Spouses' Earnings Correlation	0.02	0.24	0.11	0.06	-0.05	0.06	0.06
(10) Public Transfers Inequality	-0.23	0.05	0.01	0.06	0.05	0.02	-0.01
(11) Real Level of Public Transfers	-0.38	0.04	-0.10	-0.19	-0.01	-0.04	-0.10
(10) Other Factors	0.07	-0.01	-0.10	-0.64	-0.09	-0.13	-0.07

¹Since other factors are calculated as the residual change, they are not separated from the overestimation of household income inequality that results from applying the shift-share analysis on 1975 data for all factors rather than applying the analysis sequentially through each factor.

Source: Authors calculations using Internal March CPS data (1967-2007)

Notes: See Note to Table 1