Income and tax rates or life events: Evidence on moving patterns from the District of Columbia

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Abstract:
The District of Columbia has recently implemented a tax reform package, which includes various income tax reductions for middle and low-income families. One point of debate in the determination of the tax package was whether lower taxes would entice middle-income and low-income families to stay in the city in the face of rapid gentrification and increases in housing prices and whether high income taxes will give a reason for high-income families to relocate to lower tax jurisdictions nearby. We look at the moving patterns of all individual income tax filers who first appeared in the tax rolls in the District of Columbia in 2004. Data show that of the 42,248 of the tax filers who first appeared on the income tax rolls in 2004 and continuously submitted income tax forms, only 9,436 remained in 2012. We found that the decisions to move are not tax related. People are more likely to stay in the District if they are from the highest income quintile, and have had a life-changing event (changed their filing status and added dependents.) The tax effects are weak. In fact, whether a filer has ever been in a highest tax bracket is a strong predictor of whether the person will stay in the city. Residents who have at least once been in the highest tax bracket are half as likely to move out of the city compared to the rest of the residents.

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Introduction

The District of Columbia is a relatively small city in the middle of a large and growing metropolitan area. The city has a large transient population – interns, political appointees, and students, has a variable quality of service, a large income gap (The District's Gini coefficient was 0.627 in 2011—and being an urban jurisdiction, income inequality is greater than surrounding suburban jurisdictions. The city's population, at its height after the World War II reached 900,000. Since then, the population declined steadily, only to make a recovery beginning 2000. At its lowest, during the last half of 1990s, the population was slightly under 568,000. In July 2013, the District's projected population was 646,000 and the city has added approximately nine thousand more residents since then. The increase in population has changed the demographic structure of the city, with relatively higher income white singles replacing the low and middle-income black families.

The income tax rate, and whether it affects people's decision to locate in the city or move out of the city, is a frequent point of contention among the District's policy makers. This year the city implemented a new income tax policy as part of a major tax structure revision, which reduced the effective rates on middle and low-income households. This paper investigates the moving patterns out of the city to discern whether changes in effective tax rates have any explanatory power in the decision to move away. We find that other taxpayer characteristics present in our tax data play a much more important role in explaining the decision to move. The analysis shows that explanatory power of tax rate is extremely low, and especially so when one controls for other changes in tax filer variables that capture life events. For example, we find that the move out rates are higher for those who have added dependents and changed their filing status, suggesting that those who get married and have children in the city are more likely to stay. We also find that poverty is the key driver of residents out of the city, and the tax rates play a little role in reversing that decision.

Literature on the impact of tax rates on people's decision to locate in a certain jurisdiction is vast and mixed in its findings. A recent study by Mazerov (2014) using Census and IRS data on interstate migration shows that high-income earners did not move from states with a high marginal income tax to states with a lower, or no, income tax. In fact, relocation rates are low with fewer than two percent of residents relocating each year and those who move cite reasons other than taxes, such as job- or family-related reasons for their move. Additionally, people are equally likely to move from low-tax to high-tax jurisdictions as they are from high-tax to low-tax jurisdictions. Similarly, Thompson (2011) notes that while state and local taxes and their potential impact on out-migration are a perennial concern, the evidence suggests that the impact tax policies have a weak influence on cross-state migration decisions.

Conversely, Cebula, Nair-Reichert, and Coombs' (2013) find that voters prefer states with lower effective state income tax and property tax rates, as well as more state parks per capita and warmer January temperatures. They note that non-economic factors, such as 'quality of life' factors have also been proven to be determinants of migration, and thus must be included in any analysis. Their research is focused on data during the Great Recession in states between July 2008 and July 2009.

Saez, Slemrod, and Giertz (2012) survey of the literature on the elasticity of taxable income with respect to marginal rates and note that a number of empirical studies find evidence that behavioral responses to change in marginal rates are concentrated at the top of the income distribution. Such findings provide a rationale for focusing the analysis of the effects of changing the marginal tax rates on the upper end of the

income distribution. They also discuss the compelling evidence of strong behavioral responses of high income taxpayers during the main episodes of tax reform since 1980, most of these responses are focused around timing and avoidance, and are not compelling "evidence of real economic responses to tax rates (42)."

Fieldhouse (2013) summarizes his review of the economic literature and notes that the research suggests that lowering top marginal rates has no statistical impact on economic growth, yet these reductions do increase structural deficits and exacerbate income inequality. Thus he notes that the implications are that "increasing top rates can raise substantial sums of revenue and potentially dampen the rise of income inequality without unduly restraining economic growth (2)."

Also discussing an increase in marginal tax rates, McNichol, Nicholas, and Shure (2009) note that creating an additional tax bracket at the top of the existing income tax structure can be an effective way to raising revenue from a significant revenue source – the country's wealthiest households. Orszag and Stiglitz (2001) show that during a recession, the economic analysis actually suggests that small rate increases concentrated at the top of the income scale are likely to have less of a negative impact on a state's economy than other measures to balance the budget. This research is important for our paper, because the tax rate changes in the District, including the creation of a high-income tax-bracket in 2010 were hotly debated and there was a real concern that higher-income earners will relocate to neighboring jurisdictions.

The main distinguishing feature of this study is the use of tax returns data that allows us to include detailed demographic data and tax-filer characteristics in the analysis.

Data set and methodology

We use data from the District's tax rolls beginning 2004. That is the first year for which reliable data is available. We begin with those tax filers who first appeared in the tax rolls in 2004 and track the movement of these filers through 2012—the last year for which income tax data is available.[2] We drop from the dataset those who have appeared and disappeared over the years, and only consider continuous filers. Tax data shows that of the approximately 315,000 tax filers in 2004, 56,910, or approximately 17 percent first appeared in the tax rolls in 2004. After removing records with missing or extreme values for the variables used in the analysis, 42,257 observations for 2004 remained. The table below provides information on the composition of the data by year.

Table 1 - Composition of Tax Filers who first appeared in tax rolls in 2004, 2004 through 2012

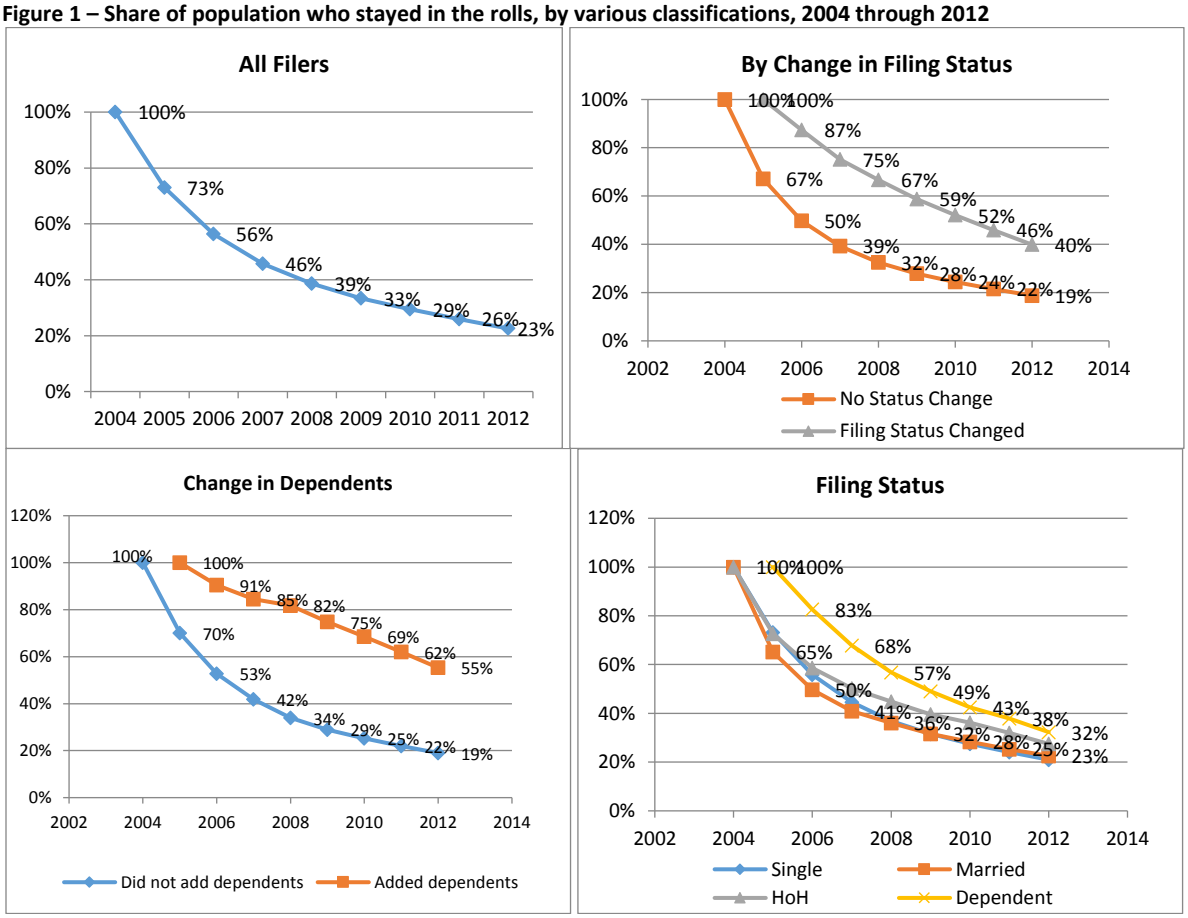
	Total	65+	Single	Married	Head of Household	Dependent	Changed Status	Added Dependent
2004	42,257	4%	68%	14%	14%	4%	18%	10%
2005	30,563	3%	68%	12%	14%	5%	25%	13%
2006	23,627	4%	68%	12%	15%	5%	28%	16%
2007	19,145	4%	67%	12%	16%	5%	30%	17%
2008	16,169	4%	65%	13%	17%	5%	31%	21%
2009	13,971	4%	65%	13%	17%	5%	32%	22%
2010	12,311	4%	64%	13%	18%	5%	32%	23%
2011	10,848	4%	63%	13%	18%	5%	32%	23%
2012	9,436	4%	64%	14%	17%	5%	32%	24%

Source: DC Individual Income Tax Returns, 2004 through 2012

[2] This data was collected in 2013 as the final tax payments for tax year 2012 is in April of 2013.

Only twenty three percent of the tax filers who first filed in 2004 remained on the tax rolls in 2012. While grouping data by filer type does not show a significant difference across different filing types (single, married, head of household, dependent), the picture changes when we group the data so we can see who has changed status and who continued with the same status from the previous year. Those who have remained in the same status in consequent years have disappeared from the rolls at a higher rate – by 2012, only 19 percent of such filers were still on the tax rolls. In contrast 40 percent of those who have changed status across any given two tax years remained by 2012. Similarly, among those filers who added a dependent between 2004 and their last year of appearance in the tax rolls, the "stay" rate was much higher. The cumulative effect can be seen in the bottom left panel of Figure 1, which shows that, 55 percent of those who added dependents had continued to stay on the tax rolls through 2012, while the comparative share for those who did not add dependents (or removed them from their tax filings) is 19 percent.

Figure 1 – Share of population who stayed in the rolls, by various classifications, 2004 through 2012

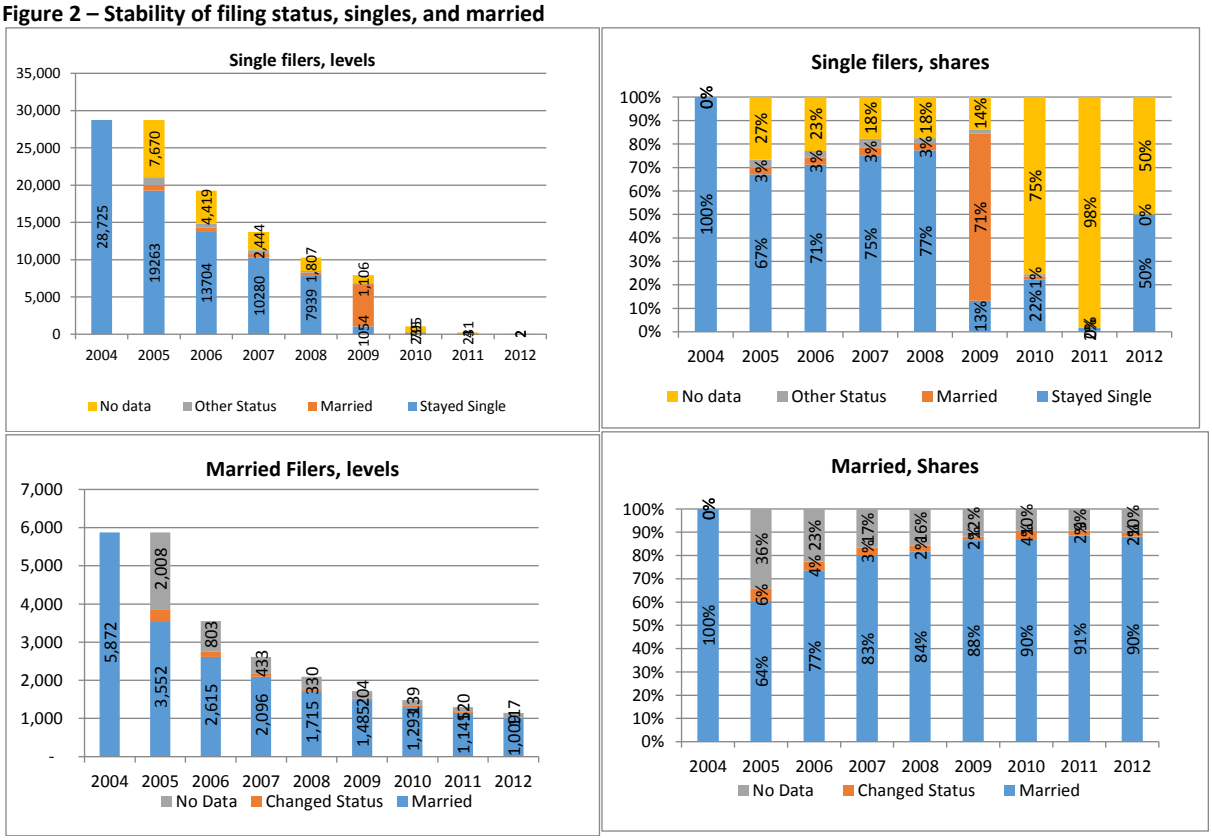


Source: Individual Income Tax Returns, 2004 through 2012

It is important to note that not all filers who disappeared from the tax rolls necessarily left the city. Singles who have married would have disappeared from the tax rolls if they became the spouse on the tax form. In fact, of the 28,725 filers who first appeared in 2004 and filed as single, only two continuously remained single year after year. Between 2004 and 2008, the share of singles were relatively stable (Figure 2, right top panel) but between 2008 and 2009, a disproportionately large share of single filers switched their status to married. It is not clear why this is the case, but one plausible explanation is the

legislation, which legalized same-sex marriages in the District, which was enacted in 2009. Overall 18,747 continuously single tax filers disappeared from the rolls—again a large share in 2010 and 2011. Another explanation related to the large reduction in filers could be income tresholds for filing tax returns. For some singles, these thresholds could have been binding in the aftermath of the great recession. The continuously married sub-population is much more stable, and the data loss among this group is much smaller (Figure 2, bottom two panels).

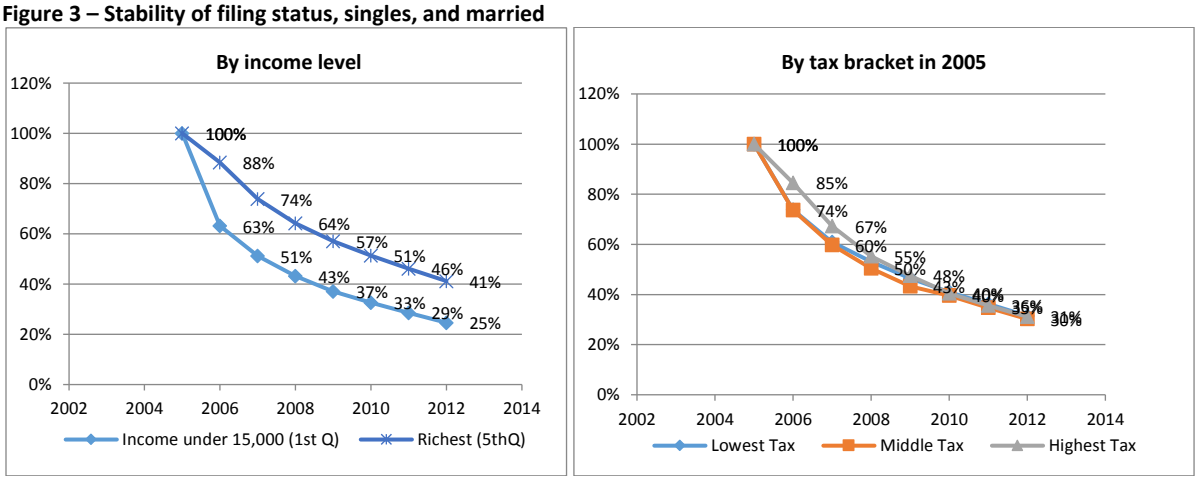
Figure 2 – Stability of filing status, singles, and married



Source: Individual Income Tax Returns, 2004 through 2012 and authors' calculations

A quick look at the data shows that while income levels play a large role in the decision to stay in the city, for the entire group tax rates do not seem to make much of a difference in exit rates. In the graphs below, we see that among those who were in the highest income quintile when they arrived in the city in 2004, 41 percent were still found on the tax rolls, compared to only a quarter of filers who were in the lowest income quintile. The tax rate brackets these filers have fallen in (highest, middle, and lowest) are homogeneous over the sample period. Those who were in the lowest tax bracket in 2005 (effective tax rates under 3.8 percent, after accounting for various tax credits) exited the rolls at rates similar to middle bracket (between 3.8 percent and 6.1 percent) and highest bracket (above 6.1 percent). The final survival rates for these three groups are 30 and 31 percent.

Figure 3 – Stability of filing status, singles, and married



Source: Individual Income Tax Returns, 2004 through 2012 and authors' calculations

The paper uses logit regressions to classify various demographic groups for their exit rates. We are most interested in the impact of demographic, income and tax variables on the decision to exit, and how this effect varies systematically across different groups. The District's tax data provides variables we can use to estimate the probability of exiting the tax rolls and we begin with the assumptions that we can correctly predict whether a taxpayer will appear on the tax rolls conditional on these variables. The model taxes the form:

$$p(X) = \frac{e^{\beta_o + \beta_1 X}}{1 + e^{\beta_o + \beta_1 X}}$$

which, with some arrangement, taxes the form:

$$logit\left(\frac{p(X)}{1 - p(X)}\right) = \beta_o + \beta_1 X$$

where $p(X)$ is the conditional probability associated with leaving the tax rolls and β_i is the effect of group i on the logit. It is important to note that the coefficients are logits of odds-ratios and our estimated probabilities can be calculated using the above form. For example, a coefficient of 1 for $\widehat{\beta_1}$ implies a change in the odds ratio of 2.7 (e^1) and if the estimated value of $\widehat{\beta_o}$ is 3, then the probability of observing a taxfiler leaving the tax rolls would be

$$p(X) = \frac{e^{2+1X}}{1 + e^{2+1X}} = \begin{cases} 0.95 \; if \; X = 1 \\ 0.88 \; if \; X = 0 \end{cases}$$

It is useful to think of this as a classification exercise: an important feature of the binomial models is that all information concerning the gross effects of, for example, senior status, on staying on tax rolls is contained in the marginal distribution staying on the rolls by age. We can work with data classified by senior status, senior status and filing status, or senior status, filing status and increase in dependent counts. In all cases, the estimated effects, standard errors and the likelihood ratio tests based on differences between deviances would be the same.

The additive model on demographic variables begins with various status variables in filing status, and adds on it two indicators of income—whether the filer was in the lowest income quintile the last year the filer is present in the tax forms, and whether he has ever lost income (move across quintiles) during his or her presence on the tax rolls. We also run a separate regression using income quintiles only and whether a filer has been in the highest tax bracket. Not included in the paper are a series of regressions on income levels, which proved to have little explanatory power.

Demographic variables, income change, and poverty

We begin regressing the probability of leaving the tax rolls on demographic characteristics. Included in the analysis is a marker status change (already demonstrated to be a big factor in the decision to leave or stay), a marker for whether the filer added more dependents, a marker for senior citizens (in 2004) and two income related classifiers: whether the filer lost income during his presence on the tax rolls, and whether in his or her last year in the city (2012 for those who remained on the rolls) the filer was in the lowest income quintile.

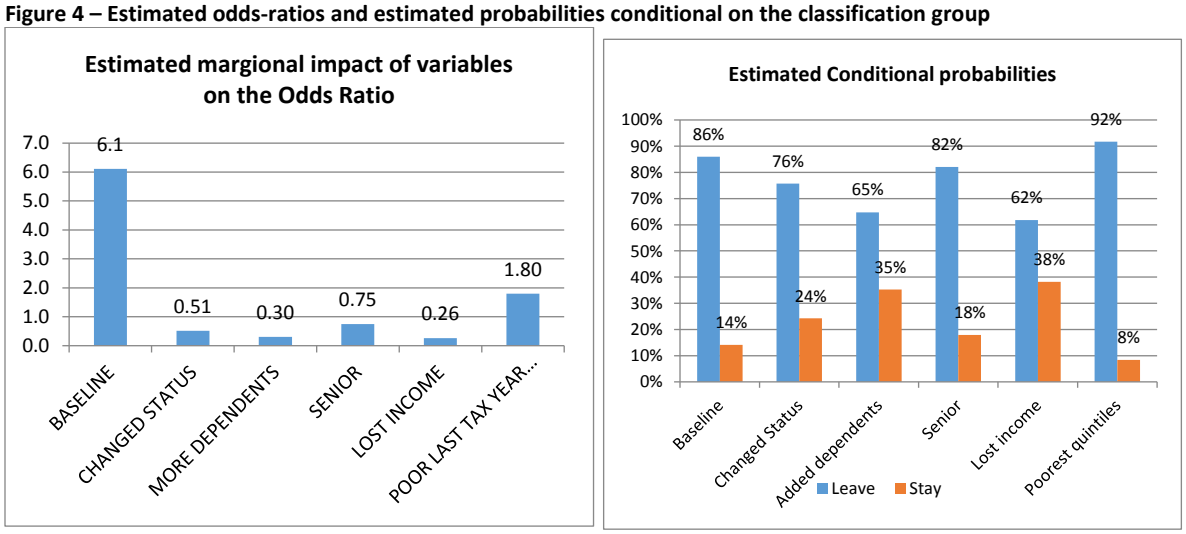
Table 2 – Estimated coefficients for

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.809467	0.020585	87.90253	0.0000
CHANGE_STATUS	-0.670240	0.030458	-22.00524	0.0000
MORE_DEPENDENTS	-1.201357	0.036257	-33.13481	0.0000
_65PLUS	-0.290526	0.063927	-4.544687	0.0000
LOST_INCOME	-1.328563	0.026763	-49.64115	0.0000
POOR_WHEN_LEFT	0.587153	0.027195	21.59012	0.0000

Figure 4 provides the estimated odds ratios for various subgroups (The model statistics are presented in the appendix.) First, we know that the estimated odds of leaving the city is 6 to 1 among the entire population –84 percent of those who appeared in the tax rolls in 2004 had disappeared from the rolls by 2012 and only 14 percent remained—the estimated coefficient for the baseline case is the constant c, at 1.809. An exponential transformation of this number ($e^{1.809}$) is 6.1, which is also the ratio of 84 to 14.

The estimates show that the odds of moving out are much lower among those who changed their filing status—the odds of leaving the tax rolls is cut by half (0.51), yielding an odds ratio of 3.12. It can also be seen in the estimated probability, which puts suggests that the probability of leaving the tax rolls is now 76 percent. Having more dependents cuts the odds-ratios by two-thirds, and among this group, the probability of leaving the tax rolls is only 65 percent, with an odds-ratio of 65:35 or 1.84 (which is .30 times 6.1). Having tax filings in one of the two bottom quintiles increase the odds of leaving the tax rolls by 80 percent, with a conditional probability of 92 percent, compared to the baseline case of 86 percent. This could be the effect of tax filing thresholds, which we plan to address in the next iteration of this paper.

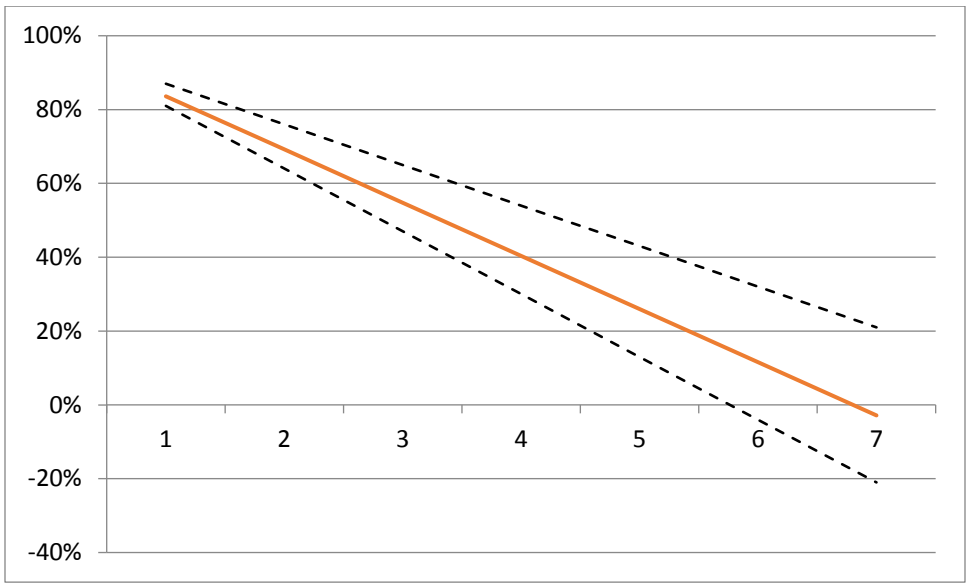
Figure 4 – Estimated odds-ratios and estimated probabilities conditional on the classification group



Source: Table 5 in Appendix

The finding about more dependents is an interesting one. Similar analysis we conducted on married couples only show that adding the first dependent is an indicator of leaving the city, but when one includes singles and other types of tax filers, the result is reversed. The District's weak school system is thought to be a reason why families are moving out of the District, and this is sometimes observed in the enrollment data, yet having children or adding dependents does not appear to be the dominant reason why tax filers are leaving the city.

Figure 5 – Marginal impact of having an additional child in 2004 on the probability of leaving the city tax rolls, with 95 percent confidence levels



The data shows that having more children is in general an indicator of staying on the tax rolls. Each additional dependent on the tax filings reduce the probability of leaving the city by 14 percent (Figure 4).

On the other hand, senior filing status is an indicator that the exit rates are going to decline, despite the old-age factor. This must again be reviewed in the context of the District's transient population, who tend to be younger residents—students, interns, political staffers, who exit the city at a rate much higher than the elderly does.

The effects of income and poverty status are also interesting. The period we looked at includes the great recession where income loss was common. The analysis shows that income loss reduces the probability of disappearing from the tax rolls, with filers who have lost income during the study period four times less likely to move out of the city. However, the data also shows that poverty is a good indicator for moving out – the odds-ratio for those who were in the lowest two income quintiles in their last year of appearance in the tax rolls is 1.80—that is they are nearly twice as likely to exit.

Income and tax variables

Our analysis shows that the impact of income variables is small, though significant, and the tax variable carries the opposite sign. First, we show the results of a regression that compares income quintiles. The regression results show that people from higher income quintiles are less likely to leave the tax rolls compared to those who are from the poorest quintile. The odds-ratio of leaving the tax rolls is lower for all income quintiles compared to the baseline case of the bottom quintile, and the effect is largest for the fourth quintile—the odds of leaving the tax-rolls for this group is three to four, suggesting that much lower exit rate for this group. Figure 5 also displays the estimated conditional probabilities for each income quintile. While stay rates are not systematically different for each quintile, the exit rates decline by income level—nearly a third of the poorest quintile exit the tax rolls annually compared to 16 percent of the richest residents. Detailed model information on the income effect is presented in the appendix tables. While income variables are significant, overall model fit is not, suggesting again that things other than income levels effect the decision to stay or leave the city. This can also be seen in the one-variate analysis we present in figure 7 – moving up an income quintile reduces the probability of leaving the city, but only by 5 percent.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.329295	0.025895	51.33392	0.0000
LAST_QUINTILE_POOR2	-0.109271	0.036847	-2.965565	0.0030
LAST_QUINTILE_MIDDLE	-0.151245	0.036829	-4.106670	0.0000
LAST_QUINTILE_RICH2	-0.313634	0.036511	-8.590032	0.0000
LAST_QUINTILE_RICH	-0.177725	0.038248	-4.646612	0.0000

Figure 6 – Estimated odds-ratios and observed conditional frequencies for leaving the city tax rolls, by income quintiles

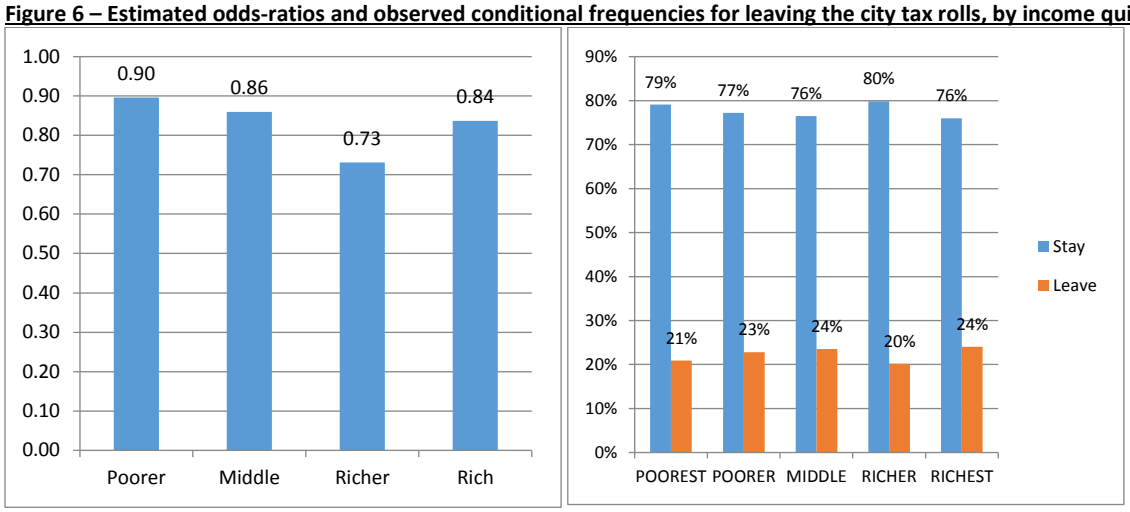
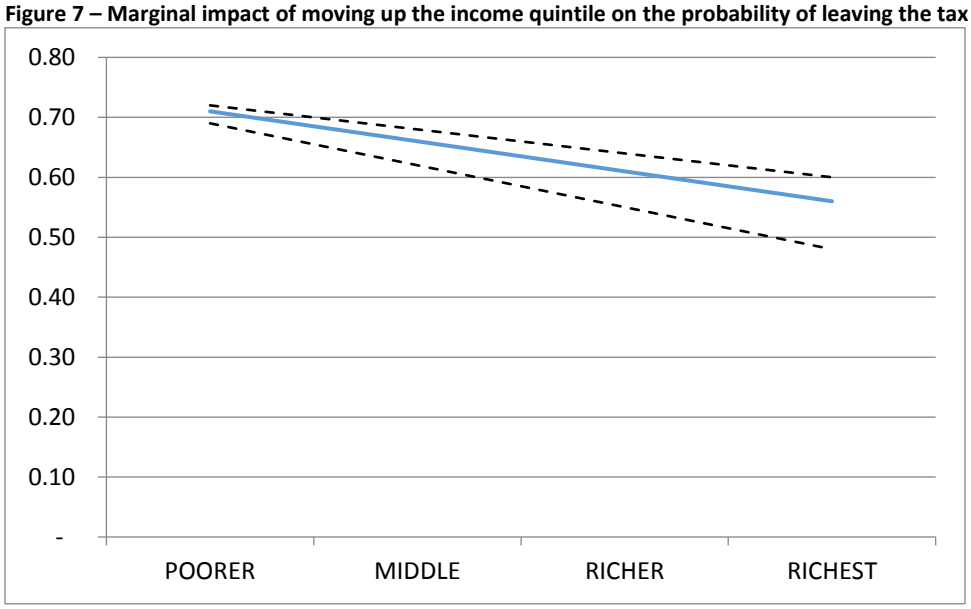
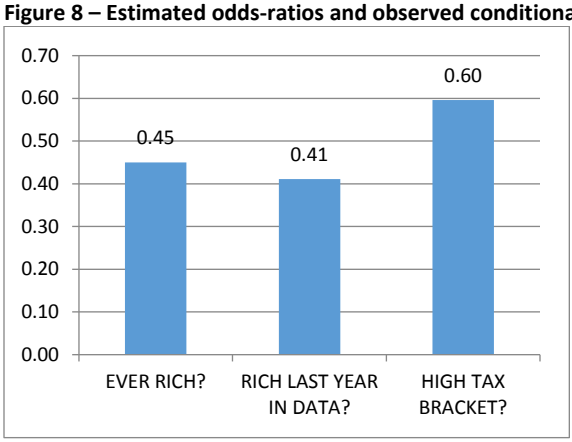


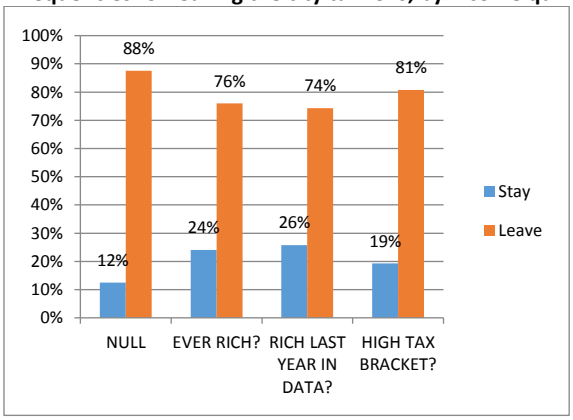
Figure 7 – Marginal impact of moving up the income quintile on the probability of leaving the tax rolls



Last, we note that while income and tax rates do not have strong explanatory power, whether one has ever been in the highest income quintile or whether one has ever been taxed at the highest income bracket do appear to matter. The analysis shows that having been in the highest income quintile cut the odds of leaving the tax rolls by more than half, and similarly having been in the highest tax bracket reduced the probability of leaving the city.

Figure 8 – Estimated odds-ratios and observed conditional frequencies for leaving the city tax rolls, by income quintiles





Conclusion and next steps

Our analysis shows that income levels and tax rates are not major determinants of why people locate to, or leave the District. The implied story from the grouping of various tax filers is that people stay in the District if something good happens to them. Changing status such as getting married and having a child anchors families to their neighbors. The "change status" variable is particularly important because of problems we have with the singles data. It is not possible to track singles since they may leave the tax rolls if they got married and became secondary names on tax filings. Nevertheless, "change in status" makes up some of the information lost in our inability to track singles.

The District has multitude of social protection programs and bestows generous tax benefits to the relatively poor residents such as EITC benefits that match the Federal government, low income housing benefits and other refundable tax credits. Seniors benefit from significant real property reduction—yet the exit rates from the city are higher among the more vulnerable groups.

The study is limited by the single cohort it investigates—those who first appeared in the tax rolls in 2004. We begin with this year since it is the first year for which reliable tax data is available. The next steps include adding more cohorts including those who have lived in the city and submitted tax forms prior.

Appendix Tables

Table 3 – Estimated effects of status change, having more dependents , senior status, lost income and povertys status on the decision to stay or leave the city

Dependent Variable: MOVE_OUT
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 11/06/14 Time: 12:13
Sample (adjusted): 1 42244
Included observations: 40036 after adjustments
Convergence achieved after 3 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.809467	0.020585	87.90253	0.0000
CHANGE_STATUS	-0.670240	0.030458	-22.00524	0.0000
MORE_DEPENDENTS	-1.201357	0.036257	-33.13481	0.0000
_65PLUS	-0.290526	0.063927	-4.544687	0.0000
LOST_INCOME	-1.328563	0.026763	-49.64115	0.0000
POOR_WHEN_LEFT	0.587153	0.027195	21.59012	0.0000

McFadden R-squared	0.113803	Mean dependent var	0.765211
S.D. dependent var	0.423872	S.E. of regression	0.397019
Akaike info criterion	0.966251	Sum squared resid	6309.696
Schwarz criterion	0.967540	Log likelihood	-19336.42
Hannan-Quinn criter.	0.966659	Deviance	38672.84
Restr. deviance	43639.09	Restr. log likelihood	-21819.55
LR statistic	4966.254	Avg. log likelihood	-0.482976
Prob(LR statistic)	0.000000		

Obs with Dep=0	9400	Total obs	40036
Obs with Dep=1	30636		

Table 4 – Categorical Descriptive Statistics for Explanatory Variables

Variable	Mean Dep=0	Mean Dep=1	Mean All
C	1.000000	1.000000	1.000000
CHANGE_STATUS	0.318936	0.151358	0.190703
MORE_DEPENDENTS	0.238511	0.071321	0.110575
_65PLUS	0.042234	0.034730	0.036492
LOST_INCOME	0.551277	0.271478	0.337172
POOR_WHEN_LEFT	0.401170	0.441017	0.431662

Variable	Standard Deviation Dep=0	Standard Deviation Dep=1	Standard Deviation All
C	0.000000	0.000000	0.000000
CHANGE_STATUS	0.466089	0.358403	0.392861
MORE_DEPENDENTS	0.426196	0.257365	0.313610
_65PLUS	0.201133	0.183099	0.187514
LOST_INCOME	0.497390	0.444729	0.472750

POOR_WHEN_LEFT	0.490161	0.496517	0.495314
Observations	9400	30636	40036

Figure 9 – Coefficient ellipses for estimators

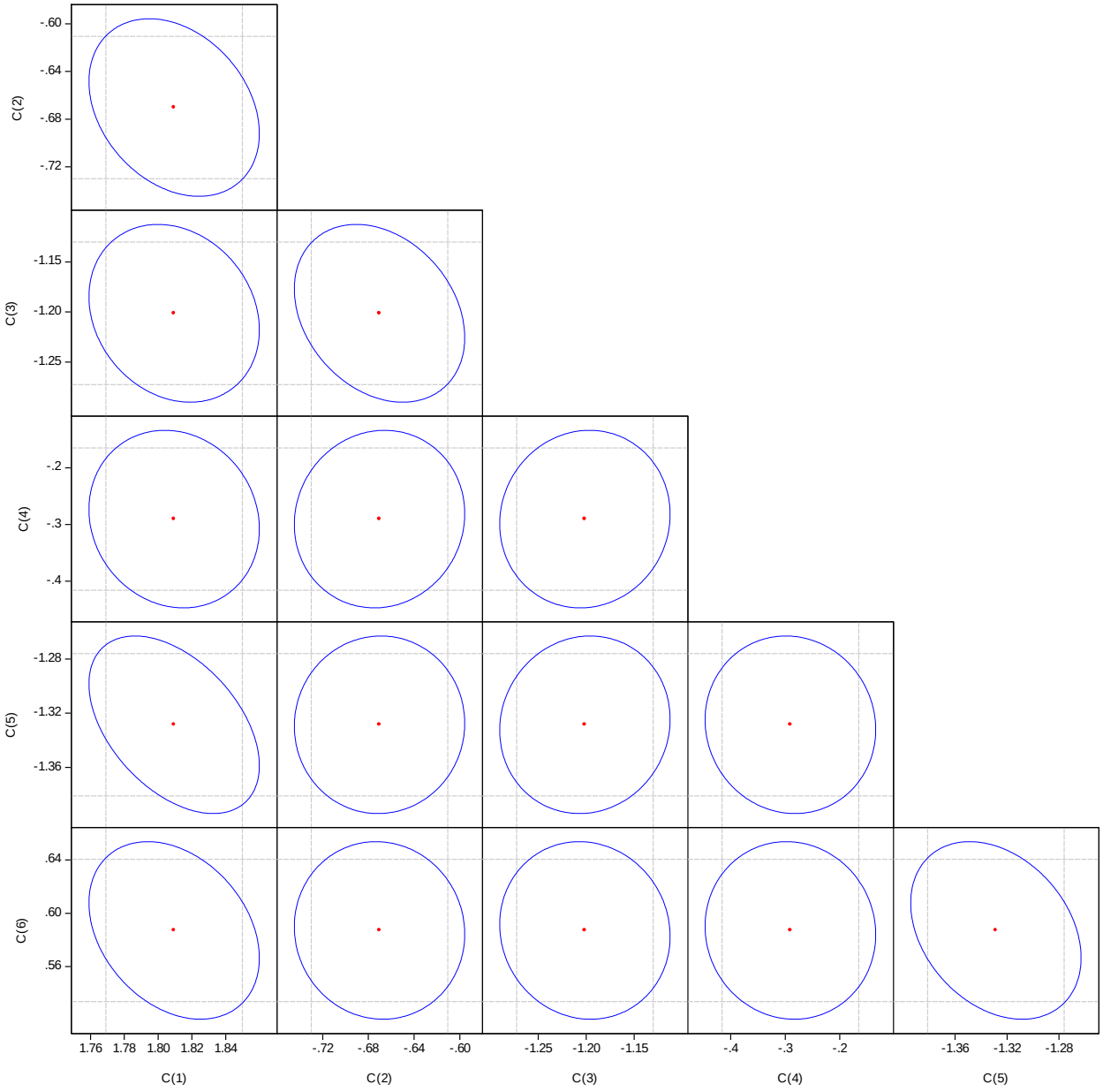


Table 5 – Estimated effects of income quintiles on the odds-ratio of moving out

Dependent Variable: MOVE_OUT
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 11/06/14 Time: 15:11
Sample (adjusted): 1 42244
Included observations: 40031 after adjustments

Convergence achieved after 4 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.329295	0.025895	51.33392	0.0000
LAST_QUINTILE_POOR2	-0.109271	0.036847	-2.965565	0.0030
LAST_QUINTILE_MIDDLE	-0.151245	0.036829	-4.106670	0.0000
LAST_QUINTILE_RICH2	-0.313634	0.036511	-8.590032	0.0000
LAST_QUINTILE_RICH	-0.177725	0.038248	-4.646612	0.0000

McFadden R-squared	0.001771	Mean dependent var	0.765307
S.D. dependent var	0.423812	S.E. of regression	0.423423
Akaike info criterion	1.088091	Sum squared resid	7176.126
Schwarz criterion	1.089164	Log likelihood	-21773.68
Hannan-Quinn criter.	1.088430	Deviance	43547.35
Restr. Deviance	43624.60	Restr. log likelihood	-21812.30
LR statistic	77.24408	Avg. log likelihood	-0.543920
Prob(LR statistic)	0.000000		
Obs with Dep=0	9395	Total obs	40031
Obs with Dep=1	30636		

Table 6 – Categorical Descriptive Statistics for Explanatory Variables in Table 6

Variable	Mean Dep=0	Mean Dep=1	Mean All
C	1.000000	1.000000	1.000000
LAST_QUINTILE_POOR2	0.200639	0.208415	0.206590
LAST_QUINTILE_MIDDLE	0.202980	0.202180	0.202368
LAST_QUINTILE_RICH2	0.218840	0.185305	0.193175
LAST_QUINTILE_RICH	0.176796	0.171498	0.172741

Variable	Standard Deviation Dep=0	Standard Deviation Dep=1	Standard Deviation All
C	0.000000	0.000000	0.000000
LAST_QUINTILE_POOR2	0.400499	0.406182	0.404864
LAST_QUINTILE_MIDDLE	0.402239	0.401633	0.401770
LAST_QUINTILE_RICH2	0.413482	0.388551	0.394794
LAST_QUINTILE_RICH	0.381516	0.376949	0.378028
Observations	9395	30636	40031

Figure 10 – Coefficient ellipses for estimators

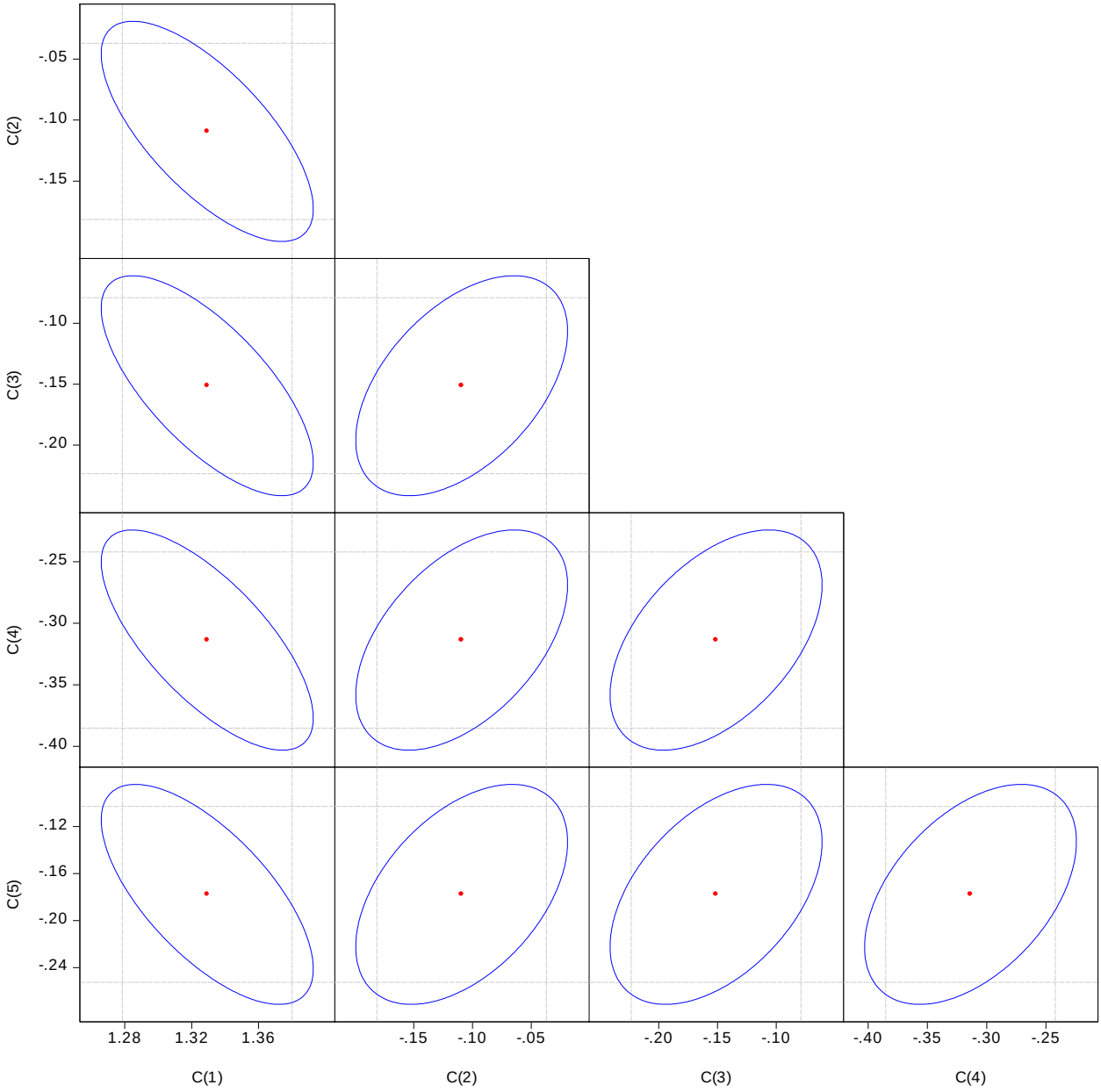


Table 7 – Estimated effects of income and tax rates on the odds of moving out

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.949601	0.023618	82.54600	0.0000
EVER_RICH	-0.797755	0.030900	-25.81745	0.0000
RICH_WHEN_LEFT	-0.889398	0.028388	-31.33021	0.0000
EVER_HIGH_TAX_BRACKET	-0.517532	0.029780	-17.37879	0.0000

McFadden R-squared	0.045127	Mean dependent var	0.765211
S.D. dependent var	0.423872	S.E. of regression	0.413508
Akaike info criterion	1.041008	Sum squared resid	6845.024

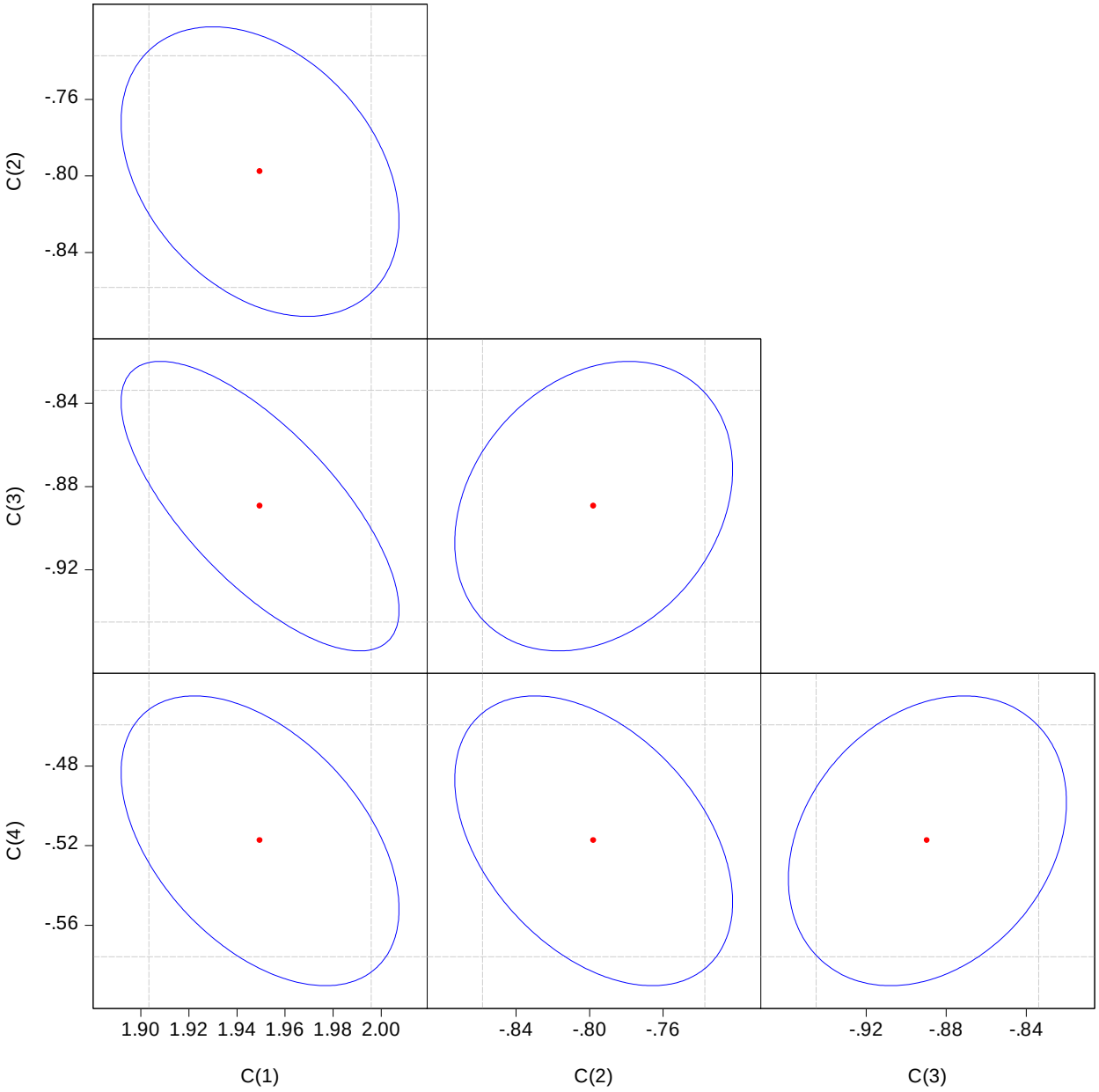
Schwarz criterion	1.041867	Log likelihood	-20834.90
Hannan-Quinn criter.	1.041280	Deviance	41669.81
Restr. deviance	43639.09	Restr. log likelihood	-21819.55
LR statistic	1969.285	Avg. log likelihood	-0.520404
Prob(LR statistic)	0.000000		
Obs with Dep=0	9400	Total obs	40036
Obs with Dep=1	30636		

Table 8 – Categorical Descriptive Statistics for Explanatory Variables in Table 7

Variable	Mean Dep=0	Mean Dep=1	Mean All
C	1.000000	1.000000	1.000000
EVER_RICH	0.388830	0.231949	0.268783
RICH_WHEN_LEFT	0.401702	0.307057	0.329279
EVER_HIGH_TAX_BRACKET	0.465000	0.328666	0.360675

Variable	Standard Deviation Dep=0	Standard Deviation Dep=1	Standard Deviation All
C	0.000000	0.000000	0.000000
EVER_RICH	0.487510	0.422084	0.443332
RICH_WHEN_LEFT	0.490268	0.461281	0.469957
EVER_HIGH_TAX_BRACKET	0.498800	0.469736	0.480202
Observations	9400	30636	40036

Figure 11 – Coefficient ellipses for estimators



Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.352133	0.027348	49.44120	0.0000
LAST_QUINTILE	-0.058417	0.008383	-6.968457	0.0000

McFadden R-squared	0.001113	Mean dependent var	0.765307
S.D. dependent var	0.423812	S.E. of regression	0.423565
Akaike info criterion	1.088657	Sum squared resid	7181.490
Schwarz criterion	1.089087	Log likelihood	-21788.01
Hannan-Quinn criter.	1.088793	Deviance	43576.03
Restr. deviance	43624.60	Restr. log likelihood	-21812.30
LR statistic	48.57127	Avg. log likelihood	-0.544279
Prob(LR statistic)	0.000000		

Obs with Dep=0	9395	Total obs	40031
Obs with Dep=1	30636		

Dependent Variable: MOVE_OUT
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 11/06/14 Time: 14:58
Sample (adjusted): 1 30924
Included observations: 30924 after adjustments
Convergence achieved after 4 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.914418	0.014797	61.79779	0.0000
DC_AGI05/10000	-0.018192	0.001656	-10.98818	0.0000

McFadden R-squared	0.004229	Mean dependent var	0.695253
S.D. dependent var	0.460308	S.E. of regression	0.458534
Akaike info criterion	1.224595	Sum squared resid	6501.466
Schwarz criterion	1.225135	Log likelihood	-18932.69
Hannan-Quinn criter.	1.224768	Deviance	37865.39
Restr. deviance	38026.19	Restr. log likelihood	-19013.10
LR statistic	160.8063	Avg. log likelihood	-0.612233
Prob(LR statistic)	0.000000		

Obs with Dep=0	9424	Total obs	30924
Obs with Dep=1	21500		