

THE TAXPAYER RELIEF ACT OF 1997 AND HOMEOWNERSHIP: IS SMALLER NOW BETTER?

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Prior to the Taxpayer Relief Act of 1997 (TRA97), the capital gain from the sale of a home was taxed differently for those over and under the age of 55. TRA97 eliminated this differential treatment. Using a difference-in-difference approach, we find that home sellers slightly under the age of 55 were 6.2% more likely to move for a less expensive house to maintain, 6.6% less likely to move for a larger place, and 5.2% more likely to reside in a condominium after TRA97's enactment, relative to those slightly over 55. (JEL H24, R21)

I. INTRODUCTION

While there is a lengthy literature on the U.S. Tax Code's mortgage interest deduction and property tax deduction, less attention has been paid to the capital gains tax treatment of owner-occupied housing. Prior to 1997, the U.S. Federal Income Tax Code allowed home sellers to roll over capital gains taxes from the sale of a home if they bought up—that is, if they purchased another house within 2 years that was at least as expensive as their previous home. In 1996, the U.S. Office of Management and Budget (OMBA) estimated tax expenditures of \$14.4 billion from this deferral (rollover) of capital gain taxation. Home sellers over the age of 55 were treated differently than those under 55 as they received a one-time capital gains tax exclusion from the sale of an owner-occupied home of up to \$125,000, a tax expenditure of \$5.2 billion.¹ To give some perspective, the tax expenditure associated with the deductibility of state and local property taxes was estimated to be \$15.9 billion, and the expenditure from the

deductibility of mortgage interest payments was \$47.5 billion in 1996.¹

The passage of the Taxpayer Relief Act of 1997 (TRA97) eliminated the differential treatment of home sellers over and under the age of 55. After 1997, the first \$250,000 (\$500,000) in capital gains from the sale of a single (married) owner-occupier's primary residence is tax exempt, regardless of the home seller's age and whether they purchase more or less housing following the sale of their residence. For most home sellers, this effectively eliminates capital gains taxation from the sale of a primary residence, as the median home price was less than the exclusion amount.² In addition, TRA97 lowered the marginal tax rate applied to long-term capital gains from any assets, including housing.

Incentives created by the Federal Tax Code prior to 1997 for home sellers under the age of 55 to purchase a more expensive house than their previous one, or “buy up,” to defer capital gains taxes have been of particular interest to economists. If, instead, a home seller bought a less expensive home, or “bought down,” and had a capital gain, taxes were paid on the difference

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1. Statistical Abstract of the U.S., 1997, Table No. 521, p. 338.

2. Homeowners had to make the residence their primary home for 2 of the past 5 years to qualify for the exemption.

ABBREVIATIONS

AHS: American Housing Survey
 CPS: Current Population Survey
 OECD: Organization for Economic Cooperation and Development
 OMBA: Office of Management and Budget

between the values of the two homes up to the maximum of the capital gain. Thus, for home sellers, incentives to buy more expensive homes were created.

In addition to the incentive to buy up, the differential tax treatment of home sellers under 55 from those older than 55 may lead to a lock-in effect—the incentive for a homeowner under 55 to defer selling her home if she desires a less expensive one, consistent with Shan (2011). This creates “mismatch” in the housing market as homeowners choose to reside in homes that no longer reflect their housing demand in an effort to avoid taxation of capital gains. This being the case, the post-TRA97 taxation of capital gains is expected to increase the likelihood that a homeowner younger than 55 moves to less expensive housing.

While it is true that home sellers over the age of 55 were affected by TRA97, as it increased the level of capital gains exempt from taxation and lowered capital gains tax rates, we do not expect the impact of these changes to lead to as significant behavioral changes for home sellers older than 55 as the behavioral changes for those under 55.³ Exploiting the fact that TRA97 differentially affects those over and under 55 allows identification of some of the effects it has had on the housing market. Specifically, this allows us to see if home sellers under the age of 55 who are no longer locked-in to their current level of housing consumption bought less expensive housing, or “moved down” after 1997, reducing mismatch. Rather than focusing on all home sellers under the age of 55 to provide better comparison with home sellers over the age of 55, we focus on home sellers between the age of 50 and 54 and compare with home sellers between the ages of 56 and 60. As our difference-in-difference methodology uses home sellers between the ages of 56 and 60 as a comparison group, our results should be interpreted as the change in housing decisions after the enactment of TRA97 for our treatment group of 50- to 54-year-old home sellers *relative* to our control group, the 56- to 60-year-old home sellers. If, in fact, both groups

reduce housing consumption after TRA97, our estimates might be considered a lower bound of TRA97’s true impact.⁴

We find evidence that our sample of households under the age of 55 are less likely to be locked-in to “mismatched” housing after TRA97, and that they are more likely to move down, relative to our comparison group of home sellers over 55. Specifically, home sellers under 55 are 6.2% more likely to move to a residence that is less expensive to maintain after 1997, relative to home sellers over 55. We also find that home sellers between the ages of 50 and 54 are about 7% less likely to move for a larger house following TRA97’s enactment, relative to home sellers over 55. In addition, home sellers affected by TRA97 are about 5% more likely to live in a condominium after TRA97 than home sellers between the ages of 56 and 60. All of these estimates are consistent with the idea that some homeowners were mismatched prior to 1997, and these homeowners moved to a residence that more closely matched their current levels housing demand, making the owner-occupied housing market more allocatively efficient.

In Section II, we review the literature on capital gains and housing. We discuss the effects of capital gains taxation on housing consumption in Section III. In Section IV, we discuss our data and empirical model. The results of our estimation are found in Section V, followed by falsification tests in Section VI. Our last section offers some concluding remarks.

II. THE LITERATURE ON CAPITAL GAINS AND HOUSING

The few studies that have examined the taxation of capital gains and housing suggest that it has significant impacts on the housing market. Studies by Burman, Wallace, and Weiner (1996) and Hoyt and Rosenthal (1990, 1992) examine the impact of pre-TRA97 capital gains taxation on housing consumption. Using administrative data Burman, Wallace, and Weiner (1996) estimate that annually as many as 200,000 home sellers under 55 purchased more expensive homes than they would have without this special tax treatment. Hoyt and Rosenthal (1992), using estimates of a housing demand function obtained with nonlinear budget techniques from

3. As discussed in more detail later, prior to TRA97 homeowners over 55 had a one-time exemption of \$125,000 in capital gains. After TRA97 the exemption increased to \$250,000 for all homeowners. As suggested by a referee, the lower exemption prior to 1997 might have reduced mobility for those over 55 who might have desired to gradually reduce housing consumption over the course of several moves.

4. We thank an anonymous referee for bringing this possibility to our attention.

Hoyt and Rosenthal (1990) and data from the American Housing Survey (AHS), predict that housing demand would fall by 16% if realized capital gains from moving down were not taxed, further illustrating the distortionary effect of the capital gains tax code. Newman and Reschovsky (1987) and Sinai (1998) use the Panel of Income Dynamics to examine the impacts of changes in the level of exemptions in the late 1970s and early 1980s on household mobility. Both of these studies found that the differential capital gains taxation appears to have a lock-in effect, that is, it reduces household mobility.

In contrast to these studies, all of which use data prior to 1997, we use data from both before and after the enactment of TRA97 to examine its impact on household mobility and housing consumption. Only four other studies of which we are aware, Bier, Maric, and Weizer (2000), Cunningham and Engelhardt (2008), Farnham (2006), and Shan (2011) examine this law using data following the TRA97's enactment.

Bier, Maric, and Weizer (2000) examine whether TRA97 affects a household's decision to buy a more or less expensive home during the 17 months following its enactment. Using public records of deed transfers from four Ohio cities, they find statistically significant results only for one city (Columbus), where more homeowners moved down in the 17 months following TRA97 than had prior to 1997. However, the impacts of TRA97 are based on whether or not the household moved before or after the passage of TRA97, as demographic variables, including age, are not available.

Shan (2011) also uses transaction data to uncover the effects of TRA97, focusing on single-family home sales in affluent towns in the Boston metropolitan area. Specifically, she imputes accumulated capital gains for each residence and finds that sales rates of houses with gains between zero and \$500,000 increased after TRA97, indicating that tax law prior to TRA97 created a lock-in effect in the towns that she examined.

Cunningham and Engelhardt (2008) use the 1997 and 1999 Current Population Survey (CPS) to estimate the effect of TRA97 on the decision to move. As TRA97 differentially affects homeowners under and over the age of 55, they use a difference-in-difference approach comparing homeowners aged 52–54 with those 56–58 years of age before and after the passage of TRA97. Estimating a linear

probability model, they find that homeowners affected by TRA97 are 22%–31% more likely to move than their counterparts above 55, with most of this effect coming from highly mobile subgroups that were expected to want to move down a priori.

Farnham (2006) exploits the fact that the AHS is a survey of housing units to determine the capital gain from the sale of a house by comparing the value at different times in the survey, an approach similar to Shan (2011). He, like Shan (2011), then estimates a hazard model of the probability of moving accounting for the estimated capital gain. He also finds, in fact, that those with higher capital gains and gains subject to taxation are less mobile.

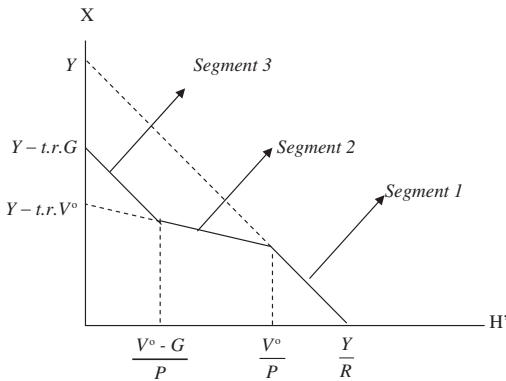
Our study complements the work of these post-TRA97 studies. Unlike Cunningham and Engelhardt (2008), Shan (2011), and Farnham (2006) who focus on the “lock-in” effect of capital gains taxation prior to TRA97 on mobility, we focus on another lock-in created by capital taxation—the impact on housing consumption. Like Cunningham and Engelhardt (2008), we exploit the difference in treatment of those under and over the age of 55 before TRA97 to do a difference-in-difference analysis. Our source of data, AHS, provides both detailed information on individual home seller characteristics and housing characteristics of the home sellers new residence. While Farnham (2006) uses these data as well he also focuses on the impact of TRA97 on household mobility and not on housing consumption. Unlike Cunningham and Engelhardt (2008) and Shan (2011), we know both the reasons that a home seller moved as well as the type of housing into which the home seller moved. Then, given a respondent sold her home, we can determine whether TRA97 did, in fact, have an impact on the nature of the housing into which she moved.

The information from the AHS on housing characteristics, including whether a home seller moved to a condominium, enables us to address the issue examined earlier by Hoyt and Rosenthal (1990, 1992) and Burman, Wallace, and Weiner (1996)—how changes in capital gains taxation affected the consumption of housing.

III. THE IMPACTS OF CAPITAL GAINS TAXATION ON HOUSING MARKETS

After TRA97, with a few exceptions, home sellers do not pay capital gains taxes on the sale

FIGURE 1
Budget Constraint for Home Sellers Under Age 55 Prior to 1997



of their home.⁵ Prior to 1997, capital gains taxes are due if a home seller under 55 purchases a less expensive home (moves down). Then, prior to 1997, home sellers under the age of 55 who buy a new house pay capital gains taxes in the amount of

$$(1) \quad T = \min[tG, t(V^0 - H'R)]$$

where T is total capital gains taxes paid, t is the marginal income tax rate facing a home seller, G is the capital gains from the sale of the home, V^0 is the sale price of the home, H' is the stock of housing in the replacement home, and R is the rental cost of owner-occupied housing, as defined by Rosen (1979).

Because the capital gains taxes paid on the sale of a previous home depend on a household's current choice of housing, homeowners face different prices of housing depending on the quantity of their new housing consumption, relative to their previous consumption. This is illustrated in Figure 1, where X represents all other goods, Y is income, P is the price of housing, and r is the household's discount rate. *Segment 1* illustrates the budget constraint for a home seller who buys a more expensive home and faces the price R . *Segment 2* corresponds to a home seller who moves down but considers a house of value such that they do not pay tax on the full

5. Homeowners are still required to pay capital gains taxes on homes that are not their primary residence and homes that they have not lived in for 2 of the last 5 years. In cases where their realized gain is larger than their exclusion amount they owe taxes on the difference.

capital gain ($V^0 - H'R < G$). This being the case, increases in housing consumption reduce the amount paid in capital gains taxes, making the effective price of housing $R(1-t)$ on this section of the budget constraint. Finally, for the home seller whose capital gain exceeds the difference between the value of their previous home and their current, less expensive home, small changes in housing do not change the capital gains taxes paid, making the price R . This case is represented by *Segment 3* in the figure.

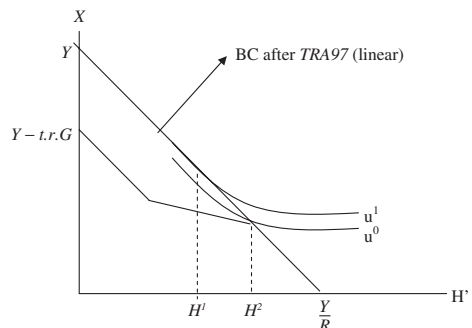
Some home sellers who, prior to 1997, purchased a home of approximately equal value to their previous home may have chosen to buy a less expensive home in the absence of capital gains taxation. These households are mismatched, as they are consuming housing that does not reflect their true housing demand. An example of this phenomenon is found in Figure 2, which contains both the pre-1997 and post-1997 budget constraints for a household under 55 with a capital gain from the sale of a home. While this household is located at the "kink" under the pre-1997 budget constraint, that is, the value of its current and previous houses are the same, under the post-1997 linear budget constraint the household will clearly purchase less housing. Therefore, the mismatch created by the pre-TRA97 tax code no longer exists.

IV. DATA AND THE EMPIRICAL MODEL

A. Data

Data for our analysis comes from the AHS, a survey of housing structures that contains

FIGURE 2
Budget Constraint Before and After TRA97: Home Sellers at the Kink Move Down After 1997



detailed housing characteristics, demographic information for occupants and, of particular interest, information about occupants' recent moves. We use metropolitan surveys from both before and after 1997 including 1995, 1996, 1998, 2002, and 2004. In each of these five surveys, between 6 and 15 metropolitan areas were surveyed annually, with at least 3,200 housing units from each area. In addition, we supplement these data with data from the 1995, 1999, and 2003 AHS national survey.⁶ We focus on recent movers who owned their previous home (home sellers), as previous tenure status is only asked of respondents who moved in the past 24 months. In an effort to ensure that our treatment group and comparison group do not have significantly different trends in housing demand, we also restrict the sample to those between 50 and 60 years of age. Similar to Cunningham and Engelhardt (2008), the age restrictions included in our analysis refer to the age of the oldest respondent in the household (either the household head or the spouse of the household head), and we exclude home sellers who are exactly 55. Therefore, our treatment group includes home sellers between the ages of 50 and 54, and our comparison group is made up of home sellers between 56 and 60. While we use this narrow age band around 55 for purposes of trying to minimize differences in housing consumption trends between the comparison groups, as we discuss more later, TRA97 might have different impacts on the housing decisions of those much younger than 55.

Unfortunately, unlike earlier waves of the AHS, recent waves do not report the value of the household's previous home. Thus, unlike Hoyt and Rosenthal (1990, 1992), we cannot directly determine if homeowners actually bought a less expensive home. However, since the pre-TRA97 tax code locked homeowners with large capital gains into their existing residences, it also created mismatch. Therefore, we exploit a number of the questions asked in the AHS to address the issue of housing mismatch, specifically examining the extent to which previous homeowners moved down, to smaller homes, after 1997.

One measure of whether a home seller moved down is her response to a question regarding the

reasons why she moved. One of their choices is a desire for a "less expensive house to maintain." While we concede that a desire for a "less expensive house to maintain" may not necessarily mean they are living in a less expensive home, we believe this response is a good indication that the respondent moved to a residence that more closely matches her housing demand, eliminating mismatch created by the pre-TRA97 tax code.

Another possible reason for moving is to move to a larger house or apartment. After TRA97, home sellers between the ages of 50 and 54 are expected to be more likely to move to a smaller place and therefore less likely to move for a larger residence, relative to those over age 55, again reducing mismatch.

We also explore changes in the probability of a home seller moving to a condominium. Compared with living in a single family home, living in a condominium involves less maintenance. In addition, in this sample, the average price of a condominium is less than that of other owner-occupied housing, with the average size of a condominium being smaller. Therefore, moving to this distinct type of housing represents both moving down and reducing mismatch, and we expect home sellers under the age of 55 to be more likely to own a condominium after TRA97, relative to those over age 55.

While, individually, none of these measures is perfectly correlated with moving down, together, they represent the first evidence of the impacts of TRA97 on changes in the desire to live in a home that is less expensive to maintain, (not) live in a larger home, and purchase a condominium, and provide a good measure of how TRA97 affected mismatch.

The variable TRA97 is designed to capture the effects of the Taxpayer Relief Act of 1997. It is an indicator variable equal to one if the oldest respondent (either the head of the household or the head of the household's spouse) was under age 55 when the household moved and the household moved after TRA97 was enacted, specifically after August 1997.⁷ Again, relative to home sellers over 55, we expect home sellers under the age of 55 to be more likely to move down and less likely to be mismatched after

6. We use national samples from the 1995, 1999, and 2003 survey years only, as these samples are supplemented with extra observations from large cities. National samples from other survey years near TRA97 (1997 and 2001) do not contain geographic identifiers for most observations.

7. TRA97 was signed into law on August 5, 1997. It applied retroactively to home sales on or after May 6, 1997. However, we assume that respondents who moved in May 1997 were not influenced by the law, which had not been passed.

1997, as they no longer have a tax incentive to move up.

In constructing TRA97, home sellers over the age of 55, those that may have moved down without penalty prior to 1997, are the comparison group. Although this tax legislation did, in fact, create a “natural experiment,” as home sellers under and over the age of 55 went from being treated differently by the tax code to the same, TRA97 also changed the tax treatment of capital gains from the sale of a home for home sellers over the age of 55 as well. The exemption amount for all home sellers is \$250,000 or \$500,000 depending on their marital status, an increase from \$125,000 for home sellers over the age of 55, with the exemption no longer limited to once in a lifetime. In addition, TRA97 eliminated the deferral of taxes with all gains on sales above the exclusion taxed in the year they are sold. Finally, TRA97 lowered the long-term capital gains tax rates from ranges of 15%–28% to ranges of 10%–20%. While it is not the case that those over the age of 55 were unaffected by TRA97, as their housing decisions may be influenced by it, it is certainly the case that TRA97 has a differential impact on homeowners over and under the age of 55. Thus, as discussed earlier, our results are best interpreted as the impacts of TRA97 on the behavior of home sellers between the ages of 50 and 54 *relative* to those between the ages of 56 and 60.

B. Summary Statistics

Summary statistics are reported in Table 1. As discussed, the sample consists entirely of home sellers who sold their previous residence and moved in the 24 months prior to being interviewed. In the table, summary statistics are given for four distinct groups: those between the ages of 50 and 54 who moved before TRA97 was passed; those between the ages of 50 and 54 who moved after TRA97 was passed; those between the ages of 56 and 60 who moved before TRA97 was passed; and those over the age of 55 who moved after TRA97 was passed. Reporting summary statistics for these four groups is consistent with the difference-in-difference estimation methodology we employ to evaluate the impacts of TRA97 on housing decisions.

Table 1 also reports difference-in-difference results based on the summary statistics. As can be seen in Table 1, only 4.4% of respondents under the age of 55 who moved prior to the passage of TRA97 said they moved for a “less expensive house to maintain,” while 8.1% of this age group who moved after TRA97 moved for this reason, which represents a statistically significant difference (column (c)). In contrast, when we examine the sample between the ages of 56 and 60, there is virtually no change in percentage of respondents giving this as a

TABLE 1
Summary Statistics

	Age 50 to 54			Age 56 to 60			Difference in Difference (g)
	Before TRA97 (a)	After TRA97 (b)	Difference (c)	Before TRA97 (d)	After TRA97 (e)	Difference (f)	
	Mean	Mean	(b)–(a)	Mean	Mean	(e)–(d)	(c)–(f)
Reported moving for a less expensive home	0.044	0.081	0.037**	0.084	0.080	–0.004	0.041*
Reported moving for a larger place	0.146	0.118	–0.028	0.058	0.095	0.037**	–0.065**
Moved to a condominium	0.070	0.100	0.030*	0.132	0.112	–0.020	0.050*
White	0.867	0.827	–0.040*	0.890	0.848	–0.042*	–0.002
Female	0.370	0.457	0.087***	0.396	0.457	0.061**	–0.026
Married	0.619	0.572	–0.047	0.595	0.615	0.020	–0.067
Number of children	0.414	0.411	–0.003	0.151	0.124	–0.027	0.024
High school diploma	0.919	0.922	0.003	0.868	0.900	0.032	–0.029
Bachelor’s degree	0.394	0.419	0.025	0.300	0.368	0.068**	–0.043
Family income/150,000 (\$2004)	0.353	0.442	0.089***	0.322	0.413	0.091***	–0.002
Observations	459	781		417	652		

*Significant at 10%; **significant at 5%; ***significant at 1%.

reason for moving before and after TRA97. As shown in column (g), the difference in difference between the two groups (column (c)–column (f)) is statistically significant—consistent with the idea that TRA97 had a differential impact on our group of home sellers under the age of 55. The percentage of respondents under 55 who list “moving for a larger place” as a reason for moving is not significantly different before and after TRA97 (column (c)). However, there is a statistically significant 3.7% increase in the percentage of respondents between the ages of 56 and 60 who list this as a reason for moving after TRA97 (column (f)). Again, the difference in difference between the two age groups is statistically significant (column (g)), suggesting that home sellers under 55 are 6.5% less likely to move for a larger place after TRA97 than those over 55. Finally, for our last measure of housing consumption, moving to a condominium, respondents under 55 are 3.0% more likely to move to a condominium after TRA97 (column (c)), while there was no statistical difference in the likelihood of moving to a condominium for respondents between 56 and 60 (column (f)). Therefore, the difference in difference is positive and statistically significant (column (g)), suggesting that home sellers under the age of 55, who were previously locked-in, are more likely to purchase a condominium after TRA97 than home sellers over the age of 55.

There were several statistically significant differences in the compositions of the two age groups before and after TRA97, with home sellers in both age groups being less white, having more female-headed households, and having higher incomes after TRA97 (column (c) and column (f)). Home sellers over the age of 55 after TRA97 are more likely to have earned a bachelor degree. For the explanatory variables, there is no statistical significance in column (g), consistent with our assumption that home sellers between the ages of 56 and 60 are an appropriate comparison group for home sellers between the ages of 50 and 54. And, of course, these are differences accounted for in our estimation.

C. The Empirical Model

All of our models of housing consumption are designed to control for important determinants of housing demand, while exploiting the differential treatment of TRA97 on home sellers under 55 and those over 55 years of age, using difference-in-difference estimation.

D. Summary of Specifications

As a test of the expected impact of TRA97 on housing consumption, we first estimate a logit model using a sample of home sellers who recently moved. Initially, the dependent variable equals 1 if the household lists “moving for a house less expensive to maintain” as a reason for moving. Explanatory variables including age, race, gender, marital status, number of children, education, and income are included in the model. Then, the model we estimate is of the form

$$(2) \quad P(\text{BuyDown} = 1)_{it} = \beta_0 + \beta_1 \text{TRA97}_{it} \\ + \beta_2 A_{it} + \beta_3 D_{it} + \text{YearMoved}_t \\ + \text{MSA}_i + \varepsilon_{it}$$

where the subscript i and t denote homeowner i in year t . TRA97 takes a value of 1 for those under 55 after 1997 and 0 otherwise thereby capturing the impact of TRA97. The term A_{it} represents an indicator variable, equal to 1 if the oldest respondent (either the household head or the household head's spouse) is between the ages of 50 and 54. The term D_{it} represents a set of additional variables for the household, which indicate if the household head is female, white, married, has completed high school, and whether he or she has a bachelor's degree. D_{it} also includes the number of children under the age of 18 in the household and real family size adjusted income measure in 2004 dollars.⁸ MSA_i represents a set of dummy variables for the MSA in which a home seller resides. An alternative specification replaces the separate dummy variables for YearMoved_t and MSA_i with the interaction of the two terms, $\text{YearMoved}_t \times \text{MSA}_i$.

A similar measure of housing consumption is based on whether a home seller listed moving for a larger place as a reason for moving, which is again estimated with a logit model. In this case, the coefficient estimate for TRA97 is expected to be negative, as home sellers no longer have a tax incentive to move to a larger, more expensive unit.

An analogous logit model is estimated to examine the impact of TRA97 on the likelihood of a home seller moving to a condominium. Again, after 1997, most home sellers can move

8. Family-size adjusted income is real family income divided by the square-root of household size. This scale is a version of the Organization for Economic Cooperation and Development (OECD) equivalence scales.

down without a capital gains tax penalty, and the average price of a condominium is smaller than that of other housing types, so they are expected to be more likely to choose a condominium. Together, these three dependent variables capture changes in the likelihood that home sellers move down and are no longer mismatched.

Finally, we need to be clear that, like with any difference-in-difference framework, there are possibilities that the identification strategy might fail. Our identifying assumption is that in the absence of TRA97 the two age groups follow the same trends in housing consumption. To the extent that these trends might differ, the confidence in our strategy is reduced. One approach to reduce these concerns about identification that we follow is to allow more flexibility in the model structure, for example including MSA effects that differ by year to proxy for local economic conditions that might differentially affect those in our two age groups.⁹

V. RESULTS

For each dependent variable, we report the results of estimating the model a total of four times. Our baseline results are made up of recent home sellers between the ages of 50 and 60. The baseline is estimated twice, first with MSA and YearMoved controlled for separately and second time with MSA–YearMoved interaction terms. We then provide the results of estimating our model with the MSA and YearMoved variables for two different subsamples: a sample of recent home sellers with family income above the median, and subsample that only includes recent home sellers who reside in areas with above average house price appreciation. We expect that the housing consumption choices of respondents under 55 in these subsamples might be more responsive to TRA97 than other respondents under 55. For those with income above the median, given the value of their previous home is likely to be greater, the value of their capital gain is likely to be greater as well. In addition they would be subject to a higher tax rate on any capital gain. The second subsample, those living in areas of high appreciation are likely to have larger capital gains as well. In estimating these subsamples, we follow the approach found in Cunningham and Engelhardt (2008) as well.

9. We thank an anonymous referee for making this point and suggesting an approach that reduces the concern. We have borrowed liberally from his/her comment in this paragraph.

Table 2 contains coefficient estimates for the dependent variable “move for a less expensive house to maintain.”¹⁰ Column (a) of Table 2 suggests that recent home sellers who are affected by TRA97 are 6.2% more likely to report “moving for a less expensive residence to maintain” than their counterparts over age 55. Dividing the marginal effect by the sample mean of 7.4%, we find that this represents an 84% increase in the probability of recent home sellers choosing this as a reason for moving. Column (b) illustrates similar results for this sample when we replace the separate MSA and YearMoved variables with the interaction of the two. Although the marginal effect of TRA97, 8.4% is larger in column (b) than in column (a), the percent change is smaller, suggesting a 76% increase in the probability of recent home sellers choosing “a less expensive residence to maintain” as a reason for moving.

In column (c) of Table 2, we limit the sample to households with income above the median. The effect of TRA97 is more dramatic for this sample, as recent home sellers affected by TRA97 are 9.1% more likely to list “moving for a less expensive residence to maintain” than those between the ages of 56 and 60. As the mean for moving to a less expensive house to maintain is 7.5% for this sample, this is a 121% increase in the probability of choosing this as a reason for moving.

Column (d) reports the results of a final subsample, home sellers residing in areas with high appreciation, in this case an annual rate above 3.5%, the sample average. As expected, the response is greater for recent home sellers affected by TRA97 in these areas—they are 16.9% more likely than their counterparts over the age of 55 to list “moving for a less expensive house to maintain.” This represents a 222% increase in the likelihood of reporting this as a reason for moving.

While our focus is on the impact of TRA97, and therefore the coefficient estimate for Affected by TRA97, coefficient estimates for other home seller and household characteristics are reported in Table 2 as well. Also included,

10. As mentioned earlier, all reported results are from the estimation of Logit models. As well, we have estimated the same equations using Probit and linear probability models. The results for the Probit and linear probability models are generally very similar in sign and significance. For the equations reported in Table 2, the coefficient estimates found in the linear probability model are of smaller magnitude than the marginal effects from Logit with the Probit results being very similar.

TABLE 2
Likelihood of Moving for a Less Expensive House to Maintain^a

	Baseline ^b		High Income ^c	High HPI Appreciation ^d
	(a)	(b)	(c)	(d)
Affected by TRA97	0.834** (2.395)	0.836** (2.172)	1.221* (1.898)	2.111* (1.874)
Marginal effect	0.062	0.084	0.091	0.169
Sample mean	0.074	0.110	0.075	0.076
Percent change	84%	76%	121%	222%
Age 50 to 54 (indicator variable)	-0.701** (2.396)	-0.736** (2.232)	-1.556*** (2.751)	-1.896* (1.727)
White	0.145 (0.587)	0.024 (0.090)	0.238 (0.495)	0.279 (0.649)
Female	0.619*** (3.477)	0.539*** (2.830)	0.964*** (3.413)	0.491 (1.640)
Married	-0.134 (0.740)	-0.152 (0.771)	-0.255 (0.825)	-0.200 (0.661)
Number of children	-0.079 (0.580)	-0.055 (0.373)	-0.176 (0.635)	-0.021 (0.092)
High school diploma	0.248 (0.844)	0.431 (1.354)	0.890 (0.827)	0.051 (0.101)
Bachelor's degree	-0.080 (0.422)	0.028 (0.140)	-0.529* (1.865)	-0.190 (0.609)
Family income/150,000 (\$2004)	-1.057** (2.372)	-1.440*** (2.689)	-1.147* (1.679)	-1.933** (2.028)
Family income/150,000 squared	0.157 (1.194)	0.274 (1.445)	0.159 (1.043)	0.265 (0.559)
Year moved fixed effects	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
× year moved dummies	No	Yes	No	No
Observations	2,309	1,532	935	818
Log-likelihood value	-564	-487	-216	-198
Pseudo R-squared	0.070	0.084	0.132	0.096

^aSpecifications are estimated using a logit model. Absolute value of t-statistics in parentheses.

^bThe sample includes recent movers who owned their previous home (age 50–60).

^cThe sample includes recent movers who owned their previous home (age 50–60) and have income above the median.

^dThe sample includes recent movers who owned their previous home (age 50–60) and reside in MSAs with above average HPI appreciation rates.

*Significant at 10%; **significant at 5%; ***significant at 1%.

but not reported, are dummy variables for Year Moved and MSA.

The dependent variable in Table 3 is “moving for a larger place.” In this case, as the dependent variable is a measure of “buying up,” we expect the coefficient estimate for TRA97 to be negative. In fact, in all four cases, the reported coefficient estimate is negative, though only statistically significant in the first three cases. In these cases, the percent change in listing “moving for a larger place” as a reason for moving is between 62% and 63% lower.

In column (d) of Table 3 the sample only includes recent home sellers who live in high house price appreciation areas. While these

home sellers are more likely to move for a cheaper house to maintain (Table 2), we do not find statistically significant evidence that they are less likely to move to a larger home, likely due to the fact that housing units tend to be smaller in areas with high house price appreciation. For residents between the ages of 50 and 60, the average dwelling size in an area with high house price appreciation is 1,844 square feet compared with 2,946 square feet in an area with house price appreciation at or below the median. Therefore, while residents in high appreciation areas may be mismatched prior to TRA97, it is less likely that they reside in homes that are too large.

TABLE 3
Likelihood of Moving for a Larger Place^a

	Baseline ^b		High Income ^c	High HPI Appreciation ^d
	(a)	(b)	(c)	(d)
Affected by TRA97	-0.831*** (2.789)	-0.895*** (2.741)	-0.853** (2.100)	-0.305 (0.526)
Marginal effect	-0.066	-0.088	-0.092	
Sample mean	0.107	0.143	0.147	
Percent change	-62%	-62%	-63%	
Age 50 to 54 (indicator variable)	0.896*** (3.584)	0.966*** (3.510)	0.981*** (2.834)	0.368 (0.672)
White	-0.564*** (2.865)	-0.612*** (2.858)	-0.219 (0.728)	-0.410 (1.298)
Female	-0.057 (0.360)	-0.113 (0.660)	0.128 (0.650)	0.200 (0.812)
Married	1.140*** (6.075)	1.171*** (5.755)	0.847*** (3.382)	0.838*** (2.961)
Number of children	0.436*** (5.470)	0.505*** (5.187)	0.490*** (3.722)	0.384*** (2.883)
High school diploma	0.623* (1.924)	0.792** (2.187)	0.701 (1.087)	1.190 (1.422)
Bachelor's degree	0.200 (1.298)	0.228 (1.345)	0.110 (0.569)	0.460* (1.881)
Family income/150,000 (\$2004)	0.716** (2.207)	0.606 (1.627)	0.223 (0.576)	0.795 (1.569)
Family income/150,000 squared	-0.110 (1.090)	-0.077 (0.648)	-0.015 (0.168)	-0.062 (0.402)
Year moved fixed effects	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
× year moved dummies	No	Yes	No	No
Observations	2,381	1,744	1,100	878
Log-likelihood value	-699	-602	-413	-268
Pseudo R-squared	0.138	0.160	0.101	0.155

^aSpecifications are estimated using a logit model. Absolute value of t-statistics in parentheses.

^bThe sample includes recent movers who owned their previous home (age 50–60).

^cThe sample includes recent movers who owned their previous home (age 50–60) and have income above the median.

^dThe sample includes recent movers who owned their previous home (age 50–60) and reside in MSAs with above average HPI appreciation rates.

*Significant at 10%; **significant at 5%; ***significant at 1%.

Table 4 reports the results of the estimation of our logit model with the dependent variable being residing in a condominium. Again, we associate moving to a condominium as generally associated with buying down, as the average price of a condominium is lower than a single-family house. As well, we view moving to a condominium as reducing mismatch, as the average size of a condominium is smaller than that of other types of housing in the sample. Home sellers affected by TRA97 are more likely to move to a condominium, according to columns (a), (c), and (d), relative to those over 55. In these columns, TRA97 changes the sample mean for residing in a condominium

by between 47% and 69%, with the larger effects from the subsamples expected to be more affected by TRA97 a priori, those with income above the median and living in areas with above average appreciation.

These results suggest that TRA97 had a greater effect on home sellers slightly under the age of 55 buying down than it did for those slightly over this age. This could be viewed as evidence that TRA97 reduced housing “lock-in” and mismatch created by pre-TRA97 tax law. In our sample, following the enactment of TRA97, home sellers under 55 are more likely to report moving for a “less expensive house to maintain,” and less likely to report moving for “a

TABLE 4
Likelihood of Moving to a Condominium^a

	Baseline ^b		High Income ^c	High HPI Appreciation ^d
	(a)	(b)	(c)	(d)
Affected by TRA97	0.567* (1.940)	0.477 (1.481)	0.783* (1.819)	0.919* (1.678)
Marginal effect	0.052		0.075	0.101
Sample mean	0.111		0.122	0.146
Percent change	47%		61%	69%
Age 50 to 54 (indicator variable)	-0.695*** (2.881)	-0.658** (2.453)	-0.798** (2.256)	-0.976* (1.894)
White	0.367 (1.579)	0.537** (2.121)	0.022 (0.062)	0.290 (0.901)
Female	0.307** (2.012)	0.352** (2.110)	0.477** (2.187)	0.392* (1.751)
Married	-0.860*** (5.400)	-0.960*** (5.538)	-1.018*** (4.432)	-1.120*** (4.644)
Number of children	-0.567*** (3.080)	-0.649*** (3.308)	-0.836*** (2.685)	-0.468* (1.853)
High school diploma	0.978*** (2.624)	0.994** (2.527)	0.925 (1.095)	0.440 (0.868)
Bachelor's degree	0.590*** (3.798)	0.587*** (3.427)	0.665*** (2.884)	0.407* (1.785)
Family income/150,000 (\$2004)	0.813* (1.857)	0.938** (1.991)	2.898*** (2.993)	1.183** (2.001)
Family income/150,000 squared	-0.319* (1.663)	-0.352* (1.708)	-1.114*** (2.618)	-0.392* (1.710)
Year moved fixed effects	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
× year moved dummies	No	Yes	No	No
Observations	2,324	1,656	1,093	863
Log-likelihood value	-686	-593	-324	-301
Pseudo R-squared	0.152	0.158	0.199	0.160

^aSpecifications are estimated using a logit model. Absolute value of *t*-statistics in parentheses.

^bThe sample includes recent movers who owned their previous home (age 50–60).

^cThe sample includes recent movers who owned their previous home (age 50–60) and have income above the median.

^dThe sample includes recent movers who owned their previous home (age 50–60) and reside in MSAs with above average HPI appreciation rates.

*Significant at 10%; **significant at 5%; ***significant at 1%.

larger place,” and, as well, they are more likely to reside in a condominium, relative to those over 55.

VI. FALSIFICATION TESTS

In an effort to ensure that recent home sellers between the ages of 56 and 60 are a suitable comparison group for recent home sellers between the ages of 50 and 54, we also conduct falsification tests for each of our three dependent variables. We restrict the sample to recent movers who moved prior to 1997 and estimate an equation similar to Equation (2), replacing the TRA97 variable with a false policy

variable. Specifically, we estimate the following equation

$$(3) \quad P(\text{BuyDown} = 1)_{it} = \beta_0 + \beta_1 \text{FALSE}_{it} \\ + \beta_2 A_{it} + \beta_3 D_{it} + \text{YearMoved}_t \\ + \text{MSA}_i + \varepsilon_{it}$$

The only variable that is different from Equation (2) is the FALSE variable. The false policy variable, FALSE, equals 1 if a recent home seller is between the ages of 50 and 54 and moved in 1996. If it is the case that over time home sellers under 55 in our sample are more likely to move down than their counterparts over the age of 55, then the results we found in

TABLE 5
Falsification Tests^{a,b}

	Likelihood of Moving for a Less Expensive House to Maintain	Likelihood of Moving for a Larger Place	Likelihood of Moving to a Condominium
Affected by false policy	-2.212* (1.879)	-0.326 (0.478)	0.028 (0.040)
Age 50 to 54 (indicator variable)	-0.415 (1.132)	0.960*** (2.708)	-0.657** (1.965)
White	0.125 (0.252)	-0.716* (1.87)	0.938* (1.722)
Female	0.341 (0.972)	-0.345 (1.042)	0.243 (0.757)
Married	-0.541 (1.499)	1.247*** (3.298)	-1.085*** (3.32)
Number of children	0.251 (1.006)	0.476*** (2.766)	-0.773* (1.802)
High school diploma	0.089 (0.187)	0.292 (0.599)	1.703** (2.198)
Bachelor's degree	-0.084 (0.215)	0.045 (0.144)	0.586* (1.838)
Family income/150,000	-1.754 (0.75)	-1.162 (0.642)	-0.906 (0.525)
Family income/150,000 squared	0.483 (0.185)	1.949 (1.163)	1.610 (1.004)
Year moved fixed effects	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes
× year moved dummies	No	No	No
Observations	664	698	641
Log-likelihood value	-156	-202	-187
Pseudo R-squared	0.122	0.190	0.193

^aSpecifications are estimated using a logit model. Absolute value of t-statistics in parentheses.

^bThe sample includes recent movers who owned their previous home (age 50–60).

*Significant at 10%; **significant at 5%; ***significant at 1%.

Section V could be due to differential trends, rather than TRA97. If that is the case, then the variable FALSE will have the same effect on our dependent variables that TRA97 did. Specifically, the FALSE coefficient estimate will be negative when the dependent variable is “the likelihood of moving for a less expensive house to maintain” and “the likelihood of moving to a condominium.” Analogously, the FALSE coefficient estimate will be positive when the dependent variable is moving for a larger home.

Table 5 includes the falsification test estimates. Ideally, the FALSE variable would be insignificant in all three specifications. While it is not statistically significant in the second two regressions, “the likelihood of moving to a larger place” and “the likelihood of moving to a condominium,” the FALSE variable is significant at the 10% level in the “likelihood of moving for a less expensive home to maintain” regression. Although, importantly, it

has a negative coefficient estimate, rather than the expected positive coefficient estimate found with the actual measure of TRA97. Therefore, recent home sellers under the age of 55 in our sample are less likely to report moving for a less expensive place to maintain in 1996, relative to recent home sellers over the age of 55. If the change we see in 1996 reflects a trend, that over time fewer and fewer home sellers under 55 report this as a reason for moving, relative to those over age 55, then the results reported in Section V are biased downward, and the true effects of TRA97 are larger than reported.

VII. CONCLUDING REMARKS

TRA97 drastically changed the tax treatment of capital gains from the sale of a home for those under the age of 55 by effectively eliminating the capital gains tax burden for a home seller's

primary residence. Since home sellers over 55 were allowed an exemption by previous tax law, TRA97 differentially affected home sellers under and over the age of 55. This differential impact of TRA97 on housing decisions allows for the use of difference-in-difference estimation to explore the effects of TRA97 on the housing consumption decisions of home sellers between 50 and 54 *relative* to those over 55.

We find evidence that after the enactment of TRA97 recent home sellers slightly under the age of 55 are more likely to move down relative to those slightly over 55. This is evidence of a lock-in effect created by the pre-TRA97 tax code, which is consistent with other studies of the lock-in effects of capital gains taxation on mobility (Cunningham and Engelhardt 2008; Shan 2011; Farnham 2006). After the enactment of TRA97 home sellers slightly under 55 were, *relative* to those slight over 55, more likely to list “a less expensive home to maintain” as a reason for moving and less likely to list moving for “larger place” than before TRA97’s enactment. In addition, the group under 55 saw a relative increase in the likelihood of living in a condominium after the enactment of TRA97. Although the data do not allow us to know with certainty whether a household moved down, the evidence we find suggests that TRA97 has induced homeowners to consume less housing in the two years following its enactment, reducing mismatch.

While it is tempting to apply the results of our analysis to the housing decisions of a broader sample of those under the age of 55 than our group of homeowners between the ages of 50 and 54, the extension of these results to home sellers well-under 55 might be tenuous. One possible impact of TRA97 on a younger population of homeowners might, in fact, be an increase in housing expenditures as these households would not have to pay capital gains if they were to desire less expensive housing in the near future, perhaps as result of moving to a less expensive housing market or a change in family structure.

The passage of TRA97 may be expected to influence other aspects of the housing market as well. TRA97 expands the favorable tax treatment of housing, making it an even better investment after 1997. While our analysis suggests that households slightly under the age

of 55 are spending less on their primary residence than they did previously as suggested earlier, this might not be the case for those much younger than 55. Chung (2006) notes that second home sales increased drastically between 1997 and 2006, and therefore, it may be that housing investment has increased, but not in the primary residence market, though this conjecture has yet to be explored rigorously.

Finally, we have looked at the impact of TRA97 on housing consumption and mismatch. Homeowners who were locked-in to mismatched housing prior to 1997 readjusted by moving, increasing the likelihood that recent home sellers choose to move for a less expensive residence to maintain, decreasing the likelihood of moving for a larger place, and increasing the likelihood of residing in a condominium. To the extent that TRA97 reduced mismatch, it also made the housing market more allocatively efficient.

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