
**What Can State Income Tax Returns Tells Us about
Migration, Household Composition, Income and the Fisc?**

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1. Introduction

The study of family composition and location has long interested demographers, planners, economists, and sociologists. With regard to the location decision, as Long(1988) reminded us, the analysis of migration entails answering five fundamental questions: (1) How much? (2)Who? (3) Where? (4) Why? (5) With what effect? Beginning with Rossi's seminal study of urban migration in Philadelphia,² the post-WWII US research on migration has focused on questions 1,2,4 and 5.

There has been less empirical attention devoted to the definition of the geographical destination of urban migrants and their *income* characteristics, little empirical attention to the changing composition of households in conjunction with their location and income, and little attention to the fiscal implications of migration and changing household compositions.

The vast bulk of migration research in the past quarter century has been conducted with data collected by the U.S. Census Bureau which typically defines origin and destination in terms of municipal or metropolitan boundaries. During the past decade, much of the empirical migration research has sought to explain the individual decision to move through the multivariate analysis of national random samples of the population and sought to ascertain reasons for moving inter-county or inter-state. Much of the theoretical attention to family composition has focused on issues of matching, resource sharing and economies of scale in household production.³

The purpose of this paper is two-fold: to measure, through the analysis of Pennsylvania individual income tax returns, the net migration of central city (and central city school district) areas in Pennsylvania, and to examine the geographic location and income over time of persons whose marital circumstance has changed.

The research reported below is unusual in several respects:

1. Migration is measured through the use of the *universe* of administrative records of one very large state's personal tax system (Pennsylvania) and hopefully will provide a template for other researchers and state tax departments to pursue;⁴
2. The geographic frame for measuring migration is the local *school district*, rather than municipality of residence across time;
3. Household composition and income of those with taxable income are measured across time and space; and,
4. The financial implications to local school districts' tax bases of such migration are an integral part of the study.⁵

From the point of view of local governments as well as state government, knowing the income characteristics of those moving to and from central cities whose school

districts are co-terminus with city boundaries is critical to identifying likely service needs. Also, the income characteristics of central city dwellers have important implications for the way in which local governments (municipalities and school districts) are financed. Understanding the income characteristics that result from changes in marital status can also inform state social welfare policy.

School districts are of interest in urban areas because there is accumulating evidence that much *intra-urban* migration is motivated by the search for “local public goods.”⁶ From a tax burden or tax price perspective, school district taxes are often about ½ of total local taxes. School services are often a dominant location consideration for those with school age children. From the point of spatial measurement, there is less ambiguity over the school district in which a respondent resides than survey responses about the municipality of residence. Respondents to migration queries may indicate the name of a metropolitan area rather than the name of a central city or suburb; the school district within which one resides (and typically pays taxes to) is usually larger geographically, and not confused with the name of the metropolitan area.

The paper is organized as follows: Section 2 describes the research methodology and data; Section 3 presents the empirical analysis of migration and income levels for central cities; Section 4 presents the empirical analysis of location, household composition, and incomes before and after marriage or divorce; Section 5 concludes.

2.0 Research Methodology

The analysis of migration and household composition through the use of state tax return information was accomplished by the author entering into a non-disclosure agreement⁷ with the Bureau of Research, Pennsylvania Department of Revenue in the Fall of 1998. The analysis was based on the *universe* of individual income tax returns with school district of residence and components of Pennsylvania taxable income for calendar tax years 1991, 1994, 1996 and 1998.¹ Throughout this paper, the focus is on those taxpayers who are in the state and in the tax system at two points in time. Those who move into or out of Pennsylvania across the research time frames, or cease being captured by the state personal income tax are necessarily not part of the analysis.

Since Pennsylvania has 501 school districts, there were potentially (501x500)/2 origin destination pairs to analyze for any time interval. On the other hand, the migration literature and Pennsylvania’s data indicate that relocation is more prevalent *intra*-metropolitan area, than *inter*-metropolitan areas. Essentially, the odds of migration diminish with distance from an area, and increase over time for a given geographic measurement frame. Accordingly, it was decided to focus on Pennsylvania’s 15 Metropolitan Statistical Areas (MSA’s); the non-MSA area taken as a whole. The construct of a “core” or central school district which is congruent with municipal boundaries was developed for each of the MSA’s. In the cases of Philadelphia, Harrisburg, and Scranton metropolitan areas, multiple “core” school districts were identified and examined based on the extent of inter-school district migration patterns within respective MSA’s.

2.1. Data Definitions

Migration was analyzed for: 1991-1996, 1991-4, 1994-6, and 1996-8. Of interest is whether or not migration in 1991-4 was the same as 1994-6, and 1996-8. In the second and third periods the economy materially improved throughout the State.

While Pennsylvania individual income tax law recognizes various types of filing units: single, married, head of household, these distinctions are not nearly as important in terms of tax consequence as they are for their Federal counterparts. There are two reasons for this:

- Pennsylvania levies essentially a gross income levy without regard to personal exemptions, and without any deductions (except in the case of the self-employed or uncompensated employee business expenses).
- Pennsylvania's marginal income tax rate, compared to other States, is quite low (no more than 3.1 percent during the period in question), and is essentially proportional or flat in rate. There is a vanishing poverty exemption for low income households, although the marginal tax rate remains constant. Pennsylvania's filing requirement is extremely low compared to the Federal individual income tax. Essentially more than \$40 of wages triggers an obligation to file a personal tax return. All filers are obligated to report the school district of residence during the year.

Migration in Pennsylvania was measured by matching the Social Security Number of the primary taxpayer on the Pennsylvania individual income tax return for an initial or "origin" year to the Social Security Number of the primary taxpayer on the Pennsylvania individual income tax return for a subsequent or "destination" year. Taxpayers were deemed to be in the State across the entire period if a match by Social Security Number occurred. Migration is defined as reporting the same or different school district at two points in time.

Another difference between Pennsylvania and Federal tax concepts involves the definition of taxable income. Under Pennsylvania tax law, payments from public and private retirement plans are not taxable. Under the Internal Revenue Code, part of Social Security and all of private retirement payments are subject to Federal tax. Thus, while Pennsylvania has an extremely low earnings level that triggers a State filing requirement, it is possible for retired individuals who receive large pension payments not to file for State purposes. Conversely, while the Internal Revenue Code has a much higher filing threshold, the elderly are much more likely to participate in filing Federal (but not State) tax returns. Table 1 displays the "core" school districts and some characteristics for the study.

Table 1: Population and Enrollment of “Core” School Districts in Pennsylvania Metropolitan Statistical Areas (MSA)

“Core” School District	1990 Population in “Core” School District	1996 Public School Enrollment k-12	MSA	Core SD’s County
Allentown City	105,090	13,442	Allentown	Lehigh
Bethlehem	101,612	12,250	Allentown	Northampton
Altoona	64,848	9,128	Altoona	Blair
Erie City	108,687	12,000	Erie	Erie
Central Dauphin	75,312	9,064	Harrisburg	Dauphin
Harrisburg City	52,376	9,066	Harrisburg	Dauphin
Johnstown	37,965	3,687	Johnstown	Cambria
Lancaster	68,738	9,838	Lancaster	Lancaster
Scranton City	81,805	8,972	Scranton	Lackawanna
Wilkes-Barre	67,385	7,409	Scranton	Luzerne
Central Bucks	71,164	10,406	Philadelphia	Bucks
Council Rock	60,031	9,952	Philadelphia	Bucks
North Penn	76,714	10,244	Philadelphia	Montgomery
Pennsbury	64,707	10,070	Philadelphia	Bucks
Philadelphia City	1,585,577	194,496	Philadelphia	Philadelphia
Upper Darby	89,119	8,258	Philadelphia	Delaware
West Chester	86,228	9,838	Philadelphia	Chester
Pittsburgh	372,893	39,384	Pittsburgh	Allegheny
Reading	78,380	12,120	Reading	Berks
Sharon City	17,493	2,483	Sharon	Mercer
State College	70,607	5,939	State College	Centre
Williamsport	45,502	7,174	Williamsport	Lycoming
York City	42,192	6,801	York	York
Ambridge	27,067	3,441	Beaver	Beaver

3.0 Empirical Findings: Flows of People and Flows of State Taxable Income

3.1 Inter MSA Migration

Statewide, 91.2 percent of the taxpayers or more in 1991 remained in the same MSA compared to 1996. The lowest rate of ‘staying,’ 91.2 percent, was in State College, the home of Penn State University. Since the inter-MSA migration rate is one minus the staying rate, it is evident that, according to State tax return information, Pennsylvania’s population does not move that much. Long(1988) reports that *inter-county* migration rates over 5 years grew from 8.6 percent in the 1955-60 period to 9.5 percent in 1965 and 9.8 percent in 1975-80.⁸

3.2 Intra-MSA Migration and “Core” School Districts

Table 2 shows the annual average net migration for each “core” school district for the three time intervals. The City of Pittsburgh, which is coterminous with the Pittsburgh

School District, lost 902 taxable units annually from 1991-4. This rate of net out migration slowed from 902/year in 1991-4 to 509/year in 1994-6, but grew to an average annual net annual outflow of 3,220 during 1996-8. Note that the larger outflow of taxable units in 1996-8 was associated with a smaller average annual loss in state taxable income; this underlines the importance of knowing the income *distribution* of stayers and movers. Since the City of Pittsburgh levies a 1% tax on earned income and the Pittsburgh School District levies a 2% tax, the loss of taxable income base, for those taxable units whose location was known at two points in time, was 3% of about \$60 million or about \$1.8 million/year during the 1990's.⁹

While the Pittsburgh School District continued to lose taxable income base from those who lived in the MSA at the same order of magnitude across 1991-6, and suffered a three-fold increase in net outflows 1996-8, the results for Philadelphia are quite different. During 1991-4, Philadelphia was losing on average about 2,000 net tax returns/year and on average \$157 million/year in State taxable income base. By 1994-6, the net numbers leaving fell, respectively to 306/year and \$62 million/year. However, in the late 1990's Philadelphia began to experience a net out migration of 13,556/year taxable units. Since Philadelphia levies essentially an income tax at 4.6%, the revenue loss of this measured net out migration is \$9.6 million/year.

It is interesting to note that a number of suburban school districts around Philadelphia, such as Council Rock, Upper Darby and Pennsbury experienced substantial outflows in the 1996-8 time period. Only the Central Bucks school district experienced an appreciable (+5.8%) annual gain in net immigration which was associated with a net average inflow of state taxable income of \$129.6 million/year.

Philadelphia's worsening outflow did not necessarily mean that it lost revenues because of the outflows, because of the operation of its 3.9% commuter tax which is levied on a place of work basis. So, while a net outflow of \$209 million annually might entail an \$9.6 million/year revenue loss, as long as the number of non-Philadelphia residents working in the City grew, the City need not experience the entire revenue loss.¹⁰

Table 2: Net Migration and End of Period Income Flows from Core School District to “Partners” in MSA 1991-6

"Core" School District in MSA	Annual Avg Net Migration 1991-4	Annual Avg Net Migration 1994-6	Annual Avg Net Migration 1996-8	Annual Net Taxable Income from Core SD To Partner 1991-4 (\$millions)	Annual Net Taxable Income from Core SD to Partner 1994-6 (\$millions)	Annual Net Taxable Income from Core SD to Partner 1996-8 (\$millions)
Pittsburgh	-902	-509	-3,220	(\$67.44)	(\$62.45)	(\$53.38)
Ambridge	5	-36	-261	(\$0.23)	(\$1.96)	(\$2.02)
Reading	-493	-53	-962	(\$31.48)	(\$9.05)	(\$16.71)
Altoona	1	-19	-549	(\$1.62)	(\$3.03)	(\$3.03)
Greater Johnstown	25	-88	-212	(\$0.20)	(\$8.20)	(\$4.5)
State College	21	-21	-1,040	\$0.53	(\$2.14)	(\$3.97)
Central Dauphin	-76	56	-1,204	(\$4.46)	\$3.26	(\$10.07)
Harrisburg	-144	-126	-964	(\$10.10)	(\$13.23)	(\$26.12)
Erie	-86	-19	-823	(\$13.79)	(\$10.98)	(\$3.84)
Scranton	-33	-49	-625	(\$5.21)	(\$6.37)	(\$5.18)
Lancaster	0	-88	-709	\$0.00	(\$16.10)	(\$12.86)
Allentown	-632	-76	-1,226	(\$44.57)	(\$18.60)	(\$20.49)
Wilkes-Barre	-295	-284	-625	(\$15.23)	(\$25.22)	(\$5.39)
Williamsport	-100	84	-653	(\$6.93)	\$3.92	(\$10.25)
Sharon	10	-37	-263	(\$0.74)	(\$2.06)	(\$3.80)
Bethlehem	80	40	-1,366	\$1.62	\$3.60	(20.36)
Central Bucks	54	331	651	\$14.39	\$47.39	\$129.63
Council Rock	347	10	-939	\$38.98	\$0.28	(\$2.74)
Upper Darby	29	-18	-1,568	(\$9.89)	(\$8.02)	(\$33.54)
Pennsbury	-93	70	-389	(\$3.02)	\$10.12	(\$20.53)
West Chester	111	136	-1421	\$3.92	\$18.05	\$1.57
Philadelphia	-1996	-306	-13,556	(\$157.44)	(\$61.99)	(\$209.49)
York City	-42	-245	-304	(\$6.16)	(\$22.54)	(\$7.47)

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

3.3 The Income Distribution of Philadelphia and Pittsburgh Migrants

We may disaggregate the above migration information by income class, although to maintain confidentiality the details of origin and destination school districts must be suppressed. Table 3 shows by taxable income class the distribution of those who

remained in the Philadelphia school district across 1991-1998, those who stayed and the net count of movers in Philadelphia from elsewhere in Pennsylvania. Whereas earlier the focus on migration was either across or within the Philadelphia MSA, the income distribution analysis in Table 3 looks at movement *anywhere* within Pennsylvania from or to the Philadelphia school district.

It is immediately evident that in the lowest income class (less than or equal to zero), Philadelphia experienced a 23 percent decline in the number of returns. Above \$75,000, Philadelphia also lost considerable numbers of taxpayers. It had fully 11 percent fewer taxpayers in the \$100,000-\$150,000 income class in 1998 than in 1996. Overall, between 1996 and 1998, Philadelphia lost 4.6% on average each year of those taxpayers whose location could be identified in both years.

The results for Pittsburgh, shown in Table 4 in terms of net migration counts, and Table 5 in terms of percentage change by income class, are similar to those in Philadelphia in that net loss of taxpayers in 1996-8 was on the order of 4%; however, during 1994-6, Pittsburgh, unlike Philadelphia, continued to lose .8% of its taxpayers on an average annualized basis.¹¹

The analysis of absolute levels of Philadelphia and Pittsburgh stayers (e.g. those who were present in 1991 and 1994, 1994 and 1996, and 1996 and 1998) shows that the number grew during 1994-6, but was lower in 1996-8 than in 1991-4 for both cities. (See Table 3 and Table 5).

Table 3: Migration to and From Philadelphia by Income Class: 1991-4, 1994-6,1996-8

End of Period Income Class	Stayers 1991-4	Stayers 1994-6	Stayers 1996-8	Annualized Net Migration		
				In migration- Out migration 1991-4	In migration - Out migration 1994-6	In migration -Out migration 1996-8
<= \$0	3,405	2,946	1,861	-309	-175	-354
\$ 1-999	24,863	21,354	14,288	-245	48	-638
\$ 1- 2,999	25,982	23,812	16,961	-275	42	-583
\$ 3- 5,999	18,873	18,733	14,424	-225	84	-342
\$ 6- 6,999	15,758	16,950	13,655	-193	101	-338
\$ 7- 8,999	12,968	14,323	12,235	-128	92	-281
\$ 9-10,999	11,701	12,754	11,470	-85	130	-277
\$ 11-12,999	10,877	11,871	10,594	-72	112	-287
\$ 13-14,999	10,717	11,709	10,718	-70	107	-257
\$ 15-16,999	10,591	11,548	10,663	-89	107	-296
\$ 17-18,999	10,937	11,315	10,151	-93	58	-325
\$ 19-21,999	16,410	16,924	15,292	-122	94	-460
\$ 22-24,999	16,503	16,715	14,425	-161	128	-491
\$ 25-29,999	25,249	26,414	23,383	-179	186	-954
\$ 30-34,999	21,241	22,456	20,222	-205	171	-935
\$ 35-39,999	18,331	19,254	17,540	-159	79	-846
\$ 40-49,999	27,880	29,676	27,147	-348	48	-1,405
\$ 50-74,999	34,493	39,335	36,602	-722	-176	-2,284
\$ 75-99,999	10,044	13,298	14,041	-379	-109	-1,104
\$100-149,999	4,182	6,347	7,121	-205	-110	-740
> \$150,000	2,691	4,300	4,510	-60	-45	-302
Total	333,696	352,034	307,303	-4,324	971	-13,494

Table 4: Migration to and from Philadelphia by Income Class, Percentage Change in Returns: 1991-4, 1994-6, 1996-8

End of Period Income Class	Annual % Change 1991-4	Annual % Change 1994-6	Annual % Change 1996-8
<= \$0	-10.0%	-6.3%	-23.5%
\$ 1-999	-1.0%	0.2%	-4.7%
\$ 1- 2,999	-1.1%	0.2%	-3.6%
\$ 3- 5,999	-1.2%	0.4%	-2.4%
\$ 6- 6,999	-1.2%	0.6%	-2.5%
\$ 7- 8,999	-1.0%	0.6%	-2.4%
\$ 9-10,999	-0.7%	1.0%	-2.5%
\$ 11-12,999	-0.7%	0.9%	-2.8%
\$ 13-14,999	-0.7%	0.9%	-2.5%
\$ 15-16,999	-0.8%	0.9%	-2.9%
\$ 17-18,999	-0.9%	0.5%	-3.3%
\$ 19-21,999	-0.7%	0.6%	-3.1%
\$ 22-24,999	-1.0%	0.8%	-3.5%
\$ 25-29,999	-0.7%	0.7%	-4.3%
\$ 30-34,999	-1.0%	0.8%	-4.8%
\$ 35-39,999	-0.9%	0.4%	-5.1%
\$ 40-49,999	-1.3%	0.2%	-5.5%
\$ 50-74,999	-2.1%	-0.4%	-6.7%
\$ 75-99,999	-3.9%	-0.8%	-8.5%
\$100-149,999	-5.2%	-1.8%	-11.6%
> \$150,000	-2.3%	-1.0%	-7.2%
Total	-1.3%	0.3%	-4.6%

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Table 5: Migration to and From Pittsburgh by Income Class: 1991-4, 1994-6, 1996-8

End of Period Income Class	Stayers 1991-4	Stayers 1994-6	Stayers 1996-8	Annualized Net Migration		
				In migration- Out migration 1991-4	In migration - Out migration 1994-6	In migration -Out migration 1996-8
\$ 1-999	9,172	7,937	5,660	-123	-93	-224
\$ 1- 2,999	9,046	8,422	6,299	-135	2	-237
\$ 3- 5,999	6,230	6,151	4,876	-52	-14	-104
\$ 6- 6,999	5,006	5,537	4,446	-37	19	-88
\$ 7- 8,999	4,149	4,377	3,933	-4	3	-99
\$ 9-10,999	3,715	3,992	3,499	-5	21	-107
\$ 11-12,999	3,474	3,801	3,380	-7	25	-91
\$ 13-14,999	3,193	3,588	3,336	3	7	-70
\$ 15-16,999	3,293	3,588	3,158	-29	-6	-154
\$ 17-18,999	3,367	3,483	3,260	-33	-20	-103
\$ 19-21,999	5,136	5,119	4,621	-44	8	-184
\$ 22-24,999	4,399	4,588	4,303	-78	-10	-154
\$ 25-29,999	6,054	6,380	5,880	-109	-24	-201
\$ 30-34,999	4,811	5,319	4,854	-50	-58	-214
\$ 35-39,999	4,365	4,647	4,096	-105	-49	-198
\$ 40-49,999	6,732	7,232	6,691	-184	-110	-343
\$ 50-74,999	8,265	9,635	9,306	-310	-270	-558
\$ 75-99,999	2,456	3,111	3,336	-104	-117	-188
\$100-149,999	1,788	2,237	2,264	-72	-61	-88
> \$150,000	1,850	2,469	2,722	-31	-16	-65
Total	97,477	102,426	90,554	-1,566	-784	-3,513

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Table 6: Migration to and from Pittsburgh by Income Class, Percentage Change in Returns: 1991-4, 1994-6, 1996-8

End of Period Income Class	Annual % Change 1991-4	Annual % Change 1994-6	Annual % Change 1996-8
<= \$0	-6.2%	-2.8%	-8.4%
\$ 1-999	-1.4%	-1.2%	-4.1%
\$ 1- 2,999	-1.5%	0.0%	-3.9%
\$ 3- 5,999	-0.8%	-0.2%	-2.2%
\$ 6- 6,999	-0.7%	0.3%	-2.0%
\$ 7- 8,999	-0.1%	0.1%	-2.6%
\$ 9-10,999	-0.1%	0.5%	-3.1%
\$ 11-12,999	-0.2%	0.6%	-2.8%
\$ 13-14,999	0.1%	0.2%	-2.1%
\$ 15-16,999	-0.9%	-0.2%	-5.1%
\$ 17-18,999	-1.0%	-0.6%	-3.2%
\$ 19-21,999	-0.9%	0.2%	-4.1%
\$ 22-24,999	-1.8%	-0.2%	-3.7%
\$ 25-29,999	-1.8%	-0.4%	-3.5%
\$ 30-34,999	-1.0%	-1.1%	-4.6%
\$ 35-39,999	-2.5%	-1.1%	-5.1%
\$ 40-49,999	-2.8%	-1.5%	-5.4%
\$ 50-74,999	-3.9%	-2.9%	-6.4%
\$ 75-99,999	-4.4%	-3.9%	-6.0%
\$100-149,999	-4.2%	-2.8%	-4.0%
> \$150,000	-1.7%	-0.7%	-2.4%
Total	-1.6%	-0.8%	-4.0%

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

4.0 Location, Income and Household Composition over Time

The economic status of each member of a household has long interested labor economists and demographers; however, its measurement is complicated by the difficulties researchers face in measuring the components of the household over time. Tax return information is superior to survey techniques in measuring income over time, and has the added advantage, as noted above, in accurately keeping track of place of residence. Further, tax return information aides the study of household composition in that the social security number of single persons, and the social security numbers of households are quite invariant, whereas last names can be altered through marriage.

Pennsylvania, like most state and federal income systems, differentiates between primary and spousal SSN's. Designation of the primary SSN is at the discretion of the taxpayer, and has no legal or tax consequence in Pennsylvania; however, it is generally expected that the male member of the household (husband) is designated as the primary

taxpayer, and the female member of the household (wife) is designated as the spousal taxpayer.¹²

Our focus here is to explore the economic and location status of those who form households and those whose households dissolve through time. Again, for individuals to remain in our measurement frame, they must be within Pennsylvania at various points in time. Thus, if a Pennsylvania resident with taxable income in Pennsylvania marries an Ohio resident with taxable income in Ohio, their economic positions will not be captured since the Ohio resident will be unknown to the Pennsylvania tax system as a single taxpayer in the base year. Also, if a single Pennsylvania resident who is a taxpayer marries another Pennsylvania resident who is not a taxpayer in the base period, they will not be within our measurement frame since the second person had no discernible economic status while a single person. On the other hand, a Pennsylvania couple's income in the base period will be measured, as will the economic status of each upon divorce, so long as each member of the dissolved household has taxable income in the second period.

4.1 General Patterns of Household Composition: 1994-6

Table 7 displays some basic facts about each individual in Pennsylvania's tax system who was present in the system in 1994 *and* 1996. Note that the 203,152 single persons in 1994, who were couples in 1996, means there were 101,576 married couples in 1996. Similarly, the 198,458 single persons from dissolved households in 1996 reflect 99,229 households in 1994, and the 4,948,666¹³ persons married in 1994 and 1996 reflect 2,474,333 households.¹⁴ This implies a divorce rate of about 4% over the 2 year period (99,229/2,573,562) or an annual divorce rate of about 2%. To be in Table 7, the same SSN had to be matched across 1994 and 1996, regardless of whether single or married.

Table 7: Household Composition of Pennsylvania Taxpayers in 1994 and 1996

	Destination Year (1996)			Total
		Single	Married	
Origin Year 1994	Single	2,271,506 [1]	203,152 [2]	2,474,658
	Married	198,458 [3]	4,948,666 [4]	5,147,124
	Total	2,469,964	5,151,818	7,621,782

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Case [4] can be further divided among those who are married to the same partner in 1996 as in 1994, and those who are married to another partner in 1996. ¹ Of those 4,948,666 married in both time periods, 78,379 were married to *different* spouses in 1996 viz. a viz. 1994. (See Table 8.)

Family economics often enquires if two can live as cheaply as one.¹⁵ If we answer the question for only those who each had Pennsylvania taxable income in 1994, and were in Pennsylvania households in 1996 with taxable income, we see that the answer is quite varied. Table 8 displays the distribution of the *sum* of single persons' taxable incomes in 1994 who were married in 1996. The sum is obtained by constructing hypothetical households in 1994 based on actual membership in 1996. If we attempt to answer the question by examining the separate distributions of such income, we find that the ratio of singles to household income *declines* from about 4.0 as one moves up the income distribution; however the ratio is not below 1.0 until the 99'th percentile. On the other hand, if calculate the actual ratio of the sum of singles' incomes to combined income, we see it varies from .17 to 16.1 and is thus actually far more disparate. Recall that the measured singles' income is 2 years earlier than the 1996 household income.

Table 8: Persons in 1994 and 1996 by 1996 Income Class and Marital Status in Pennsylvania

1996 Income Class	Single both Periods	Single, then Married	Married, Then Single	Same Spouse, both Periods	Married Different Spouse	Total Persons
<\$0	26,420	1,569	2,321	41,080	757	72,147
\$0-1k	201,834	2,832	19,420	253,453	2,944	480,483
\$1-3k	242,329	3,874	19,827	248,843	3,008	517,881
\$3-6k	190,375	4,463	15,445	190,733	2,588	403,604
\$6-7k	153,296	5,090	14,633	181,283	2,609	356,911
\$7-9k	124,948	5,114	10,338	127,786	2,016	270,202
\$9-10k	110,719	5,581	9,012	100,610	1,864	227,786
\$11-13k	103,028	5,635	8,320	91,031	1,602	209,616
\$13-15k	98,117	6,152	7,766	86,826	1,692	200,553
\$15-17k	93,802	6,242	7,347	87,954	1,716	197,061
\$17-19k	89,327	6,897	6,998	87,460	1,739	192,421
\$19-22k	124,841	10,835	9,664	132,544	2,764	280,648
\$22-25k	110,416	10,668	8,666	136,095	2,747	268,592
\$25-30k	153,273	17,916	12,276	239,705	4,734	427,904
\$30-35k	115,604	16,795	9,655	255,973	4,844	402,871
\$35-40k	86,495	15,002	7,689	269,454	4,822	383,462
\$40-50k	107,479	24,893	10,706	531,954	9,088	684,120
\$50-75k	93,502	33,606	11,308	954,126	15,124	1,107,666
\$75-100k	21,158	10,959	3,300	414,307	5,896	455,620
\$100-150k	12,529	5,612	1,972	253,842	3,471	277,426
>\$150k	12,014	3,417	1,795	185,228	2,354	204,808
Total	2,271,506	203,152	198,458	4,870,287	78,379	7,621,782

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Table 9: Distribution of Combined Singles' Incomes in 1994 Compared to Household Income in 1996 in Pennsylvania

Distribution:	1%	5%	10%	25%	50% Median	75%	90%	95%	99%
Singles Incomes(1994)	\$3,056	\$7,256	\$11,119	\$20,624	\$34,738	\$52,924	\$75,803	\$96,029	\$194,364
Married (1996)	\$768	\$5,579	\$9,689	\$18,648	\$30,540	\$47,656	\$70,159	\$92,327	\$208,478
Ratio of Singles Incomes to Married Income	3.9791	1.3059	1.1476	1.1060	1.1375	1.1105	1.0804	1.0401	.9322
Actual Ratio of Singles Incomes to Married Income	0.1743	0.3847	0.5327	0.7859	1.0718	1.5839	2.3675	3.5757	16.0802

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

The question naturally arises about the pattern of income of divorcees compared to their prior household income. Table 10 displays the separate distributions of 1994 household (married) income and 1996 combined divorcee's income. Again, the sum of the singles' (now divorcee) income is generally greater than that of earlier household income; compare \$43,656 median income of divorcees with \$29,427 of previously married households. Again, the actual ratio of divorcees' income to prior household income is more varied than the constructed ratio from the two independent distributions.

Table 10: Distribution of Household Income in 1994 to Combined Divorced Incomes in 1996 in Pennsylvania

Distribution:	1%	5%	10%	25%	50% Median	75%	90%	95%	99%
Married (1994)	\$82	\$2,162	\$5,484	\$15,007	\$29,427	\$47,540	\$70,003	\$93,092	\$212,289
Divorced (1996)	\$1,142	\$8,166	\$15,179	\$27,708	\$43,656	\$64,036	\$91,328	\$120,967	\$295,119
Ratio of Divorcees' Incomes to Married Income	13.9268	3.777058	2.76787	1.846338	1.48354	1.34699	1.3046	1.29943	1.39018
Actual Ratio of Divorced Incomes to Married Income	0.2252	0.6223	0.8233	1.0786	1.4116	2.1971	4.0901	7.4628	52.5832

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Some insights into *relative* contributions of income can be obtained by comparing the income of spouses and primary taxpayers when they were previously single. Table 11 indicates that as 1996 household income rises, the 1994 spousal income in comparison to primary income *declined*. Note that the decline in the ratio of spousal to primary income is rather pronounced at incomes above \$150,000.¹⁶

Table 11: Ratio of 1994 Spousal to 1994 Primary Income by Subsequent Married Income Class

Income Class of 1996 Couple	Ratio of 1994 Single Spousal to 1994 Single Primary Income		
	25'th %	Median	75'th %
<\$0	0.4209	0.8485	2.6494
\$0-1k	0.6333	1.8088	11.9953
\$1-3k	0.5513	1.3902	4.1632
\$3-6k	0.5776	1.2365	2.9704
\$6-7k	0.4967	1.0828	2.4039
\$7-9k	0.4597	1.0493	2.3543
\$9-10k	0.4027	0.9699	2.0161
\$11-13k	0.4048	0.8722	1.8679
\$13-15k	0.3761	0.8798	1.7394
\$15-17k	0.3972	0.8394	1.5829
\$17-19k	0.3761	0.7530	1.3978
\$19-22k	0.3342	0.7063	1.2509
\$22-25k	0.3330	0.6661	1.1881
\$25-30k	0.3407	0.6550	1.1111
\$30-35k	0.3198	0.6147	1.0162
\$35-40k	0.3357	0.6092	0.9907
\$40-50k	0.3526	0.6316	1.0006
\$50-75k	0.3693	0.6465	1.0375
\$75-100k	0.3795	0.6692	1.0952
\$100-150k	0.3044	0.5654	0.9717
>\$150k	0.1129	0.2451	0.5776

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Spousal income after divorce also results in a relative decline in income. Table 12 indicates that for the highest income couples (over \$150,000 in 1994), the median divorced spouse's income is only 14% of the former primary taxpayer's income in 1996. Three quarters of the former spouses in this income group had ratios of .58 or less.

Table 12: Ratio of 1996 Divorced Spousal to 1996 Divorced Primary Income by Prior 1994 Married Income Class

1994 Married Income	Ratio of Divorced Spouse to Divorced Primary Income		
	Ratio at 25'th %	Median Ratio	Ratio at 75'th %
<\$0	0.3802	0.9421	2.2982
\$0-1k	0.4360	1.3900	8.8513
\$1-3k	0.4471	1.0000	3.3698
\$3-6k	0.5633	1.2844	2.9846
\$6-7k	0.6031	1.4577	3.0533
\$7-9k	0.5127	1.0755	2.3962
\$9-10k	0.6215	1.2091	2.3394
\$11-13k	0.4328	1.0000	1.8985
\$13-15k	0.4443	0.9576	1.7535
\$15-17k	0.4012	0.8731	1.5605
\$17-19k	0.3853	0.8158	1.4476
\$19-22k	0.3311	0.6888	1.2683
\$22-25k	0.2987	0.6894	1.1977
\$25-30k	0.2942	0.6103	1.0291
\$30-35k	0.3103	0.5909	1.0407
\$35-40k	0.2882	0.5513	0.9750
\$40-50k	0.2696	0.5504	0.9804
\$50-75k	0.2971	0.6101	1.0261
\$75-100k	0.2703	0.6257	1.0423
\$100-150k	0.1599	0.4391	0.9290
>\$150k	0.0309	0.1388	0.4795

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

4.2 Spatial Changes Associated with Household Compositional Changes

Because marriage and divorce are relatively infrequent events across short intervals of time, it is not possible, because of disclosure limitations, to display the joint distribution of core school district locations, marital status, and income position. If we limit the location analysis to whether or not school districts of residence are the *same* or *different*, however, we can gain insights into changes in marital status, mobility and income position. Table 13 tabulates these effects for the universe of singles who married, and Table 14 tabulates these effects for the universe of couples who became singles.

For 30% to 41% of singles, marriage entailed their initially and subsequently staying in the same school district; for another 28 to 34% of singles, initially living in different districts, the spouse moved to the primary taxpayer's school district of residence.

Somewhat higher percentages (42 to 52%) of couples who broke up each remained in the same school district; from 27 to 31% of spouses changed school districts upon dissolution of the original household.

Table 13: (Marriages) Location of Households Compared to Location of Primary and Spousal School Districts in Pennsylvania: 1991-4, 1994-6, and 1996-8

Location: 1991-4	%	1991 Combined Singles Income			1994 Household Income		
		25'th Percentile	Median	75'th Percentile	25'th Percentile	Median	75'th Percentile
No Movement, $SD_{sp} = SD_{pr}$	34.14	\$13,121	\$24,381	\$38,738	\$16,689	\$23,397	\$35,396
Move to SD_{pr} $SD_{sp} \neq SD_{pr}$	33.13	\$11,505	\$23,183	\$39,468	\$12,951	\$22,360	\$34,679
Move to spouse, $SD_{sp} \neq SD_{pr}$	7.46	\$14,668	\$26,267	\$40,570	\$16,374	\$26,870	\$42,316
Move to SD_{other} $SD_{sp} \neq SD_{pr}$	16.8	\$12,626	\$25,086	\$41,297	\$16,834	\$28,609	\$44,170
Move to SD_{other} , $SD_{sp} = SD_{pr}$	8.47	\$13,423	\$24,624	\$39,042	\$16,759	\$28,157	\$43,069
Location: 1994-6	%	1994 Combined Singles Income			1996 Household Income		
		25'th Percentile	Median	75'th Percentile	25'th Percentile	Median	75'th Percentile
No Movement, $SD_{sp} = SD_{pr}$	41.12	\$20,133	\$33,227	\$50,071	\$17,728	\$29,312	\$45,451
Move to SD_{pr} $SD_{sp} \neq SD_{pr}$	34.21	\$20,011	\$35,443	\$55,174	\$17,893	\$29,777	\$47,132
Move to spouse, $SD_{sp} \neq SD_{pr}$	7.23	\$22,994	\$37,796	\$56,627	\$19,201	\$31,550	\$50,310
Move to SD_{other} $SD_{sp} \neq SD_{pr}$	10.92	\$19,633	\$34,344	\$53,215	\$19,731	\$31,754	\$49,261
Move to SD_{other} , $SD_{sp} = SD_{pr}$	6.52	\$19,420	\$32,724	\$47,300	\$18,980	\$30,860	\$46,090
Location: 1996-8	%	1996 Combined Singles Income			1998 Household Income		
		25'th Percentile	Median	75'th Percentile	25'th Percentile	Median	75'th Percentile
No Movement, $SD_{sp} = SD_{pr}$	37.49	\$21,746	\$35,594	\$53,170	\$20,491	\$33,092	\$50,346
Move to SD_{pr} $SD_{sp} \neq SD_{pr}$	28.2	\$20,511	\$36,324	\$56,673	\$19,326	\$31,634	\$49,634
Move to spouse, $SD_{sp} \neq SD_{pr}$	8.42	\$24,288	\$39,087	\$59,404	\$24,135	\$38,798	\$59,438
Move to SD_{other} $SD_{sp} \neq SD_{pr}$	15.83	\$21,366	\$37,785	\$58,086	\$23,689	\$38,512	\$59,030
Move to SD_{other} , $SD_{sp} = SD_{pr}$	10.07	\$21,332	\$35,440	\$53,353	\$22,845	\$37,207	\$56,084

Source: Author's tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Table 14: (Divorcees’) Location of Households Compared to Location of Primary and Spousal School Districts in Pennsylvania: 1991-4, 1994-6, and 1996-8

Location: 1991-4	Percent	1994 Combined Income			1991 Household Income		
		25'th Percentile	Median	75'th Percentile	25'th Percentile	Median	75'th Percentile
No moves after divorce, same SD	42.1	\$27,389	\$42,620	\$60,983	\$14,589	\$27,305	\$42,241
Primary stays put, spouse moves	30.6	\$31,126	\$46,612	\$65,877	\$15,350	\$27,637	\$41,931
Spouse stays put, primary moves	11.3	\$32,854	\$47,560	\$66,726	\$20,628	\$35,517	\$52,762
Both move, to different SDs	10.7	\$32,483	\$48,117	\$67,355	\$16,115	\$29,442	\$45,315
Both move, to same SD	5.3	\$26,867	\$42,415	\$61,056	\$12,744	\$24,278	\$40,437
Location: 1994-6	Percent	1996 Combined Income			1994 Household Income		
		25'th Percentile	Median	75'th Percentile	25'th Percentile	Median	75'th Percentile
No moves after divorce, same SD	51.8	\$25,790	\$41,947	\$62,355	\$14,717	\$29,389	\$47,576
Primary stays put, spouse moves	29.8	\$31,042	\$46,295	\$67,240	\$15,457	\$28,735	\$45,825
Spouse stays put, primary moves	6.5	\$31,853	\$47,382	\$65,738	\$19,196	\$35,876	\$55,497
Both move, to different SDs	6.4	\$27,828	\$44,341	\$64,120	\$14,750	\$28,178	\$44,547
Both move, to same SD	5.5	\$24,675	\$39,903	\$59,568	\$12,925	\$26,214	\$45,202
Location: 1996-8	Percent	1998 Combined Income			1996 Household Income		
		25'th Percentile	Median	75'th Percentile	25'th Percentile	Median	75'th Percentile
No moves after divorce, same SD	47.4	\$28,767	\$46,420	\$67,266	\$15,893	\$31,900	\$51,312
Primary stays put, spouse moves	27.2	\$34,714	\$51,722	\$72,728	\$18,401	\$33,486	\$51,950
Spouse stays put, primary moves	12.5	\$36,414	\$53,873	\$76,518	\$23,787	\$41,364	\$61,858
Both move, to different SDs	8.2	\$34,086	\$50,671	\$72,944	\$17,595	\$34,274	\$53,997
Both move, to same SD	4.6	\$28,320	\$45,392	\$66,103	\$14,975	\$29,450	\$50,164

Source: Author’s tabulations of Pennsylvania Department of Revenue State personal tax return files. All income measured at end of period nominal state taxable income levels.

Finally, we examine the pattern of income for those taxpayers whose household composition has changed over time. If we follow the persons’ incomes across time by marital status, e.g. those who married during 1991-4, divorced during 1994-6, and then either remarried or remained divorced in 1996-8, we note that those who were able to find new partners and remarried in 1996-8 wound up in the highest income intervals compared to these other demographic groups. This is consistent with the conjecture that first marriages are based on love, while second marriages are based on money. (See Figure 1).

5.0 Conclusions

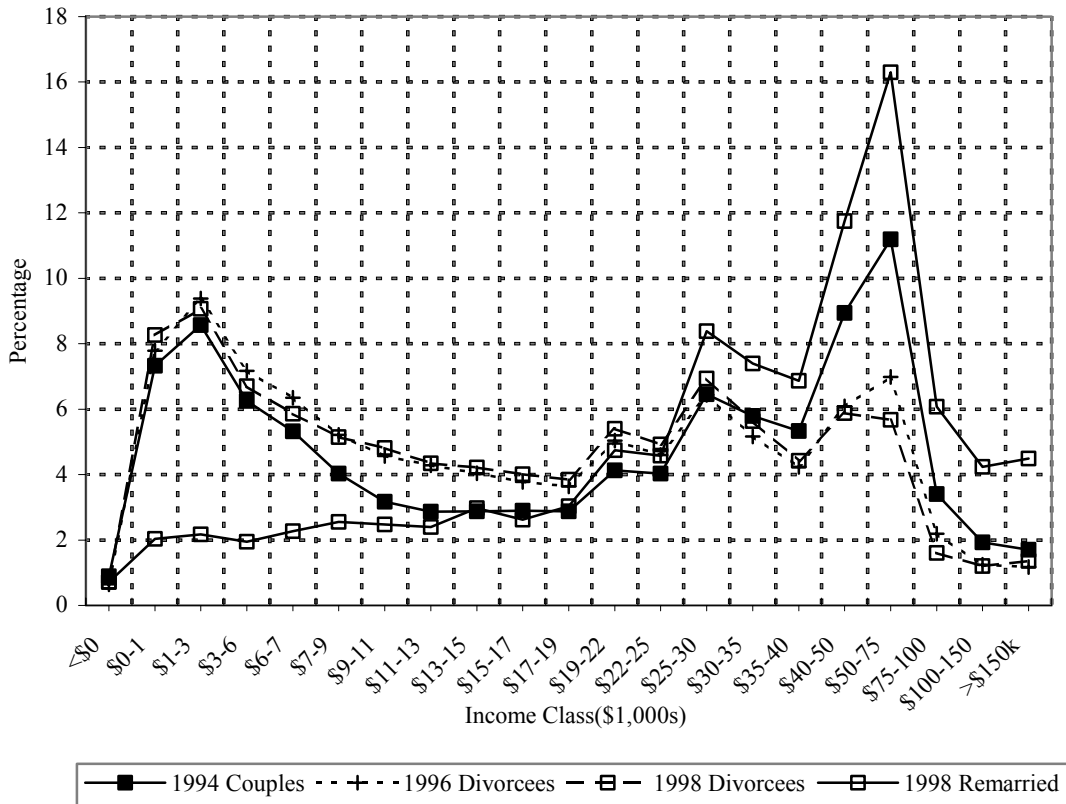
This analysis of Pennsylvania tax return information in the 1990’s indicates that, for those central city or urban taxpayers we can observe at two points in time, there was a net predilection to leave. For Pennsylvania’s two largest cities, Pittsburgh and Philadelphia,

some millions of dollars/year in foregone local wage tax revenues resulted from this net out migration. There is evidence that upper income taxpayers left in greater proportions from these two urban areas than their low and moderate income counterparts. Overall, both cities lost over 4% of their taxable units whose location was known between 1996 and 1998.

With regard to whether or not marriage, *per se*, leads to higher household income, we find patterns extremely varied. For half of taxpayers in 1996, their combined 1994 incomes before marriage were *higher*. On the other hand, for ¾ of divorcees, the sum of their 1996 incomes upon divorce was *greater* than their married incomes. Consistent with panel studies, there is substantial movement up and down the income distribution across time. Those who married, divorced, and remarried were more concentrated in the higher income intervals than other household composition groups.

Tax return information can provide significant insights into school district location and household formation/dissolution decisions in conjunction with accurately measuring economic status over time. Obvious extensions of this line of research include explaining location decisions in conjunction with local tax and service levels.

Figure 1
Comparison of Pennsylvania's Income Distribution : 1994-8
Married(1994) Divorced(1996), Divorced (1998) or Remarried(1998)



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8.0 Endnotes

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² See Rossi(1953).

³ See Rosenzweig and Stark(1997) for an excellent overview of various aspects of population and family economics.

⁴ A parallel enquiry is also underway examining intra-state migration in California through a project with the California Franchise Tax Board.

⁶ See Nechyba(1995), and Nechyba and Strauss(1998), and the references cited therein.

⁷ All manipulations (matching and analysis) of data were performed on the Department's Harrisburg computers, and only statistical data was permitted to leave the Department after careful reviews of such data. The "rule of ten," used by the Internal Revenue Service's Statistics of Income Division, was utilized as a basic decision rule. When fewer than 10 tax returns in a given year were in a cell, the data was either summarized to cells of 10 or more, or in the case of income distributions or tables showing origin from or destination to a school district, the cell was omitted.

⁸ Long(1988), Table 2.6.

⁹ As the local tax base is narrower than state taxable income, the annual revenue loss is on the order of \$1.5 million/year.

¹⁰ Also, to the extent that net inter-state migration into Philadelphia occurred the revenue effects of observable net out migration could have been mitigated.

¹¹ The net departures of middle and upper income taxpayers in Philadelphia and Pittsburgh contrasts with earlier results for the District of Columbia (Strauss(1998b)); however, in that earlier study I was not able to control for inter-city migration --across DC boundary moves--which is a distinctive feature of this *intra-state* study.

¹² Pennsylvania does not formally recognize common law marriages in the application of its income tax. Given that it is a proportional tax with no personal exemptions or differentiation between single and married standard deductions (there is no itemizing allowed), marital status is less important for filing purposes than in other states which have a progressive rate structure and accord different sized deductions that vary by marital status.

¹⁵ See Weiss(1997) for a systematic review of the theoretical literature on marriage and divorce. The general empirical finding here that the sum of singles' income is often less than subsequent household income can be explain by a number of factors. First, one spouse, typically the woman, may reduce her participation in the labor market and engage in home production. This can include child bearing and the provision of household services. If one wishes to observe that utility levels are comparable for married couples to those previously of the separate partners, then the excess of combined singles' income to household income can be viewed as the compensating utility of household production. At the median, a differential of 7% (See Table 22) seems plausible. At the third quartile, a differential of 58% is surprisingly large.

¹⁶ Becker(1991, Chapter 4) suggests that high quality men seek out high quality women. There is considerable empirical evidence that educational attainment of each member of a couple is similar; this is cited in substantiation of this conjecture. Absent wage discrimination against the spouse, and holding constant age and labor market experience, we would expect the entries in Table 11 to be invariant to income class, and to show little dispersion within income interval. It is possible that the non-wage components (physical attractiveness of the spouse) of a subsequent spouse rises with income. It is interesting to note that extent of variation (e.g. the inter-quartile range) is *smaller* for the highest income

interval. The substantial decline in median ratio suggests that high income primary wage earners may be more willing to trade off non-monetary aspects than their low income primary wage counterparts.

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