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## Distributional Gains of Near Higher Earners

Charles M Beach  
Queen's University

Department of Economics  
Queen's University  
94 University Avenue  
Kingston, Ontario, Canada  
K7L 3N6

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Charles M. Beach  
Department of Economics  
Queen's University  
Kingston, ON, Canada

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## **Abstract**

This paper looks at changes in employment and relative wages of near-higher earnings (NHE) workers between middle-class (MC) and higher earners (HE) in Canada over 2000-2015. An approach is also forwarded for evaluating these changes in terms of underlying demand and supply factors. It is found that the NHE behaves as a transition group between quite different patterns of change of the MC and HE groups, and that these changes have been recently attenuating. The MC group experienced a downward shift in employment demand, the HE group an upward shift in demand, and the NHE group an upward shift in supply of workers.

## **1. Introduction**

A considerable literature in economics has examined the dramatic distributional shift since the 1980s in Canada, the United States and many other developed economies in the share of income, and more specifically the share of earnings, away from the Middle Class and towards higher income recipients. But just as middle-class earners constitute a broad group of workers in the economy, so too are the group of higher earners. Much of the literature and media has focused on the very top one percent (and beyond) as the big winners in this resource transfer. But what about the other higher earners? Indeed where, within the broad group of workers above the Middle Class group, have the major gains been made? By using a decomposition technique developed in Beach (2016), one can perhaps more specifically ask whether demand- or supply-side labour market factors are predominantly driving these changes across the region of above-middle-class earners. Automation and globalization are leading contributors to widening earnings inequality on the demand side, while demographic shifts and educational changes are possible contributors operating through the supply side of the labour market. What can be said about what is principally driving the shift in earnings over this region of the distribution?

It has also been found that there has been a major shift of workers into the higher-earnings range of the distribution (Beach, 2016). To the extent that higher earnings reflect higher skill levels among such workers, what is the extent of this “upskilling” over the broad range of workers, and how far up the distribution does it extend?

Accordingly, the paper looks at the Canadian experience since 2000 and has several objectives. First, it seeks to determine whether upper earnings shifts are essentially being driven by the top end of the distribution and highlight possible heterogeneity among workers with above-middle-class earnings levels. Second, it investigates if demand- or supply-side labour market factors are operating differently over the higher-earnings ranges of the Canadian earnings distribution. Third, it looks at the degree of upskilling that has been occurring since 2000 over the higher-earning ranges of the distribution. Fourth, the paper

seeks to illustrate the use of a set of four distributional statistics (outlined below) for analyzing major changes in an income distribution. And fifth, the study provides a novel methodological contribution of outlining an alternative decomposition approach based on time-trend regressions.

The paper proceeds as follows. The next section describes the data sources and empirical approach used in the paper. Section 3 presents the main distributional findings of the study – as contained in Tables 1-5. Section 4 extends these results over different sub-periods, and Section 5 extends the analysis through a conventional decomposition analysis. Section 6 looks at changing trends in the major results and introduces the new decomposition approach. Section 7 then concludes.

## **2. Data Source and Empirical Approach**

The data used for this study come from the Monthly Labour Force Survey (LFS) microdata file (for May and November) for each year over 1997-2014, plus May 2015. The focus of this study is on individual workers' earnings. In the LFS files, earnings refers to usual weekly wage and salary income of paid employees who are not currently full-time students. The latter thus excludes net self-employment income. The paper considers two types of workers: all workers (henceforth AW) and full-time workers aged 25-59 (henceforth FT). The empirical analysis also treats male and female workers separately.

The approach taken is to allocate workers in the labour market into several earnings groups – referred to as lower earners (LE), middle-class workers (MC), near higher earners (NHE), and higher earners (HE) – on the basis of their (sex-specific) median earnings levels:

- Lower earners                - those with earnings below 50% of the median
- Middle-class earners      - those with earnings between 50% and 150% of the median
- Near higher earners       - those with earnings between 150% and 200% of the median
- Higher earners             - those with earnings above 200% of the median.

For simplicity of focus, this paper will examine only the latter three earnings groups. The novel feature of the current analysis is the inclusion of two separate earnings groups – the NHE and HE – for workers with

earnings above middle-class earners. We wish to examine the different distributional characteristics of the NHE and HE groups.

A further feature of the current analysis is the use of median-based cut-offs separating the different earnings groups. This contrasts with the typical distributional results reported by government agencies such as Statistics Canada or the U.S. Bureau of the Census who generally report results based on percentile cut-offs such as quintiles or deciles. This paper uses a median-based approach instead because it allows one to examine distributional changes to *both* the share of total earnings going to different earnings groups (i.e., “earnings shares”) *as well as* the share of workers falling into the different earnings groups (i.e., the “share of workers”). In a percentile-based approach, the shares of workers, by construction, are always fixed at some specified percentile value such as 10 percent or 20 percent. So the former approach provides greater latitude for analysis and interpretation of distributional changes along the lines set out in the next section.

A median-based approach to distributional analysis can be easily interpreted in terms of the well known Lorenz Curve as illustrated in Figure 1. Along the horizontal axis of the diagram is measured the cumulative share of workers ordered from lowest earnings level to highest earnings level. Along the vertical axis is the cumulative share of total earnings received by the workers at or below a given percentile earnings level. The Lorenz curve maps the former into the latter. As one moves from left to right along the horizontal axis, one is adding more workers with positive earnings, so the curve is upward sloping. Indeed, since the workers are ordered by their earnings levels, the added workers always have higher earnings levels, so the curve is also positive convex – as illustrated in Figure 1. The median worker occurs at the midpoint or 50<sup>th</sup> percentile level along the base axis. Point a on the Lorenz curve thus shows the share of total earnings (measured vertically) received by the bottom 50 percent of workers. Moreover, the slope of the Lorenz curve is known to be (Bergin, 2015, p. 471)

$$\xi_i / \mu$$

where  $\xi_i$  is the  $i$ th percentile cut-off along the horizontal axis ( $0 \leq i \leq 100$ ) and  $\mu$  is the mean of the underlying earnings distribution. So the slope at point a on the Lorenz curve corresponding to the median

is  $\xi_{50} / \mu$ . But the slope of the Lorenz curves increases monotonically from left to right along the curve as noted above. So one can find point b on the curve as the point at which the slope on the Lorenz curve is exactly 50 percent of the median – this is the cut-off between the LE group of workers and MC group of workers. Then the abscissa at point b –  $b_1$  – indicates the share of workers with earnings levels at or below 50 percent of the median, and ordinate of point b –  $b_2$  – shows the earnings share of the LE group. Similarly, point c is the cut-off point (between the MC and NHE groups) at which workers receive exactly 150 percent of the median level of earnings. Then the share of workers of the MC group is given by the difference in abscissa values  $c_1 - b_1$  and the earnings share of middle-class workers is given by the ordinate difference  $c_2 - b_2$ . Again, point d, at which the slope is twice that at the median, indicates the cut-off between the NHE and HE groups, and the share of workers of the NHE group is  $d_1 - c_1$  while the NHE group's share of earnings is  $d_2 - c_2$ . It then follows that the share of workers of the top HE group is  $1 - d_1$  and their share of earnings is  $1 - d_2$ . So once one has estimated the median of a distribution, one can also determine the estimates for all of the median-based shares of workers and earnings shares in the present analysis. By contrast, the earnings share of a percentile-based measure of earnings groups such as the middle 60 percent of earners as a measure of middle-class workers is simply the difference in ordinate values on a Lorenz curve between the 20<sup>th</sup> and 80<sup>th</sup> percentile earnings cut-offs, where the latter are pre-specified on the horizontal axis of the diagram.

Illustrative cut-off values for the four earnings groups for the sample of full-time (FT) workers (in earnings per week) in May 2015 are:

	<u>Males</u>	<u>Females</u>
LE	\$553	\$441
MC	\$553 - \$1658	\$441 - \$1323
NHE	\$1658 - \$2211	\$1323 - \$1764
HE	\$2211	\$1764
Median	\$1105.4	\$881.8

More detailed summary statistics for the analysis samples of this study appear in Appendix Tables A1-A2.

In terms of annual figures, these cut-offs for mid 2015 correspond to:

	<u>Males</u>	<u>Females</u>
LE	\$28,741	\$22,927
MC	\$28,741 - \$86,221	\$22,927 - \$68,781
NHE	\$86,221 - \$114,962	\$68,781 - \$91,707
HE	\$114,962	\$91,707
Median	\$57,481	\$45,854

At a modal hours worked per week of 37.5, these cut-offs for full-time workers also correspond to hourly cut-offs values of:

	<u>Males</u>	<u>Females</u>
LE	\$14.74	\$11.76
MC	\$14.74 - \$44.22	\$11.76 - \$35.27
NHE	\$44.22 - \$58.96	\$35.27 - \$47.02
HE	\$58.96	\$47.02
Median	\$29.48	\$23.51

Earnings shares and shares of workers are two of the four principal distributional statistics examined in this paper. Also considered are the relative-mean earnings ratios and the conditional mean earnings levels. The former is the estimate of the mean earnings for each earnings group divided by the overall mean of the earnings distribution,  $E(y | i) / \mu$ , where  $E(y | i)$  is the conditional mean earnings level for earnings group  $i = \text{LE, MC, NHE, or HE}$ . As shown in Beach (2016), it can be seen that

$$\frac{E(y | i)}{\mu} = \frac{SE(i)}{SW(i)}$$

where  $SE(i)$  is the share of total earnings received by workers in group  $i$  and  $SW(i)$  is the proportion or share of workers belonging to group  $i$ . The fourth distributional statistic of interest is simply the estimate the conditional earnings level,  $E(y | i)$ . In terms of Figure 1, the relative-mean earnings ratio is the slope of the straight line segment between the two points on the Lorenz curve corresponding to some earnings group. So, for the MC earnings group, this slope is  $(c_2 - b_2) / (c_1 - b_1)$ . The conditional mean earnings of the MC group then is  $\mu \cdot (c_2 - b_2) / (c_1 - b_1)$ .



Formulas for calculating (asymptotic) standard errors for the four principal distributional statistics in this paper are given by Beach (2016, 2017). This paper thus illustrates their use.

### **3. Empirical Results on Distributional Changes for New Higher Earners**

#### **3.1 Findings for Shares of Workers**

Results for shares of workers are set out in Table 1. Each panel of the table refers to a different earnings group – MC, NHE and HE groups, as well as a combined higher earnings group

$$\text{CHE} = \text{NHE} + \text{HE}$$

of all workers with earnings above 150 percent of the median. Each column refers to a different sample or distribution of workers, broken down separately for men and women and identified as well as for all workers or for full-time workers. Within each panel, the figures indicate the percentages of each sample that belong to a specified earnings group. The highlighted years of LFS data are for 2000, 2005, 2010, and 2015. The bottom row in each panel shows the change in the shares of workers for that earnings group between 2000 and 2015.

The figures in Table 1 indicate the percentages of workers whose earnings fall within the various earnings groups. To translate these figures into the actual numbers of workers in each group in the economy, one can make use of Statistics Canada’s figures on total (annual) employment for the indicated years (CANSIM Table 282-0004) in thousands of workers:

	<b>Males</b>		<b>Females</b>	
	<b>All Workers</b>	<b>Full-Time Workers</b>	<b>All Workers</b>	<b>Full-Time Workers</b>
2000	7,971	7,148	6,789	4,942
2005	8,579	7,644	7,545	5,512
2010	8,852	7,777	8,113	5,870
2015	9,423	8,283	8,524	6,276

So, for example, if 65.70 percent of male All Workers fall within the middle-class earnings group, this amounts to 5.237 million workers. In 2015, then, the number of female workers in the NHE group was 1.027 million compared to 1.043 million in the HE group.

The first thing to note is that the size of the NHE group is about twice as large as that of the HE group – accounting for 50-71 percent of the combined higher earnings group (see appendix Table A3). However, the size of the NHE group declined relative to that of the HE group for all four distributions of workers between 2000 and 2015. So the relative size of the top earnings group went up over this period. The experience of male and female workers, though, was somewhat different. The percentage change in the share of workers was larger for females among the NHE group, but was much larger for males among the top HE group – even though gender-specific median levels were used to divide up the earnings groups. Men were thus relatively the big winners among the top earnings group.

Second, there is generally the same pattern of increasing proportion of workers for both the NHE and HE groups over the 2000-2015 period for male and full-time female workers in the Canadian workplace. However, in terms of percentage changes, the pattern of increases is not as strong for NHE workers as it was for the top HE workers, and this is especially so for men.

More detailed patterns of year-to-year changes in the share of workers in the various earnings groups over the full 1997-2015 period are illustrated in Figures 2-9. The first four graphs are for All Workers and the second set of four graphs are for Full-Time Workers. Within each quadruplet of figures, the first is for the middle-earnings group (MC, between 50 and 150 percent of the median), the second is for the top higher-earnings group (HE, above 200 percent of the median), the third is for the near higher-earnings group (NHE, between 150 and 200 percent of the median), and the fourth graph is for the combined higher-earnings group (CHE, above 150 percent of the median). Each graph contains two lines – one for male earners and the other for female earners in that group.

Focusing on full-time workers (Figures 6-9), one can readily see the declining share of workers in the MC group, the rising share of workers in all of the HE, NHE and CHE groups, and the most marked increase in the HE group of workers in the Canadian labour market over this period.

### 3.2 Findings for Earnings Shares

Results for earnings shares are set out in Table 2, which is organized similarly to that of the previous table. First, the size of the NHE share of earnings is about the same as that for the top HE group – larger for the NHE workers in the case of full-time earners, but smaller in the case of all workers where there is greater heterogeneity of workers. While the NHE group contains more workers, the average earnings levels are higher for the top HE group. And again, the percentage increase in the share of total earnings over 2000-2015 is larger for female workers among the NHE earnings group, but much larger for males among the top-earnings HE group.

Second, there is again generally the same pattern of increasing earnings shares for both the NHE and HE earnings groups over this period for males and for full-time female workers. And once more, this pattern is not as strong in percentage terms among the NHE workers as for the top-earnings HE group, and this is particularly so for males.

Graphs of the detailed year-to-year changes in earnings shares of the different earnings groups appear in Figures 10-17. They are presented in the same order as the preceding graphs. The figures show essentially the same patterns as did the share of workers, but these patterns are generally more marked.

### 3.3 Findings for Relative-Mean Earnings

Results for relative-mean earnings (RME) ratios are presented in Table 3. Obviously, the RME values are higher for the HE earnings group than for the NHE group. But here, interestingly, there is a rather different general pattern of change since 2000 between the two earnings groups. While the HE group generally experienced a rise in their relative-mean earnings, the workers in the NHE group generally found a slight decline in their relative-mean earnings – similar in sign, but nowhere near as strong as experienced by middle-class (MC) workers over this period. The NHE group thus turns out to operate as a transition from the declining relative earnings of MC workers to the rising relative earnings of the HE group of workers. This is also illustrated in the detailed Figures 18-25.

### 3.4 Findings for Conditional Mean Earnings

Results for conditional mean earnings (CME) levels are provided in Table 4. Again, obviously, the CME figures are higher for the top HE earnings group than for the lower NHE group. But, in the case of conditional mean earnings levels, positive changes occurred over 2000-2015 for all the indicated earnings groups and over all four distribution samples. That is, all such earnings levels rose over this period – including average earnings of middle-class workers. However, larger increases in earnings – both in dollar terms and percentage terms – occurred for the top HE earnings group than for NHE earners, again across all four distributions of workers in the Canadian labour market. In general, female workers experienced larger gains in earnings – across both full-time and all workers samples than male workers, though males still had considerably higher earnings levels than female workers on average. Again, these patterns are illustrated in the detailed Figures 26-33.

### 3.5 Key Feature of NHE Distributional Changes

It may be useful to highlight the key pattern of distributional change for the NHE workers. This is illustrated in Table 5 which shows the percentage changes in shares of workers and earnings shares for the different earnings groups. In this case, the shares of workers and earnings shares are displayed in separate columns and the various worker samples and earnings groups listed down the left-hand side as separate panels. Here it can be readily seen that, for both male samples and for FT female workers, the NHE group is a transition group between the two quite different patterns for MC workers (whose shares of workers and earnings shares are declining over the 2000-2015 period) and for HE workers (where both the shares of workers and earnings shares have been very strongly rising). The percentage changes for the NHE group are the same sign as for the HE group, but not nearly as strong.

## 4. Distributional Upshifting over Different Time Periods

### 4.1 Upskilling in the Labour Market

As seen from Table 5, there has clearly been a major upshift in the proportion of workers since 2000 earning incomes above 150 percent of the median, and especially so earning incomes above 200 percent of the median earnings level. This is restated in the bottom panel of Table 6. Since the percentage increases in employment are much larger among the HE group than the NHE group (and the percentage point share increases for males as well), the principal driver of these higher-earning employment increases is strongest at the top end of the distribution and then extends down to the NHE group as well.

In terms of the numbers of workers cited on p. 7 above from CANSIM employment figures for 2000, the increases in the numbers of workers in the higher earnings groups can be calculated as:

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
	(thousands)			
NHE	127.4	54.3	-141.9	101.3
HE	254.2	108.6	+127.7	56.8
CHE	381.6	162.9	-14.2	158.2

That is, the number of full-time workers with earnings above 150 percent of the median has gone up over this period by 163 thousand males and 158 thousand females. In the case of males, about two-thirds of this increase arises from increased membership in the top HE earnings group, while for females about two-thirds corresponds to increased numbers in the transitional NHE category.

These are substantial increases in higher-paying jobs in the Canadian economy. Such higher-paying higher-skilled jobs may be viewed as more stable, more secure good-quality jobs in higher growth industries and regions of the economy (Green, 2015; Green and Sand, 2015; Green et al., 2016). Several explanations for this upskilling have been offered in the literature under the general topic of growing

polarization in the labour market (see, for example, the overview in Beach, 2016 and the range of perspectives in Green, 2016, and Green et al., 2016). Perhaps the leading explanation is the role of automation in the labour market or what has been called the *routinization hypothesis* (Acemoglu and Autor, 2011) where advances in chip-based information and computer technology have dramatically increased productivity and reduced the costs of doing routine tasks in the workplace. The focus of the literature has been on the resulting displacement of workers (many in formerly middle class jobs) doing such routine tasks. However, non-routine cognitive tasks that are complementary to the new technology are increasingly important and highly rewarded – such as jobs involving abstract problem-solving, creativity, persuasion, and professional, scientific and marginal skills. This can be viewed as an upward shift in the demand for such workers, raising both their employment levels and wage levels. These jobs typically require high levels of education. For example, Green and Sand (2015) find that high-skilled occupations in management, professional and technical occupations have dramatically increased in Canada since the 1970s.

The second broad set of explanations focus on international trade and off-shoring of production in what may be referred to as the *globalization hypothesis* (Acemoglu et al., 2016). Again, the literature here has largely focussed on lower labour costs abroad reducing the domestic demand to produce these goods, resulting in the displacement of previously well-paying, largely manufacturing, blue-collar, full-time and often unionized jobs in the middle region of the distribution. On the other hand, though, expanding international markets for valuable skills and talent (eg., merger and acquisition specialists) and freer trade in services and their providers increase the demand for such highly skilled workers, and hence increase employment and wages towards the upper end of the earnings distribution. These effects are strongest among full-time workers because their labour costs are highest; and similarly they are more marked for men's labour costs compared to the lower women's employment costs.

A third factor in the case of the Canadian labour market over this period has been the growth of specific industries, particularly in specific regions and urban areas (Veall, 2012; Fortin and Lemieux,

2015). The financial sector has grown considerably since 2000, especially in Toronto and Calgary. Indeed, Toronto has now become the second largest financial centre in North America. Until very recently, the energy sector centered around Alberta and the oil sands regions expanded enormously offering steady high-paying employment opportunities. And urban construction; especially of condos in major urban areas driven by immigration and growth, and again particularly in the greater Toronto area, has offered good wages for many lacking post-secondary education.

Fourth, Canada has expanded the proportion of its workforce with post-secondary education (colleges and universities) considerably faster than the OECD average over this period. So the supply of higher-skilled workers has also been expanding at a rapid pace. Canada's focus – compared to the United States – on skilled immigration has also brought in relatively highly educated potential workers (though their adjustment and fitting into the Canadian labour market for many has not been easy).

Fifth, the literature on widening earnings inequality and declining labour's share in the economy has drawn attention to a growing degree of firm concentration across a wide range of industries, and indeed for the U.S. economy as a whole (Summers, 2013; Elsby et al., 2013; and Stiglitz, 2012, 2015). In part, this is being driven by advances in digital technology and the opportunities for superstar benefits and extra-normal returns on capital, but it is being sustained by tax laws, and patent protection, mergers and buyouts, and other regulation. Thus higher-skilled workers in such industries stand to potentially gain above-competitive salaries and benefits. And Canadian employers have to seek to match such salaries and benefits or potentially lose their most skilled workers.

To try to disentangle these different contributing factors would involve identifying workers in the MC, NHE and HE regions of the earnings distribution and examining their detailed industry/occupational breakdowns as well as their educational attainment, age, and their provincial and urban area locations. Then one could track how these patterns have changed over time, say with detailed Census data which offer more detailed breakdown in all these dimensions than the LFS survey data. Unfortunately, with only repeated cross-sections of data such as the Census or LFS public use files, one cannot follow individuals

longitudinally, so one cannot tell the degree to which the growth of employment in some region of the earnings distribution arises from new highly-trained young entrants to the labour market, from new immigrant arrivals, from more mid-career workers advancing up the earnings distribution as they acquire more on-the-job human capital, or from employees in high-growth sectors or more concentrated industries gaining the benefits of their labour market positions.

#### 4.2 Upshifting Over Different Time Periods

While a substantial upshift has occurred among workers earning over 150 percent of median earnings levels since 2000, it would be useful to try to see whether this change occurred evenly over the fifteen-year period or whether it was more concentrated over specific sub-periods of this interval. We consider three such sub-periods: 2000-2005, 2005-2010, and 2010-2015. These sub-periods reflect different cyclical phases. The first was a relatively high-growth interval as the economy recovered from the 2000-01 economic slowdown. The second reflects the economy's shift into the post-financial meltdown (2008-2009) interval; while it was a slowdown, it was not the Great Recession experienced in the United States. The third sub-period corresponds to the economy growing out of the latter recession (but includes the 2014-2015 oil price downturn).

Table 6 shows the changes in the shares of workers over these different sub-periods (as well as for the entire period in the bottom panel). Each entry has two numbers. The first is the actual change in the shares of workers (from Table 1); the second figure expresses this change as a percentage change. A similar set of results for changes in earnings shares appear in Table 7 (based on results from Table 2).

It can be seen from the results in Table 6 that the share of workers of the HE group has increased over every sample and every sub-period. Similar calculations also show that the MC group's share of workers has decreased over all but one sub-period for males and for full-time females. Among the NHE group, however, the results are mixed for males and for full-time female workers over various sub-



periods, though the NHE share of workers did increase when viewed over the full fifteen-year period for these samples. The strength of the increases for the HE group, though, was strong enough that the combined CHE group also showed increases in shares of workers over all but one sub-period for males and for full-time female workers in the economy.

Second, the strong upskilling effect among the HE group was strongest in the 2000-2005 expansionary sub-period, again for males and full-time female workers. Indeed, this is the sub-period that was largely driving the full-period results among the male workers. Increases in the HE group's share of workers were least during the mid 2005-2010 sub-period for full-time workers. Among full-time workers, the increases in the NHE share of workers was greatest during the slow-down 2005-2010 sub-period.

Inspection of Table 7 shows that the sub-period changes in earnings shares largely mirror those above for shares of workers. The share of earnings of the HE group went up for all sub-periods and all samples but one. Again, the pattern of changes in earnings share for the NHE group was mixed. The dominant increase in earnings share for the HE group again drove the increases for the combined CHE group for all sub-periods for males and full-time female workers. And again, among full-time workers, increases in the earnings share of the NHE group was largest during the 2005-2010 slow-down sub-period.

## **5. Interval Decomposition of Changes in Earnings Shares**

### **5.1 Decomposition Over Full 2000-2015 Period**

The four statistics of earnings inequality made use of in this paper are obviously not independent. One useful linkage between them makes use of the following relationship (see also Beach, 2016). If  $SE(i)$  represents the share of earnings of earnings group  $i$  ( $i = MC, NHE, HE, \text{ and } CHE$ ),  $N(i)$  is the total number of workers in group  $i$ , and  $avg E(i)$  is the average earnings level of group  $i$  (or its conditional mean earnings), then

$$\begin{aligned}
SE(i) &= [N(i) \times \text{avg } E(i)] / [N \times \text{avg } E] \\
&= [N(i) / N] \times [\text{avg } E(i) / \text{avg } E] \\
&= SW(i) \times [\text{avg } E(i) / \text{avg } E] \\
&= SW(i) \times RME(i)
\end{aligned} \tag{1}$$

where  $N$  is the overall total number of workers,  $\text{avg } E$  is the overall average earnings level,  $SW(i)$  is the share of workers in earnings group  $i$ , and  $RME(i)$  is that group's relative-mean earnings. So the earnings share of each group is simply the product of the share of workers of the group and the relative-mean earnings of the group (which in turn is equal to  $CME(i) / \text{avg } E$ ). Geometrically, equation (1) can be interpreted in Lorenz curve terms as it says that group  $i$ 's earnings share measured vertically on a Lorenz curve is simply the corresponding workers' share increment measured horizontally multiplied by the average slope of the Lorenz curve over the earnings group interval.

In terms of simple economics, though, the first term on the right-hand side of equation (1) captures the quantity dimension of a change in total earnings, while the second term captures the (relative) price dimension. If one takes logs of equation (1) and then time derivatives on both sides, one obtains a simple decomposition formula:

$$\% \Delta SE(i) = \% \Delta SW(i) + \% \Delta RME(i) \tag{2}$$

where “ $\% \Delta$ ” indicates percentage change. A change in earnings share over time can thus be decomposed into a corresponding change in the quantity dimension and a change in the relative price dimension for a given earnings group in the labour market. The literature overview in the previous section highlighted various demand-side and supply-side contributing factors to rising earnings inequality in the labour market. Equation (2) now can be used to help identify on net the relative strength of such demand-side vs. supply-side factors behind observed distributional changes in earnings shares for different earnings groups or regions of the earnings distribution. Positive changes in both right-hand side components of

equation (2) would suggest the relative dominance of demand-side factors in driving observed changes in a group's share of earnings, while mixed-sign changes in the right-hand scale components would suggest the relative dominance of supply-side factors (see Katz and Murphy, 1992).

Results for this decomposition are presented in Table 8. The layout of the table is similar to earlier tables. But each cell in Table 8 now consists of three numbers, where the first is the percentage change in  $SE(i)$ , the second is the percentage change in  $SW(i)$ , and the third is the percentage change in  $RME(i)$  – all calculated over the period 2000-2015. Note that the decomposition in equation (2) holds exactly at a given moment in time; when evaluated in terms of discrete increments over an interval of years, it holds only approximately.

Several results are evident. For the middle-class (MC) earnings group, the strong downward shift in its earnings share arises from declines in both share of workers and relative-mean earnings. This is consistent with a downward shift in demand for workers in MC jobs. The higher earnings (HE) group, however, experienced almost everywhere increases in both shares of workers and relative-mean earnings, consistent with an upward shift in demand for workers in HE jobs in the Canadian labour market. For the near-higher earnings (NHE) group, for males and for full-time female workers, their increase in earnings share was accompanied by mixed sign results where the share of workers rose strongly while their relative-mean earnings declined. This is consistent with a rising supply of workers in this region of the earnings distribution, and consistent with the upskilling hypothesis arising from more post-secondary educated workers (both Canadian-born and immigrants) entering the Canadian labour market. The result is that for the combined higher earnings (CHE) group, their higher share of earnings for full-time workers involves increases in both share of workers and their relative-mean earnings, again consistent with a dominant net increase in the demand for such workers.

The second general finding is that, excepting for middle-class workers, far and away the dominant component or channel behind changes in earnings shares is changes in the shares of workers. That is, adjustment in the Canada labour market over this period has been characterized not much by

changes in relative earnings, but rather by employment reductions among the MC group and employment gains higher up the distribution in both HE and NHE jobs.

## 5.2 Decomposition Over Sub-Periods

Similar decomposition results are provided by sub-period in Table 9 – over 2000-2005 in Table 9(a), 2005-2010 in Table 9(b), and 2010-2015 in Table 9(c). The most obvious comment to be made is that the results are rather ragged over these much shorter periods. The MC earnings group still shows a distinctly negative demand shock over the 2000-2010 interval, but even here the results are less clear cut over the more recent 2010-2015 period. For the HE earnings group, the results are suggestive of a positive demand shock over 2000-2005 and 2010-2015, but over the intervening 2005-2010 period, the results are a mixed bag. For the broader CHE group, the results are suggestive of a positive demand shock over just the 2000-2005 interval. For the rest of the intervals, the CHE results are a mixed bag. And for the transitional NHE earnings group, the results are a mixed bag over all three sub-periods.

For males and for full-time female workers, the change in the share of workers is clearly the dominant channel by which earnings share changes occurred for all three sub-periods. With a few exceptions of MC workers over 2000-2010, changes in relative-mean earnings played hardly any role at all.

## **6. Trends in Distributional Statistics: A New Decomposition Approach**

### 6.1 Trends Across Earnings Groups

In Section 4.2, this study examined how shares of workers and earnings shares changed over the 2000-2015 interval as well as over sub-periods 2000-2005, 2005-2010 and 2010-2015. The approach, however, used only a limited amount of information (only four cross-sections for May of 2000, 2005, 2010 and 2015), and the resulting patterns over the sub-periods were rather ragged. This section takes an alternative approach to look at the same issue. It makes use of all 37 cross-sections of LFS data (for May

and November for each year 1997-2014 plus May 2015). For each of these cross-sections, the generated values of the distributional statistic SW, SE, RME and CME serve as observations in an OLS quadratic trend regression

$$\ln(DV_t) = \beta_0 + \beta_1 t + \beta_2 t^2 + \beta_3 D_t + u_t \quad (3)$$

where dependent variable  $DV$  represents each of the statistics SW, SE, RME or CME,  $t$  is a time trend taking values 0.5, 1.0, 1.5, ... (since the observations are twice a year),  $D_t$  is a dummy variable taking a value of 1 in November and 0 for May observations, and  $u_t$  is an error term with assumed zero mean and constant variance. This trend regression is run separately over each of the four statistics for each of the earnings groups (LE, MC, NHE, HE, and CHE) and for each worker sample (AW males, FT males, AW females and FT females). These regressions can be viewed as quadratic trend lines corresponding to the raw data points in Figures 2-33. A time trend in percentage terms can then be estimated from the time derivative of these estimated regressions.

An estimated time trend can also be calculated at various different time points on the trend line. And since the regression specification is quadratic in  $t$ , the estimated trend rate can be different across different time periods. To highlight the estimated pattern of changing trends, the study evaluates the estimated trend rates at the two end years 1997 and 2015 as well as the more intermediate year (before the recession began) 2007. Obviously, evaluating a regression at its end points likely leads to more extreme results, but highlighting the pattern of these changes in trends is what we want to do here for emphasis.

Results of these trend evaluations are presented in Tables 10-13. Table 10 is for share of workers and its results reinforce and strengthen the previous findings in Table 6. For the HE group, the share of workers is estimated to increase over all samples and almost all time periods (i.e., the trend estimates are positive). For middle-class (MC), the share of workers has declined (i.e., the trend estimates are negative) for males and full-time females over almost all time periods. For the NHE group of males and full-time females, the share of workers has also increased over all time periods (unlike the mixed results in Table

6). So, not surprisingly, for the combined CHE group of males and full-time females, SW has also increased over all time periods. The most rapid trends are for the HE group. For lower-earnings (LE) males, the estimated trends are not statistically significant though has been towards an increasing share of workers, while for LE females the trend has been the opposite.

But perhaps the most interesting result from Table 10 is that, in almost all cases, the above trends have been markedly attenuating. Middle-class shares of workers are declining much more slowly (less negative), and for males and full-time female earners the rise in the HE share of workers has all but vanished. A similar result holds for the CHE group as well.

The patterns of trends for earnings shares in Table 11 are quite similar to those for share of workers in Table 10 and a bit more clear cut. Middle-class earnings shares are everywhere declining, while the HE and CHE earnings shares are almost everywhere rising. For the NHE group, the earnings shares of males and full-time female workers are also generally rising. And again, these trends – except for full-time females – appear to have declined quite substantially and indeed dramatically. Again, the strongest trends occur for the HE group. For lower-earning (LE) workers, the trend has been towards an increasing earnings share for males and a decreasing earnings share for female workers.

Results for trends in relative-mean earnings (RME) appear in Table 12. Obviously, the trend rates are generally smaller than in the previous two tables because the dependent variable is *relative* earnings rather than an earnings level. Evidently, middle-class workers have been losing out (in terms of relative earnings) across all groups and sub-periods. The HE and CHE groups show mixed patterns. The NHE groups also have been losing out, but at a much smaller rate than for the MC group. Also, except for the group of HE female workers, the trends have been everywhere attenuating.

Finally, the estimated trend results for conditional mean earnings (CME) are presented in Table 13. In almost all cases (except for males in 1997), conditional mean (real) earnings levels have indeed been rising. By 2015, all earnings groups are experiencing (real) earnings growth of about 1 percent a

year – a bit less so for MC workers and a bit more so for LE and HE workers. For almost all groups of workers – but not so for all female workers as a whole – the trend in (real) earnings has been increasing.

## 6.2 Trends-Based Earnings Decomposition

Closer inspection of the figures in Tables 10, 11 and 12 reveals that, for each respective cell in these tables, the estimated trend rates in Table 11 (on earnings shares) are virtually the same as the sums of the respective trend rates in Tables 10 (on shares of workers) and 12 (on relative-mean earnings ratios). This is not happenstance. In a technical appendix at the end of the paper, it is shown that

$$\frac{d \cdot E \ln(SE)}{dt} = \frac{d \cdot E \ln(SW)}{dt} + \frac{d \cdot E \ln(RME)}{dt} \quad (4)$$

where  $E(\bullet)$  is the expectations operator, so that  $E \ln(SE)$ , for example, is the (population) regression function for the earnings share regressions. The result in equation (4) thus holds exactly. In terms of OLS estimates of these regression functions, the relationship holds approximately (to the extent that population and sample trend coefficient estimates differ in value). Inspection of these three tables shows that the approximation is amazingly close. The evident decomposition in equation (4) thus provides a further motivation for use of a trend regression-based analysis in this section.

The decomposition results based on equation (4) are provided in Tables 14(a) – 14(c). The first table refers to the trend evaluations for the year 1997, the second table for 2007, and the third table for 2015.

For the 1997-2015 period as a whole, the decomposition results are generally quite consistent with the earlier results in Table 8. For the middle-class (MC) earnings group, the strong downward shift in earnings shares of males and full-time female workers arises from declines in both shares of workers and relative-mean earnings. Again, this is consistent with a downward shift for workers in MC jobs. For the near-higher earnings (NHE) group, for males and full-time female workers, their increases in earnings share was accompanied by increased shares of workers, but decreases in relative-mean earnings, consistent with a rising supply of workers in this region of the earnings distribution and with the

upskilling hypothesis. For higher earners (HE) and the combined higher earnings (CHE) groups, among male and full-time female workers, very large increases in shares of workers essentially swamped any changes in relative-mean earnings.

As to how these earnings decomposition patterns have changed over the full 1997-2015 period, one can see that all three patterns above carry through throughout the sample period. The raggedness of results in Table 9 has basically been smoothed over. The downward shift in demand for MC males and full-time female workers holds throughout the period. The upshift in supply of NHE male and full-time female workers also carries throughout the period. And the upshift in the share of workers among HE and CHE males and full-time female workers as the driving or dominant factor in earnings share increases also carries throughout the period.

What the tables do highlight is the dramatic decline in the rise of the share of workers in the HE and CHE groups – second row in the last two panels – over the 1997-2015 period. That is, there has been an evident weakening in the growth of higher earners in the Canadian labour market. Why this is occurring is not at all clear, but would seem to be a cause for further inquiry.

## **7. Conclusions and Implications**

This paper does two main things. First, it looks at the distributional characteristics of the near-higher earnings (NHE) group of workers (i.e., between middle-class workers and higher earners) over the 1997-2015 period in the Canadian labour market with respect to (i) the degree to which this group of workers is similar to the higher earnings (HE) group of workers, and (ii) the extent to which the apparent “upskilling” in the Canadian labour market over this period has been occurring among the NHE as well as the HE group of workers. It thus illustrates the usefulness of a set of multiple distributional statistics for analyzing distributional change within a framework of conventional statistical inference. Second, the paper forwards a novel Lorenz curve-based methodology for evaluating the relative importance of



demand- and supply-side factors that are hypothesized as major driving factors behind changes in employment and relative wages over different regions of the earnings distribution.

The paper finds several main results, about the earnings groups of interest in this study where middle-class (MC) workers are identified as those earning 50-150 percent of the median earnings levels, the NHE group includes those between 150-200 percent of the median, and the HE group covers those above 200 percent of the median.

1. The size of the NHE group is about twice as large as that of the HE group, but its size has declined relative to that of HE earners. So the relative size of the top earnings group went up over the 2000-2015 period and changes in the top earnings group appear to be driving changes in the combined higher earnings (CHE = NHE + HE) group. Men were relatively the big winners among the top earnings group.
2. For male workers and full-time female workers, the NHE group behaves as a transitional group between quite different patterns of change of the MC group (whose shares of workers and earnings shares are declining over the 2000-2015 period) and the HE group (where both the shares of workers and earnings shares have been very strongly rising). The percentage changes for the NHE group are the same sign as for the HE group, but not nearly as strong.
3. There has been a major upshift in the proportion and number of workers earning incomes above 150 percent of the median, and especially so earning incomes above 200 percent of the median earnings level. The number of full-time male earners above 150 percent of the median, for example, is estimated to have gone up by 163 thousand over the 2000-2015 period and the number of female full-time workers in this group up by 158 thousand. In the case of males, about two-thirds of this increase arises from increased membership in the top HE earnings group, while for females about two-thirds corresponds to increased numbers in the transitional NHE group. This is consistent with several leading hypotheses or possible explanations of labour market distributional change.

4. One of the most interesting, and perhaps surprising, results is that the above patterns of change (in points 2 and 3) have been markedly attenuating over the sample period. The middle-class shares of workers are declining much more slowly than earlier in the period, and for males and full-time female earners the rate of rise in the HE share of workers has all but vanished. That is, there has recently been an evident weakening in the growth of higher earners in the Canadian labour market.
5. For the middle-class (MC) earnings group, the strong downward shift in its earnings share arises from declines in both shares of workers and relative-mean earnings. This is consistent with a downward shift in demand for workers with middle-class jobs. The higher earnings (HE) group, however, experienced almost everywhere increases in both shares of workers and relative-mean earnings, consistent with an upward shift in demand for workers in HE jobs in the Canadian labour market. For the near higher earnings (NHE) group, for males and for full-time female workers, their increase in earnings share was accompanied by mixed sign results where the share of workers rose strongly, while their relative-mean earnings declined. This is consistent with a rising supply of workers in this region of the earnings distribution, and consistent with the upskilling hypothesis.
6. Except for middle-class workers, far and away the dominant component or channel behind changes in earnings shares is changes in the shares of workers. That is, adjustment in the Canadian labour market over this period has been characterized not much by changes in relative earnings, but rather by employment reductions among the MC group and employment gains higher up the distribution in both HE and NHE jobs.

Several implications follow from these findings. First, the presence of strong upskilling in the NHE and HE regions of the earnings distribution has been a major contributor to rising average overall earnings levels. Higher-paying higher-skilled jobs may be viewed as more secure and good-quality jobs

(Green, 2015). But what have been the specific factors essentially driving these results? The paper has identified a range of possible contributors – automation and globalization, increased supply of skilled workers in the Canadian workplace, growth of specific industries (financial sector and energy and housing construction sectors), and growing degrees of industrial concentration and capture of extraordinary profits again in specific sectors). Can one identify the relative importance of these different factors? For example, automation may be related to specific occupations, while globalization tends to be focused on industries with tradeable output. So, for example, could one use a sequence of cross-sectional microdata (such as the Census or LFS files) or even panel data (though samples may not be large enough) to identify individual workers in the NHE and HE earnings groups and examine how their demographic (age, sex and immigrant status), educational, industry, occupational, field of study (if PSE graduates) and urban area of residence characteristics have changed over time, and then find a way to use these change patterns to identify the relative importance of these different factors?

Second, why have the major patterns of distributional change – including upskilling – been attenuating over recent years? On the one hand, this may be viewed as good if middle-class employment is not disappearing so fast. But on the other, a slowdown of upskilling would seem to be a concern. Companies often concentrate their layoffs and labour market adjustments in periods of economic slowdown or recession – such as 2008-2010 (Hershbein and Kahn, 2017) – and since then the economy has been growing relatively faster to catch up the slack. So the slowdown in rising inequality may simply be a case of rising overall aggregate demand and tightening labour markets in the latter part of the 2000-2015 period. If slower productivity growth – which has apparently been happening – is indicative of a slowdown in the rate of automation adjustment (which has been considered the dominant factor in rising earnings inequality – see Beach, 2016), then this may be a contributor. But, again, why overall productivity growth has been falling in recent years is itself not at all clear (see, for example, Beaudry, Green and Sand, 2016). On-going rapid inflow of higher educated workers into the Canadian labour has been continuing apace, but since the 2008-2010 slowdown the numbers of older workers (on average less

educated but with greater amounts of work experience in getting things done and relatively high earnings) leaving the labour market as either discouraged workers or retirees has been increasing. Canada is facing one of the largest Baby Boom waves of retirees among all OECD countries. So the simple demographics of withdrawing higher-paid workers may be at work here as well. Finally, the unusual strength of the energy sector (until recently) and the urban housing construction sector (that is continuing) in Canada brought about partly by historically low interest rates have benefitted the relatively less-skilled, especially male, workforce. But the relative strength of this construction driver in the Canadian economy may be lessening as other sectors are catching up the slack since the 2008-2010 slowdown.

Third, it appears from the decomposition analysis of this paper that, above the middle-class group of workers in the Canadian labour market, automation/globalization/sector shifts are manifesting the dominant effect of the upper end (HE) of the earnings distribution, especially for males, while increased supply of skilled workers is manifesting as the dominant effect over the NHE range of the distribution, especially for female workers. Confirming or otherwise testing this apparently broad phenomenon would also be a useful exercise. Again, a microdata-based analysis such as described above in discussion of the first implication would seem to help get some insights on this issue as well.

**Table 1**  
**Percentage of Male and Female Workers by Earnings Level, Canada, 2000-2015:**  
**LFS Data on Weekly Earnings**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
2000	65.70	76.17	57.44	73.89
2005	62.83	75.06	58.08	73.05
2010	61.75	72.59	56.79	72.50
2015	59.57	73.41	57.40	71.41
Change 2000-2015	-6.13 [-9.3%] (66.5)	-2.76 [-3.6%] (11.9)	-0.04 [-0.1%] (0.46)	-2.48 [-3.4%] (8.81)
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
2000	12.35	11.63	14.15	12.68
2005	13.56	10.94	12.81	12.30
2010	13.44	13.28	13.30	13.75
2015	13.95	12.39	12.05	14.73
Change 2000-2015	+1.60 [+13.0%] (17.6)	+0.76 [+6.5%] (5.00)	-2.09 [-14.8%] (24.0)	+2.05 [+16.2%] (11.9)
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
2000	6.44	4.79	10.36	6.16
2005	7.81	5.88	10.48	6.58
2010	9.02	5.91	11.31	6.73
2015	9.63	6.31	12.24	7.31
Change 2000-2015	+3.19 [+49.5%] (14.4)	+1.52 [+31.7%] (7.75)	+1.88 [+18.1%] (7.95)	+1.15 [+18.7%] (4.96)
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
2000	18.79	16.42	24.51	18.84
2005	21.37	16.82	23.29	18.88
2010	22.46	19.19	24.61	20.48
2015	23.58	18.70	24.29	22.04
Change 2000-2015	+4.79 [+25.5%] (15.5)	+2.28 [+13.9%] (6.75)	-0.22 [-0.9%] (0.69)	+3.20 [+17.0%] (8.14)

Note: Based on May Labour Force Surveys.

Figures in parentheses are absolute (asymptotic) “t-ratios”.

Figures in square brackets are percentage changes in the share of workers over indicated years.

**Table 2**  
**Male and Female Earnings Shares by Earnings Level, Canada, 2000-2015 (Percent):**  
**LFS Data on Weekly Earnings**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
2000	60.73	68.18	50.02	64.52
2005	56.22	66.72	50.68	63.16
2010	54.19	63.16	48.82	61.53
2015	51.77	63.48	49.03	59.23
Change 2000-2015	-8.96 [-14.8%] (29.1)	-4.70 [-6.9%] (11.5)	-0.99 [-2.0%] (3.21)	-5.29 [-8.2%] (11.3)
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
2000	19.75	18.16	21.85	19.61
2005	21.29	17.08	19.92	19.18
2010	21.01	20.57	20.44	21.22
2015	21.45	19.21	18.45	22.47
Change 2000-2015	+1.70 [+8.6%] (37.9)	+1.05 [+5.8%] (7.64)	-3.40 [-15.6%] (94.9)	+2.86 [+14.6%] (19.1)
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
2000	15.18	10.86	23.28	13.05
2005	18.13	13.16	24.35	14.59
2010	20.50	13.17	25.81	14.58
2015	22.01	14.37	27.69	15.77
Change 2000-2015	+6.83 [+45.0%] (16.8)	+3.51 [+32.3%] (9.80)	+4.41 [+18.9%] (10.4)	+2.72 [+20.8%] (6.60)
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
2000	34.93	29.02	45.13	32.66
2005	39.42	30.24	44.27	33.77
2010	41.51	33.74	46.25	35.80
2015	43.46	33.58	46.14	38.24
Change 2000-2015	+8.53 [+24.4%] (20.0)	+4.56 [+15.75%] (9.83)	+1.01 [+2.2%] (2.33)	+5.58 [+17.1%] (10.6)

Note: Based on May Labour Force Surveys.

Figures in parentheses are absolute (asymptotic) "t-ratios".

Figures in square brackets are percentage changes in earnings shares over the indicated years.

**Table 3**  
**Relative Mean Earnings of Male and Female Workers by Earnings Level, Canada, 2000-2015:**  
**LFS Data on Weekly Earnings**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings (within 50% of median)</u></b>				
2000	.9244	.8951	.8708	.8732
2005	.8948	.8889	.8726	.8646
2010	.8776	.8701	.8597	.8487
2015	.8691	.8647	.8542	.8294
Change 2000-2015	-.0553 [-6.0%] (13.12)	-.0304 [-3.4%] (10.24)	-.0166 [-1.9%] (3.50)	-.0438 [-5.0%] (12.81)
<b><u>Near Higher Earnings (150-200% of median)</u></b>				
2000	1.5992	1.5615	1.5442	1.5465
2005	1.5701	1.5612	1.5550	1.5594
2010	1.5632	1.5489	1.5368	1.5433
2015	1.5376	1.5504	1.5299	1.5255
Change 2000-2015	-.0616 [-3.9%] (6.80)	-.0111 [-0.7%] (1.17)	-.0143 [-0.9%] (1.40)	-.0210 [-1.4%] (2.22)
<b><u>Higher Earnings (above 200% of median)</u></b>				
2000	2.3571	2.2672	2.2471	2.1185
2005	2.3214	2.2381	2.3235	2.2173
2010	2.2727	2.2284	2.2821	2.1664
2015	2.2856	2.2773	2.2623	2.1573
Change 2000-2015	-.0716 [-3.0%] (5.20)	.0101 [+0.4%] (0.68)	.0152 [+0.7%] (1.57)	.0388 [+1.8%] (3.19)
<b><u>Combined Higher Earnings (above 150% of median)</u></b>				
2000	1.8589	1.7674	1.8413	1.7335
2005	1.8447	1.7978	1.9008	1.7887
2010	1.8481	1.7582	1.8793	1.7480
2015	1.8431	1.7957	1.8990	1.7351
Change 2000-2015	-.0158 [-0.8%] (2.28)	+.0283 [+1.6%] (3.64)	+.0577 [+3.1%] (8.53)	+.0016 [+0.1%] (0.20)

Note: Based on May Labour Force Surveys.

Figures in parentheses are absolute (asymptotic) “t-ratios”.

Figures in square brackets are percentage changes in RME figures over indicated years.

**Table 4**  
**Conditional Mean Earnings of Male and Female Workers by Earnings Level, Canada, 2000-2015:**  
**LFS Data on Weekly Earnings (real 2015 dollars)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
2000	895.3	990.4	590.7	739.2
2005	864.0	987.1	617.2	761.4
2010	905.0	1031.1	664.0	814.7
2015	915.6	1051.1	684.5	827.8
Change 2000-2015	20.3 [2.3%] (4.82)	60.7 [6.1%] (17.59)	93.8 [15.9%] (27.48)	88.6 [12.0%] (28.16)
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
2000	1549.0	1727.8	1047.4	1309.1
2005	1516.1	1733.7	1099.9	1373.2
2010	1612.0	1835.6	1187.0	1481.4
2015	1620.0	1884.5	1225.9	1522.4
Change 2000-2015	71.0 [4.6%] (7.81)	156.7 [9.1%] (14.1)	178.5 [17.0%] (25.7)	213.3 [16.3%] (23.7)
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
2000	2283.1	2508.7	1524.2	1793.3
2005	2241.5	2485.4	1643.4	1952.6
2010	2343.6	2640.9	1762.7	2079.5
2015	2408.1	2768.1	1812.7	2153.0
Change 2000-2015	125.0 [5.5%] (9.10)	259.4 [10.3%] (14.74)	288.5 [18.9%] (40.46)	359.7 [20.1%] (30.36)
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
2000	1800.6	1955.6	1249.0	1467.4
2005	1781.3	1996.5	1244.4	1575.1
2010	1905.8	2083.6	1451.6	1677.9
2015	1941.9	2182.7	1521.6	1731.6
Change 2000-2015	141.3 [7.8%] (20.3)	227.1 [11.6%] (24.8)	272.6 [21.8%] (53.8)	264.2 [18.0%] (37.8)

Note: Based on May Labour Force Surveys.

Figures in parentheses are absolute (asymptotic) "t-ratios".

Figures in square brackets are percentage changes in CME figures over indicated years.



**Table 5**  
**Summary of Percentage Changes in Distributional Statistics for Male and Female Workers by**  
**Earnings level, Canada, 2000-2015 (Percent)**

	Share of Workers	Earnings Share
<b>1) <u>Males AW</u></b>		
MC	-9.33	-14.75
NHE	+12.96	+8.61
HE	+49.53	+44.99
CHE	+25.48	+24.42
<b>2) <u>Males FT</u></b>		
MC	-3.62	-6.89
NHE	+6.53	+5.78
HE	+31.73	+32.32
CHE	+13.88	+15.71
<b>3) <u>Females AW</u></b>		
MC	-0.07	-1.98
NHE	-14.77	-15.56
HE	+18.15	+18.94
CHE	-0.86	+2.24
<b>4) <u>Females FT</u></b>		
MC	-3.36	-8.20
NHE	+16.17	+14.58
HE	+18.67	+20.84
CHE	+16.99	+17.09

Note: Based on May Labour Force Surveys.  
Source: See Tables 1-4.

**Table 6**  
**Changes in Share of Workers for Male and Female Workers**  
**by Earnings Level and Sub-Periods, Canada, 2000-2015**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>2000-2005</u></b>				
MC	-2.87 [-4.4%]	-1.11 [-1.5%]	+0.64 [1.1%]	-0.84 [-1.1%]
NHE	+1.21 [9.8%]	-0.69 [-5.9%]	-1.34 [-9.5%]	-0.38 [-3.0%]
HE	+1.37 [21.3%]	+1.09 [22.8%]	+0.12 [1.2%]	+0.42 [6.8%]
CHE	+2.58 [13.7%]	+0.40 [2.4%]	-1.22 [-5.0%]	+0.04 [0.2%]
<b><u>2005-2010</u></b>				
MC	-1.08 [-1.7%]	-2.47 [-3.3%]	-1.29 [-2.2%]	-0.55 [-0.8%]
NHE	-0.12 [-0.9%]	+2.34 [21.4%]	+0.49 [3.8%]	+1.45 [11.8%]
HE	+1.21 [15.5%]	+0.03 [0.5%]	+0.83 [7.9%]	+0.15 [2.3%]
CHE	+1.09 [5.1%]	+2.37 [14.1%]	+1.32 [5.7%]	+1.60 [8.5%]
<b><u>2010-2015</u></b>				
MC	-2.18 [-3.5%]	+0.82 [1.1%]	+0.61 [1.1%]	-1.09 [-1.5%]
NHE	+0.51 [3.8%]	-0.89 [-6.7%]	-1.25 [-9.4%]	+0.98 [7.1%]
HE	+0.61 [6.8%]	+0.40 [6.8%]	+0.93 [8.2%]	+0.58 [8.6%]
CHE	+1.12 [5.0%]	-0.49 [-2.6%]	-0.32 [-1.3%]	+1.56 [7.6%]
<b><u>2000-2015</u></b>				
MC	-6.13 [-9.3%]	-2.76 [-3.6%]	-0.04 [-0.1%]	-2.48 [-3.4%]
NHE	+1.60 [13.0%]	+0.76 [6.5%]	-2.09 [-14.8%]	+2.05 [16.2%]
HE	+3.19 [49.5%]	+1.52 [31.7%]	+1.88 [18.1%]	+1.15 [18.7%]
CHE	+4.79 [25.5%]	+2.28 [13.9%]	-0.22 [-0.9%]	+3.20 [17.0%]

Note: Based on May Labour Force Surveys.

First number in each couple is the change in the percent share of workers for a given earnings group; second number (in square brackets) expresses this change as a percentage of the initial-year level.

**Table 7**  
**Changes in Earnings Shares for Male and Female Workers**  
**by Earnings Level and Sub-Periods, Canada, 2000-2015**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>2000-2005</u></b>				
MC	-4.51 [-7.4%]	-1.46 [-2.1%]	+0.66 [1.8%]	-1.36 [-2.1%]
NHE	+1.54 [7.8%]	-1.08 [-5.9%]	-1.93 [-8.8%]	-0.43 [-2.2%]
HE	+2.95 [19.4%]	+2.30 [21.2%]	+1.07 [4.6%]	+1.54 [11.8%]
CHE	+4.49 [12.9%]	+1.22 [4.2%]	-0.86 [-1.9%]	+1.11 [3.4%]
<b><u>2005-2010</u></b>				
MC	-2.03 [-3.6%]	-3.56 [-5.3%]	-1.86 [-3.7%]	-1.63 [-2.6%]
NHE	-0.28 [-1.3%]	+3.49 [20.4%]	+0.52 [2.6%]	+2.04 [10.6%]
HE	+2.37 [13.1%]	+0.01 [0.1%]	+1.46 [6.0%]	-0.01 [-0.1%]
CHE	+2.09 [5.3%]	+3.50 [11.6%]	+1.97 [4.4%]	+2.03 [6.0%]
<b><u>2010-2015</u></b>				
MC	-2.42 [-4.5%]	+0.32 [0.5%]	+0.21 [0.4%]	-2.30 [-3.7%]
NHE	+0.44 [2.1%]	-1.36 [-6.6%]	-1.99 [-9.7%]	+1.25 [5.9%]
HE	+1.51 [7.4%]	+1.20 [9.1%]	+1.88 [7.3%]	+1.19 [8.2%]
CHE	+1.95 [4.7%]	-0.16 [-0.5%]	-0.11 [-0.2%]	+2.44 [6.8%]
<b><u>2000-2015</u></b>				
MC	-8.96 [-14.8%]	-4.70 [-6.9%]	-0.99 [-2.0%]	-5.29 [-8.2%]
NHE	+1.70 [8.6%]	+1.05 [5.8%]	-3.40 [-15.6%]	+2.86 [14.6%]
HE	+6.83 [45.0%]	+3.51 [32.3%]	+4.41 [18.9%]	+2.72 [20.8%]
CHE	+8.53 [24.4%]	+4.56 [15.7%]	+1.01 [2.2%]	+5.58 [17.1%]

Note: Based on May Labour Force Surveys.

First number in each couple is the change in the percent share of workers for a given earnings group; second number (in square brackets) expresses this change as a percentage of the initial-year level.

**Table 8**  
**Factor Decomposition of Percentage Changes in Male and Female Earnings Shares by**  
**Earnings Level, Canada, 2000-2015 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
Earnings Shares	-14.75	-6.89	-1.98	-8.20
Share of workers	-9.33	-3.62	-0.07	-3.36
Relative mean earnings	-5.99	-3.37	-1.92	-4.99
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
Earnings Shares	+8.61	+5.78	-15.56	+14.58
Share of workers	+12.96	+6.53	-14.77	+16.17
Relative mean earnings	-3.85	-0.71	-0.93	-1.36
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
Earnings Shares	+44.99	+32.32	+18.94	+20.84
Share of workers	+49.53	+31.73	+18.15	+18.67
Relative mean earnings	-3.09	+0.25	+0.66	+1.74
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
Earnings Shares	+24.42	+15.71	+2.24	+17.09
Share of workers	+25.49	+13.89	-0.90	+16.99
Relative mean earnings	-0.85	+1.60	+3.13	+0.09

Note: Based on May Labour Force Surveys.

**Table 9(a)**  
**Factor Decomposition of Percentage Changes in Male and Female Earnings Shares by**  
**Earnings Level, Canada, 2000-2005 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
Earnings Shares	-7.43	-2.14	+1.32	-2.11
Share of workers	-4.37	-1.46	+1.11	-1.14
Relative mean earnings	-3.20	-0.69	+0.21	-0.98
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
Earnings Shares	+7.80	-5.95	-8.83	-2.19
Share of workers	+9.80	-5.93	-9.47	-3.00
Relative mean earnings	-1.82	-0.02	+0.70	+0.83
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
Earnings Shares	+19.43	+21.18	+4.60	+11.80
Share of workers	+21.27	+22.76	+1.16	+6.82
Relative mean earnings	-1.51	-1.28	+3.40	+4.66
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
Earnings Shares	+12.85	+4.20	-1.91	+3.40
Share of workers	+13.73	+2.44	-4.98	+0.21
Relative mean earnings	-0.76	+1.72	+3.23	+3.18

Note: Based on May Labour Force Surveys.

**Table 9(b)**  
**Factor Decomposition of Percentage Changes in Male and Female Earnings Shares by**  
**Earnings Level, Canada, 2005-2010 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
Earnings Shares	-3.61	-5.34	-3.67	-2.58
Share of workers	-1.72	-3.29	-2.22	-0.75
Relative mean earnings	-1.92	-2.11	-1.48	-1.84
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
Earnings Shares	-1.32	+20.43	+2.61	+10.64
Share of workers	-0.88	+21.39	+3.83	+11.79
Relative mean earnings	-0.44	-0.79	-1.17	-1.03
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
Earnings Shares	+13.07	+0.08	+6.00	-0.07
Share of workers	+15.49	+0.51	+7.92	+2.28
Relative mean earnings	-2.10	-0.43	-1.78	-2.30
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
Earnings Shares	+5.30	+11.57	+4.47	+6.01
Share of workers	+5.10	+14.09	+5.67	+8.47
Relative mean earnings	+0.18	-2.20	-1.13	-2.28

Note: Based on May Labour Force Surveys.

**Table 9(c)**  
**Factor Decomposition of Percentage Changes in Male and Female Earnings Shares by**  
**Earnings Level, Canada, 2010-2015 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
Earnings Shares	-4.47	+0.51	+0.43	-3.74
Share of workers	-3.53	+1.13	+1.07	-1.50
Relative mean earnings	-0.97	-0.62	-0.64	-2.27
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
Earnings Shares	+2.09	-6.61	-9.74	+5.89
Share of workers	+3.79	-6.70	-9.40	+7.13
Relative mean earnings	-1.64	+0.10	-0.45	-1.15
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
Earnings Shares	+7.37	+9.11	+7.28	+8.16
Share of workers	+6.76	+6.77	+8.22	+8.62
Relative mean earnings	+0.57	+2.19	-0.87	-0.42
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
Earnings Shares	+4.70	-0.47	-0.24	+6.82
Share of workers	+4.99	-2.55	-1.30	+7.62
Relative mean earnings	-0.27	+2.13	+1.05	-0.74

Note: Based on May Labour Force Surveys.

**Table 10**  
**Predicted Percentage Annual Rate of Change of Shares of Workers by**  
**Earnings Level, Canada, 1997-2015 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Lower Earnings</u></b> <b><u>(below 50% of median)</u></b>				
1997	-0.33	-0.49	0.34**	1.97**
2007	0.04	0.11	-0.32**	-1.08**
2015	0.33	0.60	-0.85**	-3.52**
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
1997	-0.58**	-0.54**	-0.18**	-0.63**
2007	-0.40**	-0.33**	0.04**	-0.19**
2015	-0.26**	-0.17**	0.23**	0.15**
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
1997	0.82**	1.46**	-0.67**	0.17**
2007	0.60**	1.19**	-0.71**	0.70**
2015	0.43**	0.97**	-0.74**	1.13**
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
1997	4.56**	5.54**	1.24**	5.24**
2007	2.09**	1.76**	1.13**	1.97**
2015	0.12**	-1.27**	1.03**	-0.65**
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
1997	2.15**	2.75**	0.14	1.73**
2007	1.15**	1.37**	0.14	1.10**
2015	0.36**	0.26**	0.14	0.60**

Note: Based on May Labour Force Surveys.

\*indicates statistical significance (based on a 95% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

\*\*indicates statistical significance (based on a 99% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.



**Table 11**  
**Predicted Percentage Annual Rate of Change of Earnings Shares by**  
**Earnings Level, Canada, 1997-2015 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b>Lower Earnings</b> <b>(below 50% of median)</b>				
1997	-1.41 *	-1.01	0.06**	1.39**
2007	-0.09*	-0.02	-0.58**	-1.15**
2015	0.97*	0.78	-1.10**	-3.18**
<b>Middle-Class Earnings</b> <b>(within 50% of median)</b>				
1997	-1.27**	-1.11**	-0.42**	-1.03**
2007	-0.78**	-0.62**	-0.15**	-0.53**
2015	-0.40**	-0.42**	0.06**	-0.13**
<b>Near Higher Earnings</b> <b>(150-200% of median)</b>				
1997	0.40*	1.09**	-0.88**	-0.20**
2007	0.39*	1.03**	-0.81**	0.51**
2015	0.37*	0.98**	-0.76**	1.09**
<b>Higher Earnings</b> <b>(above 200% of median)</b>				
1997	4.38**	5.14**	1.66**	5.34**
2007	1.97**	1.75**	1.06**	1.84**
2015	0.03**	-0.96**	0.59**	-0.96**
<b>Combined Higher Earnings</b> <b>(above 150% of median)</b>				
1997	2.19**	2.70**	0.45**	1.92**
2007	1.12**	1.32**	0.23**	1.04**
2015	0.26**	0.22**	0.06**	0.33**

Note: Based on May Labour Force Surveys.

\*indicates statistical significance (based on a 95% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

\*\*indicates statistical significance (based on a 99% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

**Table 12**  
**Predicted Percentage Annual Rate of Change of Relative-Mean Earnings by**  
**Earnings Level, Canada, 1997-2015 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Lower Earnings</u></b> <b><u>(below 50% of median)</u></b>				
1997	-1.07**	-0.52**	-0.28**	-0.58**
2007	-0.12**	-0.13**	-0.26**	-0.07**
2015	0.64**	0.18**	-0.24**	0.34**
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
1997	-0.69**	-0.57**	-0.23**	-0.41**
2007	-0.38**	-0.29**	-0.20**	-0.33**
2015	-0.14**	-0.08**	-0.18**	-0.28**
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
1997	-0.40**	-0.37**	-0.21**	-0.37**
2007	-0.21**	-0.16**	-0.11**	-0.19**
2015	-0.06**	0.02**	-0.02**	-0.04**
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
1997	-0.18**	-0.40**	0.42**	0.10**
2007	-0.13**	-0.00**	-0.06**	-0.13**
2015	-0.08**	0.31**	-0.45**	-0.31**
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
1997	0.04	-0.04	0.31**	0.20*
2007	-0.03	-0.04	0.09**	-0.07*
2015	-0.09	-0.04	-0.08**	-0.28*

Note: Based on May Labour Force Surveys.

\*indicates statistical significance (based on a 95% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

\*\*indicates statistical significance (based on a 99% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

**Table 13**  
**Predicted Percentage Annual Rate of Change of Conditional Mean Earnings by**  
**Earnings Level, Canada, 1997-2015 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Lower Earnings</u></b> <b><u>(below 50% of median)</u></b>				
1997	-0.92**	-0.21**	0.57**	0.23**
2007	0.51**	0.53**	0.98**	1.12**
2015	1.66**	1.11**	1.31**	1.82**
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
1997	-0.55**	-0.27**	0.62**	0.41**
2007	0.26**	0.36**	1.04**	0.85**
2015	0.90**	0.87**	1.38**	1.20**
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
1997	-0.27**	-0.08**	0.61**	0.45**
2007	0.43**	0.50**	1.13**	1.00**
2015	0.98**	0.97**	1.55**	1.43**
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
1997	-0.04**	-0.10**	1.27**	0.92**
2007	0.51**	0.65**	1.18**	1.05**
2015	0.95**	1.25**	1.11**	1.16**
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
1997	0.18**	0.25**	1.15**	1.02**
2007	0.61**	0.61**	1.33**	1.12**
2015	0.95**	0.90**	1.48**	1.20**

Note: Based on May Labour Force Surveys.

\*indicates statistical significance (based on a 95% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

\*\*indicates statistical significance (based on a 99% confidence level) of the joint F-statistic of the OLS log regression including a quadratic time trend.

**Table 14(a)**  
**Factor Decomposition of Predicted Percentage Changes in Male and Female Earnings Shares by**  
**Earnings Level, Canada, 1997 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings</u></b> <b><u>(within 50% of median)</u></b>				
Earnings Shares	-1.27	-1.11	-0.42	-1.03
Share of workers	-0.58	-0.54	-0.18	-0.63
Relative mean earnings	-0.69	-0.57	-0.23	-0.41
<b><u>Near Higher Earnings</u></b> <b><u>(150-200% of median)</u></b>				
Earnings Shares	0.40	1.09	-0.88	-0.20
Share of workers	0.82	1.46	-0.67	0.17
Relative mean earnings	-0.40	-0.37	-0.21	-0.37
<b><u>Higher Earnings</u></b> <b><u>(above 200% of median)</u></b>				
Earnings Shares	4.38	5.14	1.66	5.34
Share of workers	4.56	5.54	1.24	5.24
Relative mean earnings	-0.18	-0.40	0.42	0.10
<b><u>Combined Higher Earnings</u></b> <b><u>(above 150% of median)</u></b>				
Earnings Shares	2.19	2.70	0.45	1.92
Share of workers	2.15	2.75	0.14	1.73
Relative mean earnings	0.04	-0.04	0.31	0.20

Note: Based on May Labour Force Surveys and calculations in Tables 10-12.

**Table 14(b)**  
**Factor Decomposition of Predicted Percentage Changes in Male and Female Earnings Shares by Earnings Level, Canada, 2007 (Percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings (within 50% of median)</u></b>				
Earnings Shares	-0.78	-0.62	-0.15	-0.53
Share of workers	-0.40	-0.33	0.04	-0.19
Relative mean earnings	-0.38	-0.29	-0.20	-0.33
<b><u>Near Higher Earnings (150-200% of median)</u></b>				
Earnings Shares	0.39	1.03	-0.81	0.51
Share of workers	0.60	1.19	-0.71	0.70
Relative mean earnings	-0.21	-0.16	-0.11	-0.19
<b><u>Higher Earnings (above 200% of median)</u></b>				
Earnings Shares	1.97	1.75	1.06	1.84
Share of workers	2.09	1.76	1.13	1.97
Relative mean earnings	-0.13	-0.00	-0.06	-0.13
<b><u>Combined Higher Earnings (above 150% of median)</u></b>				
Earnings Shares	1.12	1.32	0.23	1.04
Share of workers	1.15	1.37	0.14	1.10
Relative mean earnings	-0.03	-0.04	0.09	-0.07

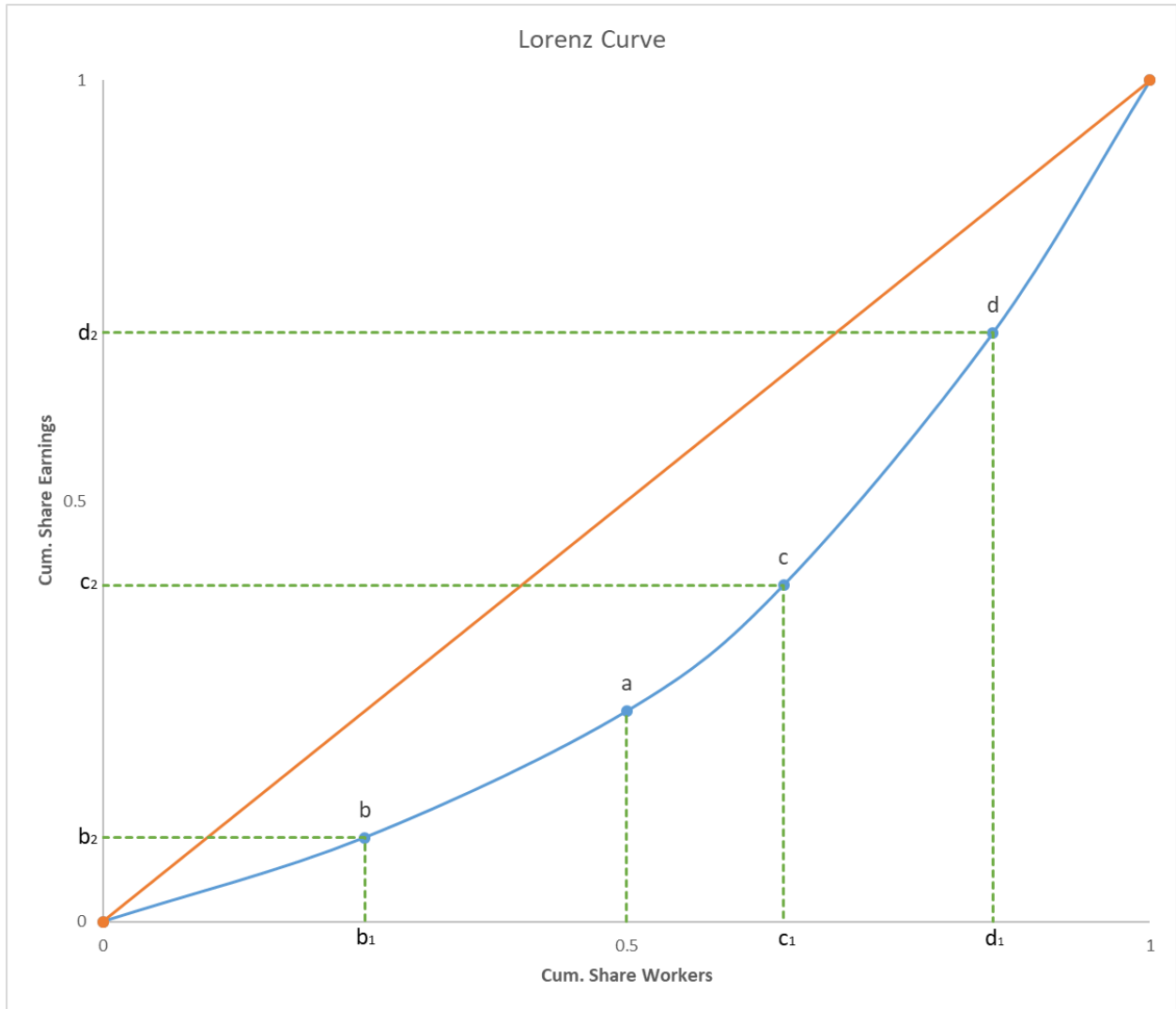
Note: Based on May Labour Force Surveys and calculations in Tables 10-12 .

**Table 14(c)**  
**Factor Decomposition of Predicted Percentage Changes in Male and Female Earnings Shares by Earnings Level, Canada, 2015 (Percent)**

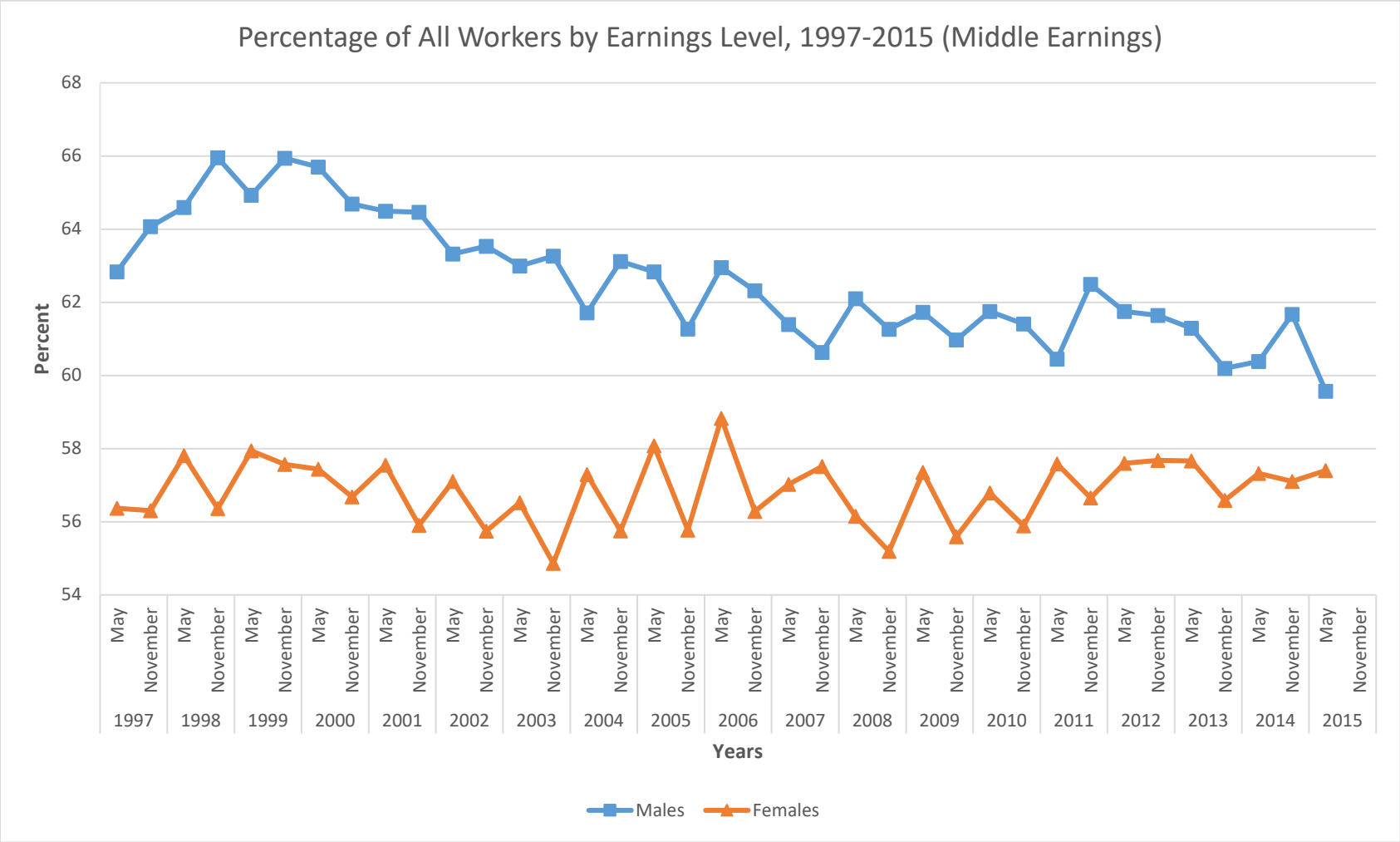
	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Middle-Class Earnings (within 50% of median)</u></b>				
Earnings Shares	-0.40	-0.42	0.06	-0.13
Share of workers	-0.26	-0.17	0.23	0.15
Relative mean earnings	-0.14	-0.08	-0.18	-0.28
<b><u>Near Higher Earnings (150-200% of median)</u></b>				
Earnings Shares	0.37	0.98	0.76	1.09
Share of workers	0.43	0.97	-0.74	1.13
Relative mean earnings	-0.06	0.02	-0.02	-0.04
<b><u>Higher Earnings (above 200% of median)</u></b>				
Earnings Shares	0.03	-0.96	0.59	-0.96
Share of workers	0.12	-1.27	1.03	-0.65
Relative mean earnings	-0.08	0.31	-0.45	-0.31
<b><u>Combined Higher Earnings (above 150% of median)</u></b>				
Earnings Shares	0.26	0.22	0.06	0.33
Share of workers	0.36	0.26	0.14	0.60
Relative mean earnings	-0.09	-0.04	-0.08	-0.28

Note: Based on May Labour Force Surveys and calculations in Tables 10-12 .

Figure 1



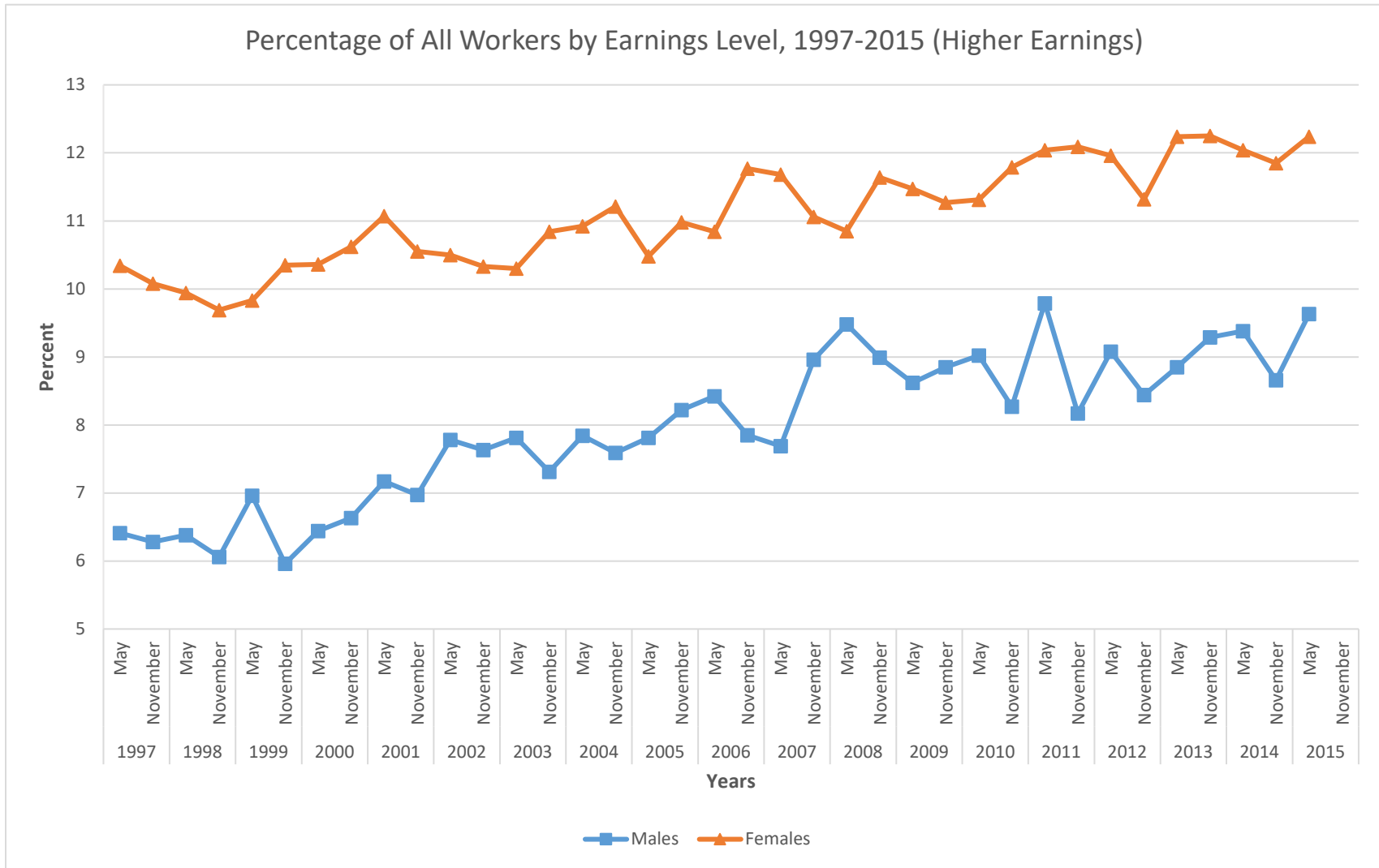
**Figure 2**



Source: LFS microdata files; calculations by author.

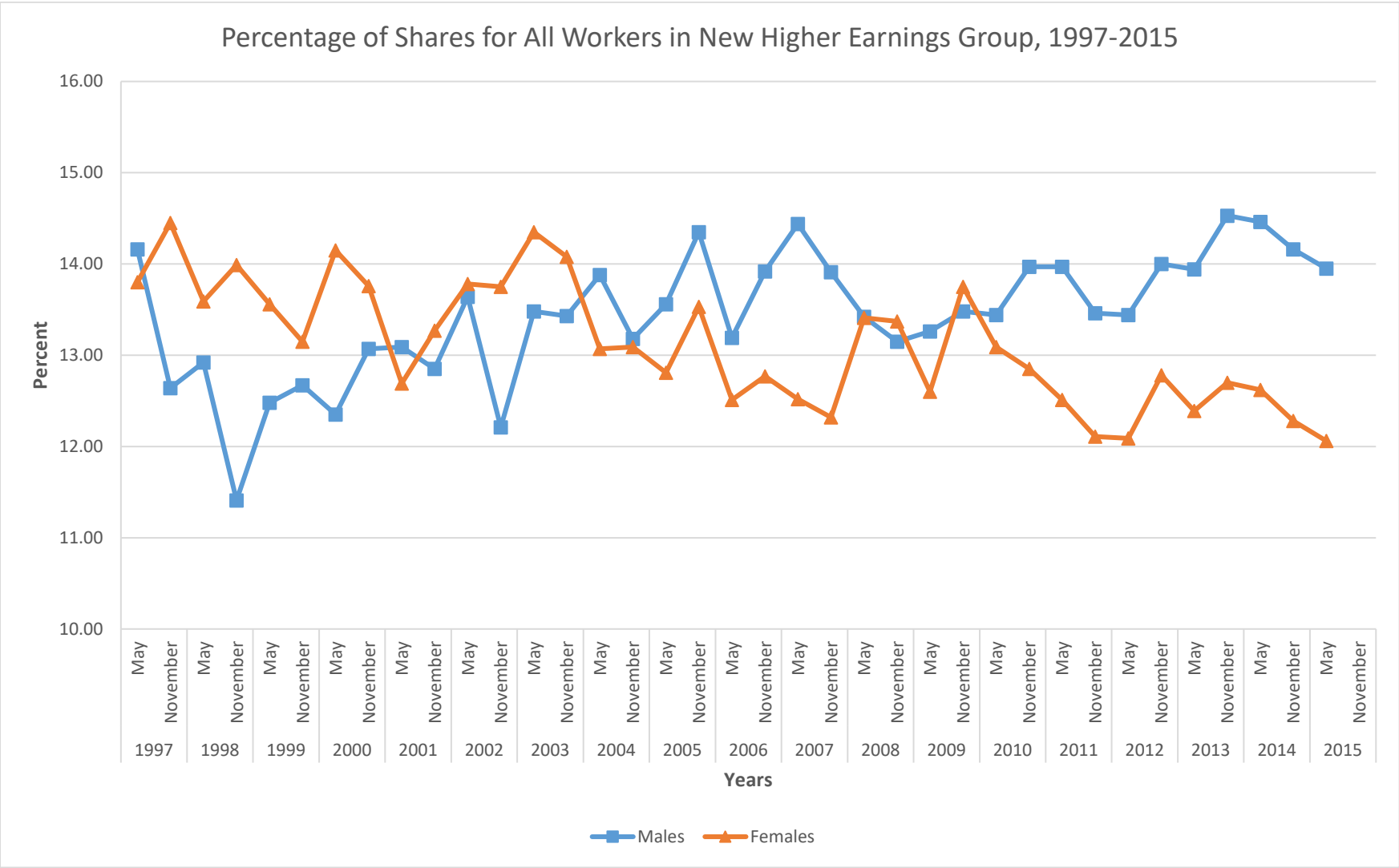


**Figure 3**



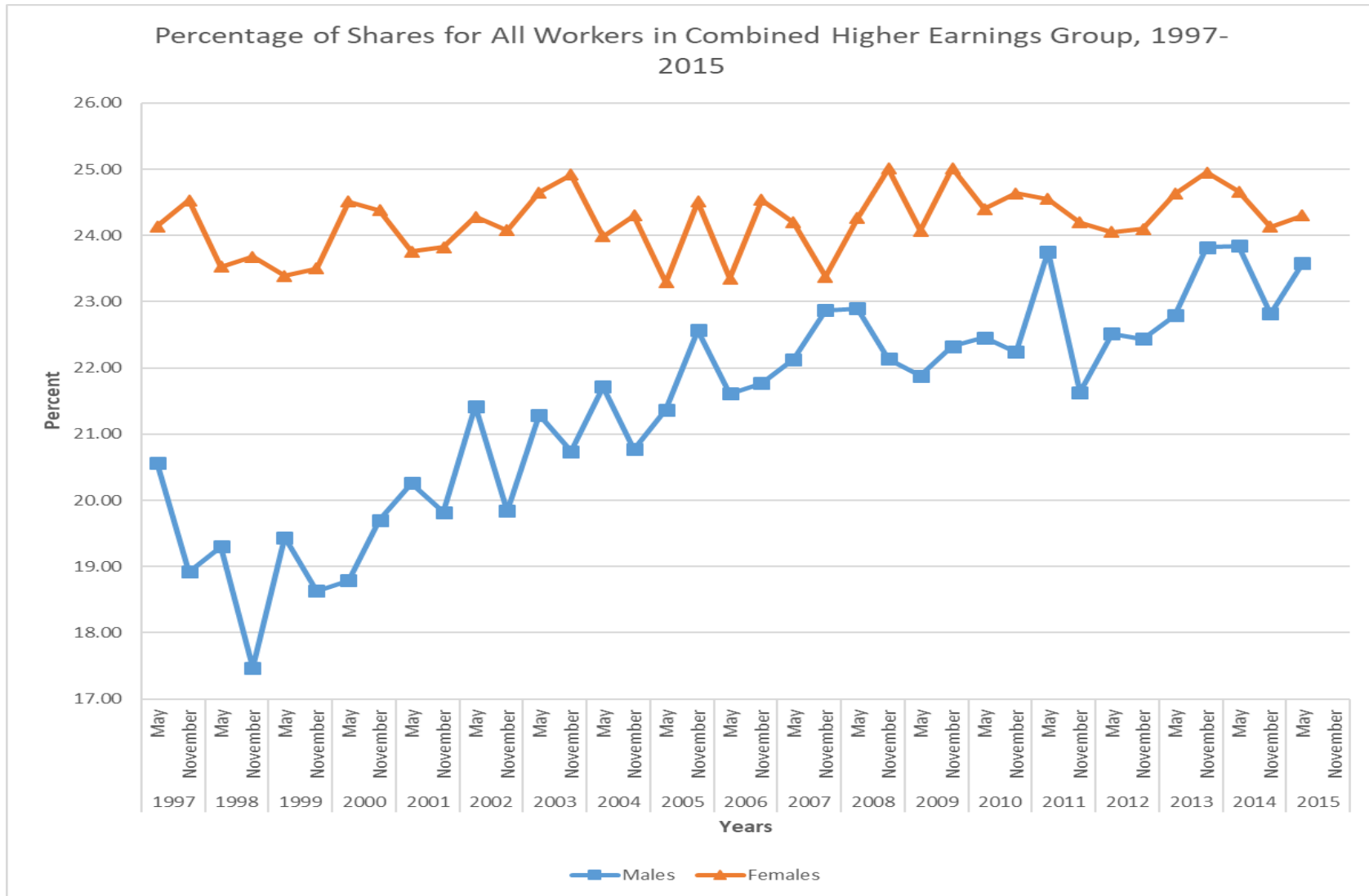
Source: LFS microdata files; calculations by author.

**Figure 4**



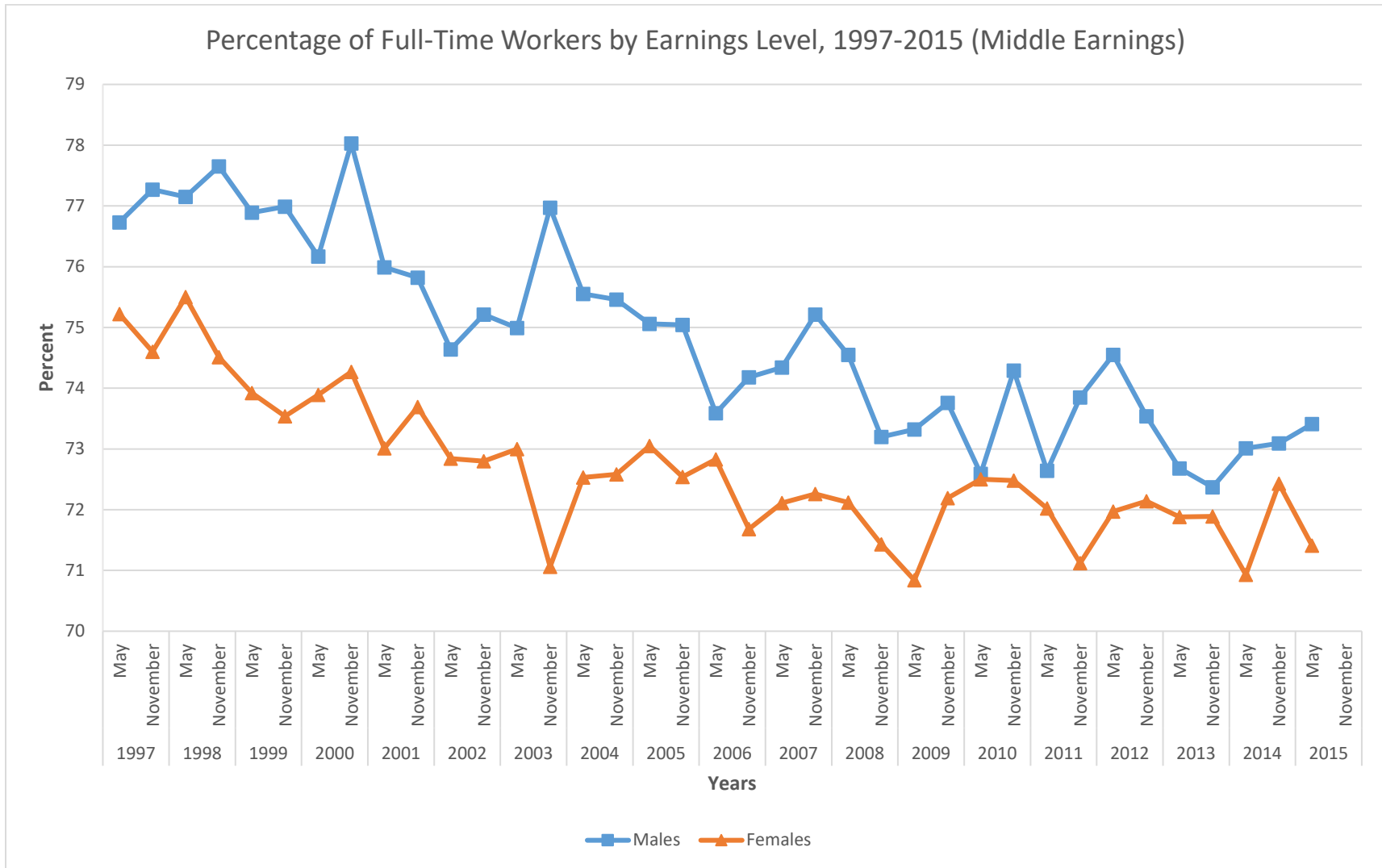
Source: LFS microdata files; calculations by author.

**Figure 5**



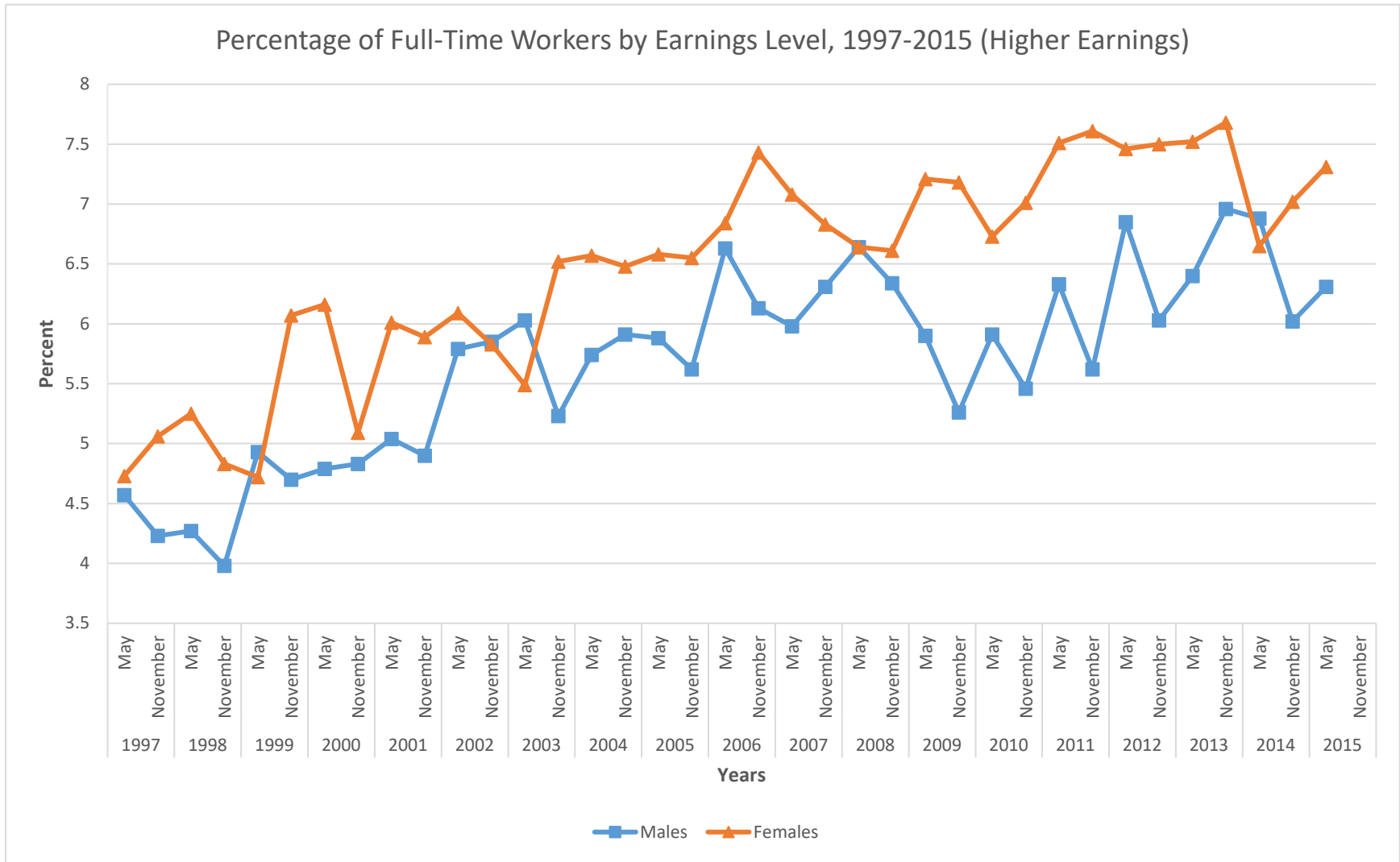
Source: LFS microdata files; calculations by author.

**Figure 6**



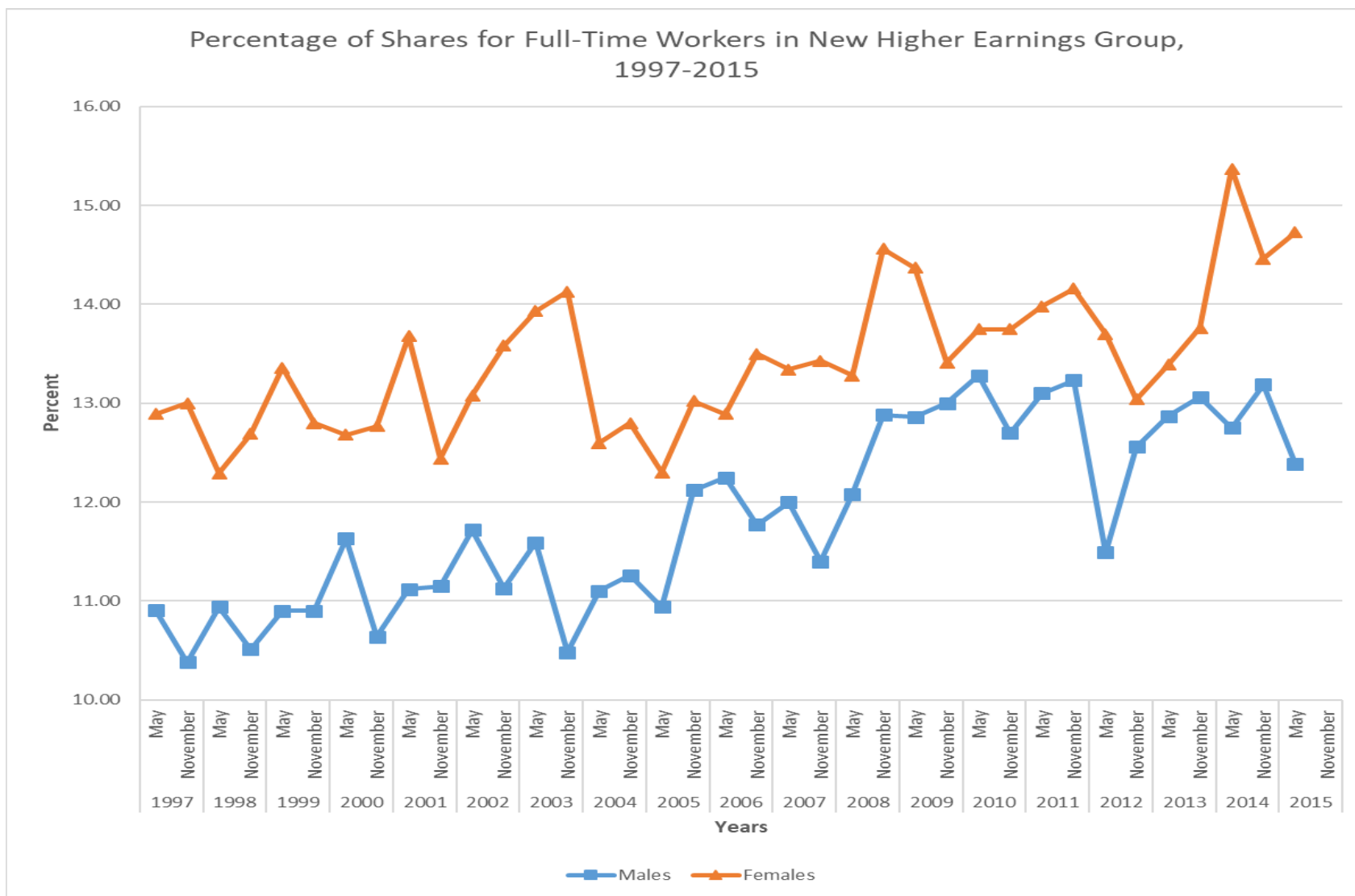
Source: LFS microdata files; calculations by author.

**Figure 7**



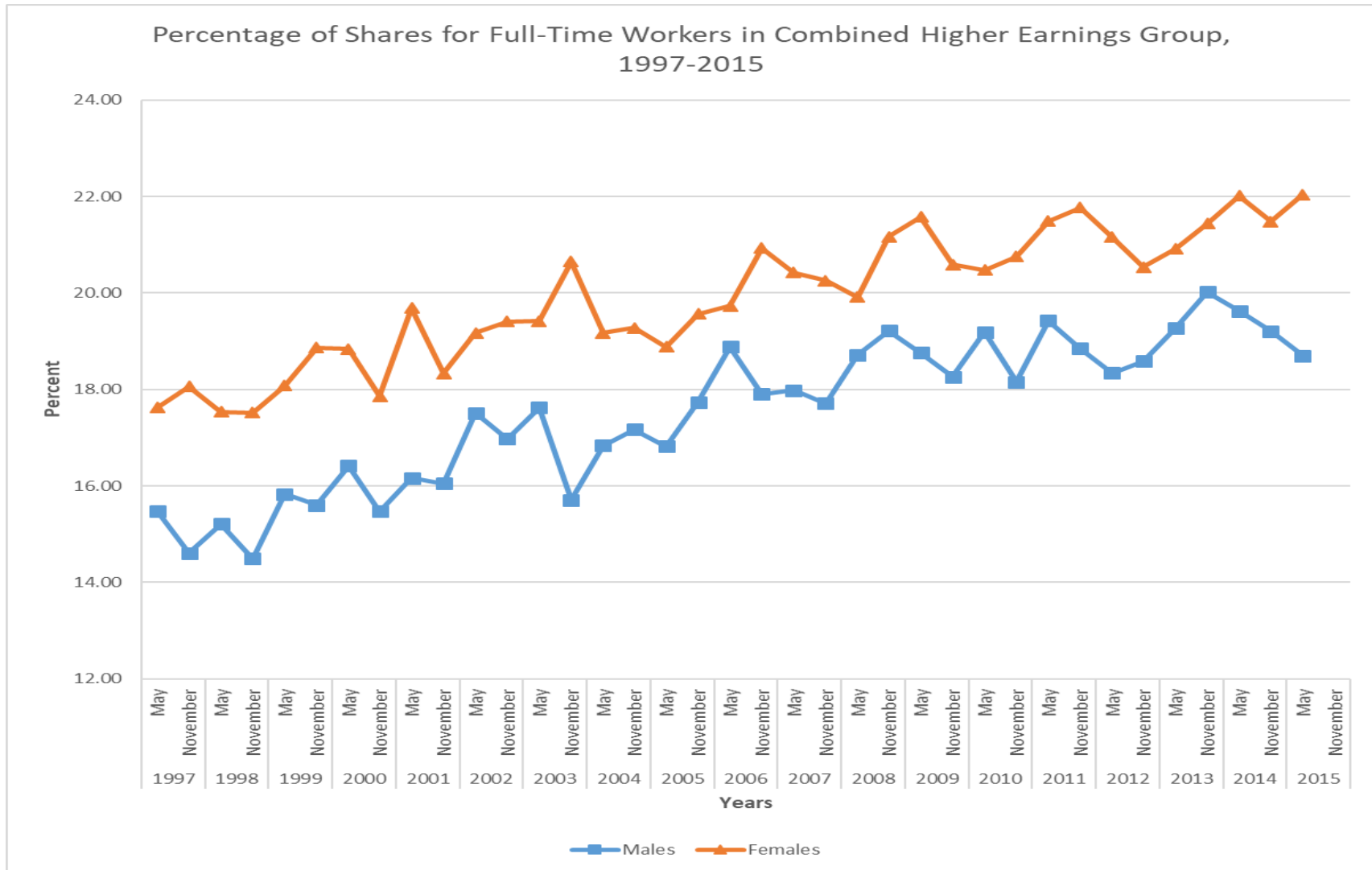
Source: LFS microdata files; calculations by author.

**Figure 8**



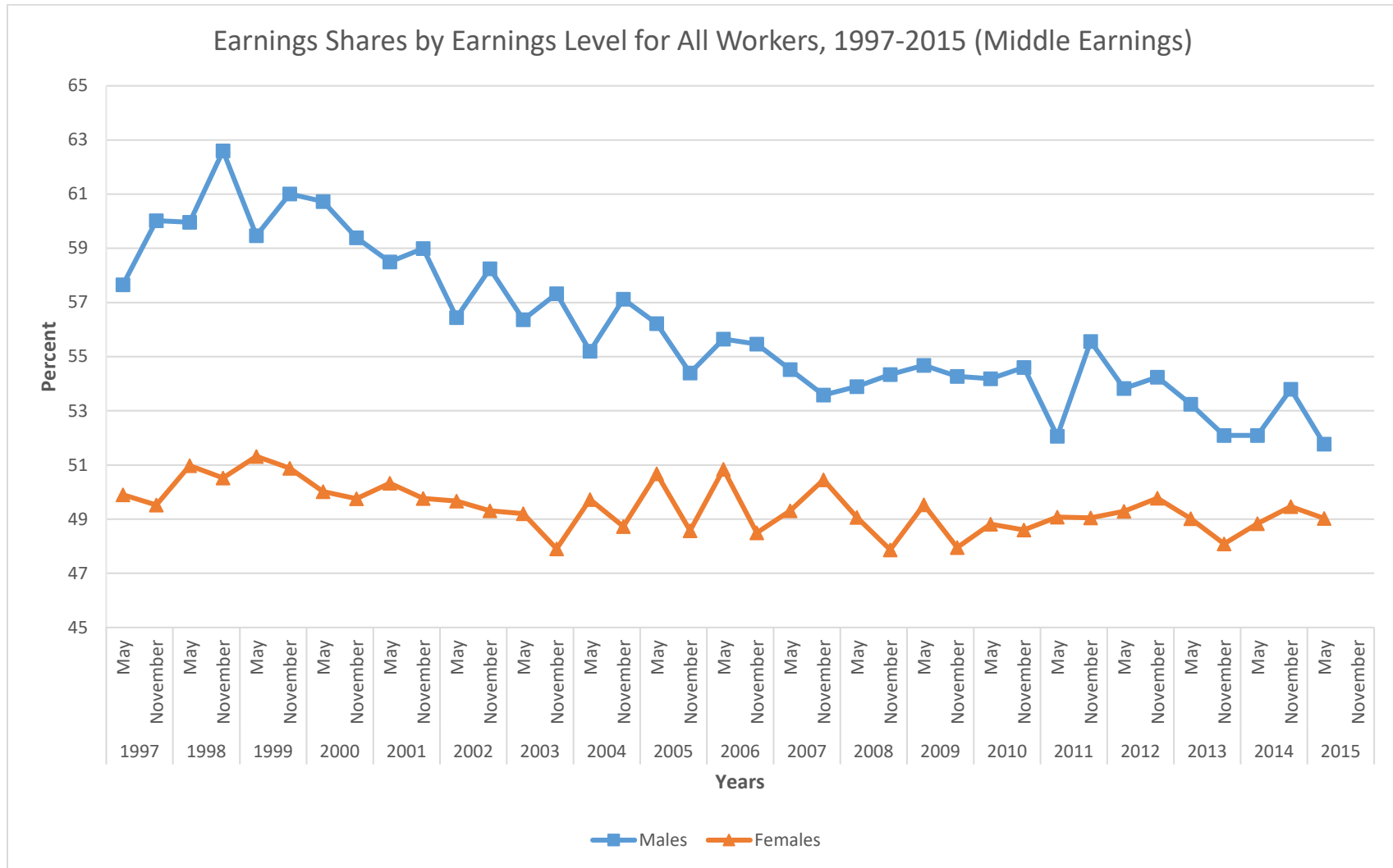
Source: LFS microdata files; calculations by author.

**Figure 9**



Source: LFS microdata files; calculations by author.

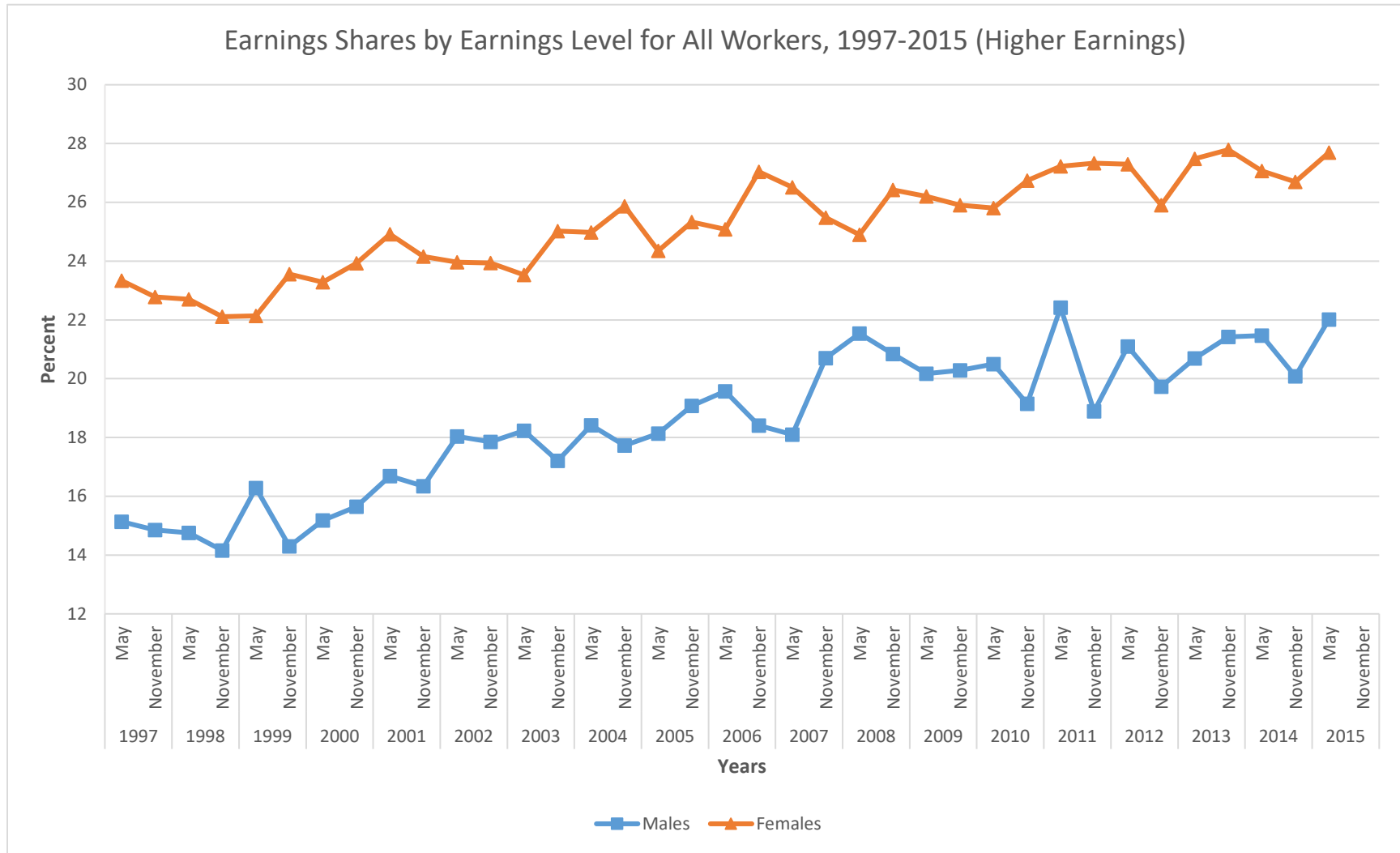
**Figure 10**



Source: LFS microdata files; calculations by author.

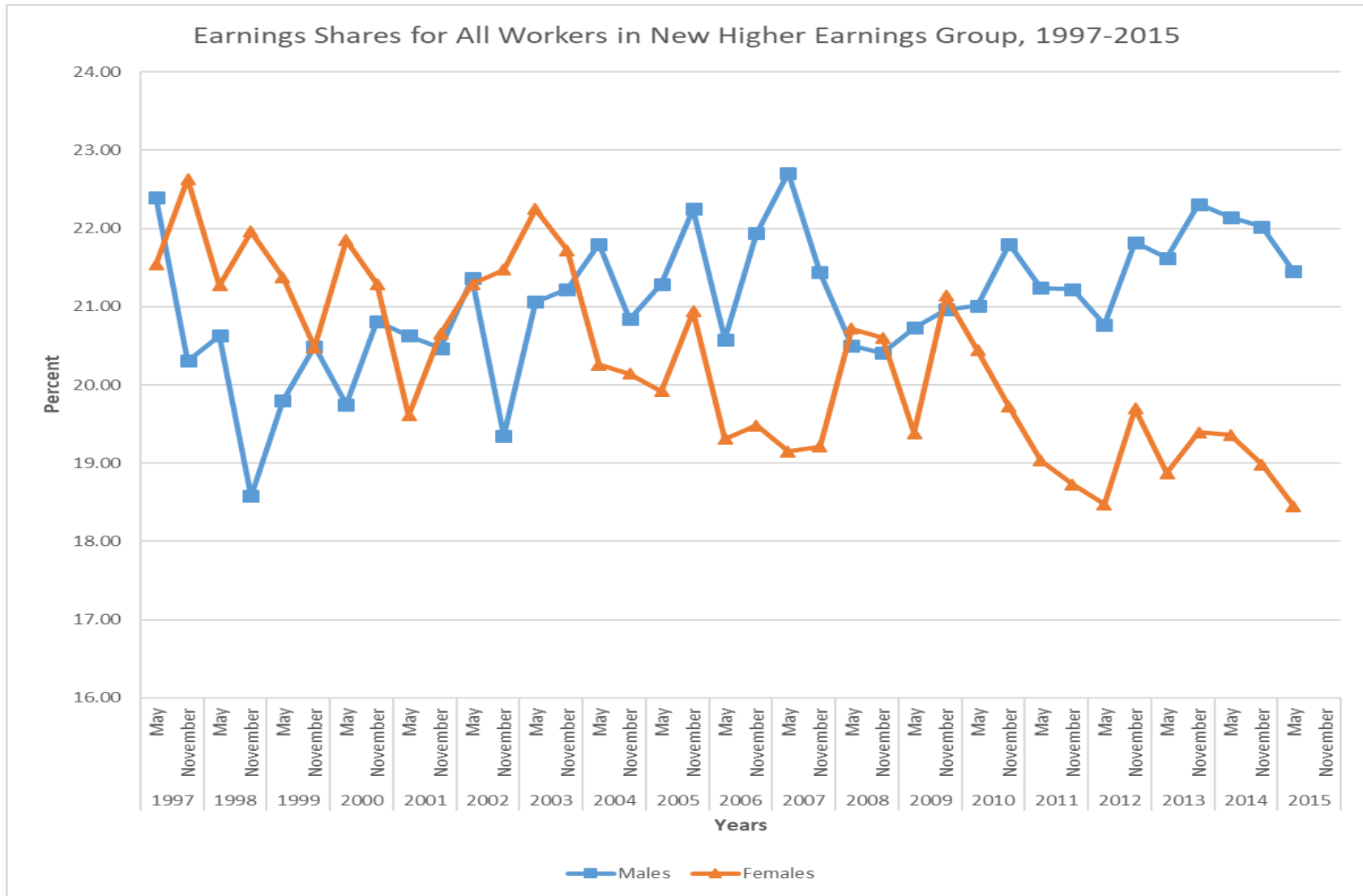


**Figure 11**



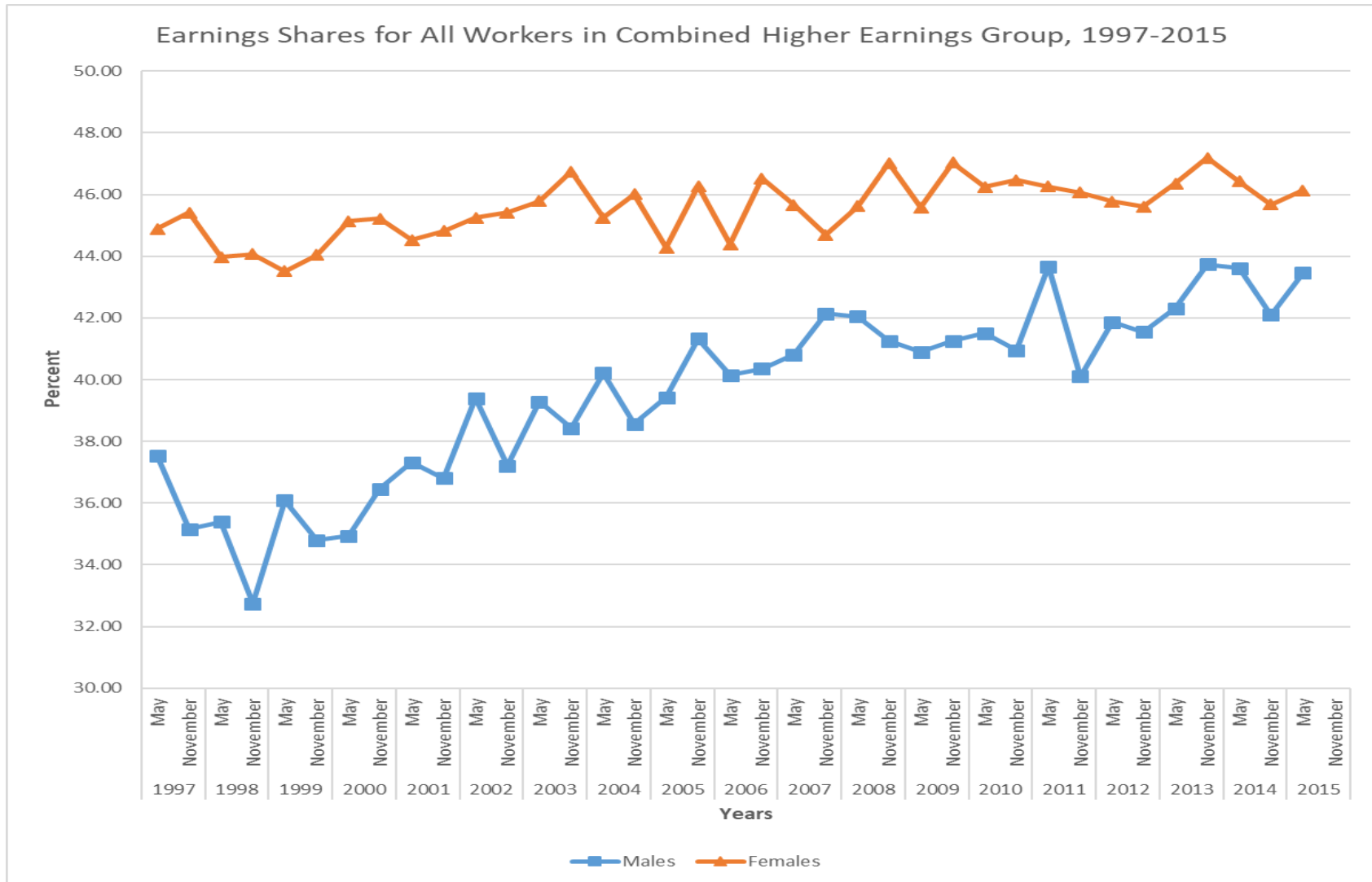
Source: LFS microdata files; calculations by author.

**Figure 12**



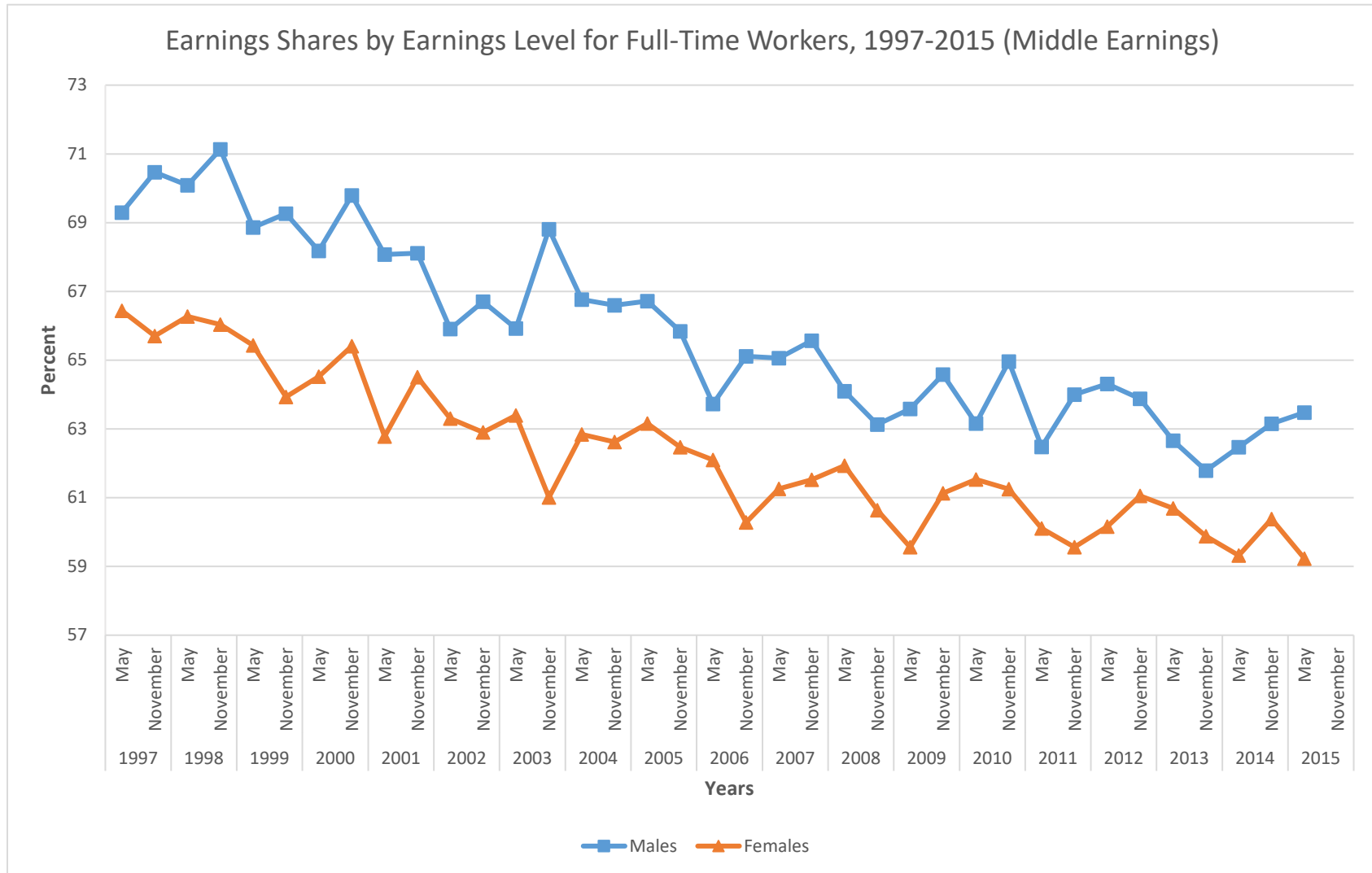
Source: LFS microdata files; calculations by author.

**Figure 13**



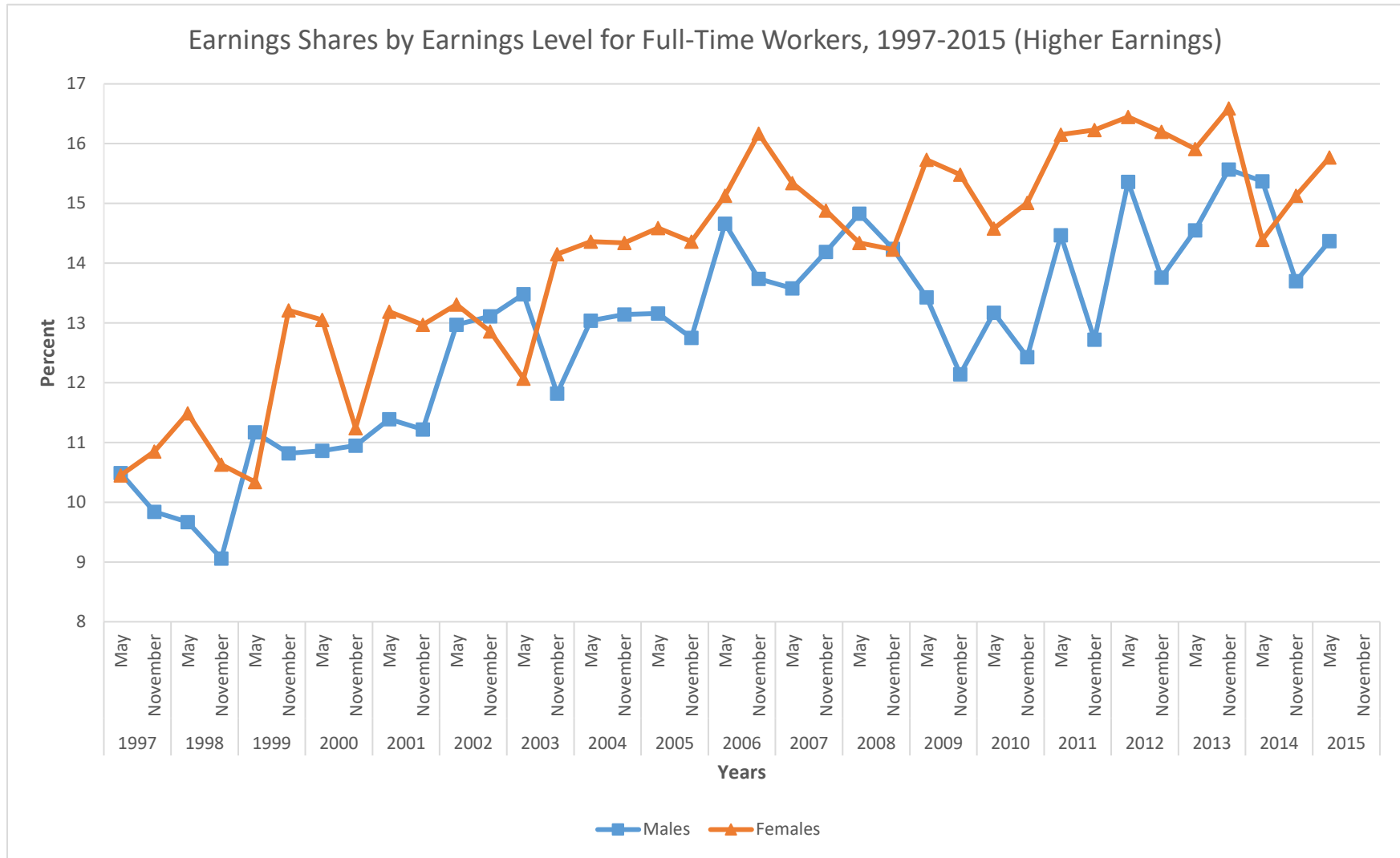
Source: LFS microdata files; calculations by author.

**Figure 14**



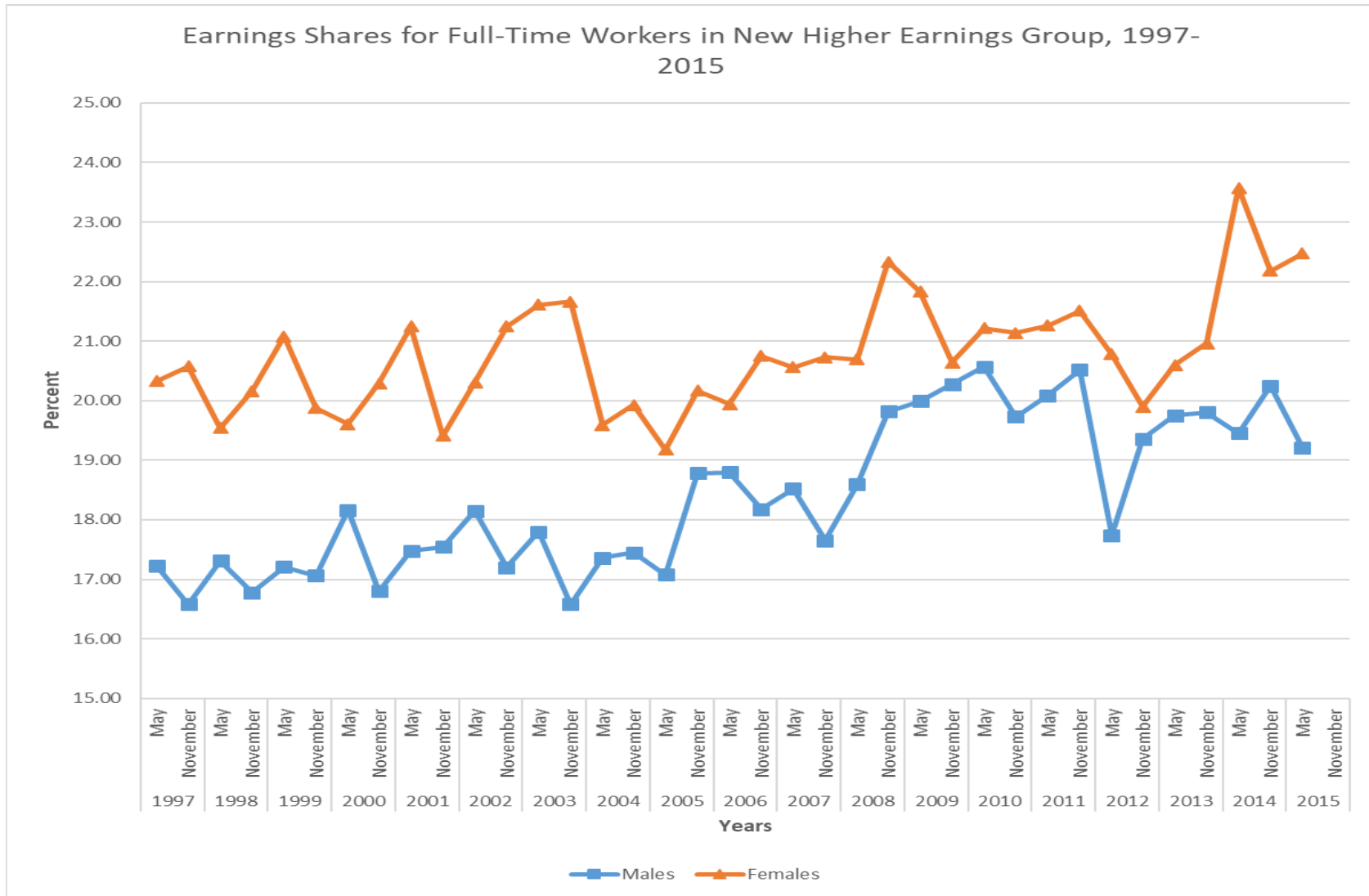
Source: LFS microdata files; calculations by author.

**Figure 15**



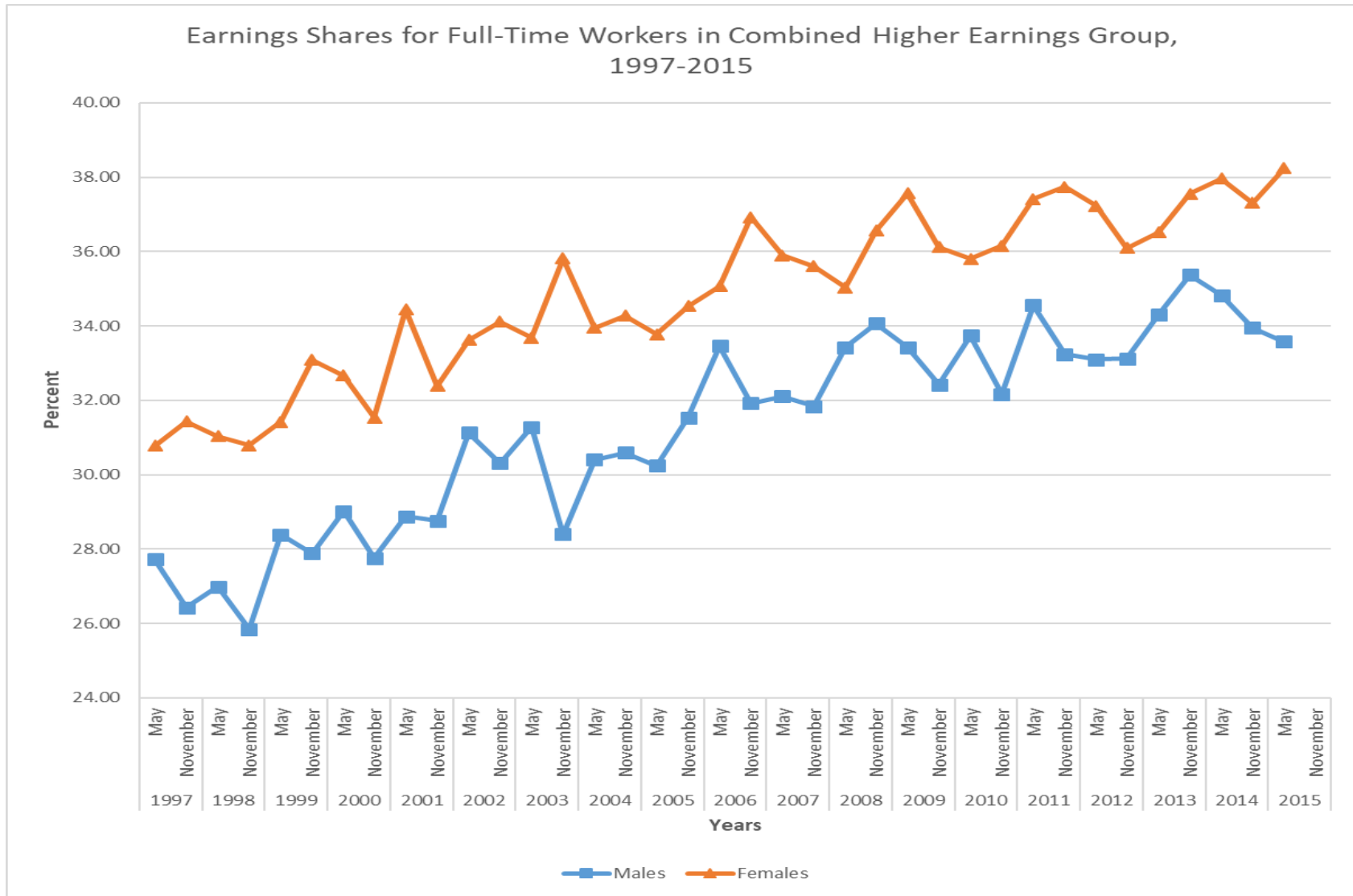
Source: LFS microdata files; calculations by author.

**Figure 16**



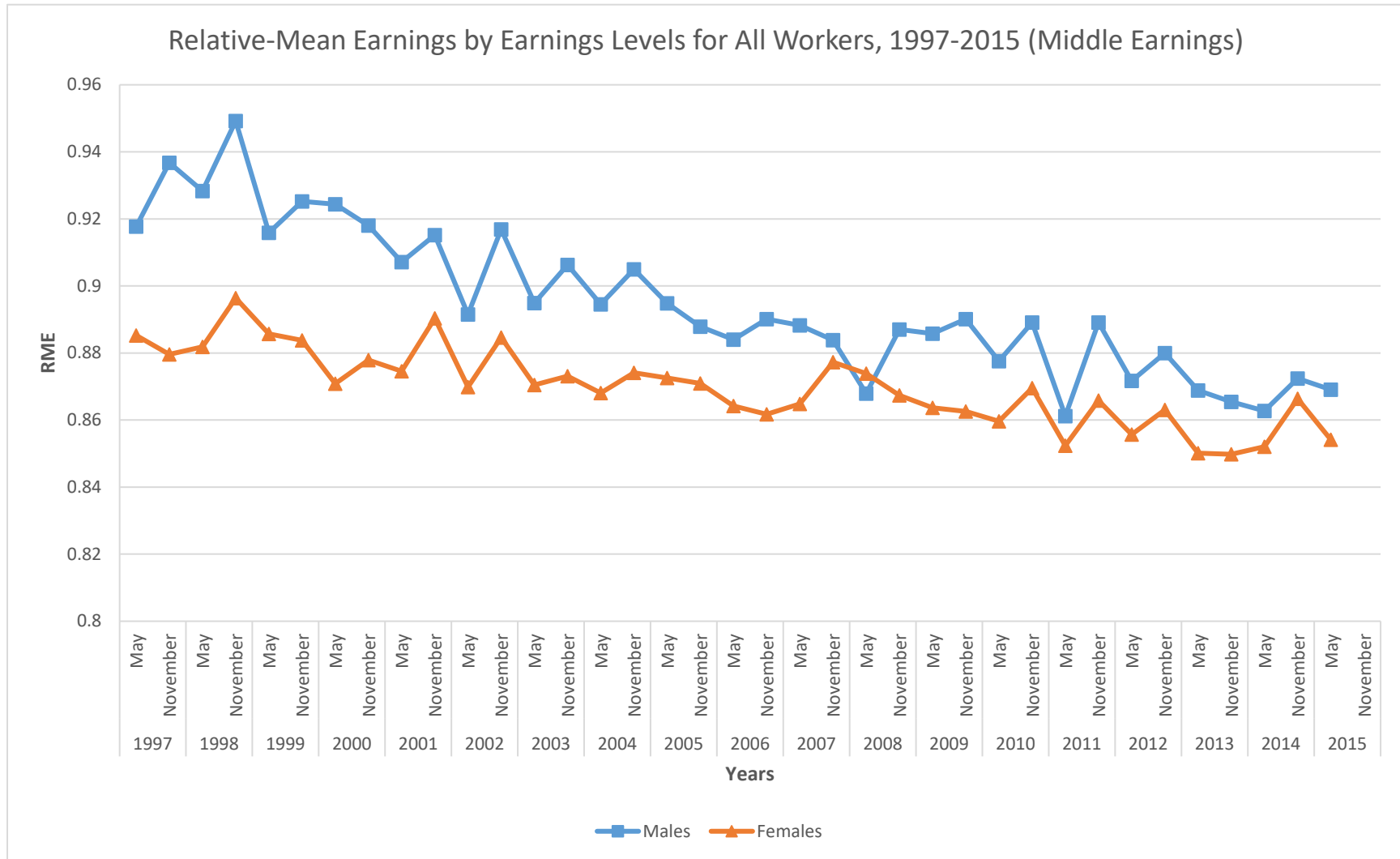
Source: LFS microdata files; calculations by author.

**Figure 17**



Source: LFS microdata files; calculations by author.

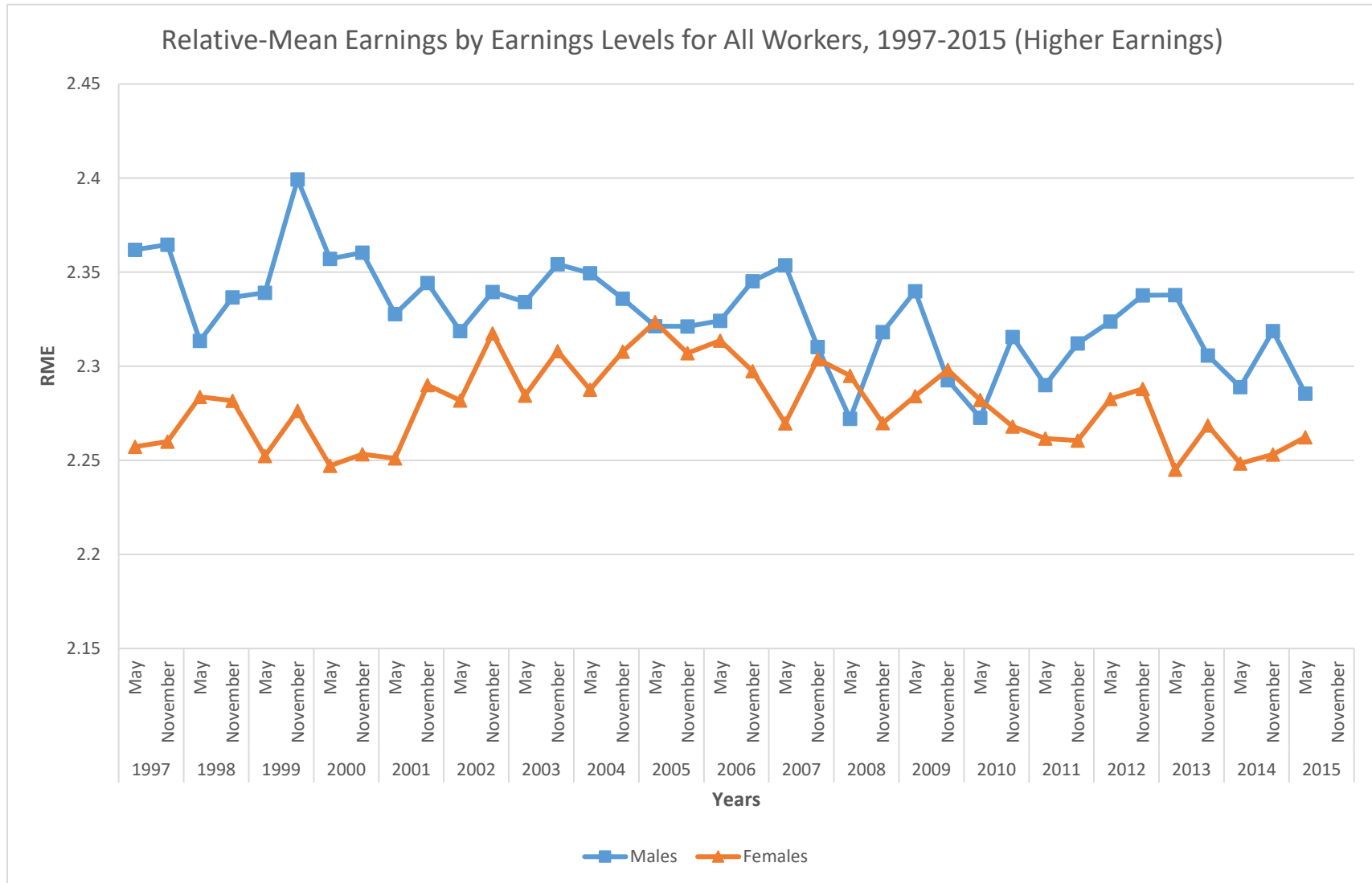
**Figure 18**



Source: LFS microdata files; calculations by author.

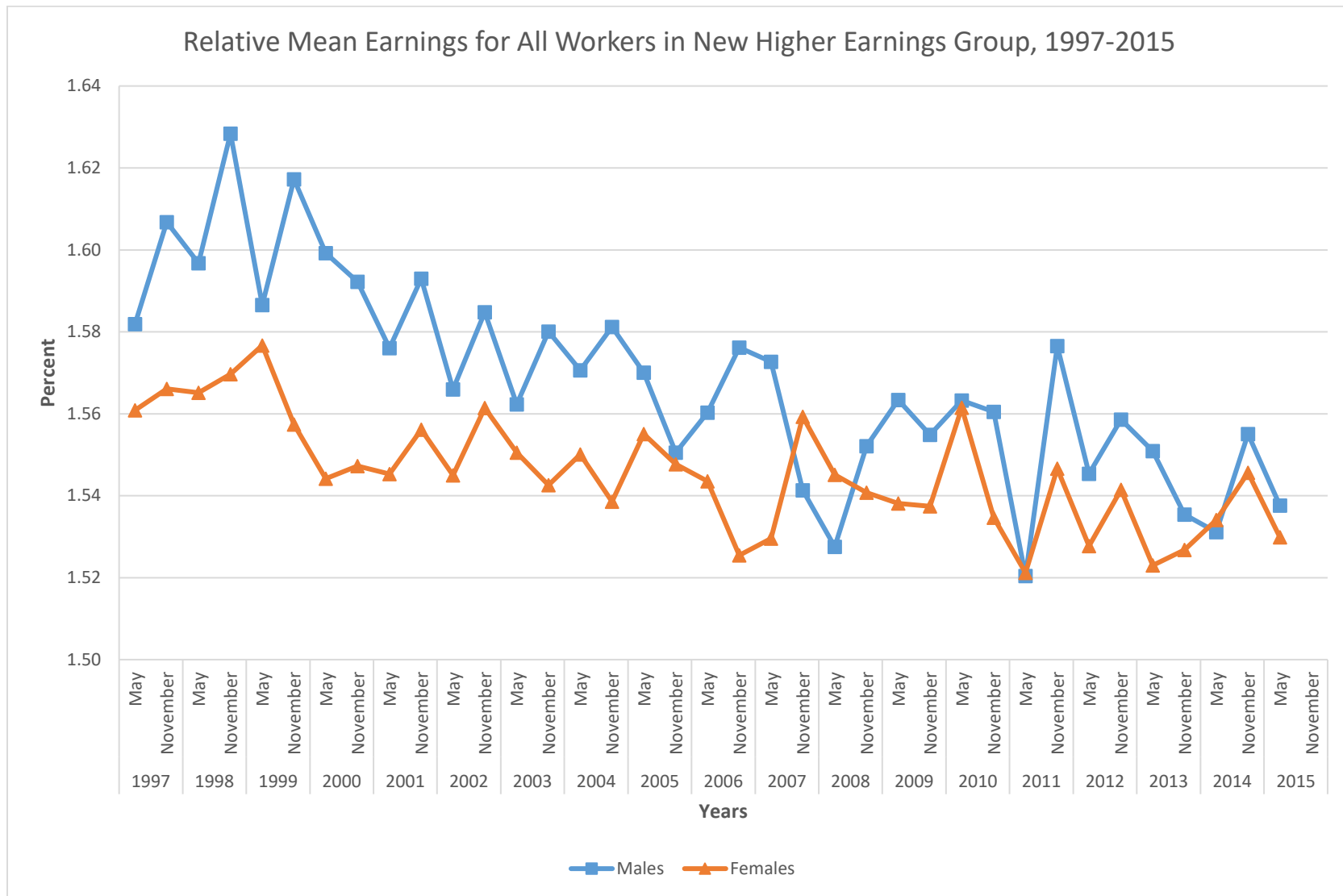


**Figure 19**



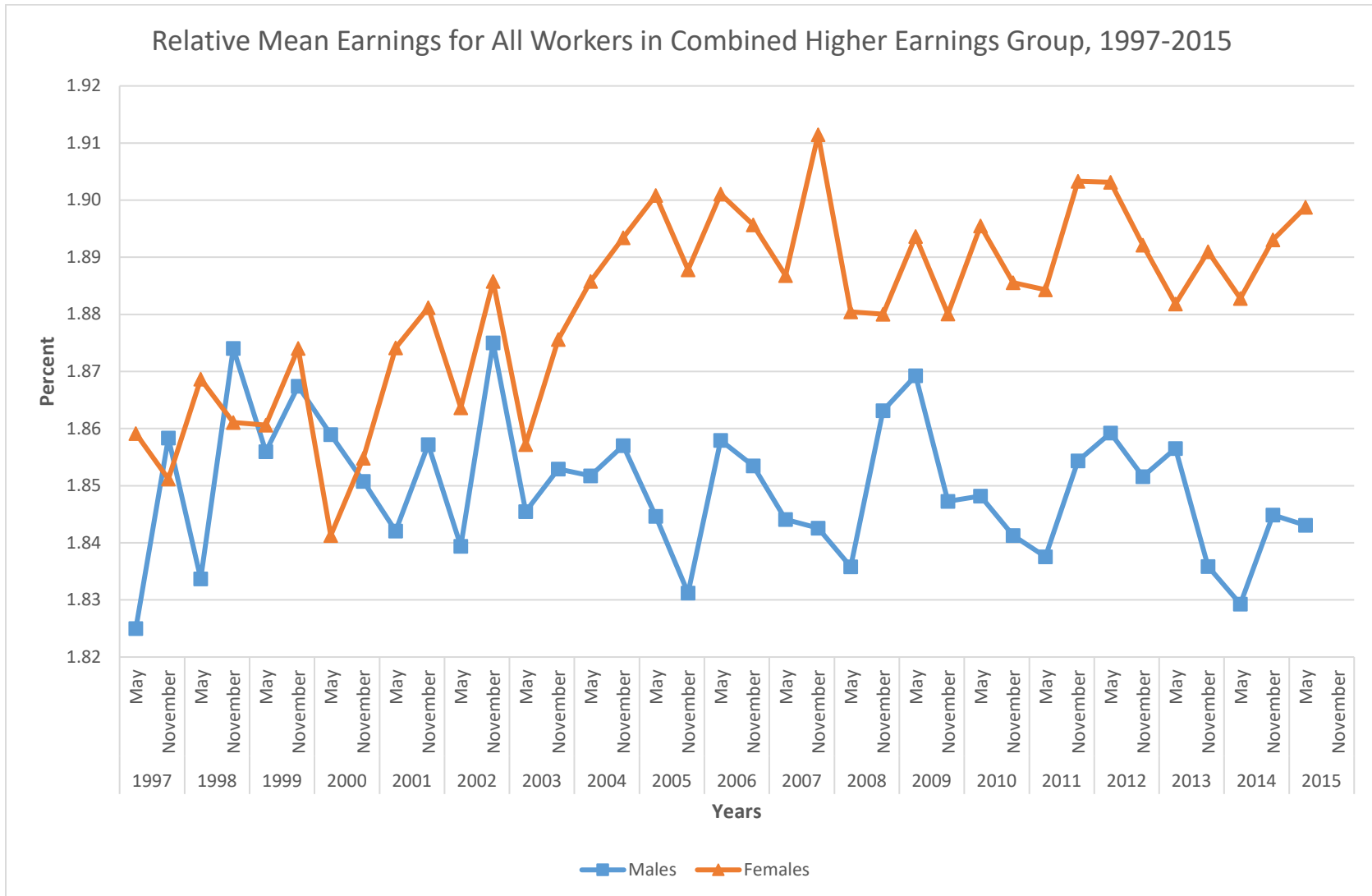
Source: LFS microdata files; calculations by author.

**Figure 20**



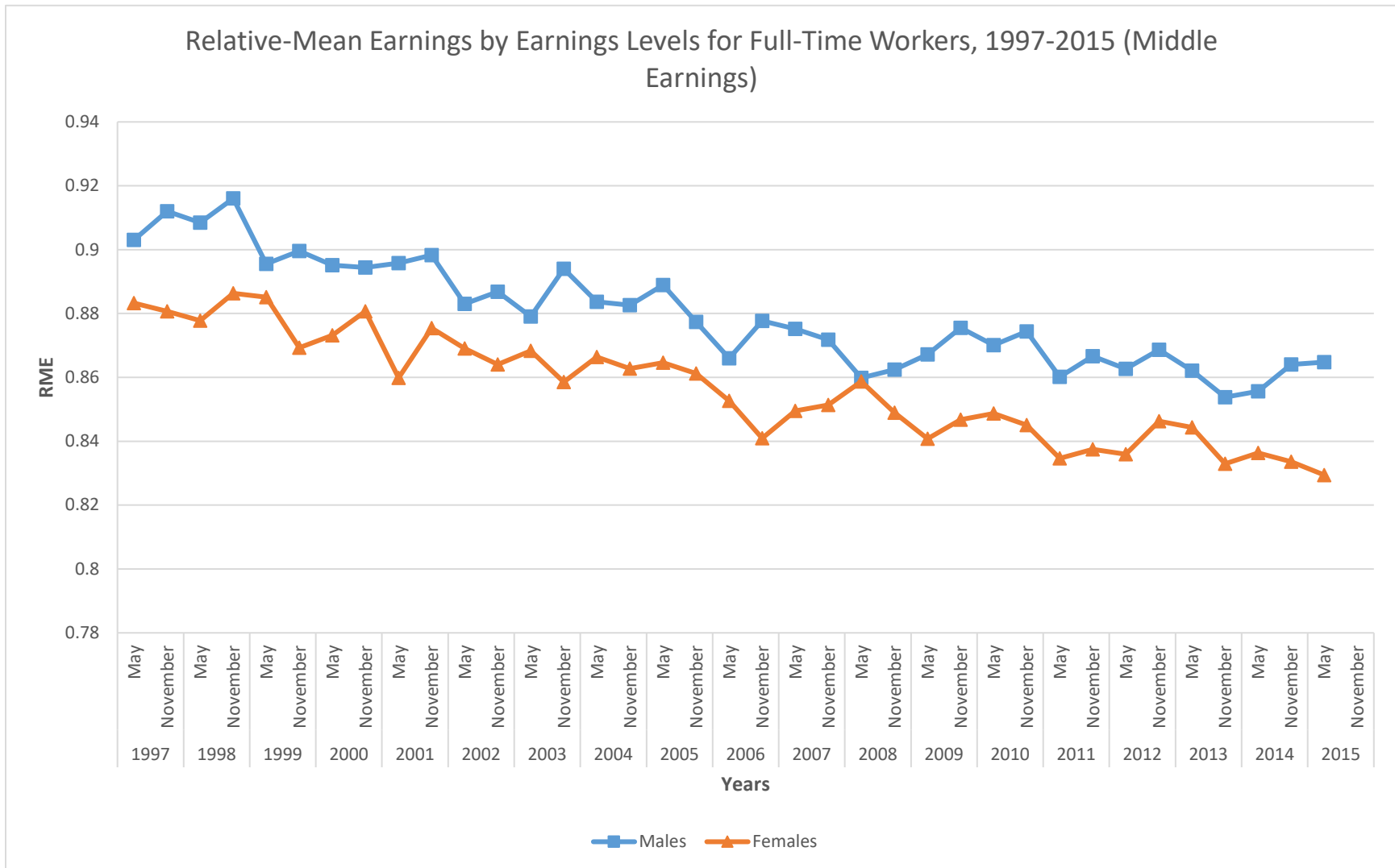
Source: LFS microdata files; calculations by author.

**Figure 21**



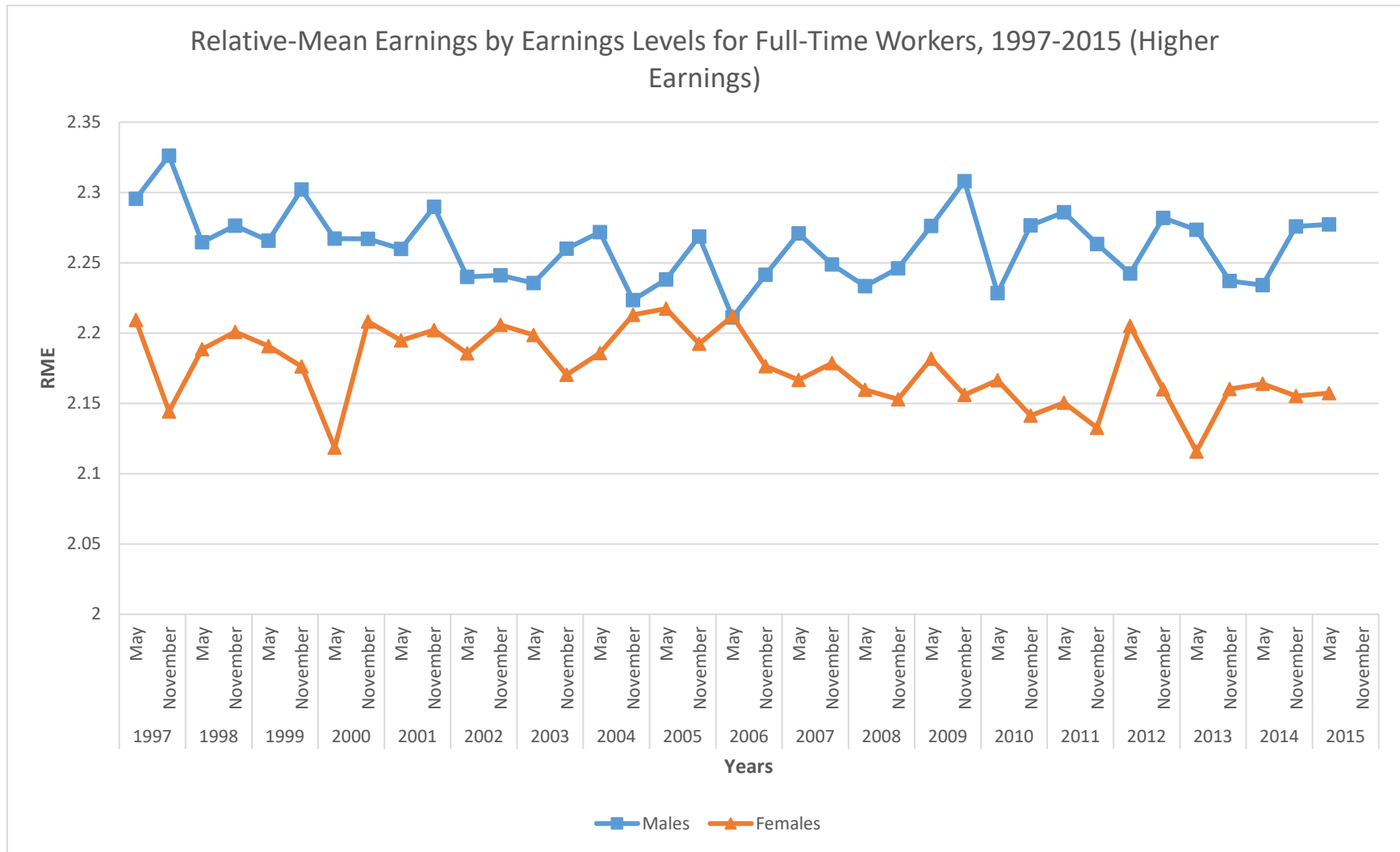
Source: LFS microdata files; calculations by author.

**Figure 22**



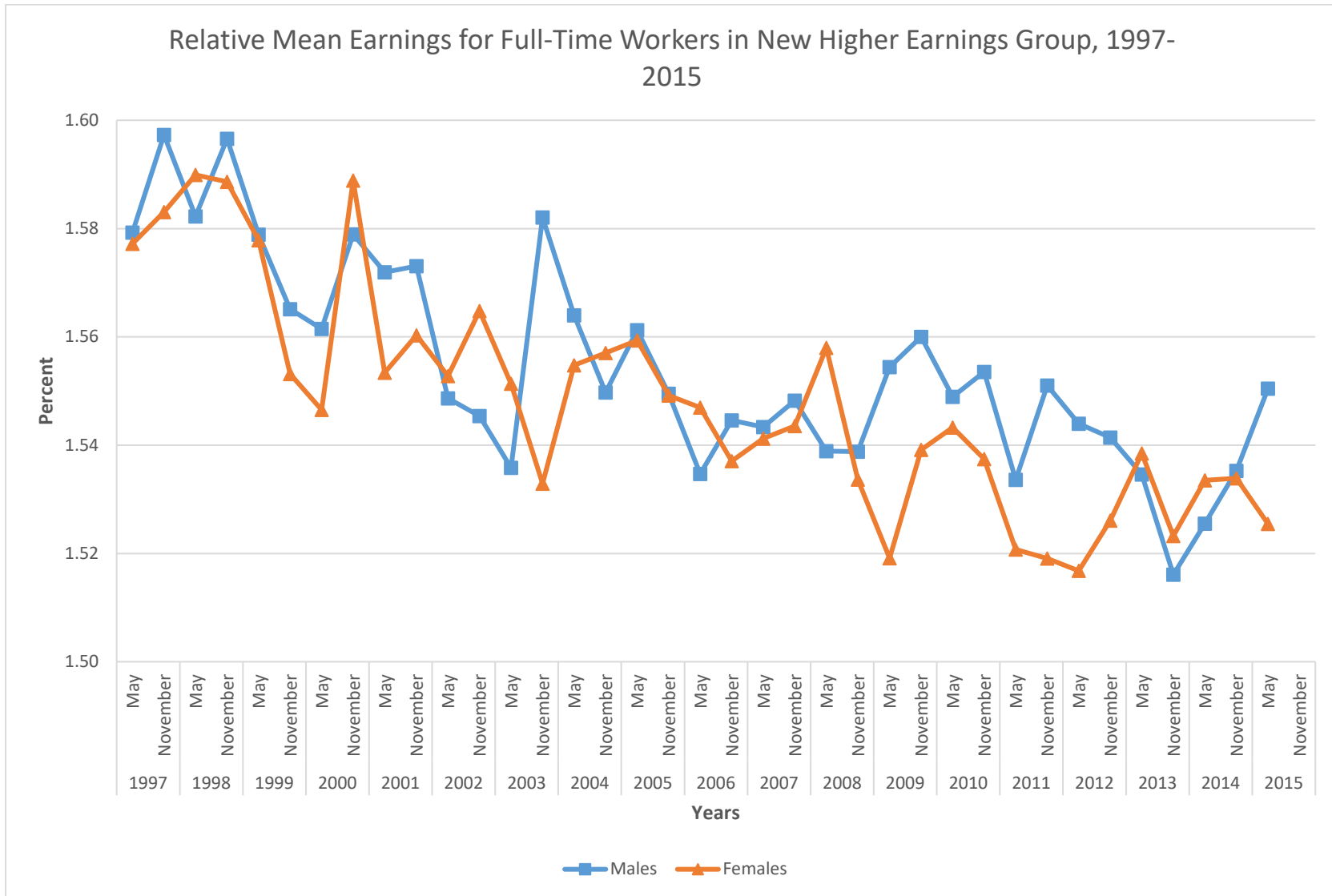
Source: LFS microdata files; calculations by author.

**Figure 23**



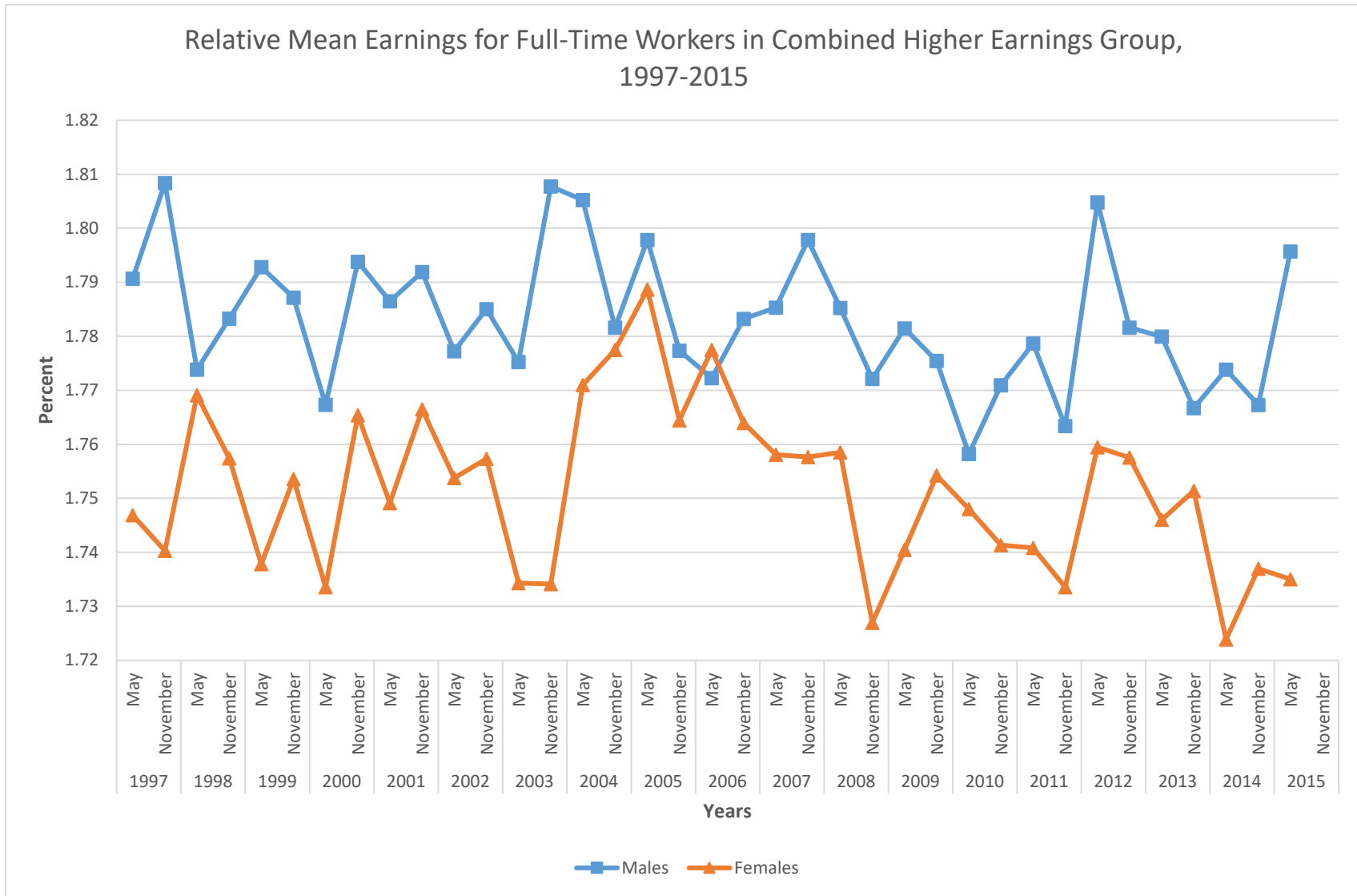
Source: LFS microdata files; calculations by author.

**Figure 24**



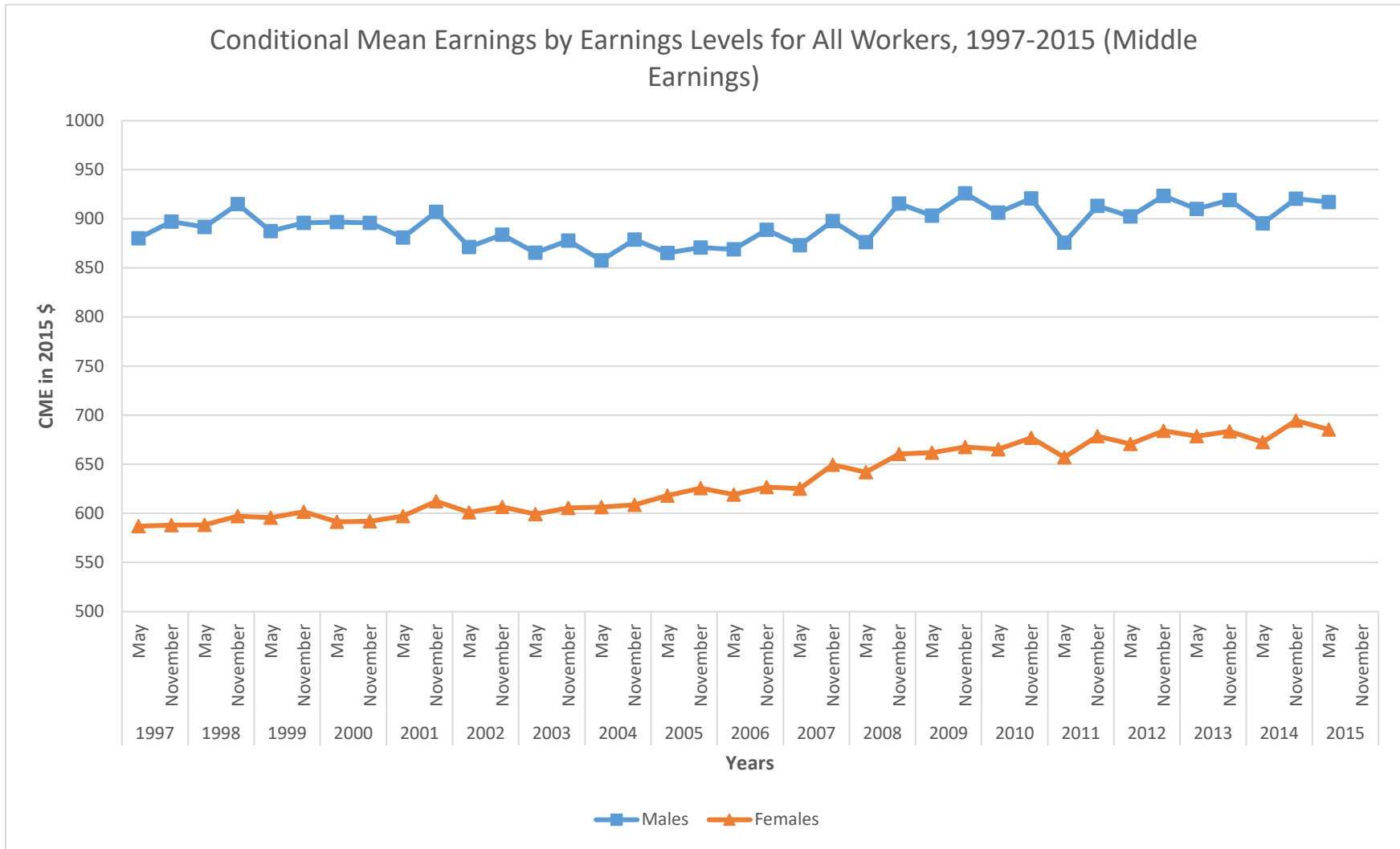
Source: LFS microdata files; calculations by author.

**Figure 25**



Source: LFS microdata files; calculations by author.

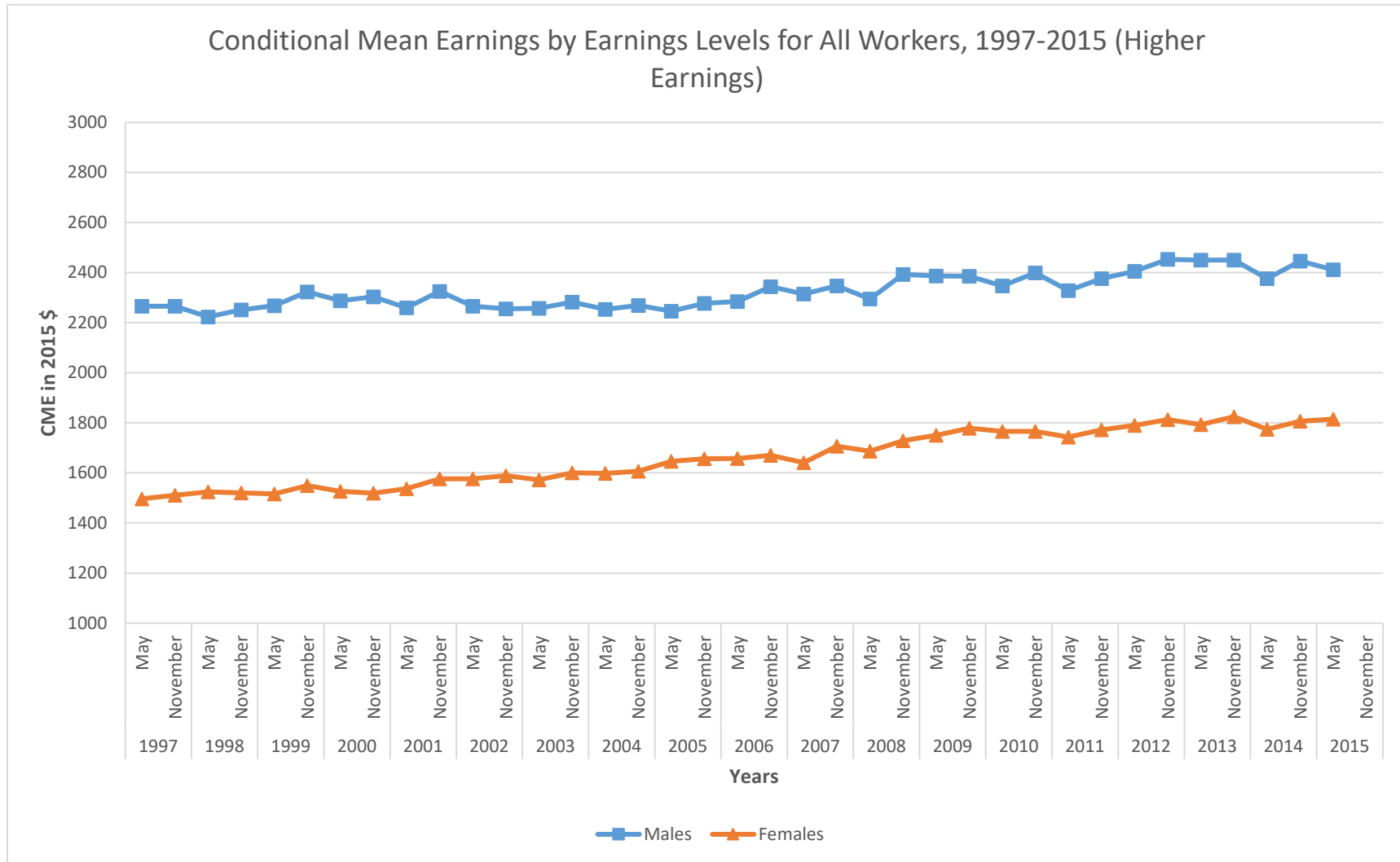
**Figure 26**



Source: LFS microdata files; calculations by author.

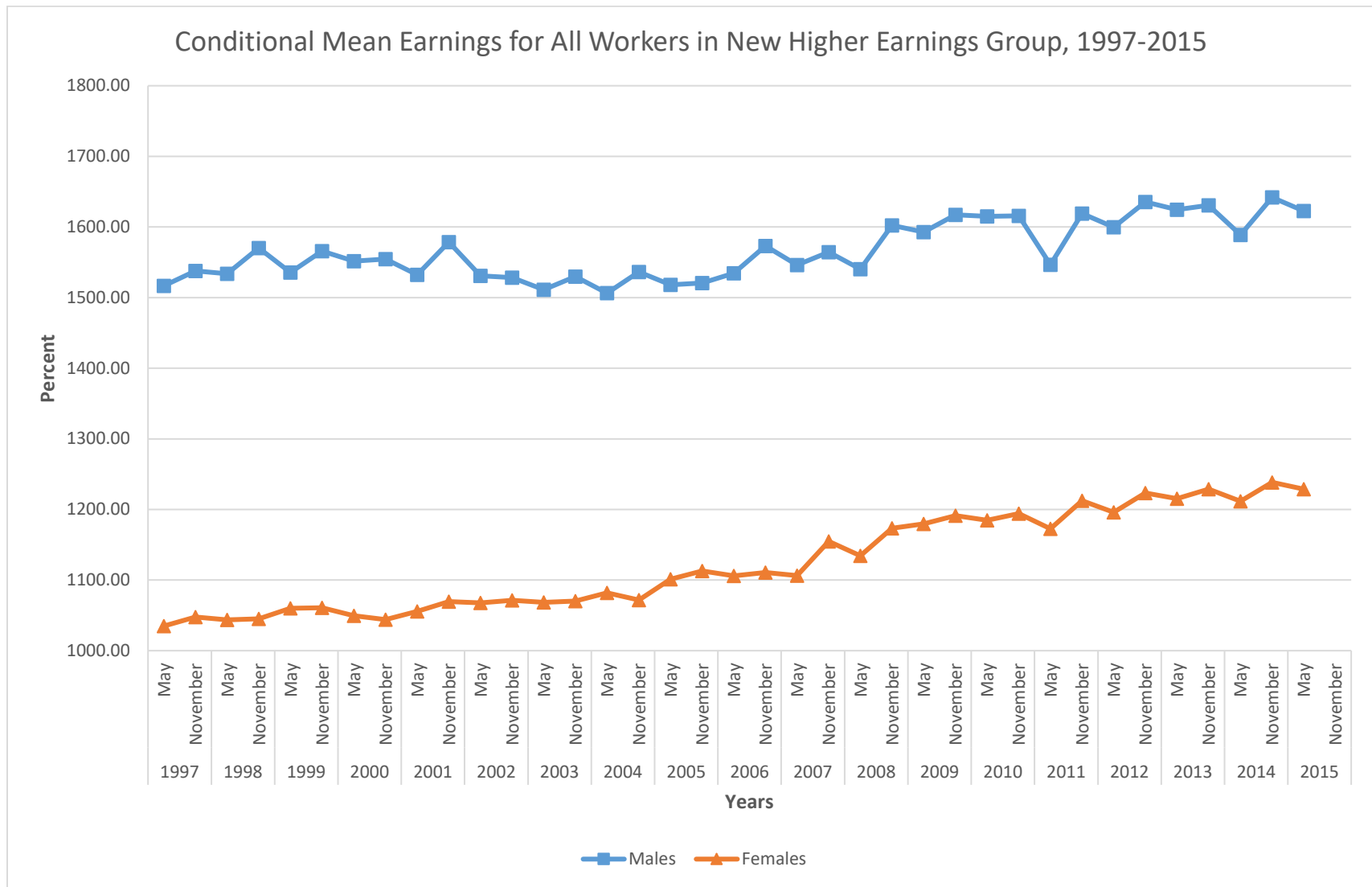


**Figure 27**



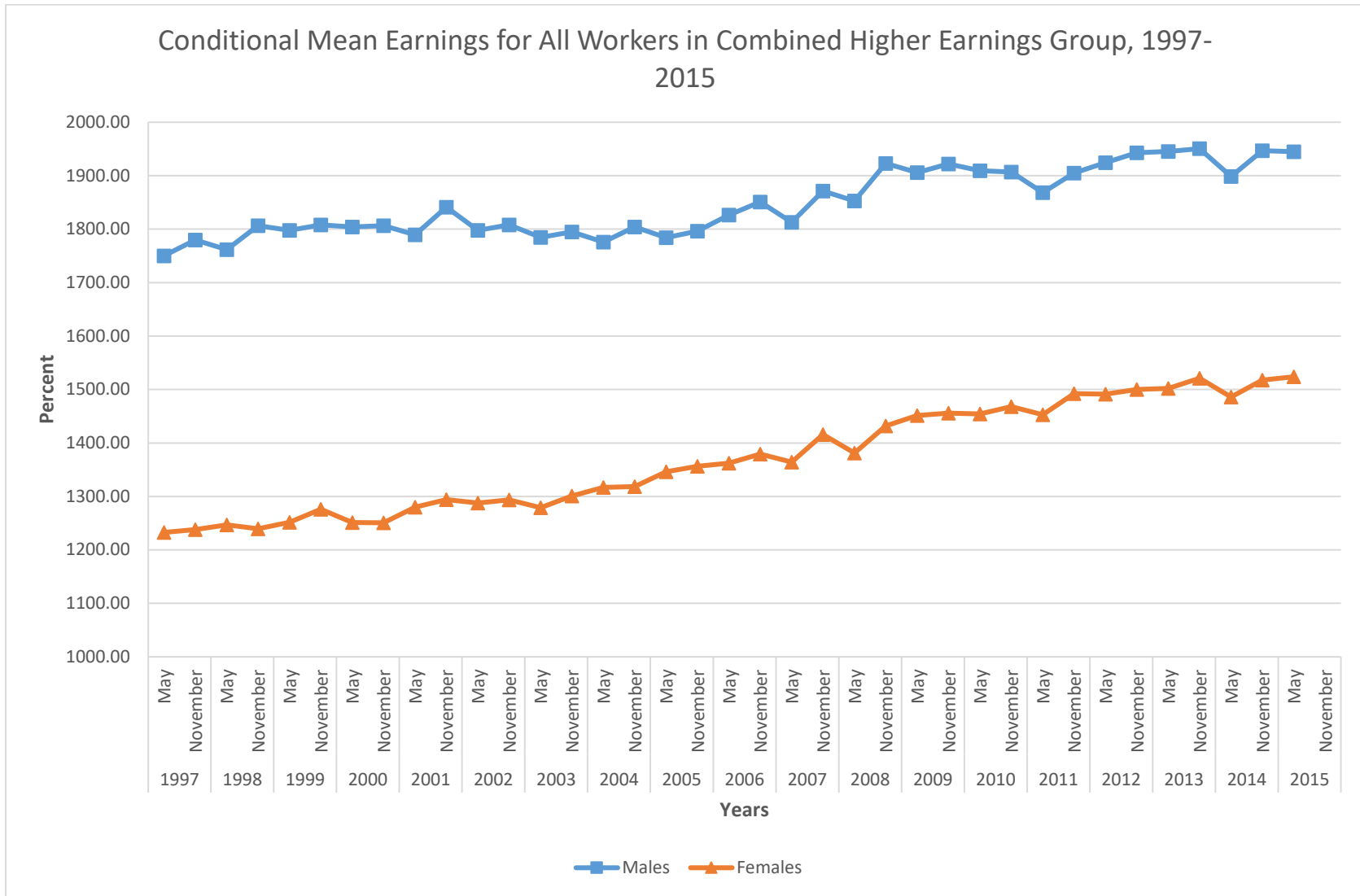
Source: LFS microdata files; calculations by author.

**Figure 28**



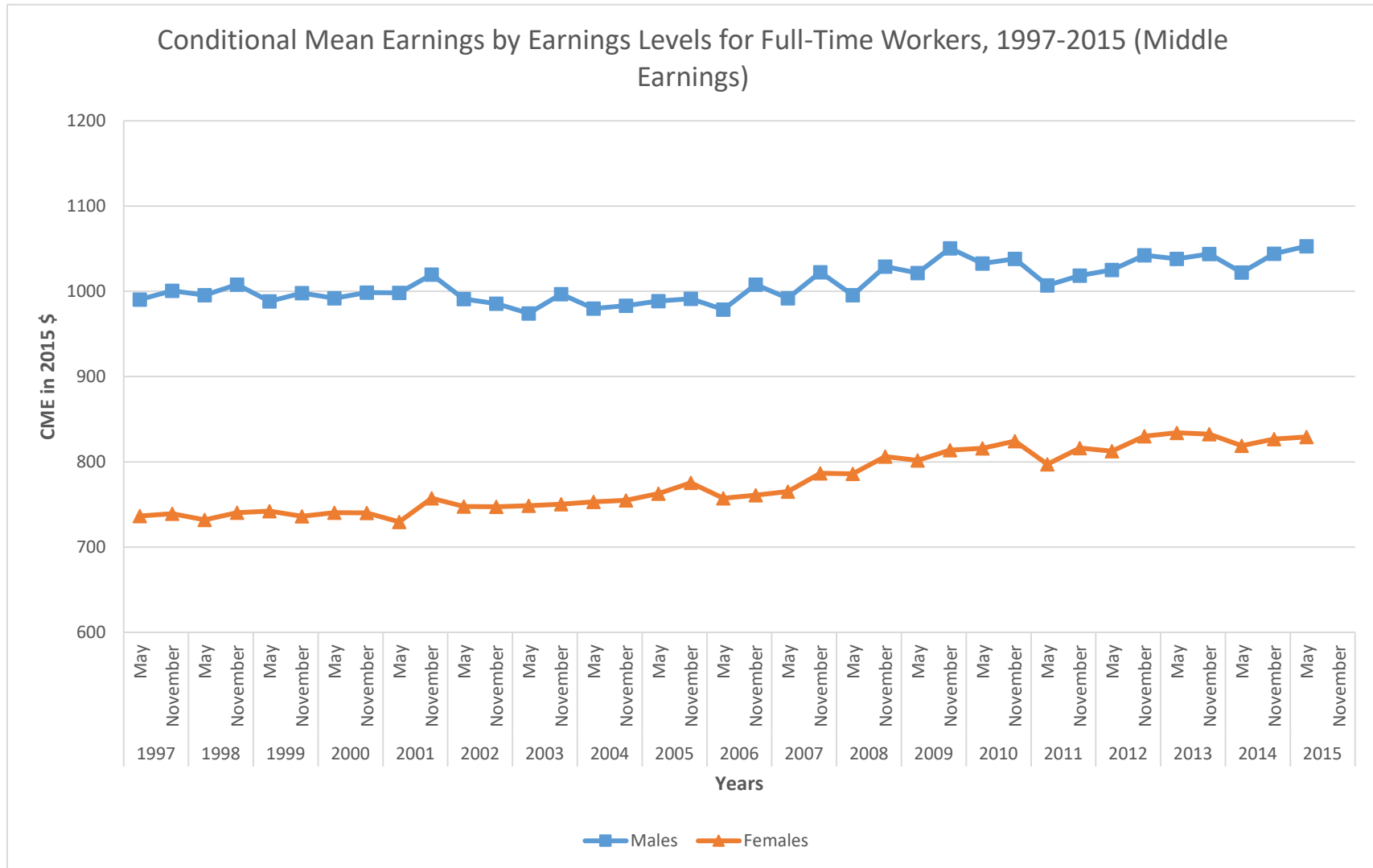
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**Figure 29**



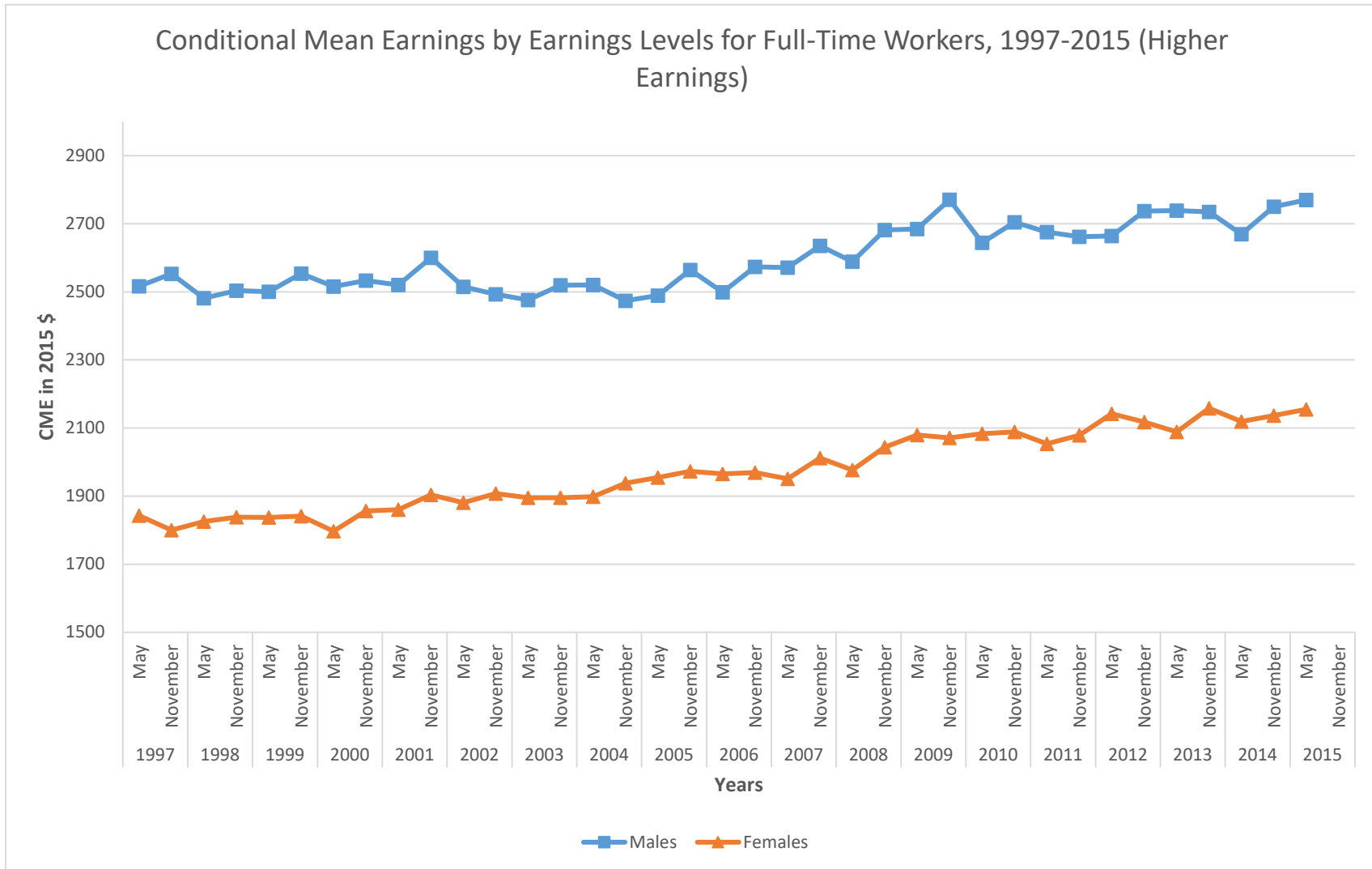
Source: LFS microdata files; calculations by author.

**Figure 30**



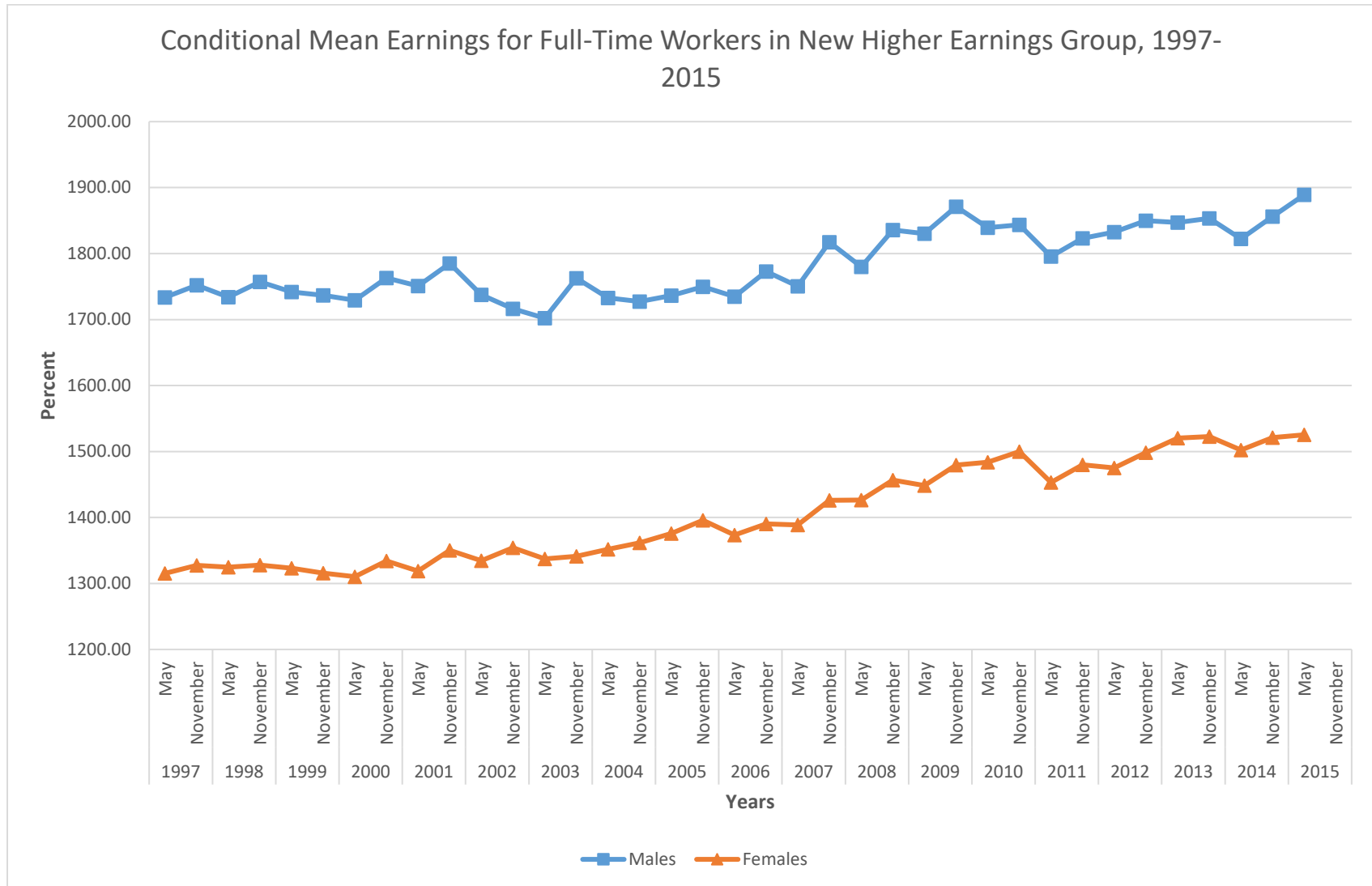
Source: LFS microdata files; calculations by author.

**Figure 31**



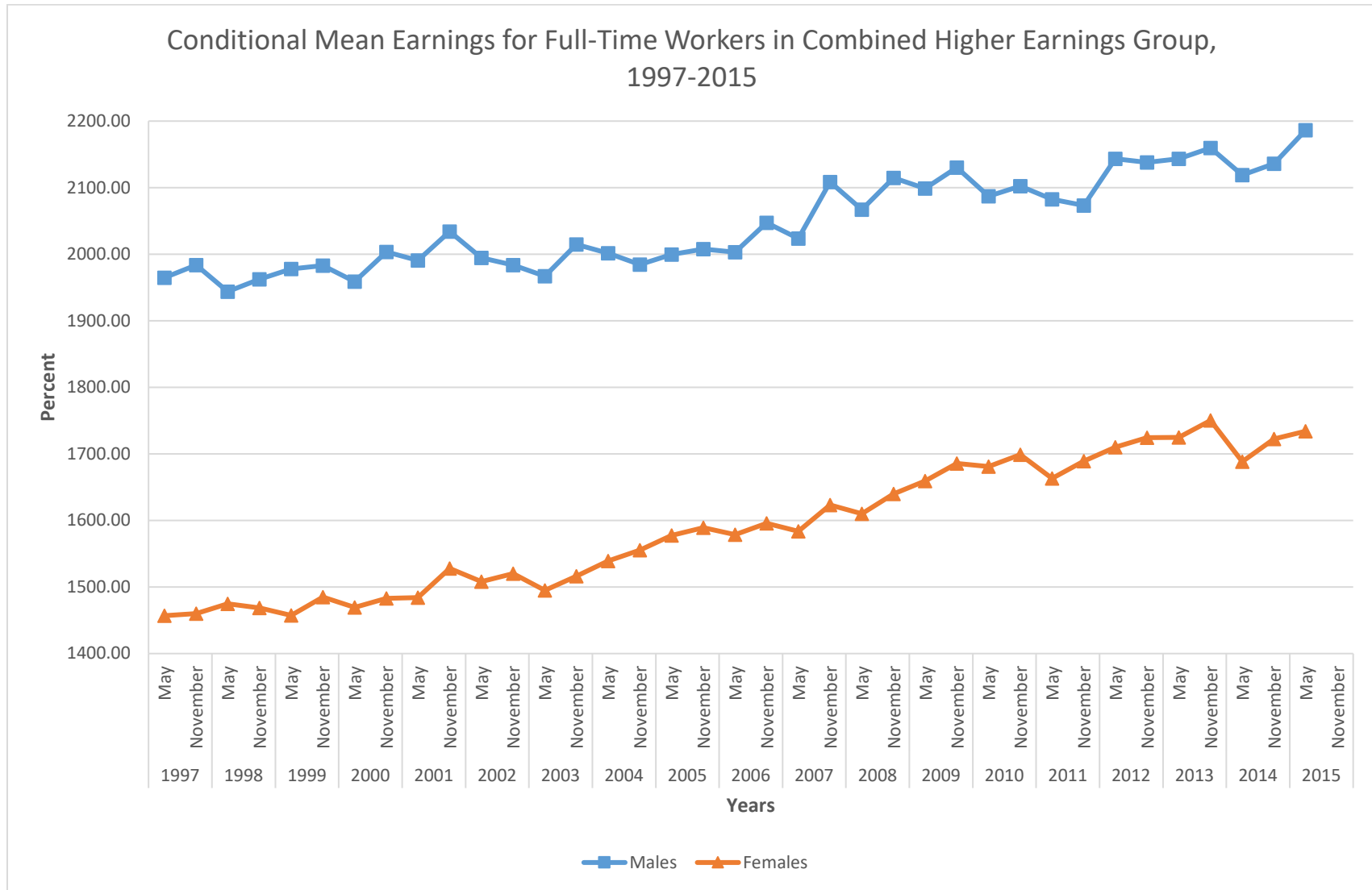
Source: LFS microdata files; calculations by author.

**Figure 32**



Source: LFS microdata files; calculations by author.

**Figure 33**



Source: LFS microdata files; calculations by author.

## References

- Acemoglu, D., and D. Autor (2011) “Skills, Tasks and Technologies: Implications for Employment and Earnings”. In *Handbook of Labor Economics*, Vol. 4, eds. O.C. Ashenfelter and D. Card. Amsterdam: North-Holland, 1043-1171.
- Acemoglu, D., D. Autor, D. Dorn, G.H. Hanson, and B. Price (2016) “Import Competition and the Great U.S. Employment Sag of the 2000s”. *Journal of Labor Economics* 34, S141-S198.
- Beach, C.M. (2016) “Changing Income Inequality: A Distributional Paradigm for Canada”, *Canadian Journal of Economics* 49, 1229-1292.
- Beach, C.M. (2017) “Have Middle-Class Earnings Risen in Canada? A Statistical Inference Approach”, Queen’s University, Department of Economics Discussion Paper No. 1393, November.
- Beaudry, P., D.A. Green, and B.M. Sand (2016) “The Great Reversal in the Demand for Skill and Cognitive Tasks”, *Journal of Labour Economics* 34, S199-S247.
- Bergin, J. (2015) *Mathematics for Economists with Applications*. Routledge: London and New York.
- Elsby, M., W.L. B. Hobyu, and A. Sahin (2013) “The Decline of the U.S. Labor Share”, unpublished paper.
- Fortin, N.M., and T. Lemieux (2015) “Changes in Wage Inequality in Canada: An Interprovincial Perspective”. *Canadian Journal of Economics* 48, 682-713.
- Green, D.A. (2015) “Chasing After ‘Good Jobs’: Do They Exist and Does It Matter If They Do?”. *Canadian Journal of Economics* 48, 1215-65.
- \_\_\_\_\_ (2016) “Inequality in Canada: Symposium Introduction”. *Canadian Journal of Economics* 49, 647-54.
- Green, D.A., and B.M. Sand (2015) “Has the Canadian Labour Market Polarized?”. *Canadian Journal of Economics* 48, 612-45.
- Green, D.A., W.C. Riddell and F. St-Hilaire (2016) “Income Inequality in Canada: Driving Forces, Outcomes and Policy”. In *Income Inequality: The Canadian Story*, eds. D.A. Green, W.C. Riddell and F. St-Hilaire. Montreal: The Institute for Research on Public Policy.
- Hershbein, B., and L.B. Kahn (2017) “Do Recessions Accelerate Routine-Biased Technological Change?”, W.E. Upjohn Institute for Employment Research 24, No. 4.
- Katz, L.F., and K.M. Murphy (1992) “Changes in Relative Wages, 1963-1987: Supply and Demand Factors”. *Quarterly Journal of Economics* 107, 35-78.
- Stiglitz, J.E. (2012) *The Price of Inequality: How Today’s Divided Society Endangers Our Future*. New York: W.W. North & Co.
- \_\_\_\_\_ (2015) *The Great Divide: Unequal Societies and What We Can Do About Them*. New York: W.W. Norton & Co.



Summers, L.H. (2013) “Economic Possibilities of Our Children”, The 2013 Martin Feldstein Lecture, NBER Reporter 2013 No. 4, N.B.E.R.

Veall, M.R. (2012) “Top Income Share: Recent Trends and Policy Implications”. *Canadian Journal of Economics* 45, 1247-72.

**Appendix Table A1**  
**Summary Statistics on Weekly Earnings for LFS Estimation Samples for Males**  
**Selective Years 2000-2015**  
**(real 2015 dollars)**

	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
<b><u>All Workers</u></b>				
No. obs.	25,511	25,831	26,621	51,680
Mean earnings	968.6	965.6	1031.2	1053.6
Median earnings	906.4	889.2	939.8	957.0
MC earnings range	453.2-1359.6	444.6-1333.8	469.9-1409.7	478.5-1435.5
Mean MC earnings	895.4	864.0	904.9	915.6
NHE earning range	1359.6-1812.9	1333.8-1778.3	1409.7-1879.5	1435.5-1913.9
Mean NHE earnings	1549.2	1515.7	1612.6	1620.2
Higher earnings cut-off	1812.9	1778.3	1879.5	1913.9
Mean higher earnings	2284.4	2242.1	2343.5	2408.1
<b><u>Full-Time Workers</u></b>				
No. obs.	19,476	19,047	19,268	36,678
Mean earnings	1106.5	1110.5	1185.1	1215.5
Median earnings	1025.3	1021.5	1075.8	1105.4
MC earnings range	512.7-1538.0	510.7-1532.2	537.9-1613.6	552.7-1657.9
Mean MC earnings	990.4	987.2	1031.2	1051.2
NHE earnings range	1538.0-2050.7	1532.2-2043.0	1613.6-2151.5	1657.9-2210.6
Mean NHE earnings	1726.6	1733.6	1836.5	1886.1
Higher earnings cut-off	2050.7	2043.0	2151.5	2210.6
Mean higher earnings	2511.7	2484.9	2639.9	2765.9

Note: Based on May Labour Force Surveys.

**Appendix Table A2**  
**Summary Statistics on Weekly Earnings for LFS Estimation Samples for Females**  
**Selective Years 2000-2015**  
**(real 2015 dollars)**

	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
<b><u>All Workers</u></b>				
No. obs.	23,917	25,414	27,422	51,658
Mean earnings	678.3	707.3	772.4	801.3
Median earnings	614.8	638.3	691.8	711.7
MC earnings range	307.4-922.3	319.2-957.5	345.9-1037.7	355.8-1067.7
Mean MC earnings	590.6	617.2	664.1	684.4
NHE earnings range	922.3-1229.7	957.5-1276.6	1037.7-1383.5	1067.7-1423.5
Mean NHE earnings	1048.0	1099.4	1187.1	1226.8
Higher earnings cut-off	1229.7	1276.6	1383.5	1423.5
Mean higher earnings	1523.8	1643.8	1763.4	1811.9
<b><u>Full-Time Workers</u></b>				
No. obs.	14,979	15,842	17,105	32,052
Mean earnings	846.5	880.6	959.9	998.0
Median earnings	769.0	798.1	863.2	881.8
MC earnings range	384.6-1153.6	399.0-1197.1	431.6-1294.9	441.0-1322.8
Mean MC earnings	739.1	761.4	814.5	827.8
NHE earnings range	1153.6-1538.0	1197.1-1596.1	1294.9-1726.3	1322.8-1763.7
Mean NHE earnings	1308.2	1373.4	1481.6	1522.9
Higher earnings cut-off	1538.0	1596.1	1726.3	1763.7
Mean higher earnings	1794.0	1951.7	2079.7	2151.6

Note: Based on May Labour Force Surveys.

**Appendix Table A3**  
**Percentage Shares of NHE and HE Workers within the Combined Higher Earnings Group of Workers, Canada, 2000-2015 (percent)**

	Males		Females	
	All Workers	Full-Time Workers	All Workers	Full-Time Workers
<b><u>Near Higher Earnings (150-200% of median)</u></b>				
2000	65.7	70.8	57.7	67.3
2005	63.5	65.0	55.0	65.1
2010	59.8	69.2	54.0	67.1
2015	59.2	66.3	49.6	66.8
<b><u>Higher Earnings (above 200% of median)</u></b>				
2000	34.3	29.2	42.3	32.7
2005	36.5	35.0	45.0	34.9
2010	40.2	30.8	46.0	32.9
2015	40.8	33.7	50.4	33.2

Note: See figures in Table 1.

### Technical Appendix

The role of this appendix is to show that the expectation of the trend growth rate decomposition in Section 6 holds, so that sample estimates of the decomposition should also hold approximately.

Let  $SE$ ,  $SW$ , and  $RME$  be the earnings shares, the share of workers and the relative mean earnings rates for some earnings group, and let each be expressed in regression format as follows:

$$\ln(SE) = X\beta_E + u_E$$

$$\ln(SW) = X\beta_W + u_W \tag{1}$$

and  $\ln(RME) = X\beta_R + u_R$

where the matrix of regressors  $X$  is common to all three regressions, but the regression coefficient vectors are different, and the  $u$ 's are (unobserved) regression error terms with zero means. Now it is shown in the text that

$$RME = SE / SW,$$

so that

$$\ln SE = \ln SW + \ln RME . \tag{2}$$

Substituting the regression functions above and taking expectations leads to:

$$E(X\beta_E) = E(X\beta_W) + E(X\beta_R) .$$

In the analysis of this paper, the three regression functions take the common form

$$X\beta = \beta_0 + \beta_1 t + \beta_2 t^2 + \beta_3 D \tag{3}$$

where  $t$  indicates an annual time trend and  $D$  is a dummy variable that takes a value of 1 for the November observation in the data set (and zero for the May observations). The  $\beta$  coefficients differ among three regressions. Therefore, for example, the time trend growth rate at time  $t$  is given by:

$$\frac{d \cdot E \ln(SE)}{dt} = \frac{d X \beta_E}{dt} = \beta_{E1} + 2\beta_{E2} \cdot t .$$

Thus, because of the decomposition (2), it follows that

$$(\beta_{E1} + 2\beta_{E2}t) = (\beta_{W1} + 2\beta_{W2}t) + (\beta_{R1} + 2\beta_{R2}t) \tag{4}$$

for all t observations.