Place-Based Consequences of Person-Based Transfers: Evidence from Recessions*

Brad Hershbein
W.E. Upjohn Institute for Employment Research
hershbein@upjohn.org

Bryan A. Stuart
Federal Reserve Bank of Philadelphia
bryan.stuart@phil.frb.org

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Abstract

This paper studies how government transfers respond to changes in local economic activity that emerge during recessions. Local labor markets that experience greater employment losses during recessions face persistent relative decreases in per capita earnings. However, these areas also experience persistent increases in per capita transfers, which offset 16 percent of the earnings loss on average. The increase in transfers is driven by unemployment insurance in the short run, and medical, retirement, and disability transfers in the long run. Our results show that nominally place-neutral transfer programs redistribute considerable sums of money to places with depressed economic conditions.

JEL Classification Codes: E32, H50, R12, R28

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1 Introduction

While economists have traditionally expressed skepticism about place-based policies, a growing literature revisits both the efficiency and equity consequences of targeting transfers to specific places (e.g., Austin, Glaeser and Summers, 2018; Fajgelbaum and Gaubert, 2020; Gaubert et al., 2020). Examples of policies intended to improve economic conditions in specific areas include targeted employment subsidies to workers or firms (e.g., Busso, Gregory and Kline, 2013) and block grants to local communities (e.g., Bartik, 2020). In 2019, the U.S. spent about $300 billion per year on place-based government transfers, but it spent a far greater amount—over $3 trillion—on person-based transfers.[1] These numbers increased dramatically over the next three years in response to the COVID-19 pandemic with the federal government's unprecedented expansion in relief and stimulus funds that flowed to individuals, businesses, and sub-national governments.[2]

Many of the person-based transfers, both before and during the pandemic, depend on individuals' employment and earnings, so policies that nominally are place-neutral could provide additional resources to areas that experience adverse economic conditions. Person-based transfers could have important place-based consequences because of the fiscal multiplier, which might improve the economic opportunities of individuals who do not directly receive transfers. For example, younger individuals who are located in areas with depressed economic opportunities might benefit from the increase in local spending facilitated by retirement benefits received by older individuals. More broadly, the place-specific consequences of person-based transfer programs inform the effectiveness of social insurance programs and the optimal design of supplementary place-based policies.

This paper investigates the response of the social safety net to place-specific shifts in economic activity arising from recessions over 50 years.[3] Specifically, we study how per capita earnings

[1]The source for the first number is Table 2 of Dilger and Cecire (2019), which we adjust to remove pass-throughs to individuals for Medicaid/CHIP and Temporary Assistance For Needy Families (provided on page 6), and that for the second is our data, which we describe below. In both cases we include only direct outlays, not tax expenditures in the form of credits, but including these would not change the order of magnitude difference between person-based and place-based transfers.

[2]An interesting recent development is that fiscal policy following the Great Recession and the pandemic provided intergovernmental transfers based on local area measures of economic distress (e.g., Clemens and Veuger, 2021).

[3]These recessions took place from 1973–1975, 1980–1982 (we pool the short recession in 1980 with the longer

and government transfers evolve in local areas where national recessions are more versus less severe. We draw upon multiple data sources, including those from the U.S. Bureau of Economic Analysis, the Census Bureau, and the Social Security Administration, to create annual panels of longitudinally-harmonized geographic areas stretching over five decades. We estimate event study models that relate the evolution of income measures to sharp employment changes during recessions, while controlling for pre-recession trends in population growth.

Our focus on recessions is motivated by two main considerations. First, the response of the safety net to recessions is of central importance to policymakers and researchers (e.g., Moffitt, 2013; Bitler and Hoynes, 2016; Bitler, Hoynes and Kuka, 2017*a*). Second, recessions lead to persistent declines in economic activity in areas that experience more severe employment losses (Hershbein and Stuart, 2023). The lasting effects of recessions on local economic activity allow us to identify the response of the safety net to persistent changes in economic opportunity, which has been the focus of much recent work (e.g., Austin, Glaeser and Summers, 2018).

We find that person-based transfer programs have substantial place-based consequences. In particular, local labor markets that experience more severe employment losses during a recession face lasting reductions in employment and per capita earnings, but they also receive lasting increases in per capita transfers. Our estimates imply that a metro area experiencing a 5 percent greater employment loss during a recession has total transfers per capita that are 2.4 percent higher nearly a decade after the national recession trough.[4] While sizable, the elevated transfers equal only 16 percent of the long-term decline in per capita earnings on average.

Our data permit us to examine which types of transfers respond, both immediately in the wake of the recession and over the next several years. By design, unemployment insurance (UI) responds immediately and then fades away. Medicaid, Medicare, and Social Security (which includes retirement and disability insurance) account for nearly all of the long-run increase in per capita transfers. Income maintenance transfers also show a sustained rise, but the magnitudes are small

one in 1981–1982), 1990–1991, 2001, and 2007–2009.

[4]On average during our sample period, metro areas with above-median recession severity experience employment losses of an additional 5 percent of baseline jobs relative to metro areas with below-median recession severity.

because these programs account for only 10 percent of total transfers.[5] Education and training transfers account for a negligible share of the total transfer response.

Because we examine the response of transfers at the local labor market level, a change in the composition of residents is a potential mechanism for post-recession changes in transfers. We find that recessions differentially shift the age structure of harder-hit areas, making them older, and that these shifts can explain 60 percent of the long-term increase in transfers. In contrast, changes in the age structure explain much less of the impacts of recessions on per capita earnings.

Additional analyses underscore the quantitative importance of person-based transfers for places. Simple calculations imply that a metro area with the median population (about 265,000 residents) that experiences a 5 percent greater employment loss during the recession receives about $630 million more in transfers during the first ten post-recession years. For a metro area at the 90th percentile of the population distribution (with 1.86 million residents), the increase in transfers in response to a 5 percent greater employment loss is over $4.4 billion. While there is considerable variation in existing estimates of local fiscal multipliers (e.g., Suárez Serrato and Wingender, 2016; Chodorow-Reich, 2019; Ramey, 2019; Pennings, 2021; Clemens, Hoxie and Veuger, 2022), our results suggest that employment declines in negatively impacted areas could be up to 21 percent more severe in the absence of increases in person-based transfers.

Our paper primarily contributes to studies of negative economic shocks and individual transfer receipt (e.g., Hoynes, Miller and Schaller, 2012; Bitler and Hoynes, 2016; Bitler, Hoynes and Kuka, 2017*a*,*b*; Moffitt and Ziliak, 2020). Closely related research finds that local economic conditions influence the receipt of Social Security Disability Insurance, Supplemental Security Income, and cash welfare (Black, Daniel and Sanders, 2002; Autor and Duggan, 2003; Black, McKinnish and Sanders, 2003; Charles, Li and Stephens, 2018; Maestas, Mullen and Strand, 2021). We contribute to this literature in three ways. First, we examine a broader set of transfers, geographies,

[5]Income maintenance transfers include Aid to Families with Dependent Children (AFDC) and its post-welfare reform successor, Temporary Assistance to Needy Families (TANF); Food Stamps and its successor, the Supplemental Nutrition Assistance Program (SNAP); Supplemental Security Income (SSI); the Earned Income Tax Credit (EITC), and a few others.

and years.[6] Second, we focus on the consequences of transfers for places, which complements the existing focus on the consequences of transfers for individuals.[7] Our analysis of the consequences of transfer programs for places reveals that retirement and medical transfers play a larger role than commonly understood. In contrast, the means-tested programs previously studied do not make up the bulk of transfer dollars going to negatively affected local areas over the longer term. Finally, we combine our estimates of the transfer response with estimates of fiscal multipliers to explore the degree to which person-based transfers could mitigate declines in local employment after recessions. These calculations underscore the sizable consequences of person-based transfers for places.

2 Estimating the Response of Local Area Transfers to Employment Losses

2.1 Data

We compile several public-use data sets that together provide a wealth of information on local economic activity and government transfers.[8] These data sets are constructed by government agencies using administrative data. Our primary source is the Bureau of Economic Analysis Regional Economic Accounts (BEAR), which provides annual data on employment, earnings, and detailed transfer categories for each county since 1969.[9] We supplement the BEAR data with county-level

[6]Our work is similar to Deryugina (2017) in examining a wide range of transfer programs, although the underlying variation differs, as she focuses on hurricanes. It is also closely related to Autor, Dorn and Hanson (2021), who examine the persistence of the China trade shock on area economic outcomes, including government transfers, and who find that commuting zones more susceptible to import competition experienced persistent increases in Social Security and Medicare benefits. Our paper is consistent with their findings but examines job losses from recessions rather than trade shocks, and it examines multiple shocks over the past 50 years.

[7]One notable example is Notowidigdo (2020), who studies the degree to which transfers explain lower mobility responses of less-skilled workers to declines in local labor demand over ten-year periods. In addition, Yagan (2019) examines how local demand shocks during the Great Recession affected individuals' receipt of Social Security Disability Insurance (SSDI). His finding of an insignificant impact on individuals' receipt of SSDI differs from our finding of a significant increase in local areas' SSDI receipt. These results underscore the difference in our approaches: we are interested in impacts on local labor markets, while Yagan (2019) estimates impacts on individuals.

[8]Parts of this section draw closely on Hershbein and Stuart (2023). That paper studies impacts on employment, population, and earnings, but does not consider transfers.

[9]The vast majority of transfers in the BEAR data come from federal and state governments. About 5 percent of transfers come from businesses in the form of liability payments for personal injury claims or direct money transfers through nonprofits (some of which are indirectly funded by governments). BEAR data measure transfers based on individuals' county of residence. Our measure of earnings is the sum of wages, salaries, and supplements. This

data from the Social Security Administration (SSA) on Disability Insurance (DI) to separately measure disability and retirement transfers.[10] We use the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) data for annual population estimates to normalize our outcomes on a per capita basis and measure pre-recession population growth separately for several age groups.

We aggregate the county-level data to examine the effects of recessions for our preferred definition of local labor markets: metropolitan areas.[11] A slight complication is that geography definitions are not fixed over time; we use Core Based Statistical Areas (CBSAs) as defined in December 2003. We focus on metro areas because of their greater size and thicker labor markets, although we also show that our results are robust to using commuting zones, which unlike metro areas, cover the entire United States. We use the personal consumption expenditures (PCE) deflator to adjust for inflation throughout, using 2019 dollar amounts.

2.2 Empirical Strategy

Our empirical strategy relies on cross-sectional variation in sharp employment changes that occur during nationwide recessions. We use this variation to estimate the impacts of local recession-induced employment losses on earnings and transfers.

Separately for each recession, we estimate the event study regression

$$y_{i,t} = s_i^r \delta_{t-p(r)}^r + x_i^r \beta_t^r + \mu_i^r + \varepsilon_{i,t}^r, \tag{1}$$

where $y_{i,t}$ is a measure of income in location i and year t, s_i^r measures the severity of recession r as the log employment change in location i from the nationwide recession start to trough (multiplied

information is available by individuals' place of work.

[10] Specifically, we subtract the SSA DI benefits from the BEAR Social Security retirement and disability (OASDI) measure to obtain estimates for Social Security retirement (OAS) benefits. We thank Tim Moore for generously providing historical county-level SSA DI files.

[11] Metropolitan statistical areas are one or more counties defined by the Office of Management and Budget (OMB) as having "at least one urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties" (Office of Management and Budget, 2003).

by -1), x_i^r is a vector of control variables, and μ_i^r is a location fixed effect that absorbs time-invariant differences across locations. The key parameter of interest is $\delta_{t-p(r)}^r$, which describes the relationship between recession severity and local area earnings or transfers in year t relative to the nationwide recession starting year $p(r)$. The inclusion of location fixed effects means that one of the $\delta_{t-p(r)}^r$ coefficients must be normalized; we do this two years before the recession start because the exact timing of recessions is uncertain and there is variation in when aggregate economic indicators decline.[12] This specification allows the impact of each recession to vary flexibly across years, transparently showing both pre-trends and dynamic impacts.

We measure local recession severity using annual employment data from BEAR. We modify NBER recession start and trough dates to account for our use of annual data. Specifically, we define s_i^r to be the log employment change for each geography between 1973–1975, 1979–1982, 1989–1991, 2000–2002, and 2007–2009.[13] We use wage and salary employment (private and public) to measure recession severity, as coverage of the self-employed is incomplete and changes over time. Variation across areas in employment losses during recessions can arise from differences in industrial specialization (e.g., recessions could decrease demand for automobiles) or even finer differences in the products that are produced in an area (e.g., recessions could particularly decrease demand for more expensive trucks and SUVs). Idiosyncratic shocks to a single large firm also could drive local employment losses (c.f., Gabaix, 2011; Salgado, Guvenen and Bloom, 2020).

The key identifying assumption is that local recession severity, s_i^r, is exogenous to residual determinants of local labor market outcomes, $\varepsilon_{i,t}^r$, conditional on the controls in the regression. In addition to controlling for time-invariant differences across local areas, we include several variables in x_i^r to bolster the credibility of this assumption, and we allow the coefficient vector on these controls, β_t^r, to vary freely across years for increased flexibility. First, we include Census division fixed effects to flexibly capture broad shifts in local labor demand, supply, and transfers that are not driven by recessions, such as the rise of the sunbelt (Glaeser and Tobio, 2008). Including di-

[12]Because we show the entire range of estimates of $\delta_{t-p(r)}^r$, it is straightforward to see how our estimates would change with a different normalization year.

[13]The NBER recession dates are November 1973 to March 1975, January 1980 to July 1980, July 1981 to November 1982, July 1990 to March 1991, March to November 2001, and December 2007 to June 2009.

vision fixed effects in x_i^r amounts to including division-by-year fixed effects in the regression.[14] Second, we include *pre*-recession population growth to adjust for secular shifts in local labor supply that could affect earnings and transfers.[15] Estimates of $\delta_{t-p(r)}^r$ for pre-recession years allow us to directly examine the presence of pre-trends, and estimates of $\delta_{t-p(r)}^r$ for post-recession years shed light on whether areas that experience larger employment losses during recessions are differentially exposed to subsequent economic shocks (which would show up as spikes or jumps in the coefficients). To further address autocorrelation concerns, we control in some specifications for the severity of prior recessions, again allowing the coefficients on these covariates to vary freely across years.

We construct equally-weighted averages of each $\delta_{t-p(r)}^r$ parameter estimate across the five recessions. These coefficients provide a more accurate representation of the average shifts in earnings and transfers before and after a recession. We provide the full set of recession-specific estimates in the appendix. To allow for arbitrary autocorrelation in the error term $\varepsilon_{i,t}^r$, we use a nonparametric bootstrap procedure. For each of 500 bootstrap replications, we resample metropolitan areas with replacement and then estimate regressions for all five recessions.

This empirical strategy identifies changes in local area per capita income (earnings and transfers) that are catalyzed by employment losses that occur during recessions. Comparing outcomes in areas where recessions are more versus less severe allows us to identify relative effects of employment losses.[16] There is considerable variation in which areas experience severe employment losses across the five recessions that we study, and the similarity of the results across recessions suggests that our results are not driven by a limited set of local areas or policy responses that are specific to a given recession. Potential mechanisms underlying these place-level changes include

[14] We show below that our results are robust to using state fixed effects in x_i^r (i.e., state-by-year fixed effects in the regression).

[15] Given the flexibility of β_t^r, this control amounts to interactions between year fixed effects and pre-recession population growth. We control for the log change in population age 0–14, 15–39, 40–64, and 65 and above. We construct these population variables using SEER data, which are available starting in 1969. The pre-recession population growth years are 1969–1973 (for the 1973–1975 recession), 1969–1979 (for the 1980–1982 recession), 1979–1989 (for the 1990–1992 recession), 1990–2000 (for the 2001 recession), and 1997–2007 (for the 2007–2009 recession).

[16] The cross-sectional variation used to estimate equation (1) does not identify absolute effects (such as those on the nationwide economy).

adjustments made by individuals, such as differential migration. We examine below the role of changes in the composition of residents living in an area.

2.3 Basic Patterns of Per Capita Transfers and Recession Severity

Before moving to estimates of equation (1), we describe basic patterns in per capita transfers, our key outcome of interest. Panel A of Figure 1 shows that real per capita transfers more than quadrupled between 1969 and 2019. The increase in transfers stems predominantly from the rise in medical, retirement, and disability insurance transfers. Medical transfers (essentially Medicare and Medicaid) grew from about $330 per capita in 1970 to $4,200 in 2019 (in 2019 dollars). Medical, retirement, and disability transfers account for 70–80 percent of total transfers throughout this period. By comparison, income maintenance transfers (primarily AFDC/TANF, EITC, SNAP, and SSI) equal about 10 percent of total transfers on average. Panel B of Figure 1 plots per capita transfers in logarithms to more clearly display cyclical patterns. UI benefits rise and fall around each recession, while cyclicality in other transfer categories is more muted. Appendix Table A.1 provides summary statistics on detailed transfer categories over time. Transfers for Social Security retirement benefits are much larger than those for disability insurance, while Medicare and Medicaid are comparable in size.

The five recessions that we study differ in several ways. While there is little consensus on the macroeconomic causes of each recession, the drivers almost certainly differ (Temin, 1998). The 1973–1975 and 1980–1982 recessions followed increases in the price of oil and subsequent increases in interest rates by the Federal Reserve. There is less agreement on the causes of the 1990–1991 recession (Temin, 1998). The 2001 recession followed the burst of the dot-com bubble, while the 2007–2009 recession followed tumult in housing and financial markets. Despite the differences in the macroeconomic features of recessions, the impacts on local area employment, population, and earnings are remarkably similar (Hershbein and Stuart, 2023). Appendix Table A.2 shows considerable variation in the overall severity of recessions, measured by the change in nationwide employment from start to trough. The recessions from 2007–2009 and 1980–1982

were the most severe. Manufacturing and construction usually experience the largest employment decline, but the impact on other industries varies widely across recessions.[17] Recessions are generally more severe in places with initially higher employment rates and per capita earnings, a higher manufacturing employment share, and lower education levels, but these differences are small in magnitude (Hershbein and Stuart, 2023).

Our empirical strategy makes use of the considerable variation in recession severity across space, as shown in Appendix Figures A.1–A.3. Recession severity within a local labor market displays only a modest positive correlation across recessions (see Appendix Table A.3). This fact is consistent with the different macroeconomic drivers of recessions and the different patterns of industry-level employment declines. Specifications that control for the severity of prior recessions demonstrate that our results do not simply reflect lagged effects of previous downturns.

3 Results

3.1 The Response of Per Capita Earnings and Transfers

Figure 2 shows equally-weighted averages of the $\delta^r_{t-p(r)}$ parameters for the log of real per capita earnings, as a solid blue line. (We discuss the red line with circles in Section 3.2.) We include four years before the nationwide recession start to examine pre-trends, and we follow areas for 12 years afterward. Metro areas that experience more severe employment losses during recessions experience a sharp relative decline in per capita earnings, and this relative decline persists over the entire post-recession period. Appendix Figure A.4 shows that these results are robust to different sets of control variables, including the severity of prior recessions and state-by-year fixed effects.[18] Per capita earnings fall not just on average but after each recession (Appendix Figure A.5), and results are similar when using commuting zones instead of metropolitan areas (Appendix Figure

[17] Appendix Table A.2 uses annual data from BEAR. These data mask some of the severe employment losses that are evident in monthly data, but cross-industry patterns are similar in Current Employment Statistics data.

[18] Hershbein and Stuart (2023) report several additional robustness tests. Most notably, results are similar when controlling for interactions between the pre-recession share of employment in each industry and year fixed effects, so these results do not simply reflect secular trends in manufacturing or other industries.

A.6).

Panel A of Table 1 summarizes the response of per capita earnings 1–3, 4–6, and 7–9 years after the nationwide trough. In response to a 5 percent greater employment loss during a recession, per capita earnings are 5.1 percent lower 1–3 years after the trough. There is limited recovery, as per capita earnings remain 4.8 percent lower 7–9 years after the trough. The average impact of a one standard-deviation greater employment loss after 7–9 years is similar, at 4.5 percent.[19]

In Hershbein and Stuart (2023), we show that employment losses during recessions yield persistent declines in relative employment, population, and employment-population ratios as well. That paper contains further discussion of the mechanisms underlying changes in local labor market outcomes. For this paper, the key takeaway is that recessions generate persistent relative declines in economic activity in areas that experience more severe employment losses.

To what degree does the amount of person-based transfers respond to the decline in local economic activity after recessions? Figure 3 provides an initial answer to this question by showing estimates of the effect of recession-induced employment changes on the log of real per capita transfers. We find that transfers rise by more in local labor markets that experience a more severe recession. Moreover, transfers remain elevated throughout the post-recession period. As with earnings impacts, the estimates are robust to different sets of control variables (Appendix Figure A.7) and are similar following each recession (Appendix Figure A.8) and when using commuting zones (Appendix Figure A.9). The event study figures also reveal little evidence that large economic shocks subsequent to each recession confound the results. Panel A of Table 1 shows that a 5 percent greater employment loss during the recession leads on average to a 2.2 percent increase in per capita transfers 1–3 years after the recession trough. At 7–9 years post trough, per capita

[19]These results do not adjust for changes in local prices. In Hershbein and Stuart (2023), we use housing price index data by metro area from the Federal Housing Finance Agency to estimate an elasticity to employment changes of about -0.75 for the period 7–9 years after a recession trough (about 9–11 years after recession start). Assuming one-third of income is spent on housing, a 5 percent greater employment loss during a recession translates into roughly a 1.2 percent ($= 0.75 \times 0.05 \times 0.33$) long-term decrease in expenditures, potentially offsetting some of the income losses. To the extent that local prices decline, the increase in transfers we document below will be even larger in real terms. However, this interpretation is complicated in that homeowners facing a similar housing price loss experience a decrease in their wealth (Campbell and Cocco, 2007; Mian, Rao and Sufi, 2013; Guren et al., 2021), and that the value of amenities may also decline.

transfers are slightly higher, at 2.4 percent.

To shed light on why transfers increase after recessions, Panel A of Figure 4 plots estimates from regressions in which the dependent variables are the log of per capita transfers in each of several categories. In the immediate aftermath of the recession, UI transfers respond most strongly in proportional terms: two years after the recession trough UI transfers increase by 15 percent in response to a 5 percent greater employment loss. However, UI transfers decline relatively quickly and display no persistent long-run increase. Income maintenance transfers display the second strongest proportional response, but gradually decline by 50 percent over the decade after the trough. In contrast, the other transfer categories increase gradually and remain elevated.

The elasticities shown in panel A describe proportional responses, but the contribution of each category to the *overall* transfer response also depends on the relative size of each category. To shed light on this dimension, Panel B of Figure 4 displays the effects of recession-induced employment losses on per capita transfers divided by effects on per capita earnings (both in levels, not logs). This ratio of estimates is akin to an effective replacement rate for the local area, as it can be interpreted as the increase in per capita transfers for each dollar decrease in per capita earnings. We focus on the post-recession period, because the impact on earnings is near zero before. The replacement rate (shown as a thick black line) is 12 percent near recession trough and tends to increase during post-recession years. UI accounts for the greatest share of the transfers response in the first two years after a recession, before fading as benefits expire. In the long run, nearly all of the increase in total transfers comes from retirement and disability (Social Security OASDI) and medical (Medicare and Medicaid). Income maintenance transfers (AFDC/TANF, SSI, SNAP, and EITC) contribute smaller replacement rates because they account for a smaller share of total transfers (see Figure 1).[20]

Panel B of Table 1 shows that, on average, the increase in per capita transfers is 16 percent of

[20]Appendix Figure A.10 contains the recession-specific estimates that underlie Panel A, and Appendix Figure A.11 reports analogous results for Panel B. There is little evidence that the implementation of the Affordable Care Act (ACA) in 2014 changed the elasticity of medical transfers. However, the estimated replacement rate rose more quickly after 2014, which could be explained by increasing medical transfers nationwide. Nonetheless, the timing of the post-recession increase in transfers makes clear that our results for the 2007–2009 recession are not driven primarily by the ACA. Appendix Figure A.12 shows that results are similar for commuting zones.

the decrease in per capita earnings 7–9 years after the recession trough.[21] The table also reports replacement rates for more detailed transfer categories. Among retirement and disability, retirement (old-age security, OAS) accounts for 88 percent of the dollar increase in transfers, due to its more universal nature, although DI is about equally responsive in an elasticity sense (Panel A of Appendix Figure A.13). The increase in medical transfers is greater for Medicare but still sizable for Medicaid (public assistance medical care). Income maintenance and UI transfers account for 26 percent of the increase in transfers 1–3 years after the recession, but their importance declines over time.

3.2 The Role of Recession-Induced Changes in the Age Structure of Local Areas

The longer-term increase in transfers, especially in programs not typically thought of as the safety net, is perhaps most surprising. One possible explanation is that areas which experience greater employment losses also see changes in the composition of residents due to different migration responses. Since we find persistently elevated transfers among Social Security retirement and Medicare, a natural hypothesis is that areas hit harder by recessions become older. Indeed, Appendix Figure A.14 shows that, for each recession, there is an increase in the share of the population that is 65 or older and a decrease in the share age 15–39.[22] Since this paper is focused on changes in transfers to places, migration is not a source of bias but instead a potential mechanism.

To quantify the importance of changes in the age structure, we estimate for each recession the cross-sectional relationship between log per capita transfers and the shares of the population age

[21] Because these replacement rates are the ratios of two estimates, calculating the standard error of the ratio through a nonparametric bootstrap is complicated by a very small number of cases in which the denominator is close to zero. Instead, we apply a first-order Taylor series approximation, which delivers the following variance estimate:

$$\widehat{Var}\left(\frac{\hat{\beta}_T}{\hat{\beta}_E}\right) = \frac{(\hat{\beta}_T)^2}{(\hat{\beta}_E)^2}\left[\frac{\widehat{Var}(\hat{\beta}_T)}{(\hat{\beta}_E)^2} - 2\frac{\widehat{Cov}(\hat{\beta}_T,\hat{\beta}_E)}{\hat{\beta}_T\hat{\beta}_E} + \frac{\widehat{Var}(\hat{\beta}_E)}{(\hat{\beta}_E)^2}\right],$$

where $\hat{\beta}_T$ is the coefficient for per capita transfers, $\hat{\beta}_E$ is the coefficient for per capita earnings, and the variance and covariance terms are estimated via the bootstrap.

[22] Hershbein and Stuart (2023) show that the decline in population after the 2001 and 2007–2009 recessions is driven entirely by falling in-migration, as opposed to rising out-migration. Monras (2020) also documents the importance of falling in-migration after the Great Recession.

15–39, 40–64, and 65+ at the metropolitan area level, controlling for division fixed effects.[23] We then multiply the coefficient estimates for each age group from these regressions by coefficient estimates of the change in age structure from Appendix Figure A.14. The temporal evolution of the resulting products provides a simulated path of how transfers would be expected to evolve solely from the recession-induced impacts on the age structure. While recessions could affect the relationship between transfers and age, we view this back-of-the-envelope calculation as helpful for informing the potential role of shifts in the age structure.

We show these paths in Figure 3 in red circles. The share of the increase in transfers explained by the age structure tends to rise throughout the post-recession period, consistent with observed gradual changes in the age structure. At the end of the post-trough horizon, age shifts alone can explain 60 percent of the increase in per capita transfers on average.[24] By comparison, Figure 2 shows that shifts in the age structure explain less than 20 percent of the decrease in per capita earnings; this makes intuitive sense, as earnings do not vary with age thresholds as sharply as does eligibility for transfers programs like Social Security and Medicare.

How do these patterns inform the interpretation of our results? First, changes in the age structure of local areas explains a substantial share (but not all) of the long-run increase in transfers. Second, while our data do not allow us to examine the relative importance of changes in benefit eligibility and take-up rates, prior work finds that a decline in local labor market opportunities increases the probability that individuals apply for and receive benefits (e.g., Black, Daniel and Sanders, 2002; Autor and Duggan, 2003; Autor et al., 2014; Charles, Li and Stephens, 2018; Maestas, Mullen and Strand, 2021). Consequently, the estimated increase in per capita transfers after recessions likely reflects both of these channels.

We acknowledge that the *individuals* who receive higher transfers after the recession could be different from those who experience lower earnings and employment. However, our focus is on

[23] We use pre-recession cross-sections: 1971 for the 1973–1975 recession, 1977 for the 1980–1982 recession, 1987 for the 1990–1991 recession, 1998 for the 2001 recession, and 2005 for the 2007–2009 recession.

[24] When repeating this exercise for specific transfer categories, we find that changes in the age structure can explain most of the increase in retirement, disability, and Medicare transfers but little of the change in other transfer categories, including UI. These patterns are unaffected even if we use more detailed age categories.

places, and the overall change in per capita earnings and transfers matter for a variety of local economic and social outcomes, as we discuss in the conclusion. Studying earnings and transfers in per capita terms allows us to make meaningful comparisons across places and time, particularly because population declines in local areas that experience more severe recessions (Hershbein and Stuart, 2023).[25]

4 Conclusion

This paper examines how the amount of local-area transfers responds to declines in local economic activity induced by recessions. We find that recessions lead to persistent decreases in per capita earnings in areas with more employment losses. These areas also experience lasting increases in per capita transfers that offset 16 percent of the longer-run decline in earnings. However, the long-run increase in transfers arises from programs that are not typically emphasized in discussions of countercyclical policy. In particular, the longer-term response comes from medical, retirement, and disability transfers. Income maintenance transfers also rise, but they play a smaller role in the overall response because they are a smaller share of total transfers.

Federal transfers that are nominally person-based provide implicit, persistent, and underappreciated geographic transfers to economically less successful places. Over the decade following a recession trough, our estimates imply that a median-sized metropolitan area (about 265,000 residents) that experiences a 5 percent greater employment loss receives about $630 million more in transfers. By virtue of its larger population, a metro area with 1.86 million residents (the 90th percentile) facing the same log employment loss would receive about $4.4 billion over the same time period. These estimates imply that, aggregated across the country, metro areas with log employment losses during recessions that are more severe than the median metro area would receive about $330 billion more than the other half of metro areas over the subsequent decade. For context, this amounts to nearly three quarters of SNAP transfers paid to residents of all metro areas over an

[25]The papers that we cite below on fiscal multipliers also examine per capita variables.

average 10-year period.[26]

The increase in transfers via person-based policies could have substantial effects on local areas. Estimates of cross-sectional fiscal multipliers vary in the literature, and we consider benchmark cases where the cost per job-year in 2019 dollars is $35,000, $60,000, $120,000 or $940,000.[27] We use these estimates to gauge the potential impact of shutting down a local increase in transfers due to recession-induced employment losses of $440 million per year (= $4.4 billion over a decade, equally distributed across years for simplicity). The implied decrease in annual employment from eliminating these transfers to harder-hit local areas ranges from 12,571 to 468 (see Appendix Table A.6). Given estimates of local employment effects from Hershbein and Stuart (2023), this implies that long-run local employment losses after recessions might be up to 21 percent more severe in the absence of the increase in person-based transfers.[28] However, the effect of transfers could be much smaller if the cost per job-year is higher, which underscores the value of additional research

[26]We calculate the numbers for the metro-area-specific estimates by adding all of the coefficients in Figure 3 for ten years after the nationwide recession trough—which provides an estimate of the total percent increase in per capita transfers—and then multiplying by the product of average per capita transfers in 2019 (about $9,000, see Figure 1), the magnitude of the employment loss (5 percent), and the number of residents. For the aggregation across metro areas, we use the fact that, on average, metro areas with an above-median recession severity experience an employment loss that is 5 percentage points larger than metro areas with a below-median recession severity. We assume for simplicity that population is equally distributed between more and less severe recession metros and multiply per capita transfer differences by half the total metro area population in 2019 ($2387 $\times$ 137.8 million = $329 billion). These simple calculations do not account for the fact that a 5 percent greater employment loss leads to about a 2.5 percent decrease in population 7–9 years after the recession trough (Hershbein and Stuart, 2023). Accounting for population declines would lead to aggregate numbers only a few percent smaller.

[27]The choice of the lowest cost per job-year (i.e., largest multiplier) is motivated by Suárez Serrato and Wingender (2016), who estimate a 2009-dollar cost per job-year of $30,000 using county-level data from 1980–2008 and persistent increases in transfers due to population estimates, and Pennings (2021), who estimates a 2009-dollar cost per job-year of $38,500 using state-level data from 1952–1974 and persistent increases in Social Security transfers due to periodic legislation. Because the unit of geography and time period in Suárez Serrato and Wingender (2016) is closer to our own analysis, we place greater weight on these results. Chodorow-Reich (2019) surveys papers that estimate multipliers using variation from the 2009 American Recovery and Reinvestment Act, as well as other sources of variation. His central estimate of the cost per job-year across all of these studies is $50,000, which translates into roughly $60,000 in 2019 dollars. Ramey (2019) argues that the cross-state estimates in Chodorow-Reich (2019) could overstate the national-level multiplier by a factor of two. While the sub-national estimate is of interest for our back-of-the-envelope calculation, we use a cost per job-year of $120,000 as well for illustrative purposes. Finally, our upper bound on the cost per job-year is motivated by Clemens, Hoxie and Veuger (2022), who estimate a 2012-dollar cost of $855,000 based on transfers during the pandemic. We convert these costs per job into 2019 dollars and round to the nearest $5,000.

[28]Hershbein and Stuart (2023) estimate that a 5 percent employment loss during a recession is followed by a 6 percent decline in employment nine years later on average. A metro area with 1.86 million residents has about 1 million jobs on average, which translates into a loss of 60,000 jobs nine years later. This implies that in the absence of additional person-based transfers induced by the recession, the employment decline under the lowest cost per job-year would be 72,571 jobs (21 percent worse than is actually realized).

on local fiscal multipliers.

Because the long-run consequences of recessions on local labor markets are not yet widely appreciated, there has been little discussion of whether the existing structure of the social safety net constitutes an appropriate policy response, not just for individuals but for communities as a whole. The traditional analysis of optimal social insurance balances consumption smoothing benefits against moral hazard costs for *individuals*. However, our results show that these programs also have consequences for *places*. To the extent that increasing local economic activity in areas hit harder by recessions leads to positive externalities or spending in these areas is more valuable (e.g., Austin, Glaeser and Summers, 2018; Stuart, 2022), the social benefits of transfers might be larger once accounting for their consequences on places. However, the analysis of Notowidigdo (2020) suggests that these transfers also could increase moral hazard costs by reducing the tendency for individuals to move to areas with better employment prospects.

The type of transfers also matters. One important takeaway from our results is that the most responsive transfer programs in the current system are unlikely to encourage labor supply, skill development, or job creation, which could be essential factors in helping local areas recover. Indeed, as we show in Appendix Figure A.15, an area's share of income coming from transfers—as opposed to market activity—persistently rises following a more severe recession. Thus, even though retirement and medical transfers could raise local economic output by increasing the demand for locally-produced goods and services, the current transfer response is unlikely to promote business dynamism and economic vibrancy (e.g., Maestas, Mullen and Powell, 2016; Karahan, Pugsley and Şahin, 2019). A transfer system that promotes greater local economic activity both in the short and longer terms could have important benefits not just for current workers but also for children (Sprung-Keyser, Hendren and Porter, 2022). Useful directions for future work include formal analyses of how place-based consequences change the optimal level and structure of person-based transfers, as well as the interaction between person-based and place-based transfers.

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Table 1: Summary of Impacts of Log Employment Decreases During Recessions on Metropolitan Area Earnings and Transfers

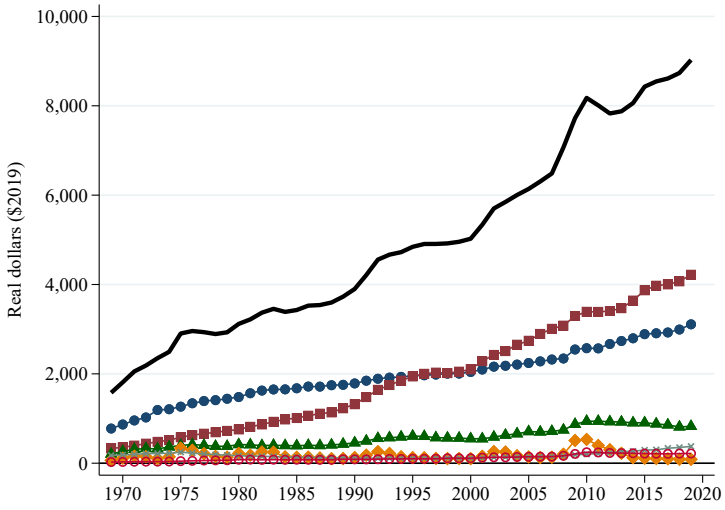
	Horizon relative to nationwide recession trough		
	1–3 years post	4–6 years post	7–9 years post
Panel A: Overall Elasticities, by Dependent Variable			
Log real per capita earnings	−1.022	−0.991	−0.957
	(0.048)	(0.060)	(0.075)
Implied effect of 1 SD log employment decrease	*−0.049*	*−0.047*	*−0.045*
Log real per capita transfers	0.446	0.475	0.481
	(0.035)	(0.050)	(0.057)
Implied effect of 1 SD log employment decrease	*0.023*	*0.024*	*0.023*
Panel B: Detailed Transfers Relative to Earnings Impact (× −100)			
Total transfers per Capita	11.98	13.88	16.23
	(0.99)	(1.31)	(1.80)
Retirement and DI	5.29	7.53	8.82
	(0.40)	(0.62)	(0.89)
Social Security OAS	4.37	6.26	7.76
	(0.36)	(0.57)	(0.86)
Social Security DI	0.86	1.13	1.04
	(0.10)	(0.13)	(0.17)
Medical	3.42	4.87	6.39
	(0.59)	(0.80)	(1.10)
Medicare	2.79	3.88	5.10
	(0.38)	(0.51)	(0.65)
Public assistance medical care	0.75	1.15	1.44
	(0.41)	(0.49)	(0.71)
Income maintenance	2.00	1.79	1.85
	(0.25)	(0.24)	(0.35)
SSI	0.18	0.27	0.37
	(0.05)	(0.07)	(0.08)
EITC	0.20	0.27	0.25
	(0.07)	(0.12)	(0.15)
SNAP	1.26	1.05	0.96
	(0.13)	(0.12)	(0.18)
UI	1.07	−0.22	−0.18
	(0.20)	(0.16)	(0.25)

Notes: Panel A reports estimates from equation (1), averaged across five recessions, at different time horizons since recession trough. Standard errors are calculated using a metro-area cluster bootstrap of the entire estimation and averaging process. We impose the constraint that pre-recession coefficients equal zero and group post-recession coefficients across years 1–3, 4–6, 7–9, and 10. Panel B shows estimates for select transfer categories; we normalize these by dividing the coefficients for per capita transfers by the coefficients from per capita earnings (both in levels), and multiplying by −100. Panel B thus shows impacts on transfers as a percentage of the impact on earnings, where this percentage is constructed as the average transfers estimate across recessions divided by the average earnings estimate across recessions. Standard errors for Panel B are calculated using the metro-area cluster bootstrap and a first-order Taylor approximation, as described in the text. The key independent variable in both panels is the log wage and salary employment change during the recession from BEAR data. All dollar values are inflation-adjusted using the PCE deflator and divided by total population from SEER to create per capita measures. All regressions control for division-year fixed effects and interactions between pre-recession population growth and year indicators. There are 358 metropolitan areas in the sample. Full, recession-specific estimates at the 7–9 year horizon are shown in Appendix Tables A.4 and A.5.

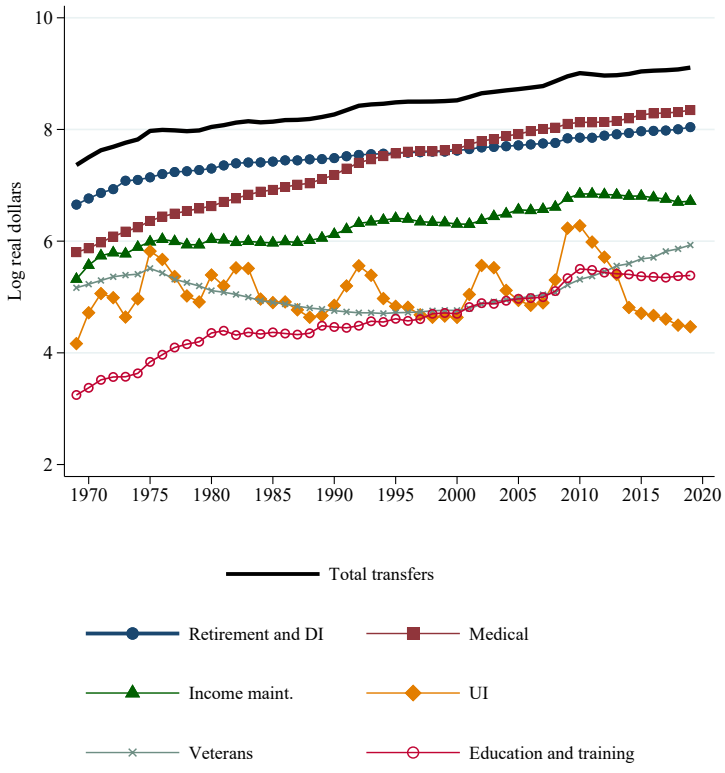
Source: Authors' calculations using BEAR and SEER data.

Figure 1: Aggregate Trends in Real Per Capita Transfers, 1969–2019

(a) Levels

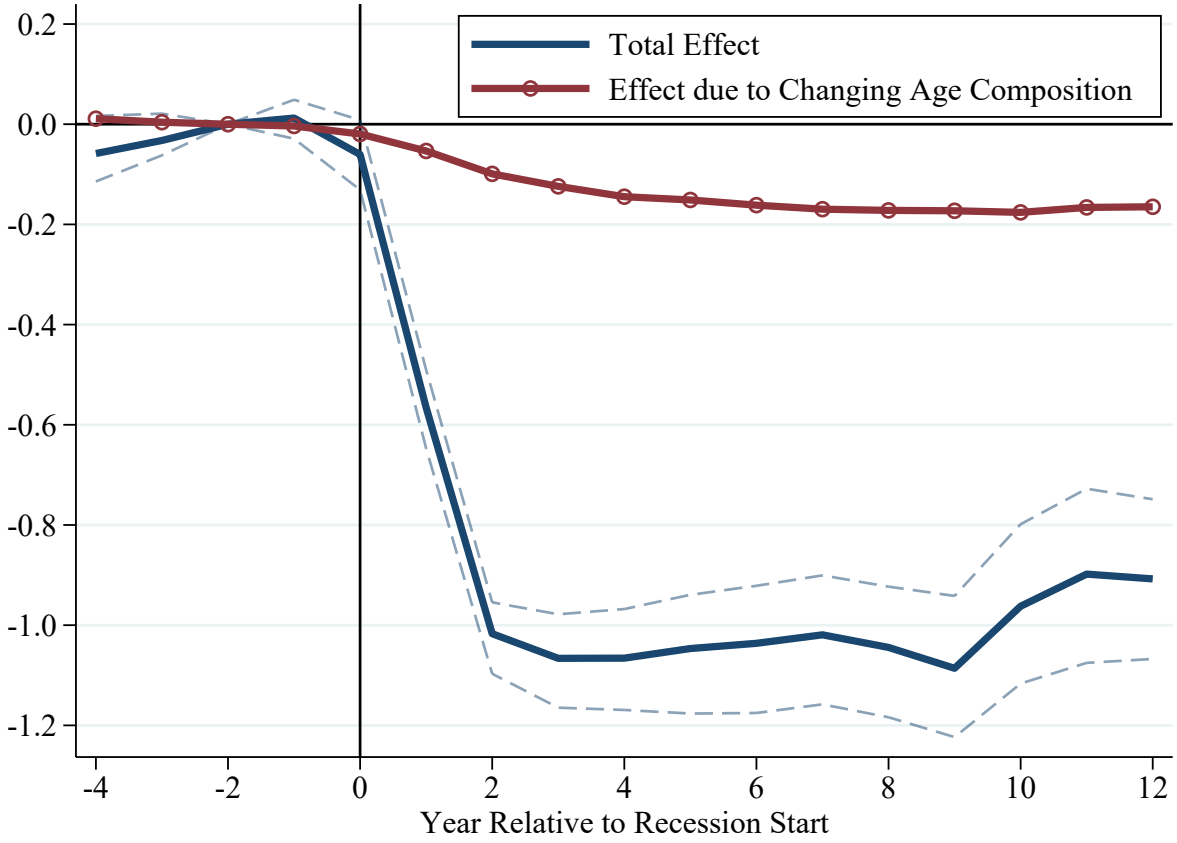


(b) Logs



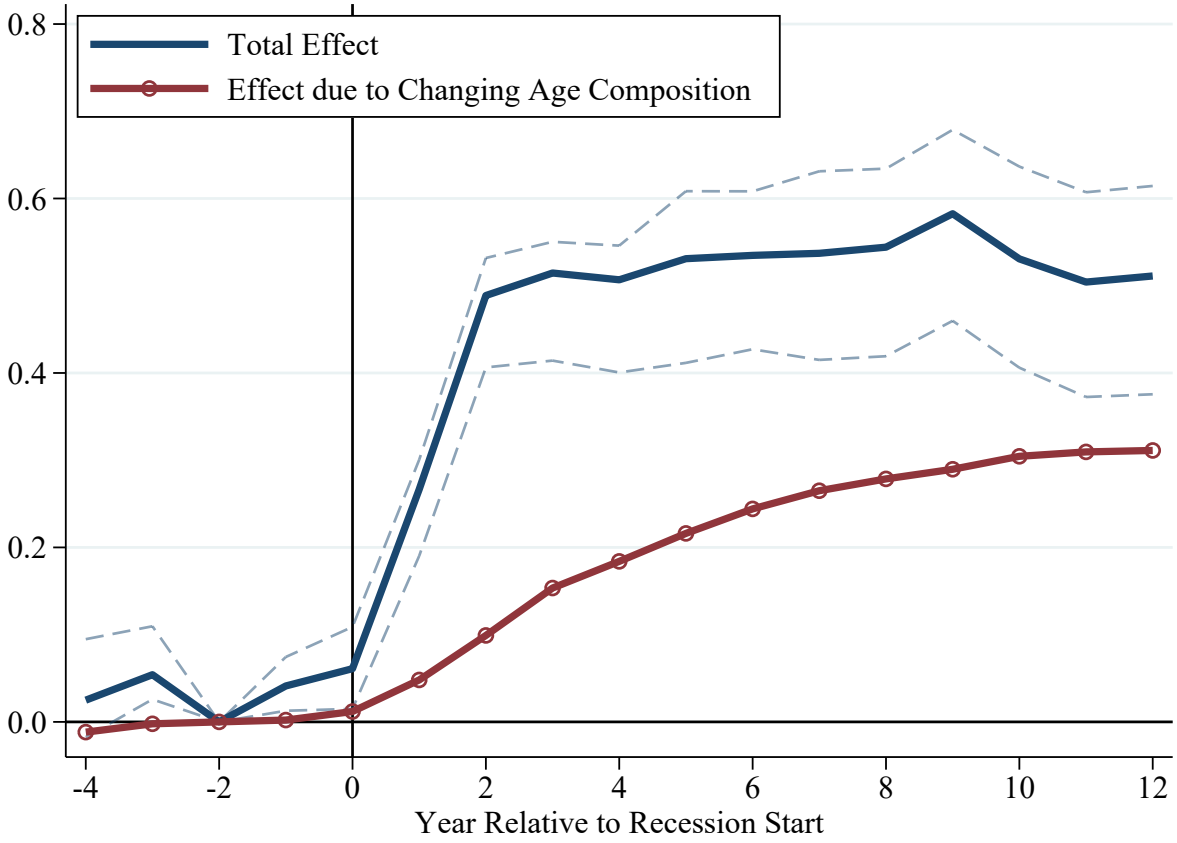
Notes: Figure reports national totals, per capita, by transfers category across 358 metropolitan areas (CBSAs). Transfers categories are indicated by the legend.
Source: Authors' calculations using BEAR and SEER data.

Figure 2: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Real Per Capita Earnings and Implied Changes via Shifts in Age Structure



Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of log real per capita earnings and predicted effects on earnings due to the recession-induced impacts on the age structure. The latter is calculated based on estimates of changes in the age structure after recessions and the pre-recession relationship between earnings and age structure, as described in the text. The key independent variable is the log wage and salary employment change during the recession from BEAR data. There are 358 metropolitan areas in the sample. The 95 percent pointwise confidence intervals come from a metro-area cluster bootstrap of the entire estimation and averaging process.
Sources: Authors' calculations using BEAR and SEER data.

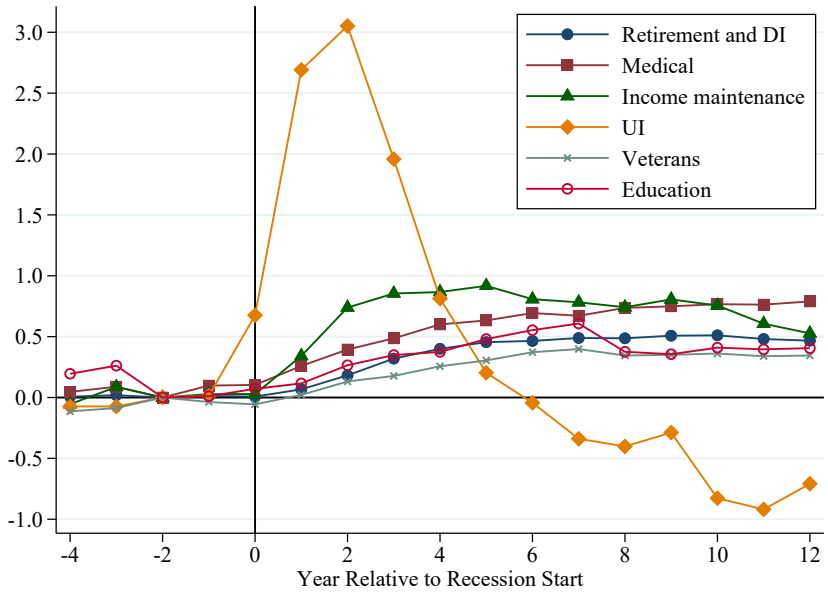
Figure 3: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Real Per Capita Transfers and Implied Changes via Shifts in Age Structure



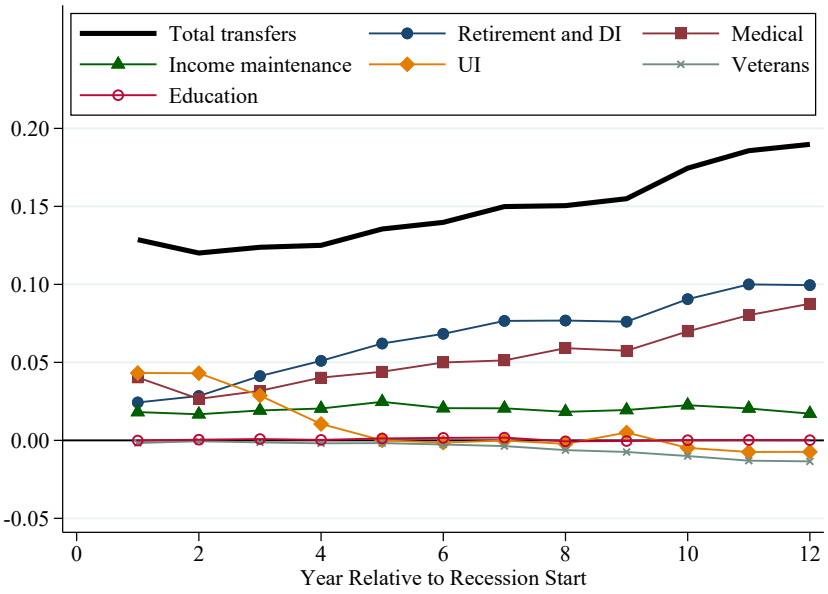
Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of log real per capita transfers and predicted effects on transfers due to the recession-induced impacts on the age structure. See notes to Figure 2.
Sources: Authors' calculations using BEAR and SEER data.

Figure 4: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Real Per Capita Transfers and Effective Replacement Rates, by Category

(a) Elasticities



(b) Replacement Rates



Notes: Figure reports estimates of equation (1), averaged across recessions. Panel A displays elasticities, where the dependent variable is log per capita transfers as in Figure 3, but for specific transfer categories. Panel B displays coefficients for per capita transfers in the indicated category divided by coefficients for per capita earnings (both in levels), where these ratios are constructed as the average numerator (across recessions) divided by the average denominator. See notes to Figure 2.
Sources: Authors' calculations using BEAR and SEER data.

Online Appendices

Table A.1: Summary of Detailed Per Capita Transfers, Selected Years

	1973	1980	1990	2001	2007	2019
Total per capita transfers	2351	3118	3901	5337	6486	9026
Retirement and DI	1191	1481	1785	2097	2321	3109
Social Security and DI	1086	1367	1648	1976	2186	3001
OAS	977	1199	1490	1728	1855	2632
DI	108	167	157	246	331	369
Non-SS retirement	105	114	137	121	135	108
Medical	479	755	1320	2285	3009	4219
Medicare	228	433	752	1154	1651	2307
Public assistance medical care	240	313	546	1115	1315	1868
Military medical care	11	9	21	17	43	45
Income maintenance	322	416	456	546	713	825
SSI	73	91	115	159	166	173
Other income maintenance	203	212	203	173	259	285
EITC		21	41	141	170	204
SNAP		93	97	73	118	163
UI	104	220	128	155	134	87
State UI	95	178	124	151	128	85
Federal UI	9	43	4	4	5	2
Veterans	220	166	116	121	155	376
Education	36	78	87	124	148	218
Other	1	1	8	8	6	192

Notes: Table shows real per capita transfers by category for select years. We use the PCE deflator from the BEA for adjustment to year 2019 dollars. Per capita numbers represent totals across 358 sample CBSAs divided by the aggregate population in those CBSAs in each year. The table includes the full set of transfers we observe in BEA data, as well as separation of Social Security OASDI into OAS and DI components using DI data from SSA.
Sources: Authors' calculations using BEAR, SEER, and SSA data.

Table A.2: Aggregate Employment Changes, by Recession

	Share of start year emp. (1)	Log emp. change (2)	Emp. change (3)	Share of start year emp. (4)	Log emp. change (5)	Emp. change (6)	Share of start year emp. (7)	Log emp. change (8)	Emp. change (9)
	1973–1975 Recession			1980–1982 Recession			1990–1991 Recession		
Total	1.000	0.004	421,100	1.000	0.010	1,123,200	1.000	0.011	1,531,000
Manufacturing	0.216	−0.090	−1,758,600	0.196	−0.110	−2,230,100	0.150	−0.049	−962,800
Services	0.203	0.053	1,041,400	0.220	0.103	2,606,900	0.276	0.060	2,264,500
Government	0.177	0.046	792,000	0.168	0.008	149,000	0.156	0.023	493,000
Retail Trade	0.159	0.010	153,300	0.161	0.020	359,600	0.168	0.005	110,800
Finance, Insurance, Real estate	0.076	0.027	192,700	0.079	0.037	322,200	0.080	−0.014	−146,000
Transportation and Public Utilities	0.054	−0.018	−91,400	0.052	0.003	17,400	0.048	0.034	220,600
Construction	0.054	−0.084	−410,000	0.054	−0.096	−536,900	0.054	−0.065	−451,500
Wholesale Trade	0.048	0.073	341,800	0.052	0.008	44,900	0.050	−0.012	−76,200
Mining	0.008	0.140	114,100	0.011	0.264	350,800	0.008	−0.025	−26,000
Agriculture, Forestry, Fisheries	0.006	0.073	45,800	0.008	0.043	39,400	0.010	0.077	104,600
	2001 Recession			2007–2009 Recession					
Total	1.000	−0.000	−62,700	1.000	−0.034	−5,866,000			
Manufacturing	0.109	−0.120	−2,004,900	0.082	−0.147	−1,982,600			
Services	0.409	0.022	1,504,500	0.432	−0.012	−886,900			
Government	0.141	0.027	638,000	0.137	0.018	452,000			
Retail Trade	0.114	−0.015	−268,300	0.107	−0.064	−1,171,600			
Finance, Insurance, Real estate	0.082	0.019	260,100	0.094	0.025	426,900			
Construction	0.059	0.013	128,500	0.064	−0.190	−1,975,100			
Transportation and Public Utilities	0.038	−0.022	−133,000	0.037	−0.061	−385,500			
Wholesale Trade	0.039	−0.027	−169,900	0.037	−0.070	−443,300			
Mining	0.005	−0.012	−9,000	0.006	0.107	114,300			
Agriculture, Forestry, Fisheries	0.005	−0.010	−8,700	0.005	−0.017	−14,200			

Notes: Table reports nationwide wage and salary employment changes during recessions. Employment changes are from 1973–1975, 1979–1982, 1989–1991, 2000–2002, and 2007–2009. The 1973–1991 data are based on SIC industries, and the 2000–2009 data are based on NAICS industries. Industry changes may not sum to total changes due to rounding.
Source: Authors' calculations using Bureau of Economic Analysis Regional Economic Accounts (BEAR) data.

Table A.3: Correlation of Metropolitan Area Recession Shocks

	Change in Log Employment During Recession Years				
	1973–75	1979–82	1989–91	2000–02	2007–09
Panel A: Unadjusted					
1973–75	1.000				
1980–82	0.386	1.000			
1990–91	0.459	0.154	1.000		
2001	0.446	0.412	0.281	1.000	
2007–09	0.354	0.210	0.002	0.155	1.000
Panel B: Adjusted for Census division					
1973–75	1.000				
1980–82	0.327	1.000			
1990–91	0.275	0.170	1.000		
2001	0.291	0.304	0.234	1.000	
2007–09	0.363	0.071	−0.044	0.091	1.000
Panel C: Adjusted for Census division and pre-recession population growth					
1973–75	1.000				
1980–82	0.258	1.000			
1990–91	0.161	0.018	1.000		
2001	0.144	0.084	0.098	1.000	
2007–09	0.400	0.279	0.050	0.212	1.000

Notes: Table reports correlations of log wage and salary employment changes across recessions for 358 metropolitan areas. Panel B reports correlations after partialling out Census division fixed effects, and Panel C partials out Census division fixed effects and pre-recession population growth.
Source: Authors' calculations using BEAR data.

Table A.4: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Earnings and Transfers, 7–9 Years after Recession Trough, by Recession

	Recession				
	1973–1975	1980–1982	1990–1991	2001	2007–2009
Log real per capita earnings	−0.788	−0.594	−1.124	−1.626	−0.653
	(0.115)	(0.158)	(0.147)	(0.214)	(0.171)
Log real per capita transfers	0.423	0.425	0.428	0.907	0.224
	(0.134)	(0.105)	(0.187)	(0.126)	(0.088)
Retirement and DI	0.442	0.451	0.333	0.964	0.228
	(0.110)	(0.093)	(0.177)	(0.142)	(0.073)
Social Security and DI	0.528	0.542	0.395	0.953	0.158
	(0.115)	(0.103)	(0.173)	(0.138)	(0.064)
Social Security OAS	0.496	0.567	0.359	0.990	0.168
	(0.119)	(0.106)	(0.162)	(0.147)	(0.074)
Social Security DI	0.817	0.455	0.470	0.692	0.134
	(0.162)	(0.144)	(0.248)	(0.214)	(0.179)
Non-SS retirement	−0.197	−0.258	−0.405	1.205	−0.832
	(0.293)	(0.277)	(0.458)	(0.608)	(0.446)
Medical	1.277	0.864	0.090	0.608	0.626
	(0.272)	(0.162)	(0.238)	(0.181)	(0.124)
Medicare	0.618	0.627	0.395	0.788	0.454
	(0.232)	(0.141)	(0.212)	(0.214)	(0.118)
Public assistance medical care	2.165	1.175	0.063	0.371	0.636
	(0.609)	(0.299)	(0.330)	(0.578)	(0.252)
Military medical care	0.059	0.323	−0.336	0.813	−0.635
	(0.394)	(0.243)	(0.416)	(0.455)	(0.160)
Income maintenance	0.364	0.117	1.153	1.241	0.557
	(0.353)	(0.271)	(0.292)	(0.388)	(0.188)
SSI	1.066	1.104	0.170	0.655	0.671
	(0.429)	(0.253)	(0.293)	(0.310)	(0.236)
Other income maintenance	0.120	−0.627	2.209	1.136	0.024
	(0.466)	(0.386)	(0.525)	(0.684)	(0.381)
EITC		0.639	0.199	0.504	0.455
		(0.172)	(0.262)	(0.210)	(0.135)
SNAP		0.145	1.807	2.507	1.330
		(0.423)	(0.414)	(0.544)	(0.375)
UI	−1.520	−1.024	−0.087	1.812	−2.874
	(0.489)	(0.420)	(0.473)	(0.703)	(0.629)
State UI	−1.856	−1.142	−0.143	1.918	−2.979
	(0.504)	(0.419)	(0.482)	(0.704)	(0.574)
Federal UI	1.685	0.398	0.963	2.384	−2.575
	(0.630)	(0.600)	(0.645)	(1.147)	(1.668)
Veterans	0.395	0.637	0.916	−0.014	0.125
	(0.175)	(0.159)	(0.476)	(0.370)	(0.268)
Education	−0.079	0.187	0.897	0.801	−0.405
	(0.396)	(0.195)	(0.418)	(0.523)	(0.413)
Other	4.490	−0.687	−0.286	0.279	2.705
	(2.564)	(0.892)	(1.073)	(0.666)	(0.926)

Notes: Table reports estimates of equation (1), separately for each recession. The dependent variable is log per capita transfers in the indicated category. See notes to Table 1.
Sources: Authors' calculations using BEAR and SEER data.

Table A.5: Impacts of Log Employment Decreases During Recessions on Detailed Transfer Categories, Relative to Effect on Earnings (Replacement Rates), 7–9 Years after Recession Trough, by Recession

	Recession				
	1973–1975	1980–1982	1990–1991	2001	2007–2009
Total transfers per capita	21.33	19.96	−0.63	10.17	36.63
	(2.83)	(3.98)	(3.82)	(3.15)	(8.28)
Retirement and DI	13.31	10.82	−0.76	6.02	17.92
	(1.95)	(2.26)	(1.68)	(1.26)	(4.37)
Social Security and DI	13.28	10.56	−0.49	5.68	17.83
	(1.94)	(2.21)	(1.59)	(1.19)	(4.40)
Social Security OAS	11.52	9.90	−0.29	4.99	15.96
	(1.72)	(2.12)	(1.38)	(1.07)	(4.22)
Social Security DI	1.76	0.66	−0.15	0.99	1.89
	(0.28)	(0.19)	(0.36)	(0.34)	(0.45)
Non-SS retirement	0.02	0.26	−0.27	0.34	0.09
	(0.42)	(0.47)	(0.52)	(0.28)	(0.45)
Medical	8.45	8.80	−4.29	0.65	24.34
	(1.28)	(2.32)	(3.34)	(1.62)	(6.45)
Medicare	5.65	5.18	−1.07	1.01	18.74
	(1.00)	(1.38)	(1.63)	(1.02)	(4.63)
Public assistance medical care	2.89	3.87	−3.41	−0.41	6.42
	(0.66)	(1.21)	(2.49)	(0.98)	(3.13)
Military medical care	−0.17	−0.25	0.19	0.05	−0.82
	(0.08)	(0.11)	(0.14)	(0.36)	(0.31)
Income maintenance	1.50	1.17	2.23	1.86	2.34
	(0.68)	(0.55)	(1.13)	(0.73)	(0.91)
SSI	0.46	0.68	0.13	0.19	0.61
	(0.27)	(0.20)	(0.24)	(0.09)	(0.20)
Other income maintenance	0.38	−0.01	0.98	0.59	0.06
	(0.40)	(0.50)	(0.67)	(0.37)	(0.51)
EITC		0.08	0.15	0.15	0.58
		(0.06)	(0.67)	(0.13)	(0.19)
SNAP		0.43	0.98	0.92	1.09
		(0.20)	(0.45)	(0.30)	(0.43)
UI	−1.49	−1.16	−0.10	1.32	−1.81
	(0.92)	(0.48)	(0.41)	(0.50)	(0.54)
State UI	−1.57	−0.96	−0.12	1.25	−1.74
	(0.93)	(0.42)	(0.40)	(0.49)	(0.53)
Federal UI	0.08	−0.20	0.02	0.07	−0.07
	(0.07)	(0.10)	(0.04)	(0.03)	(0.13)
Veterans	−0.07	0.26	2.29	−0.25	−6.90
	(0.22)	(0.18)	(1.06)	(0.41)	(3.69)
Education	−0.53	−0.01	0.03	0.48	−0.91
	(0.29)	(0.13)	(0.22)	(0.38)	(0.53)
Other	0.17	0.08	−0.04	0.08	1.64
	(0.18)	(0.18)	(0.04)	(0.10)	(0.74)

Notes: Table reports estimates of equation (1), separately for each recession. The dependent variable is per capita transfers in the indicated category (in levels). We normalize the impacts by dividing the coefficients for transfers by the coefficients for per capita earnings and multiplying by −100. See notes to Table 1. This table includes the full set of detailed transfers we observe in BEA data.
Sources: Authors' calculations using BEAR and SEER data.

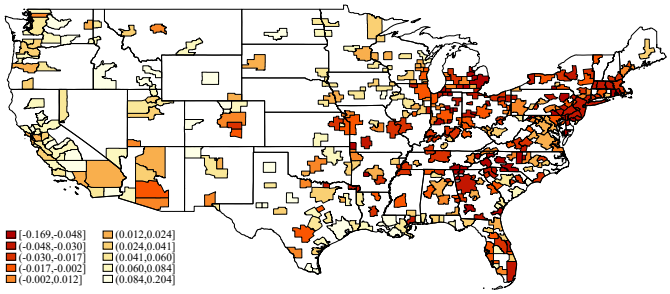
Table A.6: Counterfactual Changes in Employment Due to Transfer Response Under Different Assumed Values of the Cost per Job-Year

Cost per job-year (1)	Employment decline under counterfactual of no transfer response to local employment loss (2)	Percent increase in post-recession employment decline under counterfactual of no transfer response (3)
$35,000	12,571	21%
$60,000	7,333	12%
$120,000	3,667	6%
$940,000	468	0.8%

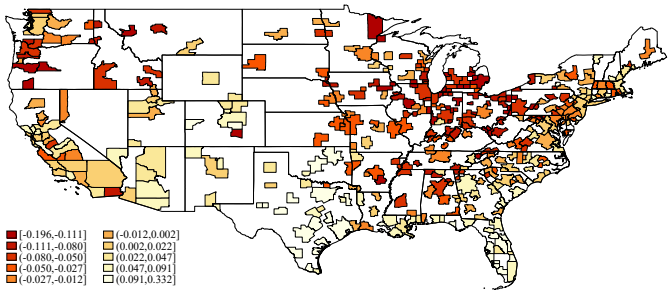
Notes: Column 1 reports different assumed values of the cost per job-year from transfers. Column 2 reports the implied annual employment decrease from a $440 million decrease in transfers to a metro area. This is calculated as $440 million divided by the value in column 1. Column 3 reports the percent increase in the post-recession employment decline under the counterfactual of no transfer response. This is calculated as the employment decline in column 2 divided by the baseline employment decline of 60,000 jobs.

Figure A.1: Log Employment Changes During Recessions in Metropolitan Areas

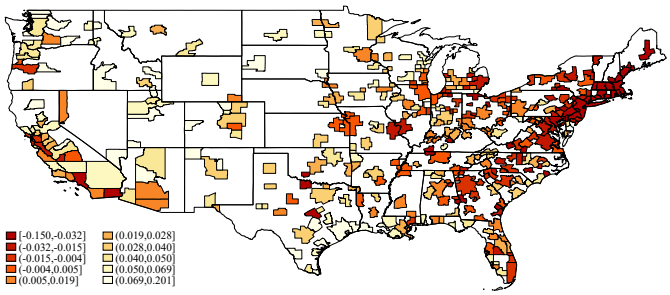
(a) 1973–1975 Recession



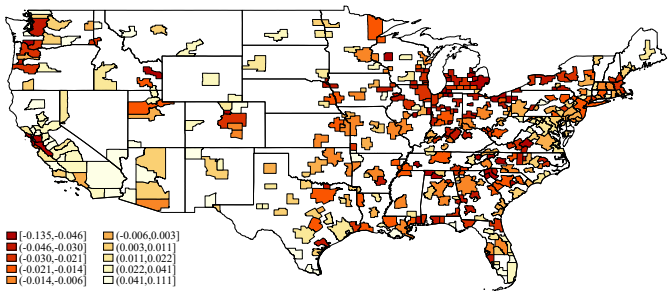
(b) 1980–1982 Recession



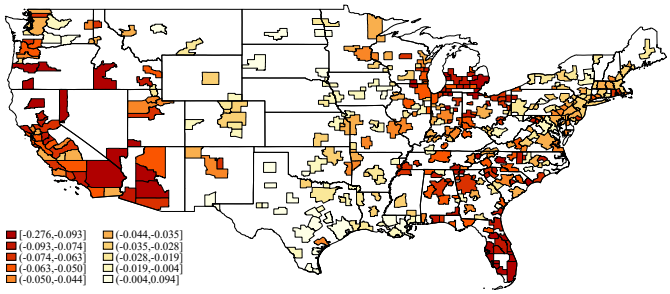
(c) 1990–1991 Recession



(d) 2001 Recession

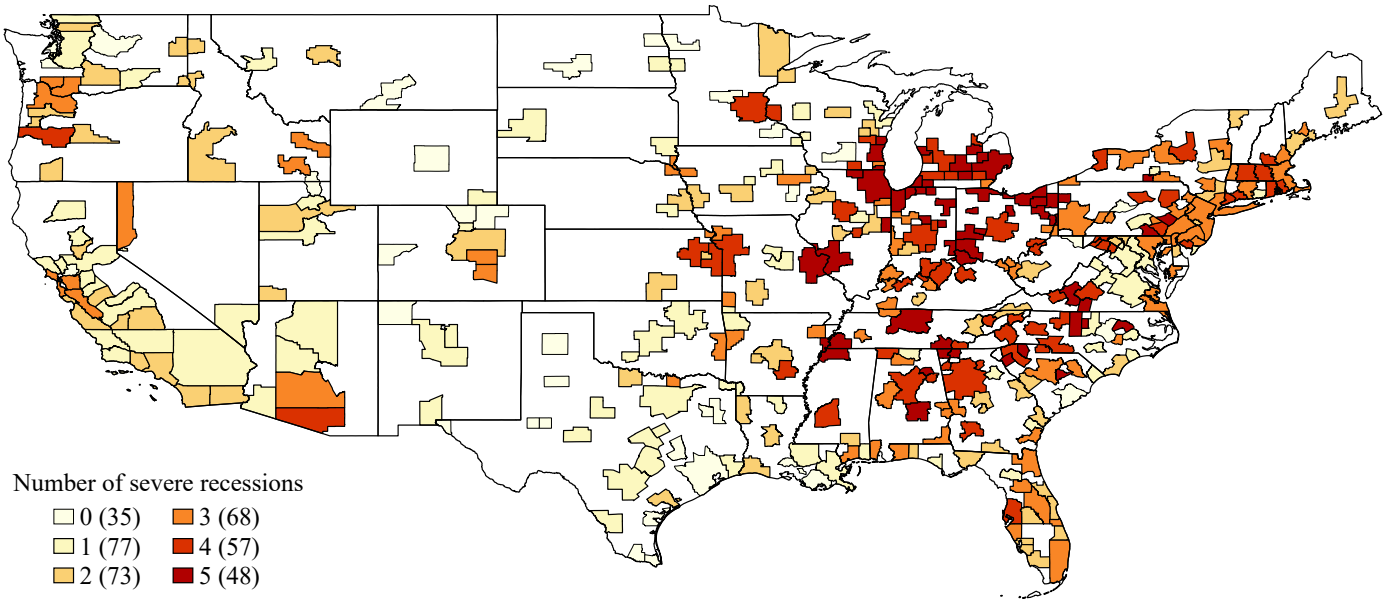


(e) 2007–2009 Recession



Notes: Each map shows the change in log employment from nationwide recession start to trough for 358 CBSAs (OMB vintage 2003 definitions) as described in the text. Areas in darker colors experienced larger employment losses.
Source: Authors' calculations from BEAR.

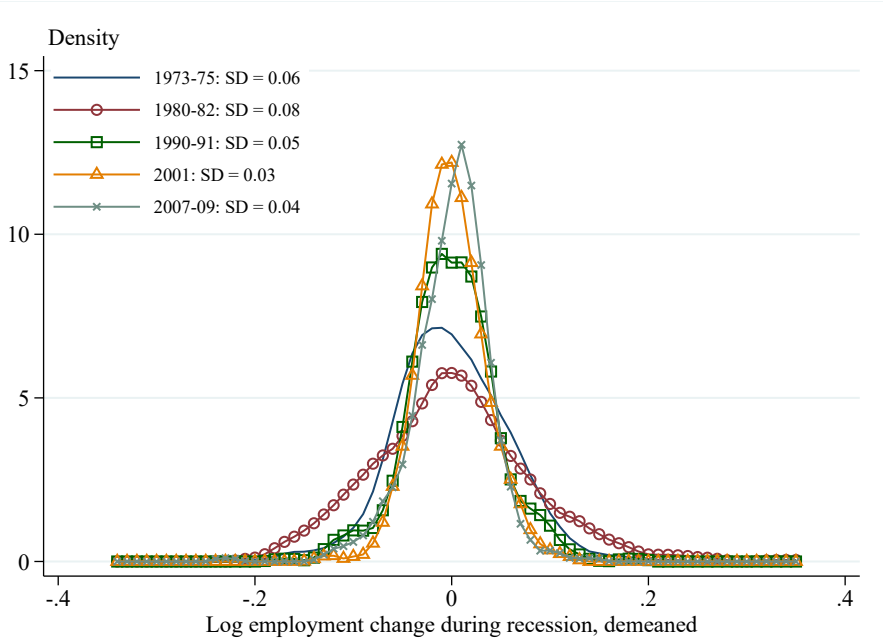
Figure A.2: Frequency of Severe Recessions, by Metropolitan Area, from 1973–2009



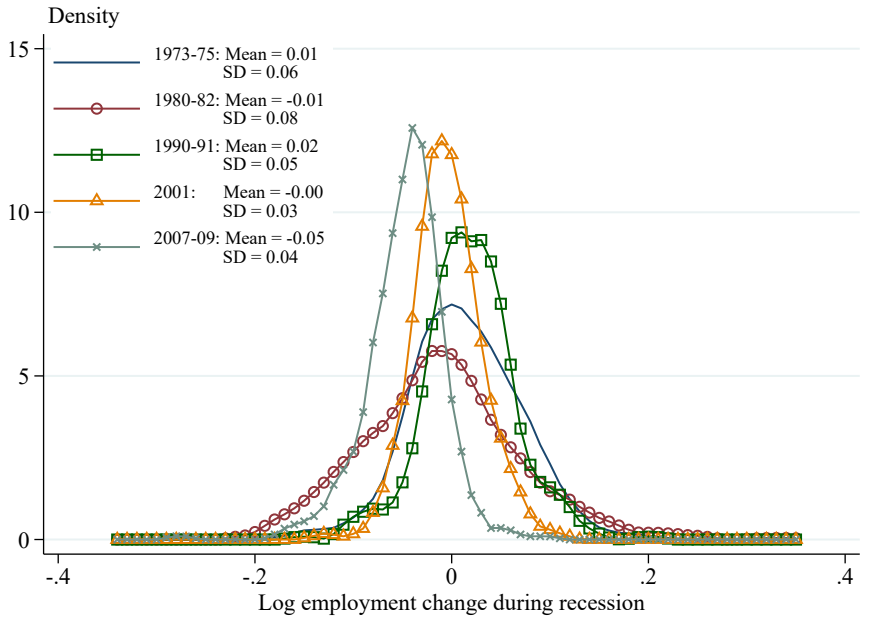
Notes: We denote an area as suffering a severe recession if its log employment change for a given recession is less than the median across CBSAs for that recession.
Source: Authors' calculations from BEAR.

Figure A.3: Density of Log Employment Changes During Recessions Across Metropolitan Areas

(a) Log Employment Changes, Demeaned

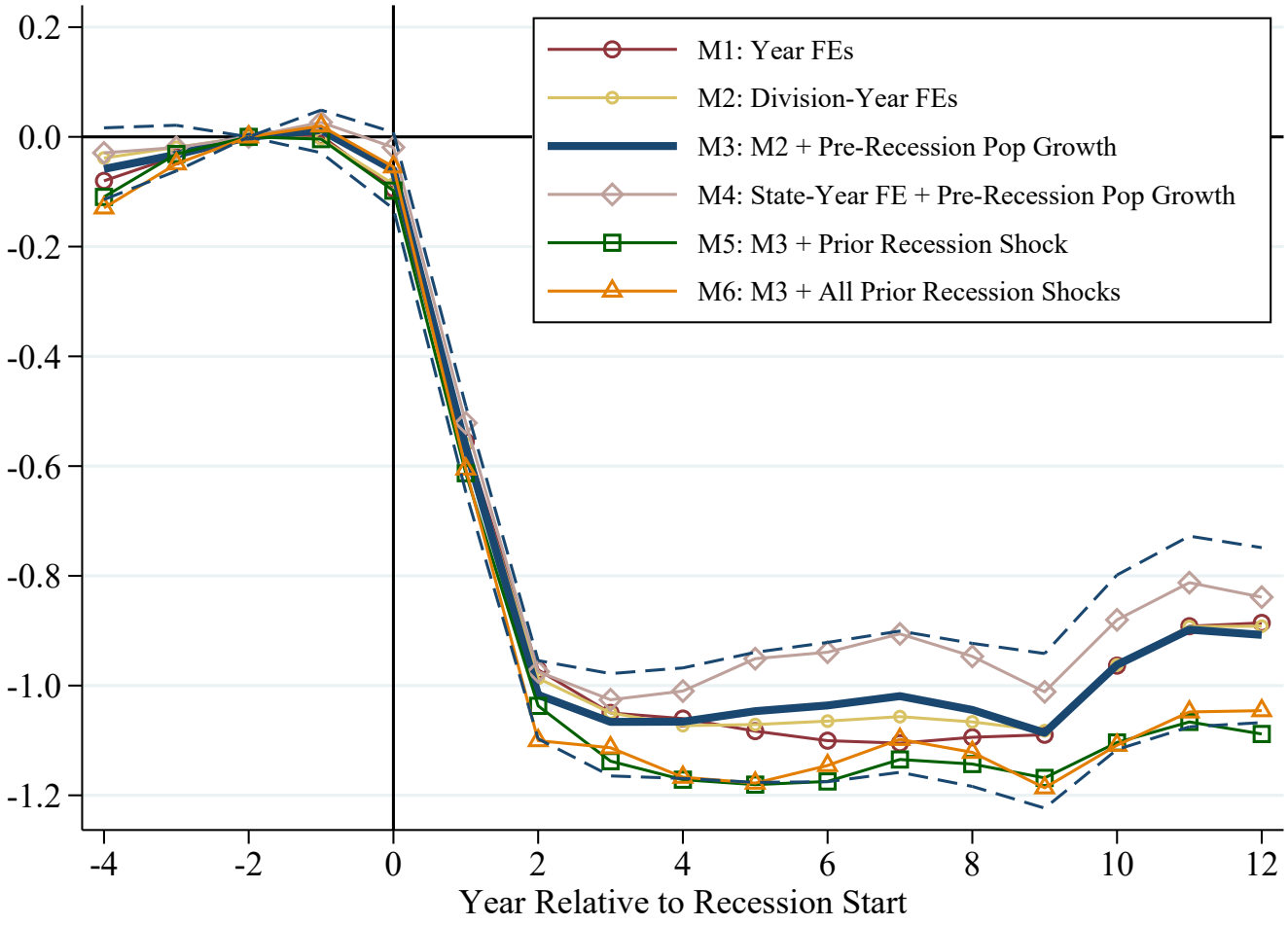


(b) Log Employment Changes



Notes: The figure shows estimated kernel densities of the log wage and salary employment change for each of the five recessions between 1973 and 2009. In Panel A, log employment changes are demeaned for each recession using the unweighted average across metropolitan areas (CBSAs).
Source: Authors' calculations from BEAR data.

Figure A.4: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Real Per Capita Earnings, Robustness to Other Specifications and Controls

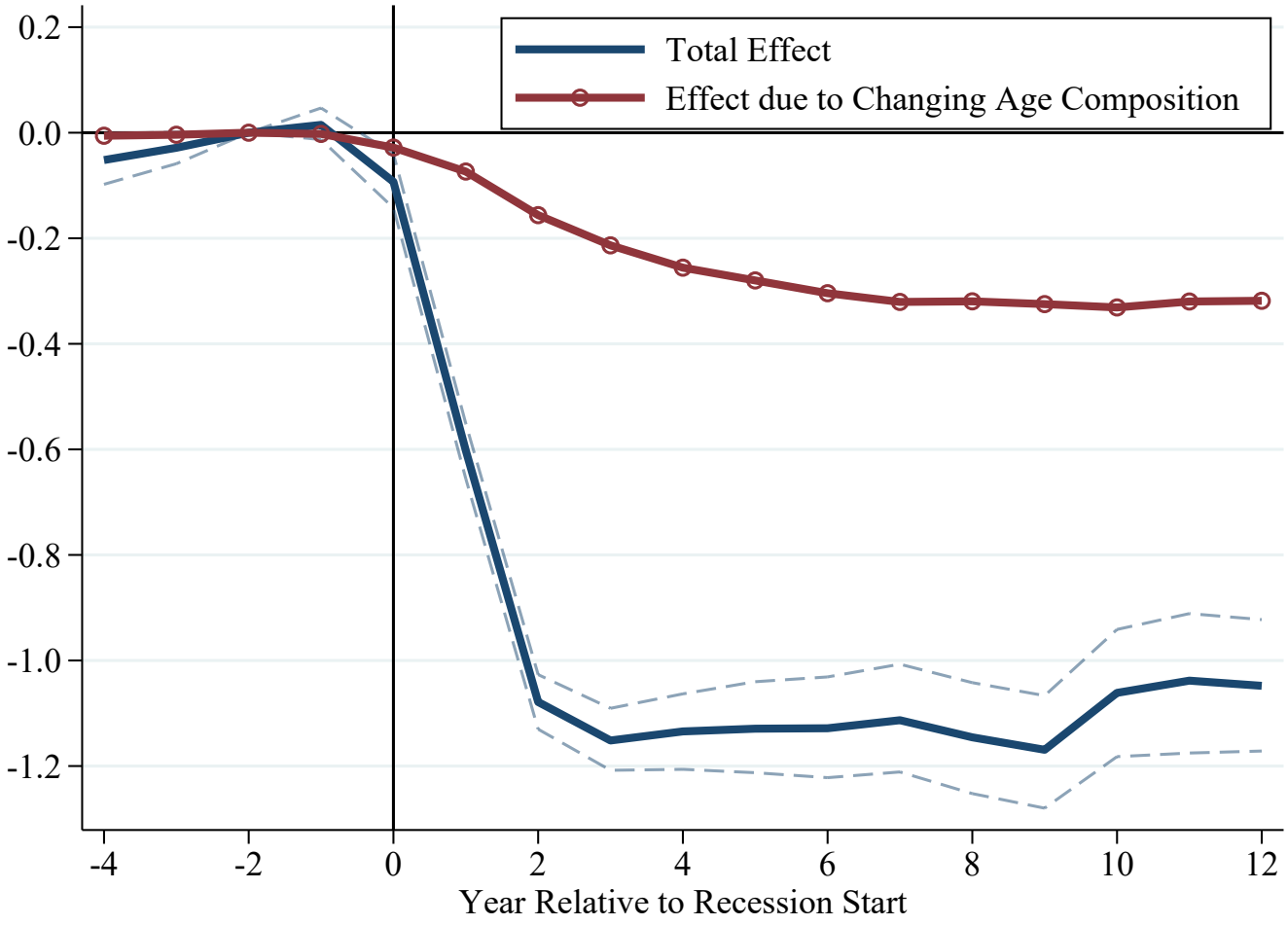


Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of log real per capita earnings. Specification M1 controls for year fixed effects. Specification M2 controls for census division-by-year fixed effects. Our main specification M3 adds interactions between year fixed effects and pre-recession population growth by age group. Specification M4 controls for state-by-year fixed effects instead of division-by-year fixed effects. Specification M5 adds to specification M3 a control for the log employment change during the prior recession, and specification M6 adds such controls for *all* previous recessions since the mid-1970s. All specifications also control for metropolitan-area fixed effects. The key independent variable is the log wage and salary employment change during the recession from BEAR data. There are 358 metropolitan areas in the full sample. The 95 percent point-wise confidence interval for specification M3 comes from a metro-area cluster bootstrap of the entire estimation and averaging process; see note to Figure 2.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.5: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Real Per Capita Earnings and Implied Changes via Shifts in Age Structure, by Recession

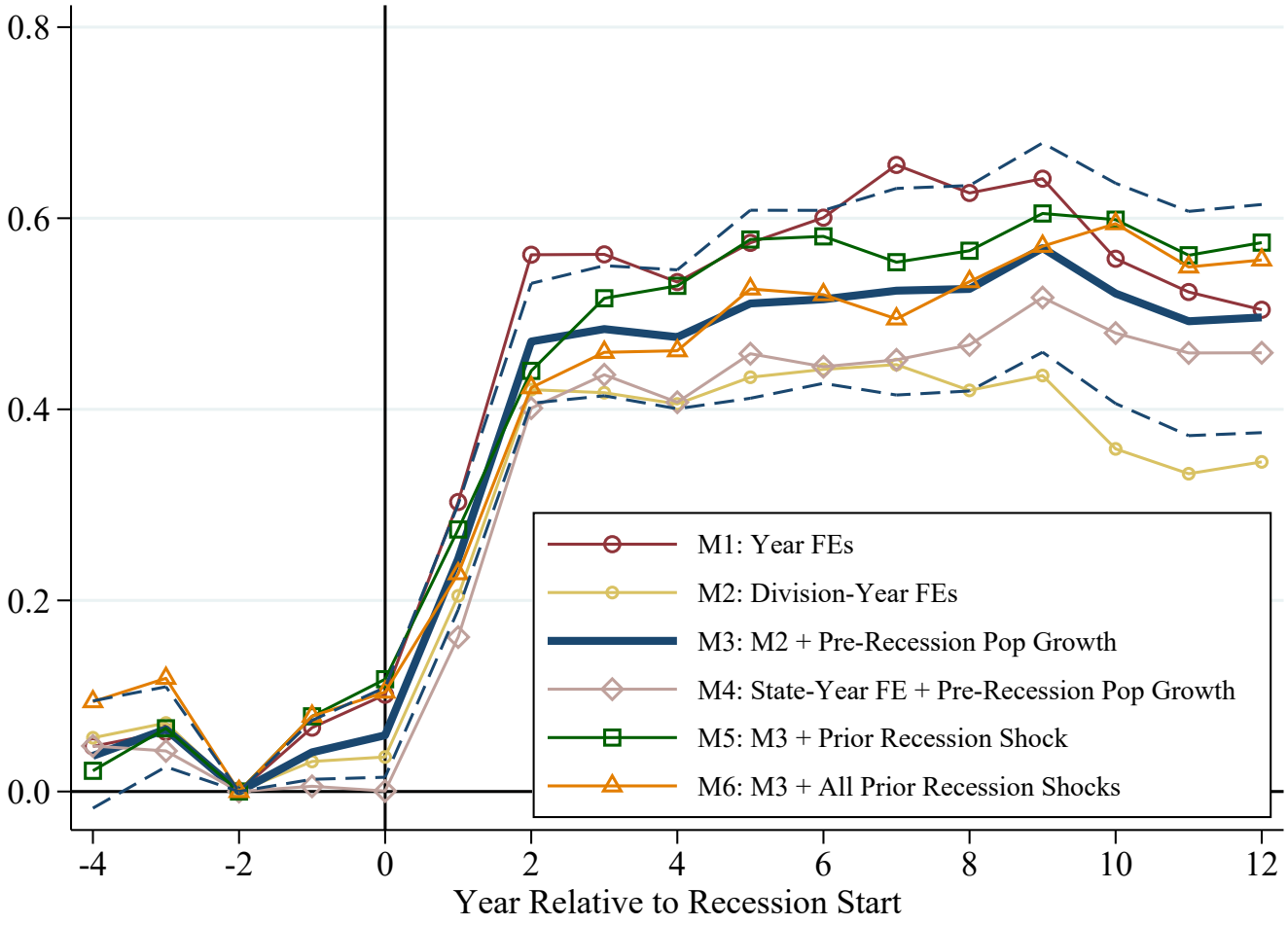
Notes: Figure reports estimates of equation (1), separately for each recession, for the dependent variable of log real per capita earnings and predicted effects on earnings due to the recession-induced impacts on the age structure. Standard errors are clustered by metropolitan area and 95 percent confidence intervals are shown. See notes to Figure 2.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.6: Impacts of Log Employment Decreases During Recessions on Commuting Zone Log Real Earnings per Capita and Implied Changes via Shifts in Age Structure



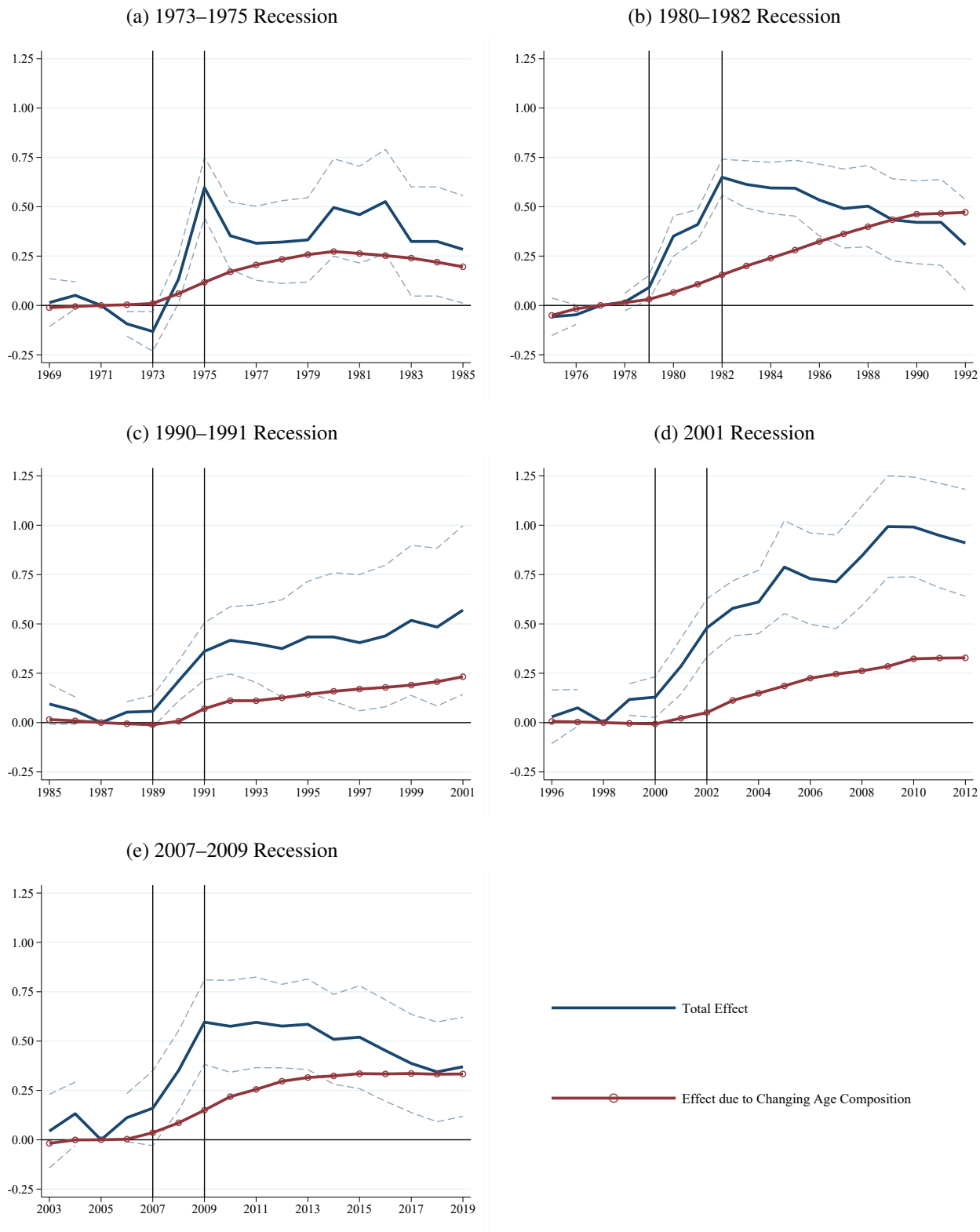
Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of log real earnings per capita and predicted effects on earnings due to the recession-induced impacts on the age structure. The latter is calculated based on estimates of changes in the age structure after recessions and the pre-recession relationship between transfers and age structure, as described in the text. The key independent variable is the log wage and salary employment change during the recession from BEAR data. Of 691 total commuting zones, we include in the estimation sample the 487 that had 1990 populations of at least 50,0000. This covers 98% of the total population and reduces measurement error and outliers from very small areas. The 95 percent pointwise confidence intervals come from a commuting zone cluster bootstrap of the entire estimation and averaging process.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.7: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Real Per Capita Transfers, Robustness to Other Specifications and Controls



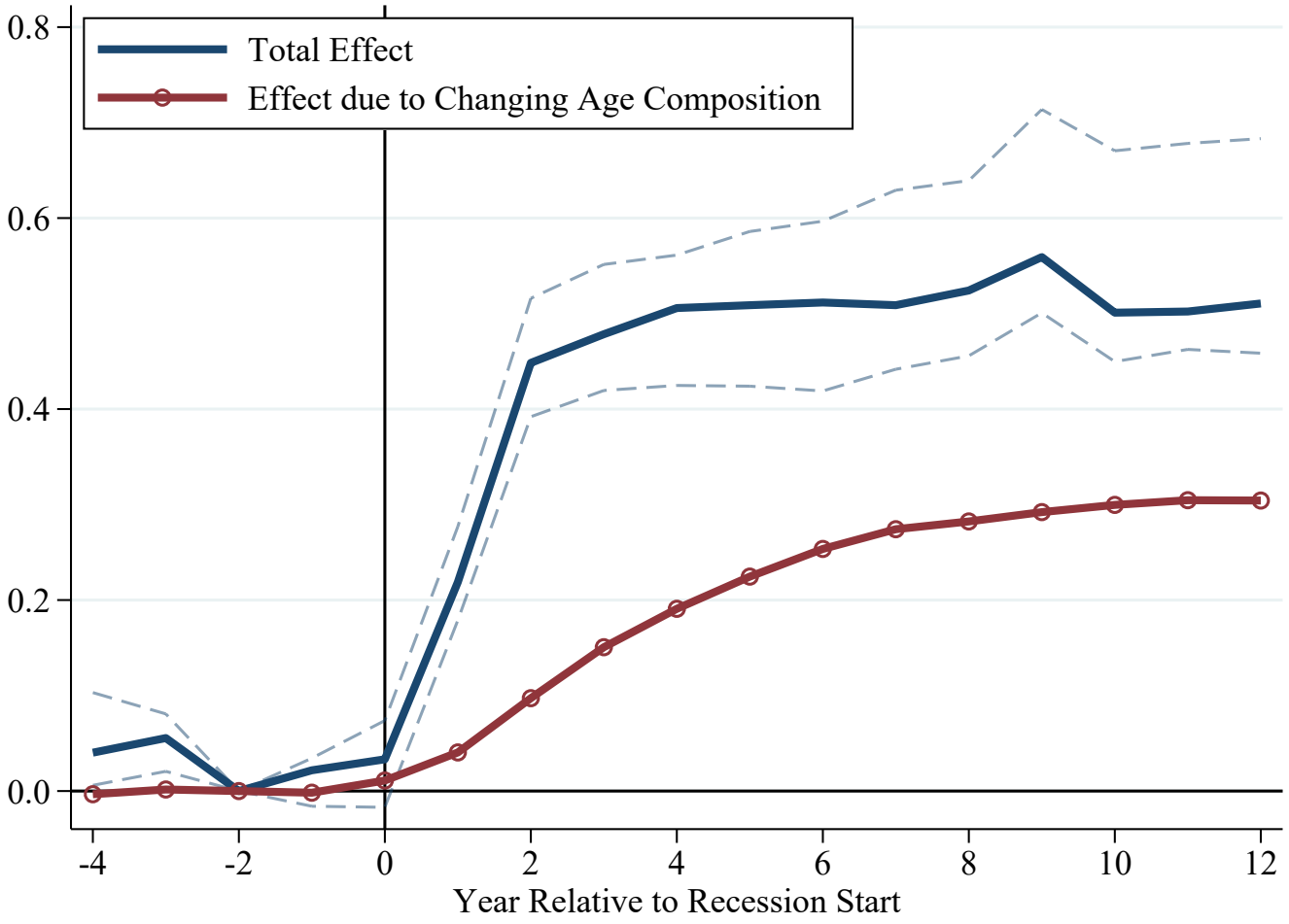
Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of log real per capita transfers. See notes to Appendix Figure A.4 for details on specifications.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.8: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Log Real Per Capita Transfers and Implied Changes via Shifts in Age Structure



Notes: Figure reports estimates of equation (1), separately for each recession, for the dependent variable of log real per capita transfers and predicted effects on transfers due to the recession-induced impacts on the age structure. See notes to Appendix Figure A.5.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.9: Impacts of Log Employment Decreases During Recessions on Commuting Zone Log Real Transfers per Capita and Implied Changes via Shifts in Age Structure

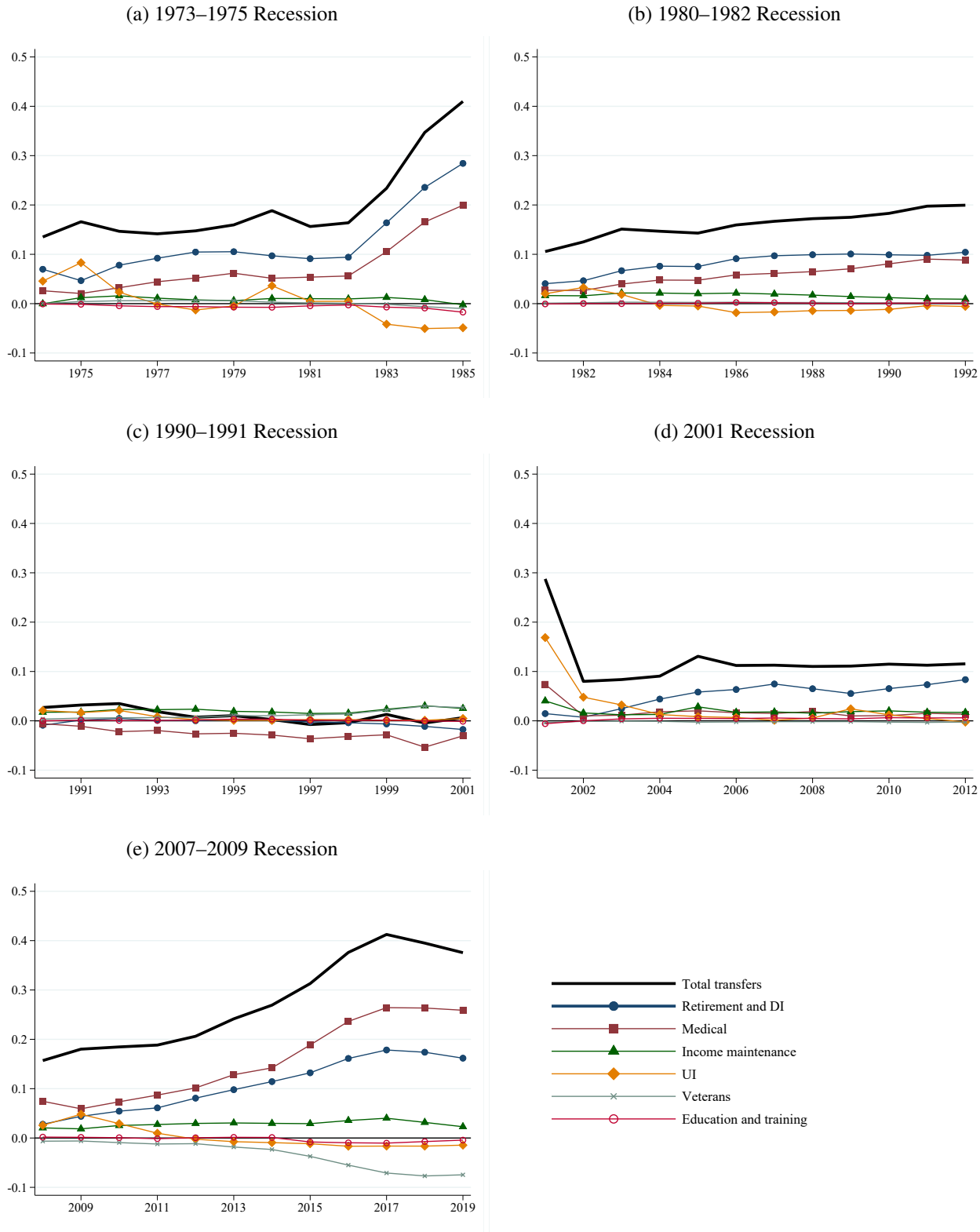


Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of log real transfers per capita and predicted effects on earnings due to the recession-induced impacts on the age structure. See notes to Figure 3.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.10: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Real Per Capita Transfers, by Category and Recession

Notes: Figure reports estimates of equation (1), separately for each recession. The dependent variable is log per capita transfers for the indicated category. Standard errors are clustered by metropolitan area and 95 percent confidence intervals are shown. See notes to Figures 2 and 4.
Sources: Authors' calculations using BEAR and SEER data.

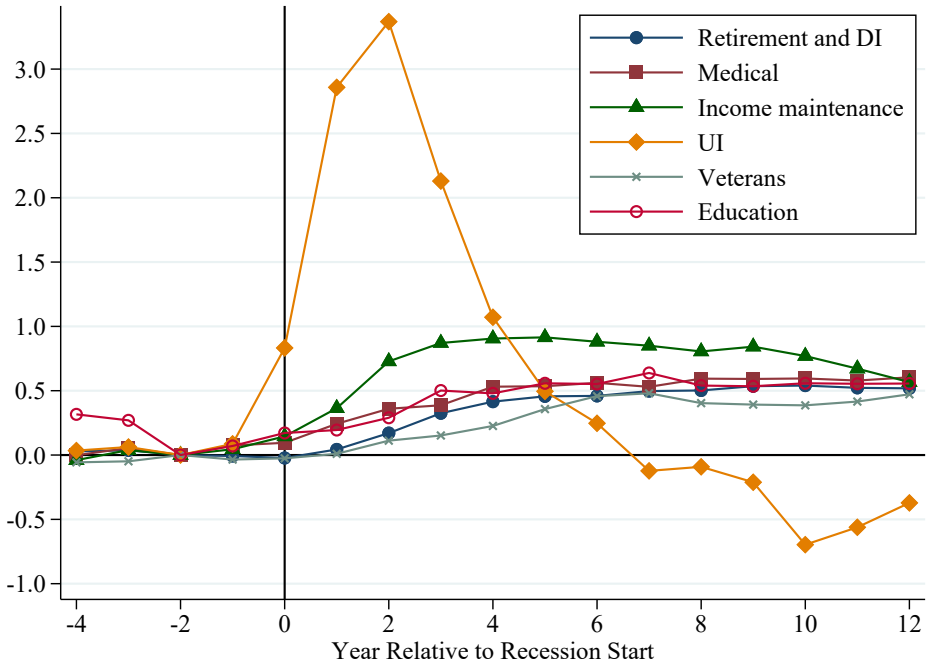
Figure A.11: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Real Per Capita Transfers Relative to Impact on Real Per Capita Earnings, by Category and Recession



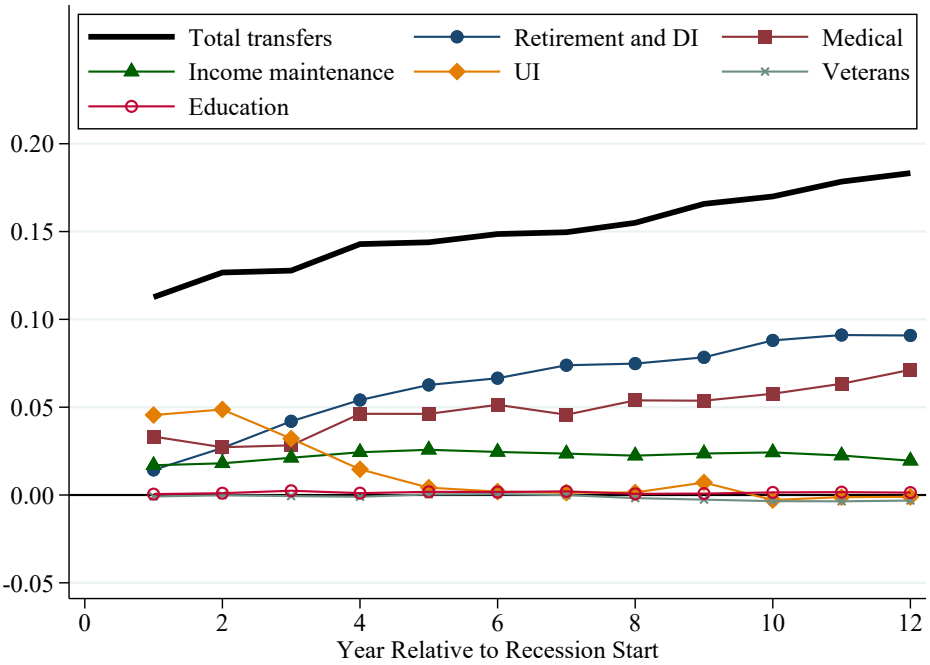
Notes: Figure reports estimates of equation (1), separately for each recession. The dependent variable is per capita transfers in the indicated category (in levels). We normalize the impacts by dividing the coefficients for transfers by the coefficients for per capita earnings and multiplying by -100. Standard errors are clustered by metropolitan area and 95 percent confidence intervals are shown. See notes to Figures 2 and 4.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.12: Impacts of Log Employment Decreases During Recessions on Commuting Zone Real Transfers per Capita and Effective Replacement Rates, by Category

(a) Elasticities



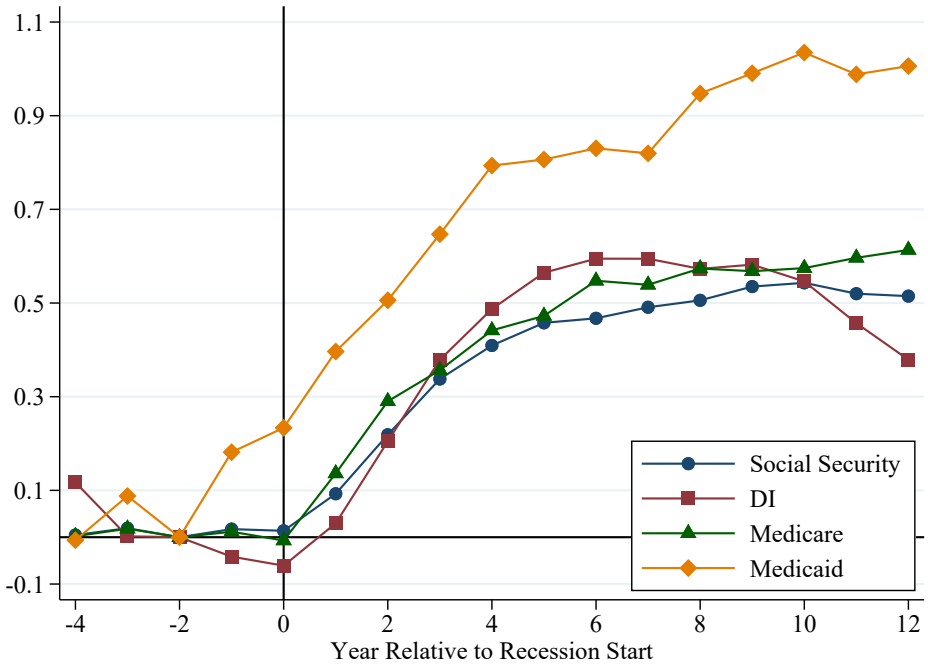
(b) Replacement Rates



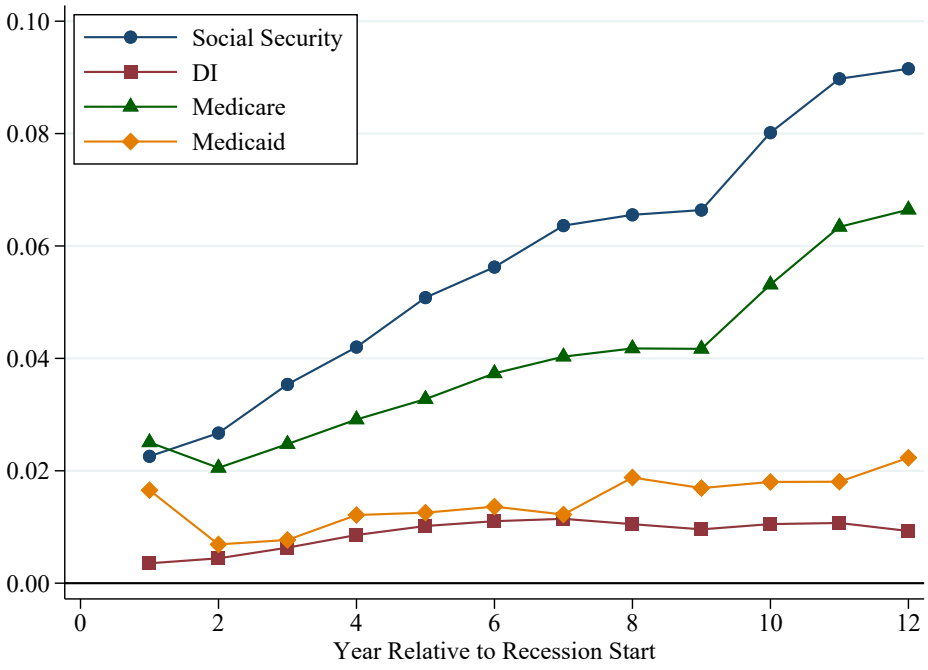
Notes: Figure reports estimates of equation (1), averaged across recessions. Panel A displays elasticities, where the dependent variable is log transfers per capita as in Figure A.9, but for specific transfer categories. Panel B displays coefficients for per-capita transfers in the indicated category divided by coefficients for per-capita earnings (both in levels), where these ratios constructed as the average numerator (across recessions) divided by the average denominator. See notes to Figure A.6.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.13: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Real Per Capita Transfers and Effective Replacement Rates, by Detailed Category of OASDI and Medical

(a) Elasticities

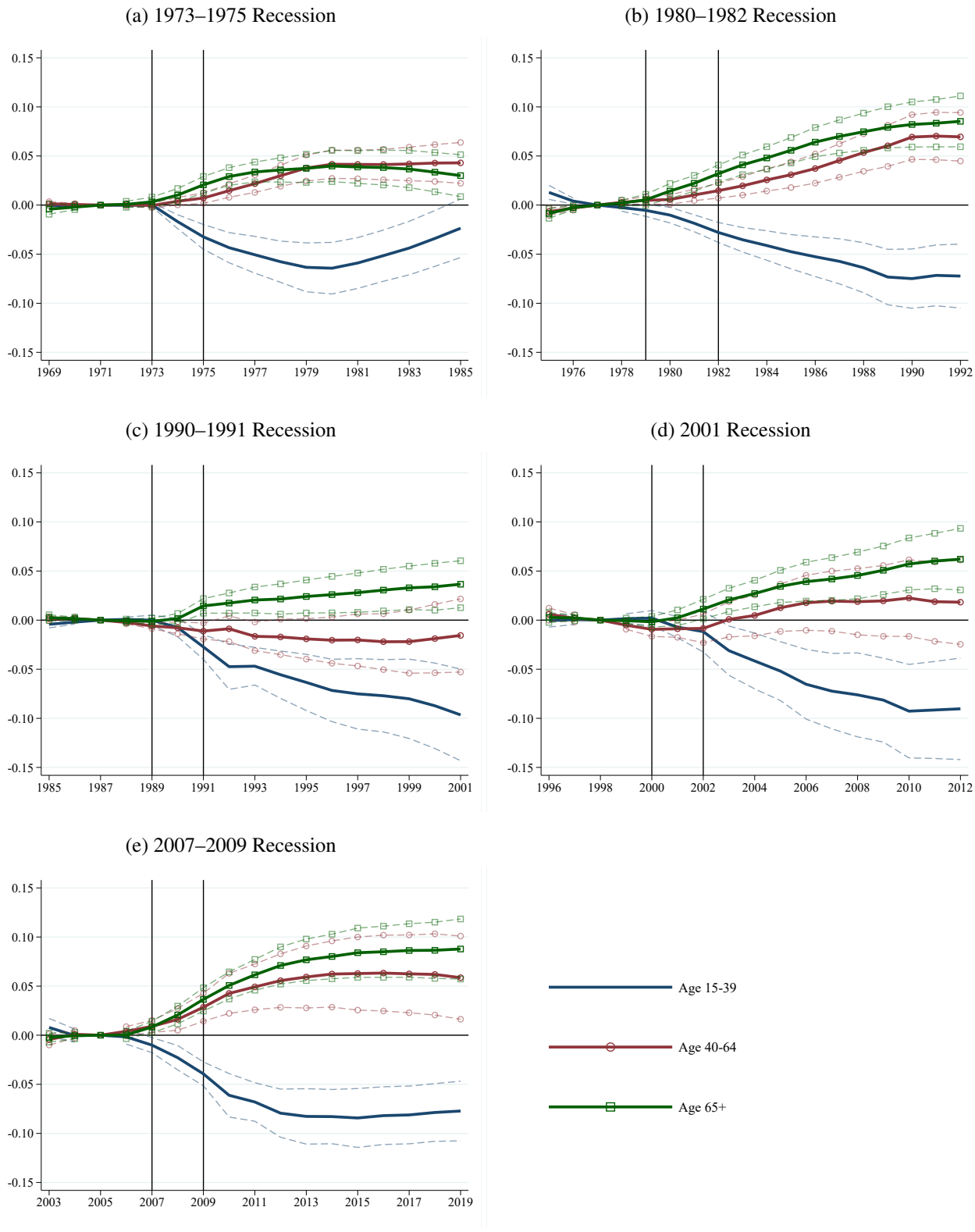


(b) Replacement Rates



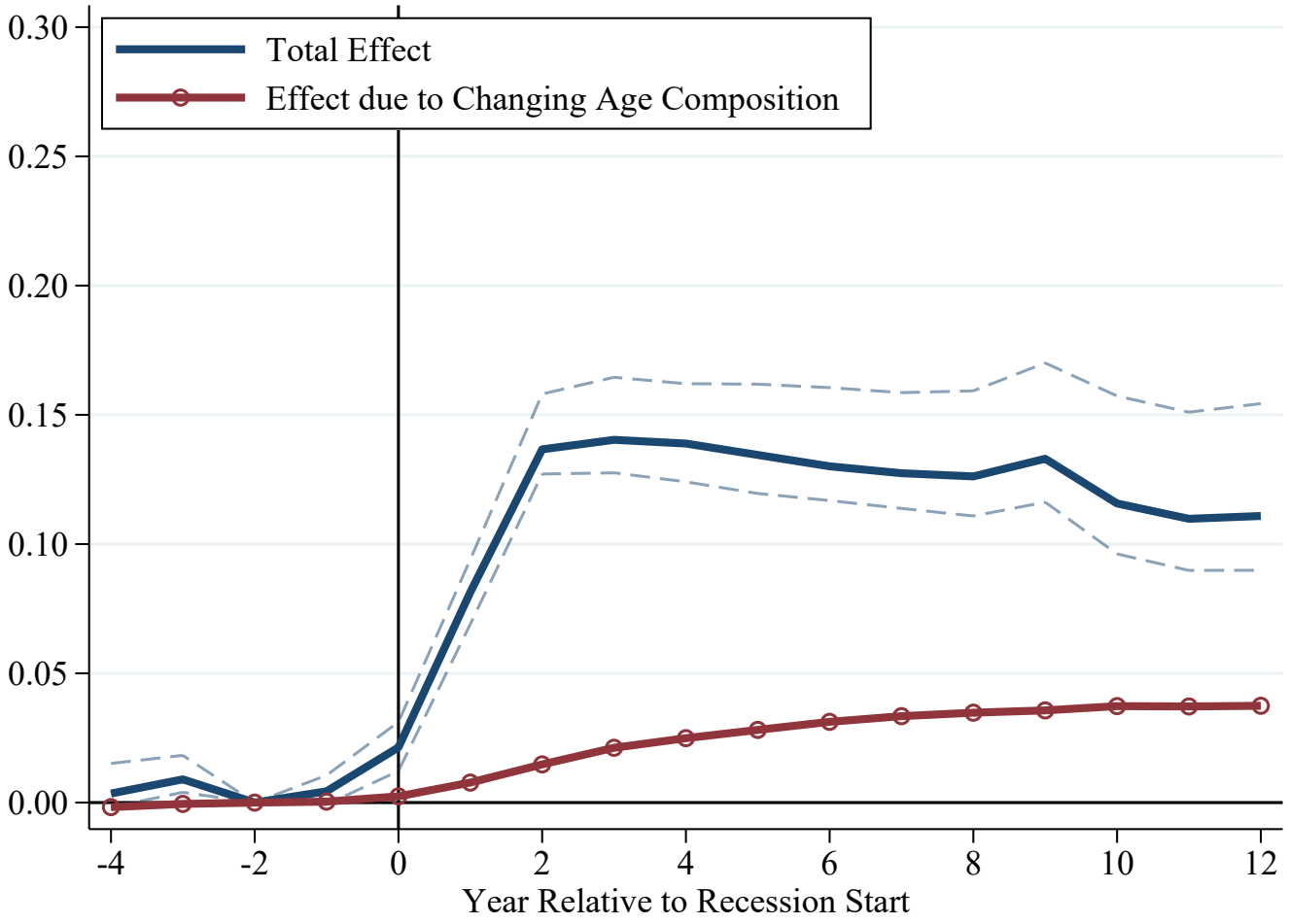
Notes: Figure reports estimates of equation (1), averaged across recessions. Panel A displays elasticities, where the dependent variable is log per capita transfers as in Figure 3, but for the specific transfer categories of Social Security retirement, Disability Insurance, Medicare, and Medicaid. Panel B displays coefficients for per capita transfers in the indicated category divided by coefficients for per capita earnings (both in levels), where these ratios are constructed as the average numerator (across recessions) divided by the average denominator. See notes to Figure 2.
Sources: Authors' calculations using BEAR, SSA, and SEER data.

Figure A.14: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Age Structure



Notes: Figure reports estimates of equation (1), separately for each recession. The dependent variables are the shares of the population that are ages 15–39, 40–64, and 65+ (0–14 is omitted). See notes to Figure 2.
Sources: Authors' calculations using BEAR and SEER data.

Figure A.15: Impacts of Log Employment Decreases During Recessions on Metropolitan Area Transfers Share of Income and Implied Changes via Shifts in Age Structure



Notes: Figure reports estimates of equation (1), averaged across recessions, for the dependent variable of the transfers share of total income and predicted effects on this share due to the recession-induced impacts on the age structure. See notes to Figure 2.
Sources: Authors' calculations using BEAR and SEER data.