

Net Fiscal Impacts of Raising Educational Attainment in Philadelphia

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Acknowledgements

This paper follows a study that we completed in 2009 titled *The Tax and Transfer Fiscal Impacts of Dropping out of High School in Philadelphia*. The earlier paper was written at the instigation of Sallie Glickman who in 2007 served as Executive Director of the Philadelphia Workforce Investment Board. Sallie was concerned about the low levels of educational attainment of city residents at that time. She wanted to better understand the potential fiscal impacts (if any) that might occur if resources could be mobilized to increase the share of city residents with a high school diploma through workforce development programs aimed at both teen and adult dropout residents of Philadelphia. Sallie encouraged the authors to create measures of the tax and transfer fiscal impacts of dropping out in Philadelphia using a variety of data sources and methods that were available at that time. Sallie's intelligence, tenacity, and good spirit were driving forces that led to the completion of that study—a precursor to this report.

The present paper is not an update of the earlier study as the data and measures available today are substantially different from those available ten years ago. Yet this paper tackles the same issue by examining data and measures available today that can provide us with important insights into the net fiscal contributions of residents by the level of their educational attainment.

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Introduction

Dropping out of high school is a catastrophic act that mostly leads to a set of poor life outcomes compared to those who earn a high school diploma. In Philadelphia the risks of permanent disconnection from the job market are high for those who fail to finish high school, and this, of course, means a very grave risk of poverty and dependency. A very large share of Philadelphia's working-age poverty population has not worked at all in the prior five years.¹ Non-elderly adult high school dropout residents of Philadelphia have a very high probability of not working for extended periods of time. Analysis of American Community Survey (ACS) data for the city reveals that 45 percent of the city's dropout residents between the ages of 21 and 64 had not worked in the prior five years.²

Philadelphia has among the highest teen and young adult disconnection rates in the nation. These young people are disconnected in the sense that they are not engaged in human capital building activities that are essential for long-term labor market success. Among the city's 16- to 24-year-old population 25 percent are disconnected; that is, they are not enrolled in school, not employed, and not enlisted in the military. About 30 percent of the city's disconnected youth are high school dropouts, but in contrast just 3 percent of those young people engaged in a human capital development activity had dropped out of high school.³

The adverse personal consequences of dropping out of high school are quite substantial. Dropping out not only leads to a very heightened risk of poor labor market outcomes and diminished household and family incomes, but is also linked to a number of negative social, personal, and family consequences associated with poverty and life at the margins of the labor market.

The negative impacts of dropping out are not limited solely to the personal consequences associated with exiting school before earning a diploma. There are very

¹Neeta Fogg, Paul Harrington, and Ishwar Khatiwada, *Philadelphia's Detached: The Disconnection between the Poor and the Labor Market in Philadelphia*, Center for Labor Markets and Policy, Drexel University, June, 2018.

²Authors' analysis of the ACS public use microdata files, 2015-2017.

³Neeta Fogg and Paul Harrington, *The Human Capital Deficit of Disconnected Youth in Philadelphia*, Center for Labor Markets and Policy, Drexel University, September, 2015.

substantial social costs partially manifest in the form of reduced tax contributions and increased reliance on means-tested publicly financed benefit transfer programs.

The grim consequences of dropping out of high school are exacerbated in an economy that continues to create jobs that require high levels of skills and literacy proficiencies. Employment opportunities for unskilled persons have declined sharply as the industry structure of employment has shifted from manufacturing to service industries and as the production of the nation's output has become more technologically sophisticated raising the literacy and educational requirements of the workforce.

The Greater Philadelphia labor market has seen sizeable changes over the past decade. In the companion paper, *Changing Structure of Employment in Greater Philadelphia: Implications for Educational Attainment and Skills Development Policy*, we have presented findings from our examination of the changes in the industry, occupational, and educational attainment of employed residents of the Greater Philadelphia region over the last decade. It documents the change in the structure of employment opportunity and examines the increasing employment of college graduates, not only in rapidly expanding industries and occupations that utilize college graduates at high rates, but also in industry and occupational labor market segments that are not traditionally intensive employers of those with college diplomas. The analysis also connects trends in the earnings of workers with changes in composition of employment over time.

In this paper, *Net Fiscal Impacts of Raising Educational Attainment in Philadelphia*, we begin with a presentation of some of the costs associated with dropping out of high school in Philadelphia by providing a set of measures of the value of tax contributions of residents by their level of educational attainment and a comparison of these tax contributions with measures of the value of various cash and in-kind benefit transfers that individuals receive by the level of their educational attainment. The balance between the value of taxes paid and the value of publicly-financed benefits received provides a measure of the net fiscal impact of achieving alternative levels of educational attainment.

The second section of this paper discusses newly available data about literacy and numeracy skills and labor market outcomes and the imperfect relation between measures of educational attainment and foundational skills. This section of the paper examines the skill levels of students in the city and the state and follows this with a discussion of what appears to be very wide foundational skill gaps across high schools within the city. The labor market rewards to foundational skills are quite substantial, even after accounting for levels of educational attainment. Schools must organize to not only bolster high school graduation rates, but to also raise the literacy and numeracy proficiencies of these graduates.

Employment, Earnings, and Lifetime Earnings of the Residents of Philadelphia City and Suburbs

The employment and earnings experiences of adults are key determinants of their fiscal contributions to the federal and state government budgets in the form of tax payments. For most individuals, the level of their earnings is a key determinant of the amount of tax payments since taxes are closely related to earnings and incomes. Each of the six types of taxes included in the analysis in this paper is closely related to the level of earnings and incomes. The federal personal income tax is a progressive tax whereby adults with higher personal incomes not only pay higher amounts of federal income taxes, but also pay a higher share of their personal income in federal income taxes. The Pennsylvania state personal income tax is a proportional tax and not a progressive tax which means that the state income tax liability still rises with income levels, but only proportionate to the rise in income.⁴

The social security payroll tax is also a proportional tax of 6.2 percent up to a maximum income threshold that is increased each year based on the rate of inflation. The upper income limit for social security payroll tax over each of the four years that are the focus of analysis in this paper was \$117,000 in 2014, \$118,500 in 2015 and 2016, and

⁴ Tax exemptions for low income individuals make even the proportional state income taxes mildly progressive.

\$127,200 in 2017.⁵ Similarly, the city of Philadelphia's payroll tax is a proportional tax on earnings of persons employed in the city averaging to about 3.9 percent for city workers who live in the city and 3.5 percent for city workers who live outside the city.⁶ The state sales tax is also a proportional tax since the amount of sale tax payments typically increase with income as increased incomes are associated with increases in expenditures on goods and services, many of which are subject to the sales tax. Property tax payments are made by home owners and home ownership is closely associated with income. And, the amount of property tax payment is based on the value of the home which is also closely related to income.

An examination of the employment rates of non-elderly adult residents in Philadelphia city and its suburbs found that the employment rate of residents of both areas increased with educational attainment. Only 40 percent of high school dropouts in Philadelphia city were employed per year over the 2015-2017 period. Completing high school increased the probability of employment among city residents by 16 percentage points. Fifty-six percent of the city's high school graduates were employed per year in 2015-2017. Postsecondary education is associated with even higher rates of employment. Adult residents of the city with some college education below a bachelor's degree had an employment rate of 71 percent, while 84 percent of those with a bachelor's or a higher academic degree were employed on average in 2015-2017.

There were sizable differences in employment rates of high school dropouts and college-educated residents of the city. The employment rate of college-educated city residents with a bachelor's or a higher academic degree was more than twice as high (84% versus 40%), and that of residents with some college or an associate's degree was

⁵ The 6.2 percent tax is paid by the employee and is matched by a 6.2 percent tax payment by the employer. There is no upper income limit on Medicare taxes where the employer and employee each pay 1.45 percent on all earnings.

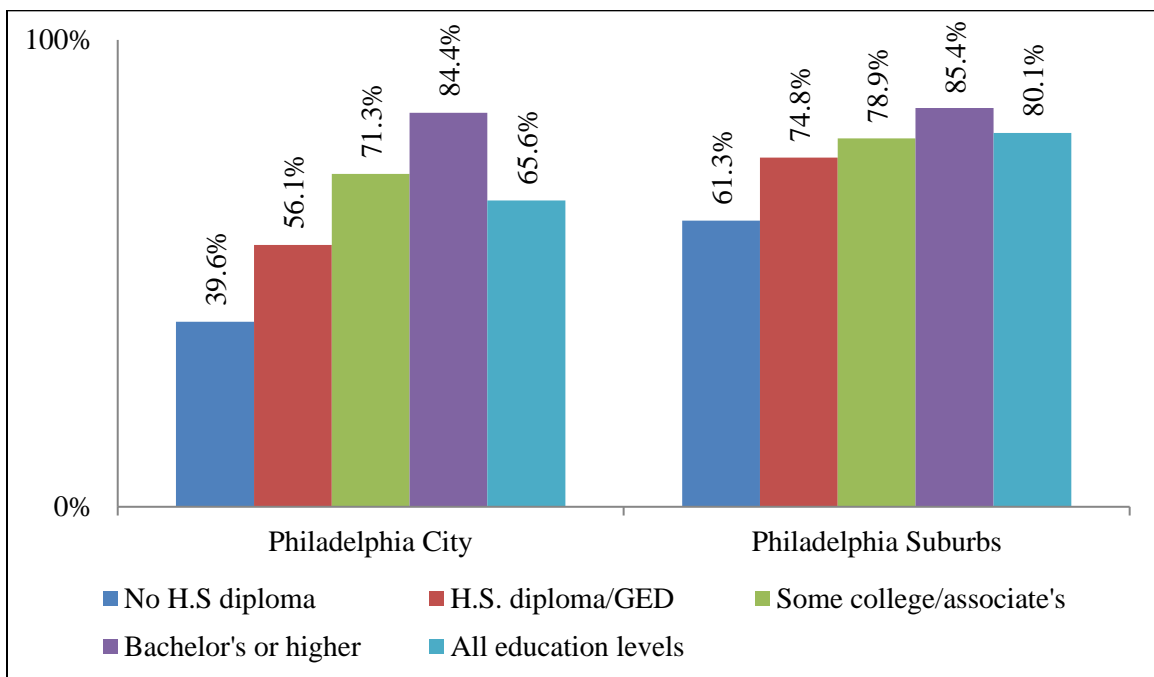
See: OASDI and SSI Program Rates & Limits, Annual Fact Sheets. Available for each year at: https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2014.html (for 2014), https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2015.html (for 2015), https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2016.html (for 2016), & https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2017.html (for 2017).

⁶ See: City of Philadelphia Earnings Tax website: <https://www.phila.gov/services/payments-assistance-taxes/income-taxes/earnings-tax-employees/>

over 30 percentage points higher than that of their counterparts who had failed to complete high school (70% versus 40%).

The employment rate of 16- to 64-year-old residents of Philadelphia suburbs also varied by educational attainment, albeit not as sharply as that of their city counterparts. Over 60 percent of high school dropout residents of Philadelphia suburbs were employed over the 2015-2017 period compared to 75 percent among high school graduates, 79 percent among those with some college education below a bachelor’s degree, and 85 percent among college graduates with a bachelor’s or a higher academic degree.

Chart 1:
Employment to Population Ratios of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs,* by Educational Attainment, 3-Year Averages: 2015-2017



Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

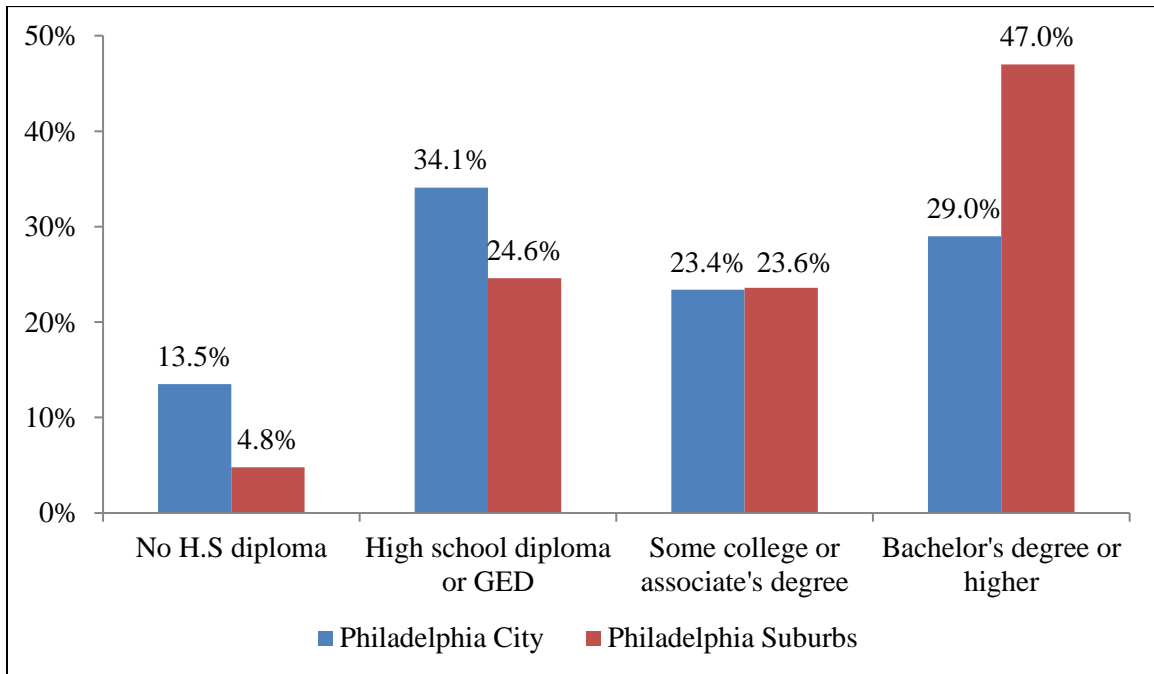
*Philadelphia suburbs include Bucks, Chester, Delaware, and Montgomery counties.

Within the entire Philadelphia Metro area (city and its suburbs), individuals with lower levels of education have lower rates of employment than better-educated individuals. In fact, on every labor market outcome the performance of poorly-educated individuals lags considerably behind that of better-educated individuals. The remainder

of this section of the paper provides clear evidence of the sizeable gaps between the labor market outcomes of poorly-educated individuals and their better-educated counterparts. Consequently, the overall labor market performance of the population of an area is closely linked to the educational attainment of its workforce. Areas with a better-educated workforce are expected to have better overall labor market outcomes than those with a poorly-educated workforce.

A comparison of the educational attainment of adult residents of Philadelphia city and the Philadelphia suburbs reveals very sharp differences. City residents were much more likely than their suburban counterparts to drop out of high school and much less likely to have graduated college with a bachelor’s or a higher academic degree. Data presented in Chart 2 reveals that the share of high school dropouts among 18- to 64-year-old residents in Philadelphia city was nearly 3 times as high as the share of high school

Chart 2:
Percentage Distribution of the 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs,* by Educational Attainment,
3-Year Averages: 2015-2017



Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Bucks, Chester, Delaware, and Montgomery counties.

dropouts among Philadelphia's suburban residents (14% in the city versus 5% in the suburbs). An equally sizable gap exists at the upper end of the educational distribution. The share of city residents with a bachelor's or a higher academic degree was 18 percentage points lower than their suburban counterparts (47% in the suburbs versus 29% in the city). Different levels of educational attainment of city and suburban residents partly underlies the lower overall employment rate of city residents compared to suburban residents. The 2015-2017 average employment rate (presented in Chart 1) among all education groups in Philadelphia city was only 66 percent; 14 percentage points lower than the 80 percent employment rate among suburban residents.

A comparison of the city and suburban employment rates (Chart 1) reveals that within each education subgroup the rate of employment was higher among suburban residents than their city counterparts. The employment rate gap between city and suburban residents was largest among high school dropouts (40% in the city versus 61% in the suburbs; a difference of 21 percentage points) and the smallest among college graduates with a bachelor's or a higher academic degree (84% in the city versus 85% in the suburbs; a difference of 1 percentage point).

Not only are high school dropouts less likely to be employed than their better-educated counterparts, but when employed they work fewer hours and earn lower wages than better-educated workers. The combined effect of lower rates of employment, lower hourly wage rates, and fewer annual hours of work among high school dropouts result in considerably lower levels of earnings and create sizeable gaps between the annual earnings of high school dropouts and their better-educated counterparts.

The mean annual earnings of all 18- to 64-year-old high school dropouts in Philadelphia city stood at only \$11,700.⁷ Just earning a high school diploma is associated with a two-third increase in earnings. On average, high school graduate residents of the city earned \$19,400 per year. The earnings of Philadelphia city residents increased sharply with additional education after high school completion. Individuals with a postsecondary education are more likely to be employed, are paid a higher hourly wage,

⁷ The mean earnings presented in Table 1 represent the average across individuals including those who were employed and had positive earnings as well as those who were not employed. Individuals who were not employed were assigned zero earnings in the computation of mean annual earnings.

and work a greater number of hours during the year and thus earn much more than those without any postsecondary education. The earnings of college-educated Philadelphians ranged from \$29,000 among those who had completed some college below the bachelor’s degree level to \$60,200 among those with a bachelor’s or a higher academic degree. These earnings levels were, respectively, 2.5 and 5.2 times higher than the mean annual earnings of high school dropouts in the city.

Within each educational group, as well as for all educational groups combined, the mean annual earnings among residents of Philadelphia suburbs were higher than that of their counterparts who lived in the city. The mean annual earnings of all Philadelphia city residents (all education levels) were \$32,500 representing a level that was only a little more than one-half (55%) of the mean annual earnings of their suburban counterparts (\$58,700). Even among high school dropouts, the mean annual earnings of suburban residents (\$21,700) was 86 percent higher than the mean annual earnings of their city counterparts (\$11,700). Many factors underlie these differences including the incidence of employment, intensity of employment, access to better quality jobs, and wage rates. Higher earnings in the suburban areas compared to those in the city means that the tax payments within each educational group of suburban residents, including high school dropouts, will be higher than the tax payments of city residents.

Table 1:
Mean Annual Earnings of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs,* by Educational Attainment,
3-Year Averages: 2015-2017 (in 2017 dollars)

Educational Attainment	Ratio Relative to		Ratio Relative to	
	Philadelphia City	High School Dropouts	Philadelphia Suburbs	High School Dropouts
No H.S diploma	\$11,669	1.000	\$21,663	1.000
High school diploma or GED	\$19,442	1.666	\$31,982	1.476
Some college or associate's degree	\$29,050	2.490	\$42,410	1.958
Bachelor's degree or higher	\$60,190	5.158	\$84,672	3.909
All education levels	\$32,446	2.781	\$58,726	2.711

Note: Individuals with no earnings were assigned 0 earnings in the computation of mean annual earnings.
Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Bucks, Chester, Delaware, and Montgomery counties.

A comparison of the mean earnings of residents of Philadelphia city with those of their suburban counterparts found higher earnings in each educational subgroup of suburban residents than city residents. The earnings differentials between educational subgroups of adult residents of the Philadelphia suburban area, although quite large in absolute numbers, were not as large as those of city residents. The mean annual earnings of high school graduates in the suburbs were 1.5 times higher than that of high school dropouts. Suburban residents who had completed some college education below the bachelor's degree level earned about twice as much as high school dropouts per year. The gap between the mean annual earnings of high school dropouts and college graduates with a bachelor's or higher academic degree was even larger. For every \$1 earned by high school dropout residents of Philadelphia's suburbs, their college graduate counterparts (with a bachelor's or a higher academic degree) earned \$3.91.

These sharp differences between the annual earnings of high school dropouts and well-educated adult residents of Philadelphia city and suburbs are expected to result in large differences in their annual tax payments for federal and state personal income taxes, payroll taxes, and sales taxes.

An examination of the lifetime earnings of adult residents of the two areas reveals that these differences persist over their entire working lifetimes. Using three-year averages from the 2015, 2016, and 2017 American Community Survey (ACS) data, we have computed cross-sectional estimates of lifetime earnings for each educational subgroup of adult residents of the city and suburbs as the sum of the mean annual earnings in single age groups within each educational subgroup. Findings are presented in Table 2. Lifetime earnings differentials across educational groups represented by these cross-sectional estimates are conservative since they do not account for declines in the earnings of poorly educated individuals that have characterized the nation's earnings trends over the past 25 to 30 years and that are likely to continue into the future.

Table 2:
Mean Lifetime Earnings of 18- to 64-Year-Residents (Excluding 18- to 24-Year-Old
Students) of Philadelphia City and Suburbs,* by Educational Attainment,
3-Year Averages: 2015-2017 (in 2017 dollars)

Educational Attainment	Ratio Relative to		Ratio Relative to	
	Philadelphia City	High School Dropouts	Philadelphia Suburbs	High School Dropouts
No H.S diploma	\$531,974	1.000	\$997,952	1.000
High school diploma or GED	\$904,612	1.700	\$1,443,200	1.446
Some college or associate's degree	\$1,321,089	2.483	\$1,868,462	1.872
Bachelor's degree or higher	\$2,809,811	5.282	\$3,578,882	3.586
All education levels	\$1,449,583	2.725	\$2,544,256	2.549

Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Bucks, Chester, Delaware, and Montgomery counties.

Over their entire working lifetime, a high school dropout in Philadelphia is expected to earn a little over one-half million dollars (\$532,000). The lifetime earnings of high school graduates were somewhat higher, \$904,600 or 70 percent higher than that of high school dropouts. Similar to the college annual earnings premium, the lifetime earnings premium associated with a college education was sizable. Philadelphians who complete some college education below a bachelor’s degree can expect to earn \$1.321 million, representing nearly 2.5 times higher lifetime earnings compared to high school dropouts. City residents with a bachelor’s or a higher college degree are expected to earn \$2.810 over their working lifetimes; representing a lifetime earnings amount that was 5.3 times as much as their high school dropout counterparts.

Differences between the lifetime earnings of the four educational groups were also large for Philadelphia’s suburban residents. However, the size of the relative gaps between better-educated suburban residents and high school dropouts were smaller than those of their counterparts in the city. The mean lifetime earnings of suburban high school dropout residents of \$998,000 was \$445,200 lower than that of high school graduates; \$870,500 lower than the lifetime earnings of those with some college education below a bachelor’s degree; and \$2.581 million lower than the lifetime earnings of those with a bachelor’s degree or a higher level of education. Over their working lifetimes, suburban residents with a high school diploma or a GED are expected to earn

over 1.45 times as much as high school dropouts, and those with a bachelor's or a higher college degree are expected to earn 3.6 times as much as high school dropouts.

Home Ownership Rate and the Value of Owner-Occupied Homes in Philadelphia City and Suburbs

The property tax is the largest single source of revenue for most local governments. Many of the services provided by local governments, particularly elementary and secondary education, are largely financed by local real estate or property taxes. In Pennsylvania as well as other states, property tax revenues are a large component of the financing of the K-12 education system. During the 2016-17 fiscal year in Pennsylvania, real estate property taxes accounted for 81 percent of local tax revenues devoted to school districts statewide, and total local revenues (including property taxes and other revenue sources) accounted for 57 percent of the total revenue devoted to statewide school district finance.⁸ Given their importance to state and local finance we have included property tax revenue impacts as one of the revenue components in our estimates of the fiscal impacts of adults with different levels of education.

The amount of property taxes paid by individuals depends on their home ownership rates and the market value of their homes. Home ownership is closely associated with the level of income of the householder which in turn is determined largely by the employment and earnings of the householder. As noted above, the employment rate and earnings of individuals in Philadelphia city and suburbs rose sharply with educational attainment. Therefore, we expect home ownership rates and mean values of owned homes to also be closely related to the educational attainment of the householder.

Our examination of home ownership rates in Philadelphia city found that similar to most cities, the home ownership rate in the city of Philadelphia was quite low. However, the rate of home ownership in the city did increase with educational

⁸ Source: (i) Pennsylvania Department of Education, Revenue Data for: School Districts, CTE Centers, and Charter Schools, Summary Level AFR Data, 2016-2017 (<https://www.education.pa.gov/Teachers%20-%20Administrators/School%20Finances/Finances/AFR%20Data%20Summary/Pages/AFR-Data-Summary-Level.aspx#.VZvrX2XD-Uk>).

attainment. A little less than 47 percent of all 18- to 64-year-old householders in Philadelphia city owned their homes. The rate of home ownership was just 39 percent among high school dropouts and 43 percent among high school graduates. Home ownership rates of college-educated householders in the city ranged between a little over half (52%) among those with below-bachelor's degree college education to about half among householders with a bachelor's or a higher academic degree.

Table 3:
Home Ownership Rates and the Mean Value of Owner-Occupied Homes (in 2017 dollars) of 18- to 64-Year-Old Householders (Excluding 18- to 24-Year-Old Students) in Philadelphia City and Suburbs,* by Educational Attainment,
3-Year Averages: 2015-2017

Educational Attainment	<u>Philadelphia City</u>		<u>Philadelphia Suburbs</u>	
	Home Ownership Rate	Mean Value of Owner-Occupied Home (in 2017\$)	Home Ownership Rate	Mean Value of Owner-Occupied Home (in 2017\$)
No H.S diploma	39.5%	\$137,355	44.6%	\$245,348
High school diploma or GED	43.1%	\$149,220	62.3%	\$264,234
Some college or associate's degree	52.6%	\$163,578	68.4%	\$306,121
Bachelor's degree or higher	49.2%	\$315,211	79.9%	\$429,266
All education levels	46.9%	\$209,948	72.3%	\$368,393

Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Bucks, Chester, Delaware, and Montgomery counties.

The suburban Philadelphia area had a much higher rate of home ownership than the city. Over 72 percent of 18- to 64-year-old householders residing in Philadelphia's suburbs owned their homes. A comparison of home ownership by educational attainment of suburban householders reveals sizable gaps. Home ownership gaps between poorly-educated and better-educated householders were significantly larger in Philadelphia suburbs than in the city. A little less than 45 percent of householders in Philadelphia suburbs who were high school dropouts owned their homes; a rate of home ownership that was nearly 17 percentage points lower than that of high school graduate householders (62%). The home ownership rate of suburban householders with some

college education below a bachelor's degree was 68 percent while nearly 80 percent of their peers with a bachelor's or a higher college degree owned their homes.

Property tax revenues of local governments are mostly determined by the value of the property that is owned by residents of the locality. Our analysis of the 2015, 2016, and 2017 ACS data files found that the value of owned homes varied widely by the educational attainment of the householder. The mean value of an owner-occupied home in Philadelphia city was \$209,900 (measured in 2017 dollars). The mean value of owner-occupied homes in the city increased steadily with educational attainment of the householder. Homes owned by high school graduates had a nearly 9 percent higher market value (\$149,200) compared to those owned by high school dropouts while the mean value of homes owned by householders with a below-bachelor's degree college education (\$163,600) was nearly one-fifth higher than the mean value of homes owned by high school dropouts. Householders with a bachelor's degree or higher owned homes with a mean market value of \$315,200 or 129 percent higher than the mean value of homes owned by Philadelphia city householders who had failed to complete high school.

The mean market value of owner-occupied homes in Philadelphia's suburbs was \$368,400. Householders who had failed to complete high school owned homes with a mean value of \$245,300. Similar to the trend in the city, the value of owner-occupied homes in the suburban area also increased with the education of the householder. Compared to the \$245,300 mean value of owner-occupied homes of high school dropouts, homes owned by high school graduates, below-bachelor's degree college-educated householders, and householders with bachelor's or a higher college degree had mean values that were higher by 8 percent, 25 percent, and 75 percent, respectively.

Data Sources and Methodology Underlying the Fiscal Impact Estimates in Philadelphia City and Suburbs

Data Sources

Analyses of the fiscal consequences of dropping out of high school presented in this report are based on a wide array of national and state data sources that are listed in Table 4. Estimates of the net fiscal contributions of non-elderly adult residents (18- to 64-

years-old) in Philadelphia city and its suburbs in selected educational subgroups are based on a number of different data sources and several series of data calculations by the U.S. Census Bureau and the Center for Labor Markets and Policy at Drexel University.

First, the primary source for most of the annual taxes, cash, and in-kind transfer data is the Annual Social and Economic Supplement to the March Current Population Survey (CPS).⁹ We have used the U.S. Census Bureau's March CPS Supplement surveys data for March 2015, March 2016, March 2017, and March 2018. The March CPS surveys for these four years contain data for 1,400 persons aged 18-64 in Philadelphia city and 2,300 persons in Philadelphia suburbs.¹⁰ The monthly CPS household survey is conducted by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics and is the source of monthly data on the nation's labor force, employed, and unemployed populations.

The March CPS survey contains a supplementary set of questions designed to gather information from respondents on their sources of income during the previous calendar year, and their receipt of various forms of cash and in-kind public assistance such as food stamps, energy assistance, and Medicaid from local, state, and national government agencies. With the available income and employment information and marital status of respondents, the U.S. Census Bureau imputes estimates of the amount of Social Security payroll taxes, federal retirement contributions, and state and federal income taxes paid by individuals during a given calendar year. These imputed tax and cash/in-kind transfer data for calendar years 2014, 2015, 2016, and 2017 are used to estimate the net fiscal contributions of 18- to 64-year-old adults in Philadelphia city and suburbs by the level of their educational attainment.

Second, many of the employment and earnings measures as well as a number of the housing, income, home values, property tax, and institutionalization measures are based on the American Community Surveys for 2015, 2016, and 2017. The American Community Survey (ACS) is an annual national survey conducted year-round by the U.S.

⁹ For more details on the design of the March CPS supplement and the definitions for each of the variables for which data are collected. See: www.census.gov/CPS.

¹⁰ For a review of the labor force concepts and measures underlying the monthly CPS household surveys, See: U.S. Bureau of Labor Statistics, *Employment and Earnings*, January 2017, <https://www.bls.gov/opub/ee/>

Census Bureau. Nearly 3 million households are randomly surveyed throughout the year. The ACS collects detailed information on demographic and socioeconomic characteristics of household members, including their citizenship status, place of birth, place of work, their educational attainment levels and enrollment status, college major, labor force status, industry and occupation of jobs, their mean annual earnings, commuting behavior, receipt of various government cash and in-kind transfers, health insurance status, home ownership status, property tax payment, etc. ACS data files for three years (2015, 2016, and 2017) contain data for over 18,500 (18- to 64-year-old) residents of Philadelphia city and nearly 39,500 suburban Philadelphia residents of the same age.

Table 4:
Sources and Uses of the Databases Utilized in This Research Report

Data Source	Use of Data
American Community Surveys 2015, 2016, and 2017	Used to estimate a variety of employment, earnings, income, housing, institutionalization, and educational attainment measures for PA and U.S. adults.
March 2015, March 2016, March 2017, and March 2018 Supplements to the Current Population Surveys (CPS)	Primarily used to estimate the net fiscal contributions of adult residents by their level of educational attainment.
Urban Institute and Kaiser Foundation Commission on Medicaid and the Uninsured	Used to estimate the cost of Medicaid services and health insurance.
U.S. Department of Treasury, Internal Revenue Service, “State and Local General Sales Taxes,” Publication 600, 2015, 2016, 2017.	Used to estimate personal sales tax
U.S. Department of Justice: James J. Stephan, “State Prison Expenditures”, Bureau of Justice Statistics, Special Report, U.S. Department of Justice, June 2004. https://www.bjs.gov/content/pub/pdf/spe01.pdf	Used the annual report for information on the annual cost to house inmates.
The City of Philadelphia Department of Revenue	Used the Philadelphia wage tax rates for resident Philadelphians and non-residents who worked in Philadelphia city to estimate dollar amounts of city wage tax payments.

A third data source was administrative data from the Urban Institute and Kaiser Foundation Commission on Medicaid and the Uninsured. This data source provided estimates of the annual cost to the Medicaid system in Pennsylvania of providing health services to the Medicaid population. We have used these data to generate estimates of the fiscal costs of providing health insurance to Medicaid recipients by educational attainment in Philadelphia city and its suburbs.

A fourth set is the data that we used to estimate sales tax payments which was provided by the U.S. Department of Treasury, Internal Revenue Service for 2015, 2016, and 2017. We used 2015, 2016, and 2017 ACS survey personal income data and IRS sales tax exemption data to estimate average sales tax payments by adults.

A fifth source of data that were used in conducting this study was an administrative data base provided by the U.S. Department of Justice. This database provided information on the annual costs of housing an inmate in a Pennsylvania prison. These cost data were used to estimate the higher lifetime institutionalization costs associated with adult dropouts in the state of Pennsylvania in comparison to those of their better educated counterparts.

A final source of data was used to estimate Philadelphia city wage tax payments made by employed city residents and by Philadelphia suburban residents who worked in Philadelphia city. The city of Philadelphia taxes all types of earned income, wage and salaries, commissions and other forms of compensation paid to workers.¹¹ There are two city wage tax rates. The first is the rate that is applied to the earnings of Philadelphia city residents and the other is for non-residents of Philadelphia city who commute to the city for work. We obtained the city wage tax rates from the website (<http://www.phila.gov/Revenue>) of the Revenue Department of the City of Philadelphia. Philadelphia city residents are taxed at a higher rate on their earned incomes than their non-resident counterparts. For example, in 2017, city wage tax on earned income for Philadelphia residents was 3.891 percent compared to 3.465 percent for non-resident workers.

¹¹ The city wage tax is not levied on unearned income.

Methodology

From self-reported information on annual earnings and incomes, sources of those incomes, the marital status of respondents, and the type of household in which the respondent lived (married couple family, single parent family, single individual) in the March CPS supplement surveys, the U.S. Census Bureau calculates estimates of their Social Security payroll taxes, federal government retirement contributions, and their state and federal income tax liability.¹² In the case of federal and state income tax payments, the U.S. Census Bureau uses the following methodology to estimate federal and state tax payments for married couple families. On the assumption that married couple families file a joint tax return, the estimate of the federal and state income tax payments are assigned to the householder in a married couple family. The spouse in a married couple family is assigned no federal and state income taxes. Using a methodology that we have developed (described in Appendix A) we have made separate estimates of the federal and state income tax liability for the householder and the spouse in married couple families. For individuals who are not married, the U.S. Census Bureau imputes estimates of their federal and state income tax payments and assigns these payments to their personal record on the March CPS data files.

Social security payroll taxes and federal government retirement contributions were estimated by the U.S. Census Bureau for each individual based on their annual earnings and the sources of their annual earnings. Only the employees' contribution to the social security payroll tax is included in this estimate. However, employers also pay an equivalent amount of social security payroll taxes to the federal government. The employers' contribution goes to the U.S. treasury in the form of tax revenue. This social security payroll tax payment by the employer would not have been made without the employment and earnings of the employee. Therefore the employer portion as well as the employee portion of the social security payroll tax payment should be attributed to workers as part of their fiscal contribution.

Using the 2015 to 2018 March CPS survey data and the 2015, 2016, and 2017 ACS data, we have estimated the annual tax payments for each individual between the

¹² For married couples, an assumption is made by the U.S. Census Bureau that the couple files a joint tax return in determining its federal income tax liability.

ages of 18 and 64 (excluding 18- to 24-year-olds who were enrolled in school at the time of the surveys) in each of the tax categories listed in Table 5. The sum of these taxes represents the combined annual tax payments that were estimated for individuals in each of the four educational groups.

The U.S. Census Bureau does not provide any estimates of annual state sales tax payments by persons interviewed for the March CPS survey. In our fiscal impact analyses, we have estimated sales tax payments for individuals by using a combination of personal income data from the 2015, 2016, and 2017 ACS surveys and sales tax tables for Pennsylvania published annually by the U.S. Department of Treasury’s Internal Revenue Service (IRS).¹³ Federal taxpayers are allowed to claim state and local sales taxes paid when filing their federal income tax returns. Tax filers use published data from IRS tables to estimate their sales tax deductions based on their taxable income and the number of exemptions. Sales tax rates vary by state.¹⁴ Allowable deductions for state sales taxes are based on the number of exemptions. In our analysis of state sales taxes, we applied a single person exemption to each individual respondent between 18- and 64-years-old with a positive income. For each person in our analysis, we assigned a state sales tax payment equal to the IRS sales tax deduction for a person with their average income over the 2015-2017 period.

Table 5:
Income, Payroll, Sales, and Property Tax Payments to the Federal, State and Local Governments Used in the Computation of Net Fiscal Impacts

Federal Government	State and Local Governments
Federal income tax payments Federal retirement payroll deductions Social Security retirement payroll taxes	State income tax liability Property tax liability State Sales tax payments Philadelphia city wage tax payments

The U.S. Census Bureau also does not provide estimates of the annual property taxes paid by households that own their homes. These data are not collected as part of the

¹³ U.S. Department of Treasury, Internal Revenue Service, “State and Local General Sales Taxes,” Publication 600, 2017, www.irs.gov. State and Local General Sales Taxes,” Publication 600, 2017

¹⁴ Alaska, Delaware, New Hampshire, Montana, and Oregon did not have a state sales tax in 2015-2017.

March CPS supplement on earnings and incomes. We have utilized findings from the 2015-2017 American Community Surveys (ACS) on home ownership rates of households, the market value of the owner-occupied home, and annual property tax payments.¹⁵ The property tax payments are assigned to the householder in each household that owned the housing unit they occupied at the time of the 2015-2017 ACS survey.

Using the Philadelphia city wage tax rates, we computed the per capita annual city wage tax payments among residents of Philadelphia city and its suburbs. We applied tax rates for Philadelphia resident workers and non-resident workers in Philadelphia city on their earnings reported in 2015-2017 American Community Surveys. We then divided this gross tax revenue by the number of 18- to 64-year-old residents of Philadelphia city to obtain estimates of the per capita city wage tax payment. We repeated this calculation for each of the four educational subgroups in our analysis. We also repeated these sets of calculations to estimate per capita wage tax paid by residents of Philadelphia suburbs who worked in city of Philadelphia.

The U.S. Census Bureau also has used the March CPS supplement to collect data from respondents on their receipt of a wide array of cash income transfer payments from local, state, and federal governments, including unemployment insurance payments, Temporary Assistance to Needy Families (TANF) benefits, Supplemental Security Income (SSI) payments for the aged and the disabled, Social Security Disability payments, general relief, veteran's payments, and the federal earned income tax credit (EITC).¹⁶ The combined annual amounts from each of these cash income transfer programs (listed in Table 6) were calculated for each respondent. In addition to the cash transfer payments, the March CPS questionnaire collected information on respondents'

¹⁵ Appendix B provides a description of the methodology used in estimating property tax payments by households.

¹⁶ The federal Earned Income Tax Credit (EITC) is primarily a cash tax credit refunded to low earner households by the Internal Revenue Service. The federal EITC is treated as a cash transfer rather than a negative tax by the U.S. Census Bureau in its calculations of the taxes paid and transfers received by individuals. For a review of the design and operations of the federal EITC program, See: Saul Hoffman and Laurence S. Seidman, Helping Working Families: The Earned Income Tax Credit, W.E. Upjohn Institute for Employment Research, Kalamazoo, 2003.

receipt of a wide array of in-kind transfers from state and federal governments, including food stamps, Medicaid health insurance benefits, and energy assistance.

The U.S. Census Bureau has imputed cash values for each of these in-kind benefits, except Medicaid.¹⁷ They are primarily assigned to the household unit rather than to individual household members. We have used per capita measure of these cash transfer values by dividing values of these transfers by numbers of persons in households.¹⁸ We then summed the cash values of each of these in-kind benefits and added them to the estimated value of cash income transfers for each household member. Finally, we estimated jail/prison costs for adults in Pennsylvania¹⁹ in the four educational groups using ACS and U.S. Justice Department’s statistics on jail/prison costs by state.

Table 6:
Cash and Non-Cash Transfers Received by Individuals or Households
That are Used in the Computation of the Net Fiscal Impacts

Cash Transfers	Non-Cash Transfers (In-Kind Benefits)
Unemployment benefits	Market value of food stamps
Worker's compensation	Value of Medicaid insurance
Social Security payment	Energy assistance payments
Supplemental Security Income for the disabled and aged	
Public assistance income (TANF, general relief)	
Veteran's payments	
Survivor's income benefits	
Other disability income	
Federal Earned Income Tax Credit	

¹⁷ Appendix E provides a detailed description of the methodology used to estimate costs of Medicaid.

¹⁸ Children under 18 years of age are excluded from the count of numbers of persons in households.

¹⁹ As noted earlier our methodology of computing incarceration costs involves the use of the ACS data to compute the rate of institutionalization among residents of the area. The ACS count of the residents of an area includes the residents of all group quarters located in the area. This means that if a jail or prison is located in an area, the areas will have a higher institutionalization rate. This methodology would produce accurate rates of institutionalization for an entire state. However, the institutionalization rate at the sub state areas would be highly sensitive to the location of jails and prisons in the area resulting in an upward bias in the institutionalization rate for the area if a prison or jail is located in the area. An upward bias in the institutionalization rate would produce an upwards bias in the cost of institutionalization per adult resident in the area. Therefore in this paper, we have used the institutionalization costs per adult resident in the entire state of Pennsylvania to represent the incarceration costs per adult resident in Philadelphia city and suburbs.

The final fiscal ledger for estimating fiscal costs is presented in Table 7. Details about the specific series of computations that were undertaken to produce estimates of federal and state income tax payments, property tax payments, sales tax payments, cost of Medicaid, estimates of jail and prison costs, and the lifetime net fiscal contributions of adults in the four educational subgroups are presented in Appendix A through G.

Table 7:
A Listing of the Tax Payments, Cash Transfers, Non-Cash Transfers,
and Jail/Prison Cost Items Used in the Computation of the Net Fiscal Impact

(A) Total Tax Payments

- + Mean Federal Income Tax Payments
 - + Mean State Income Tax Payments
 - + Mean Federal Government Retirement Contribution
 - + Mean Social Security Payroll (Include Employer Contribution)
 - + Mean Expected Property Tax Payment
 - + Mean Sales Taxes
 - + Mean Philadelphia City Wage Tax Payment
-

(B) Total Transfers/Jail or Prison Cost

- + Mean Non-Cash Transfers
 - + Mean Cash Transfers
 - + Mean Jail/Prison Cost (for 18-60)
-

Net Fiscal Impact: Taxes Paid -Transfer/Jail or Prison Cost (A-B)

Net Fiscal Impact Ratio: Ratio of Taxes Paid to Transfer/Jail or Prison Cost (A/B)

Incidence of Tax Payments among Residents of Philadelphia City and Suburbs by Educational Attainment

In this section we present the proportion of Philadelphia city and suburban residents in each educational category that paid federal and state income taxes, social security payroll tax, and property tax.²⁰ Findings presented in Charts 3 and 4 and Table 8

²⁰ Although our computation of fiscal impacts of achieving alternative levels of educational attainment includes seven types of taxes listed in Table 7, in this section we have analyzed the incidence of tax payment for only four types of taxes. Data on the actual tax payments by persons and the incidence of tax payment are not available for the sales tax and Philadelphia wage tax. We have estimated state sales tax payments for individual adults in Philadelphia city and suburbs by using a combination of personal income data from the 2015, 2016, and 2017 ACS survey and sales tax tables for Pennsylvania published annually by the U.S. Department of Treasury’s Internal Revenue Service (IRS). Our computation of the amount Philadelphia city wage tax payments is based upon city wage tax rates for resident and non-resident workers and aggregate earnings reported for resident and non-resident workers from the 2015, 2016 and

clearly demonstrate that the proportion of Philadelphians that paid each of these taxes increased sharply with educational attainment. The level of earnings and incomes of individuals determine the likelihood that they would pay taxes. Analysis presented in a previous section clearly demonstrates that earnings rose steadily and sharply with increases in educational attainment. Consequently, the proportion of individuals that contribute to the public coffers through taxes should also increase with increases in educational attainment.

Payment of the federal personal income tax was made by 59 percent of 18- to 64-year-old residents of Philadelphia city per year during the 2014-2017 period. The share of city residents who were federal income taxpayers varied widely by educational attainment. Just a little over one-quarter (27%) of high school dropouts in the city had paid any federal personal income tax per year over the 2014-2017 period compared to 48 percent of high school graduates and 59 percent of those who completed some college below the bachelor's degree level. The higher rate of employment among college graduates with a bachelor's or a higher academic degree yielded a higher share of federal taxpayers among this group of Philadelphians. Eighty-five percent of Philadelphia city residents with a bachelor's or a higher college degree had contributed to the U.S. treasury by paying the annual federal income tax per year over the 2014-2017 period.

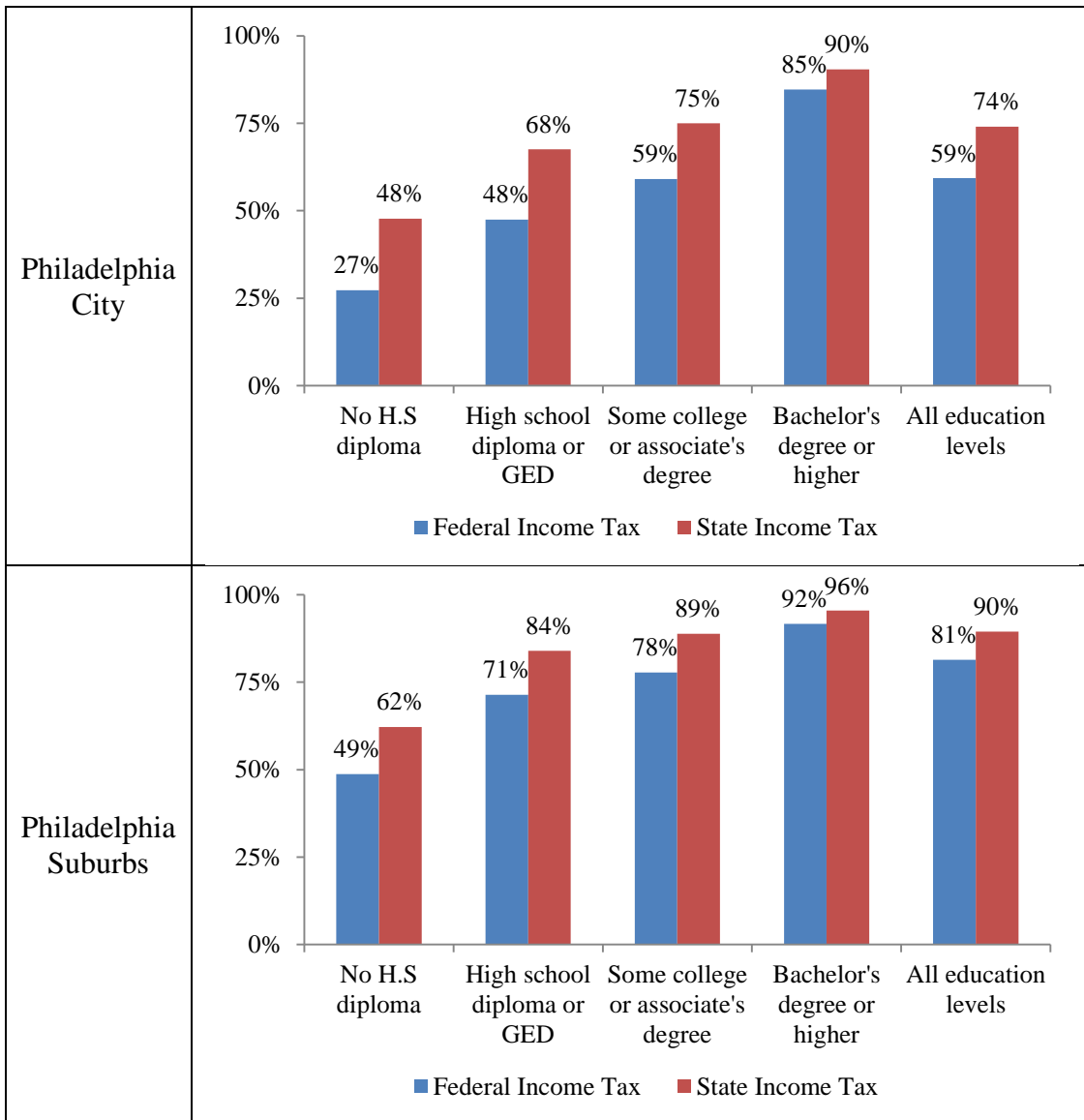
Residents with a high school diploma or a higher level of education were considerably more likely to pay the federal income tax compared to high school dropouts. Relative to high school dropouts, the likelihood of paying the federal income tax was 21 percentage points higher among high school graduates, 32 percentage points higher among those with some college education below a bachelor's degree, and 58 percentage points higher among college graduates with a bachelor's or a higher academic degree.

The proportion of adult residents of Philadelphia city who paid state personal income taxes also increased steadily by educational attainment. About three-quarters of

2017 American Community surveys. Another tax category, Federal Government Retirement Contribution is included in our fiscal computations but not included in the discussion in this section. Only 0.2 percent of workers in the city and suburbs actually made these contributions, and the per capita contributions were \$2 in Philadelphia city and \$22 in the suburbs. Because the very low incidence of payment of this tax, we have not included a separate discussion in this paper on the incidence of payment or the amount of payment of federal retirement contributions and the variation of these payments by educational attainment.

adult residents of Philadelphia city had paid state personal income tax during the calendar year over the 2014-2017 period. Among high school dropouts, 48 percent had paid any

Chart 3:
Percent of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs* Who Paid Any Federal or State Income Taxes, by Educational Attainment, 4-Year Averages: 2014-2017



Source: March Supplement to the Current Population Survey, 2015, 2016, 2017, and 2018, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Philadelphia Metropolitan Area (within the boundaries of Pennsylvania) excluding Philadelphia city.

state income tax annually over the same 4-year period; 20 percentage points lower than the share of high school graduates who had made annual state income tax payments over

the same period. The incidence of state income tax payments increased steadily as educational attainment increased. Philadelphians with some college education below the bachelor's degree level had a slightly higher incidence of state income tax payment (59%); higher than high school dropouts and high school graduates, but lower than those with a bachelor's or a higher college degree. Among college graduate Philadelphians with a bachelor's degree or a higher level of education, 90 percent had paid state income taxes per year over the 2014-2017 period.

Adult residents of the Philadelphia suburban area were more likely than their counterparts in the city to pay federal and state income taxes. In each educational subgroup of the suburban population, a higher proportion of suburban residents paid taxes compared to their city counterparts. The incidence of federal income tax payment among suburban residents ranged from 49 percent among high school dropouts, to 71 percent among high school graduates, and 92 percent among college graduates with a bachelor's or a higher academic degree. State income tax payments in Philadelphia's suburbs were made by 62 percent of high school dropouts, 84 percent of high school graduates, and 96 percent of college graduates with a bachelor's or a higher college degree.

The social security payroll tax is a proportional tax on earnings up to a maximum threshold or the social security wage base that is increased each year based on the rate of inflation.²¹ Although there is an upper income limit on taxable earnings (\$117,000 in 2014, \$118,500 in 2015 and 2016, and \$127,200 in 2017), the social security payroll tax liability begins with the very first dollar of earnings on jobs that are subject to the FICA (Federal Insurance Contributions Act) tax.

The incidence of social security payroll tax payments varied widely by educational attainment among adult residents of Philadelphia city. Nearly 71 percent of

²¹ The 6.2 percent tax is paid by employee and is matched by a 6.2 percent tax payment by the employer. There is no upper income limit on Medicare taxes where the employer and employee each pay 1.45 percent on all earnings. See: OASDI and SSI Program Rates & Limits, Annual Fact Sheets. Available for each year at: https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2014.html (for 2014), https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2015.html (for 2015), https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2016.html (for 2016), & https://www.ssa.gov/policy/docs/quickfacts/prog_highlights/RatesLimits2017.html (for 2017).

all 18- to 64-year-old adult residents of the city made social security payroll tax payments (Table 8). The percent of Philadelphians paying this tax ranged from only 47 percent of high school dropouts, 65 percent of high school graduates, and 69 percent of those with some college education below the bachelor’s degree level, to nearly 87 percent among college graduates with a bachelor’s or a higher academic degree.

Table 8:
Percent of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs* Who Paid Any Social Security Payroll Tax, by Educational Attainment, 4-Year Averages: 2014-2017

Educational Attainment	Philadelphia City	Philadelphia Suburbs
No H.S diploma	47.4%	60.1%
High school diploma or GED	65.0%	78.1%
Some college or associate's degree	69.1%	84.0%
Bachelor's degree or higher	86.8%	88.9%
All education levels	70.6%	83.7%

Source: March Supplement to the Current Population Survey, 2015, 2016, 2017, and 2018, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Philadelphia Metropolitan Area (within the boundaries of Pennsylvania) excluding Philadelphia city.

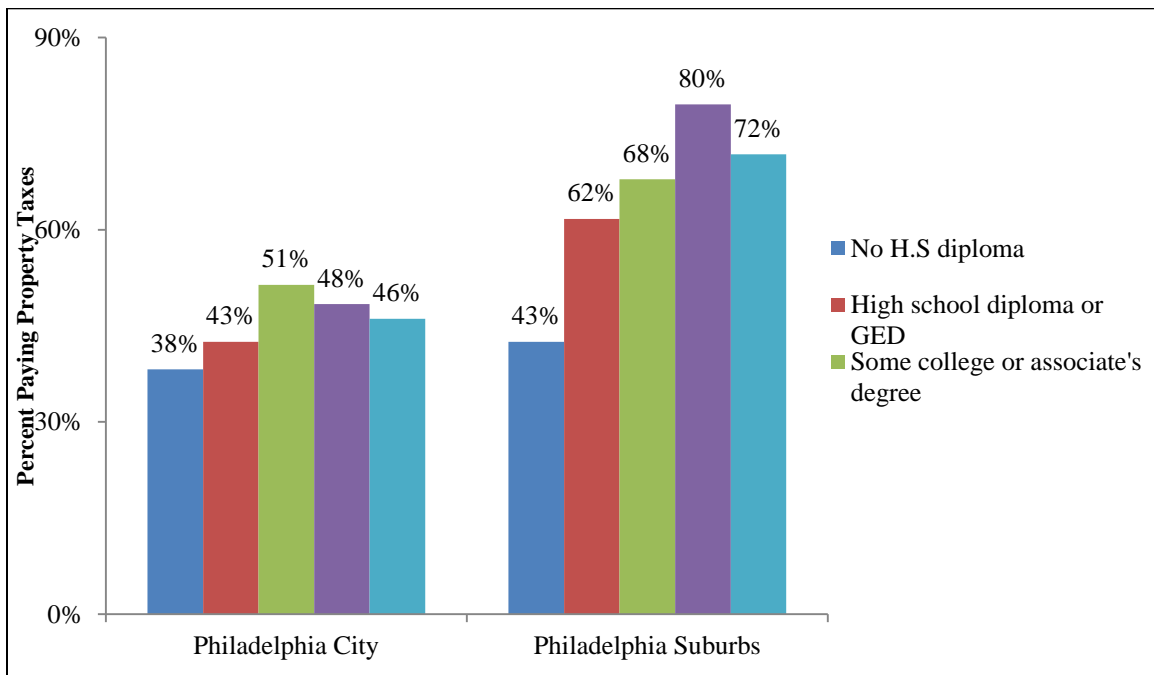
Among residents of suburban Philadelphia, 84 percent had paid social security payroll tax per year over the 2014-2017 time period. Six out of ten high school dropout residents of suburban Philadelphia had paid the social security payroll tax compared to over three-quarters (78%) of high school graduates and nearly 89 percent of the area’s adult college-educated residents with a bachelor’s or a higher academic degree. Within each educational group, residents of Philadelphia suburbs were more likely to pay the social security payroll tax than their counterparts who lived in Philadelphia city. The gap ranged from 13 to 15 percentage points among high school dropouts, high school graduates, and those with below-bachelor’s degree college education to just 2 percentage points among college graduates with a bachelor’s or a higher academic degree.

The incidence of property tax payments is directly associated with property ownership. As noted in an earlier section of this paper, the higher earnings and incomes of better-educated adults means that they are more likely to own their homes and

therefore more likely to pay property tax. Therefore, it is not surprising that our analysis found rising incidence of property tax payments among householders by their level of educational attainment. However, these differences were much larger among householders residing in Philadelphia’s suburbs than those living in the city.

In Philadelphia city, 38 percent of high school dropout householders made property tax payments per year over the 2015-2017 period; representing an incidence of property tax payment; that was 5 percentage points lower than householders who had graduated from high school (43%), 13 percentage points lower than householders who had completed some college education below the bachelor’s degree level (51%) and 10 percentage points lower than householders with a bachelor’s degree or a post-graduate degree (48%). The incidence of property tax is directly related to the rate of home ownership. The slightly higher incidence of property taxes among the city’s below-

Chart 4:
Percent of 18- to 64-Year-Old Householders (Excluding 18-24-Year-Old Students) in Philadelphia City and Suburbs* Who Paid Any Property Tax on Owned Homes, by Educational Attainment, 3-Year Averages: 2015-2017



Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Bucks, Chester, Delaware, and Montgomery counties.

bachelor's degree college-educated householders compared to those with a bachelor's or a higher college degree reflects the slightly higher home ownership rate of the former group compared to the latter (presented in a previous section of this paper).

The incidence of property tax payment among householders residing in suburban Philadelphia varied from 43 percent among high school dropouts, to 62 percent among high school graduates, 68 percent among those with some college education below the bachelor's degree level, and 80 percent among college graduates with a bachelor's or a higher academic degree. Compared to a high school dropout in Philadelphia's suburbs, the share of property tax payers was 19 percentage points higher among high school graduates and 37 percentage points higher among college graduates with a bachelor's or a post-graduate degree.

Annual Tax Payments of the Residents of Philadelphia City and Suburbs by Educational Attainment

Not only were better-educated residents of Philadelphia city and its suburbs more likely to pay federal, state, and local taxes but they also paid much higher amounts of these taxes during any given year. We have estimated the mean amount of annual federal and state income taxes, Philadelphia city wage taxes, social security payroll tax, federal government retirement tax contribution, property tax, and sales tax payments by adult residents of Philadelphia city and its suburbs. The methodologies underlying the computations of these estimates are described in detail in Appendices A, B, C, and G. Findings presented in Table 9 highlight the sharp differences in the amount of these taxes that were paid by Philadelphians with different levels of educational attainment.

During the 2014-2017 period, the mean annual federal income tax paid by city residents was only \$648 among high school dropouts compared to \$2,500 among high school graduates, \$3,100 among those with some college education below the bachelor's degree level, and \$10,500 among those with a bachelor's or a higher college degree. High school graduates in Philadelphia made federal income tax payments that were on average 3.9 times higher than those paid by high school dropouts. The much higher annual earnings of those Philadelphians who had a bachelor's or a higher college degree meant

that the mean federal income tax payment of these individuals was 16 times higher than that of high school dropouts within the non-elderly adult population of the city.

The progressive structure of the federal income tax is expected to result in disproportionately sharp differences between the amounts of taxes paid at different income levels. The Pennsylvania state income tax has a flat or proportional rate structure with a rate of 3.07 percent in the years included in the analysis in this report—2015, 2016, and 2017. Although the tax forgiveness provision of the Pennsylvania tax code makes the state’s income tax somewhat progressive, only 19 percent of all Pennsylvania state personal income tax returns in 2016 were filed as tax forgiveness returns (1.184 million tax forgiveness returns out of 6.249 million total returns filed).²² Moreover, some of the filers of the tax forgiveness returns may have been eligible for only partial tax forgiveness meaning that they did pay the state income tax albeit over a smaller portion of their incomes. Thus the tax forgiveness provision of the state’s income tax makes it only mildly progressive. The city wage tax, sales tax, property taxes, and social security payroll taxes are flat or proportionate taxes with a constant tax rate.

Despite the less progressive nature of the state income tax and the proportionate structure of the sales tax, property taxes, city wage tax, and social security payroll tax, better-educated residents of the city paid much more in these taxes compared to high school dropout residents. In comparison to high school dropouts, city residents who had graduated high school paid 2.1 times more in the state income tax, 1.6 times more in the city wage tax, 1.8 times more in social security payroll taxes, and 1.2 to 1.3 times more in property taxes and sales taxes per year during the 2014-2017 period. The mean per capita amounts of taxes paid by Philadelphia city residents increased steadily and sharply with increases in educational attainment. Relative to high school dropouts, the best-educated Philadelphians (those with a bachelor’s degree or a higher level of education) paid between 2.3 and 6.4 times higher amounts of state income taxes, city wage taxes, social security payroll taxes, property taxes, and sales taxes. The higher rates of employment

²² Tax Forgiveness is a credit that allows eligible taxpayers to reduce all or part of their Pennsylvania state tax liability, *See*: https://www.revenue.pa.gov/GeneralTaxInformation/News%20and%20Statistics/ReportsStats/PIT/Documents/2016_pit_stats.pdf

and earnings among better-educated individuals underlie their higher per capita tax payments.

The per capita tax payments among residents of Philadelphia’s suburbs were higher than that of their city counterparts. Suburban residents in each educational subgroup as well as across all education levels had higher per capita tax payments than

Table 9:
Estimates of Mean Annual Tax Payments of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs, by Type of Tax Paid and Educational Attainment, 4-Year Averages: 2014-2017 (In 2017 Dollars)

Educational Attainment	Federal Income Tax Payments	State Income Tax Payments	Philadelphia City Wage Tax	Social Security Payroll Tax Payments	Mean Expected Property Tax Payment	Mean Sales Taxes
Philadelphia City						
No H.S diploma	\$648	\$318	\$424	\$1,752	\$631	\$226
High school diploma or GED	\$2,522	\$675	\$699	\$3,135	\$809	\$279
Some college or associate's degree	\$3,140	\$857	\$1,047	\$3,950	\$1,053	\$355
Bachelor's degree or higher	\$10,493	\$2,041	\$2,171	\$8,952	\$1,436	\$519
All education levels	\$4,935	\$1,100	\$1,170	\$4,970	\$1,023	\$359
Philadelphia Suburbs						
No H.S diploma	\$2,064	\$650	\$83	\$3,560	\$2,085	\$293
High school diploma or GED	\$4,467	\$1,051	\$156	\$4,939	\$3,064	\$371
Some college or associate's degree	\$6,295	\$1,342	\$181	\$6,190	\$3,600	\$434
Bachelor's degree or higher	\$14,791	\$2,478	\$473	\$10,021	\$4,949	\$621
All education levels	\$9,726	\$1,783	\$308	\$7,594	\$4,030	\$499

Sources: (i) Federal, state, payroll, and retirement taxes, cash/non-cash transfers data are 4-year averages (CPS March Supplements 2015, 2016, 2017, and 2018). (ii) Property tax data are estimated from 2015, 2016, and 2017 ACS PUMS data files; (iii) Sales taxes data estimated from 2015, 2016, and 2017 ACS PUMS data files using IRS tax sales tax exemption for 2015, 2016, and 2017; (iv) Philadelphia city wage taxes data estimated from 2015, 2016, and 2017 ACS PUMS data files using resident tax rate on earnings of employed city residents and non-resident tax rate for suburban residents who were employed in Philadelphia city for 2015, 2016, and 2017.

city residents in all six tax categories presented in Table 9. However, sizable gaps existed in the per capita tax payments between high school dropouts and better-educated

residents of Philadelphia's suburbs. For every \$1 of taxes paid per year during the 2014-2017 period by high school dropouts residing in suburban Philadelphia, their high school graduate counterparts paid \$2.20 in the federal income tax, \$1.60 in state income taxes, \$1.90 in the city wage tax, \$1.40 in social security payroll tax, \$1.50 in property taxes, and \$1.30 in sales taxes. Suburban residents with a college education below the bachelor's degree level and those with a bachelor's or a higher academic degree had considerably larger amounts in tax payments than high school dropouts.

The mean combined tax payments by educational attainment represent the total tax payments in the form of federal, state, and local contributions made by individuals in each educational group and are provided in Chart 5.²³ The mean combined tax payment by each Philadelphia city resident between 18- and 64-years-old was \$13,600. High school dropouts made a combined tax payment of just \$4,000, which represents just 29 percent of the mean combined tax payment of all adult residents of the city (\$13,600). The mean combined tax payment among high school graduates was \$8,100 or about twice as much as the amount paid by the city's high school dropout residents.

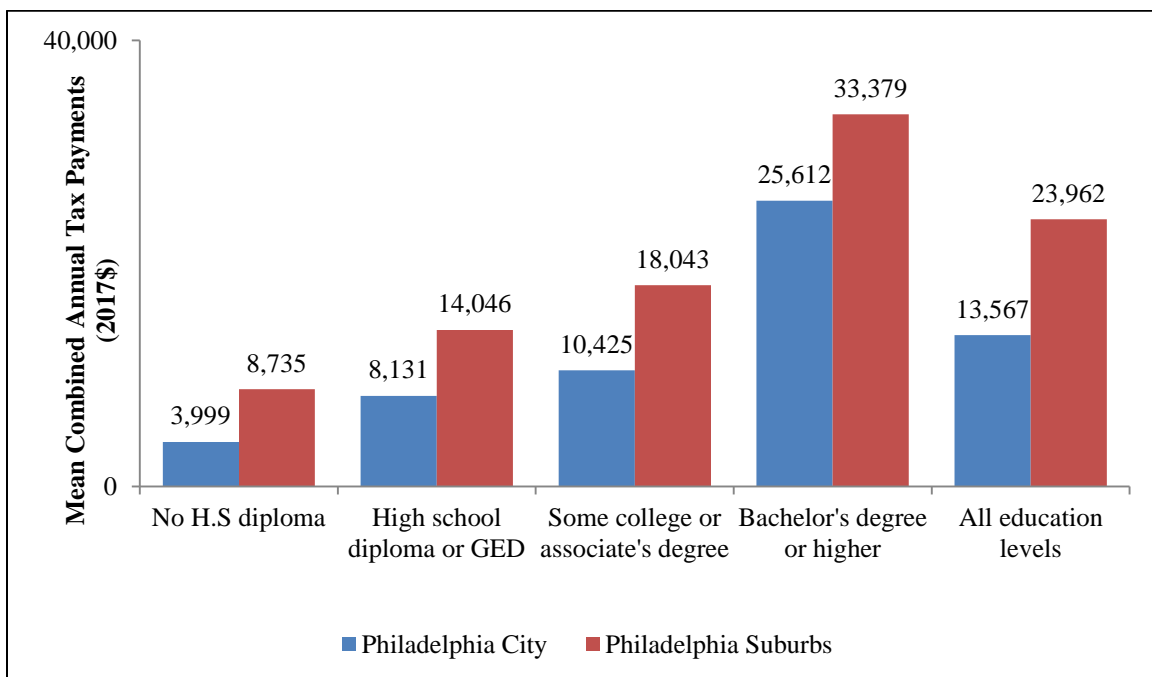
Postsecondary education below the bachelor's degree level in the city was associated with a somewhat higher tax payment. City residents with postsecondary education below the bachelor's degree level made combined tax payments of \$10,400 or 2.6 times higher than the combined tax payments of high school dropouts and only 1.3 times higher than that of high school graduates (with no additional schooling). Philadelphians with a bachelor's or a higher college degree paid an average of \$25,600 in combined annual taxes each year during the 2014-2017 period. On average for every \$1 in taxes paid by a high school dropout in Philadelphia city, high school graduates paid \$2.03, those with postsecondary education below the bachelor's degree level paid \$2.61, and college graduates with a bachelor's or a higher academic degree paid \$6.40.

The mean per capita tax payment among residents of suburban Philadelphia during the 2014-2017 period was \$24,000. Suburban residents who were high school

²³ The combined tax payments include the six taxes listed in Table 9 as well as federal government retirement contributions. As noted earlier, because of the small incidence of the payment of this tax and the consequent small per capita amount of payment of federal government retirement contributions, this report does not provide a separate discussion of the variation in the payment of this tax by educational attainment.

dropouts paid only \$8,700 per year in taxes; a level of tax payment that was only 36 percent of the level of payment of all adult residents of the Philadelphia suburban area (\$24,000). The mean per capita tax payment of high school graduates was \$14,000 or 61 percent higher than high school dropouts. Residents who had completed postsecondary education below the bachelor’s degree level paid somewhat more in taxes: \$18,000 or about 2 times higher than high school dropouts and about 28 percent higher than high school graduates without any postsecondary education. The best-educated residents of suburban Philadelphia paid an average of \$33,400 in taxes per year during the 2014-2017 period.

Chart 5:
Estimates of Mean Combined Annual Tax Payments of 18- to 64-Year-Old Residents
(Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs, 4-Year
Averages: 2014-2017 (in 2017 Dollars)



Note: The mean combined annual tax payments include federal and state income taxes, social security payroll taxes, Philadelphia city wage tax, federal government retirement contributions, local property taxes, and state sales taxes. Sources: (i) Federal, state, payroll, and retirement taxes, cash/non-cash transfers data are 4-year averages (CPS March Supplements 2015, 2016, 2017, and 2018). (ii) Property tax data are estimated from 2015, 2016, and 2017 ACS PUMS data files; (iii) Sales taxes data estimated from 2015, 2016, and 2017 ACS PUMS data files using IRS tax sales tax exemption for 2015, 2016, and 2017; (iv) Philadelphia city wage taxes data estimated from 2015, 2016, and 2017 ACS PUMS data files using resident tax rate on earnings of employed city residents and non-resident tax rate for suburban residents who were employed in Philadelphia city for 2015, 2016, and 2017.

For every \$1 of taxes paid by a high school dropout living in Philadelphia's suburbs, their counterparts who were high school graduates without any postsecondary schooling paid \$1.61, those with some postsecondary schooling below the bachelor's degree level paid \$2.07, while those with a bachelor's degree or a higher academic degree paid \$3.82. Although there were sizable gaps between the tax payments of high school graduates and better-educated residents of suburban Philadelphia, the size of these gaps were smaller than those of their counterparts who lived in Philadelphia city.

The contributions of high school dropouts to the federal, state, and local governments in the form of tax payments are significantly smaller than that of their better-educated counterparts. Across each of the six types of taxes that we have included in this analysis, the amount of taxes paid by better-educated non-elderly adult residents of Philadelphia city and suburbs were considerably higher than those paid by high school dropouts. Although not included separately in the discussion, the per capita amounts of federal government retirement contribution exhibited similar variation by educational attainment.

The low levels of employment and earnings of high school dropouts in Philadelphia city and suburbs clearly translate into a low incidence of tax payment and much lower dollar amounts of taxes paid when such payments are made. On the contribution side of the fiscal ledger, poorly-educated residents of Philadelphia city and suburbs, particularly high school dropouts had the lowest incidence of tax payment and made the smallest average per capita tax payment across each tax category compared to their better-educated counterparts.

The Receipt of Cash and Non-Cash Government Transfer Payments Among Residents of Philadelphia City and Suburbs by Educational Attainment

Cash Transfers

In previous sections of this paper, we emphasized the strong connections between the level of educational attainment of Philadelphia residents and their labor market success in the form of employment and earnings. We also found that as a result of their

higher earnings and incomes, better-educated Philadelphians were much more likely to pay federal, state, and local taxes than those who were poorly-educated, especially those who failed to graduate from high school. Moreover, better-educated adult residents of the city also made larger tax payments and therefore made larger revenue contributions to the budgets of the federal, state, and local governments.

In this section we present our analysis of the other side of the budget ledger: government transfer payments in the form of cash and in-kind benefits received by Philadelphia city residents with different levels of educational attainment. Our analysis of transfers includes 9 cash transfers and 3 non-cash (in-kind) transfers. The entire list of these cash and non-cash transfers is presented in Table 6. In order to receive a government transfer payment, the applicant must meet a variety of program eligibility guidelines. Income is a recurring and important component of eligibility criteria for most government transfer payments to the non-elderly population of the state. Indeed, these programs are often called ‘means-tested transfer programs.’

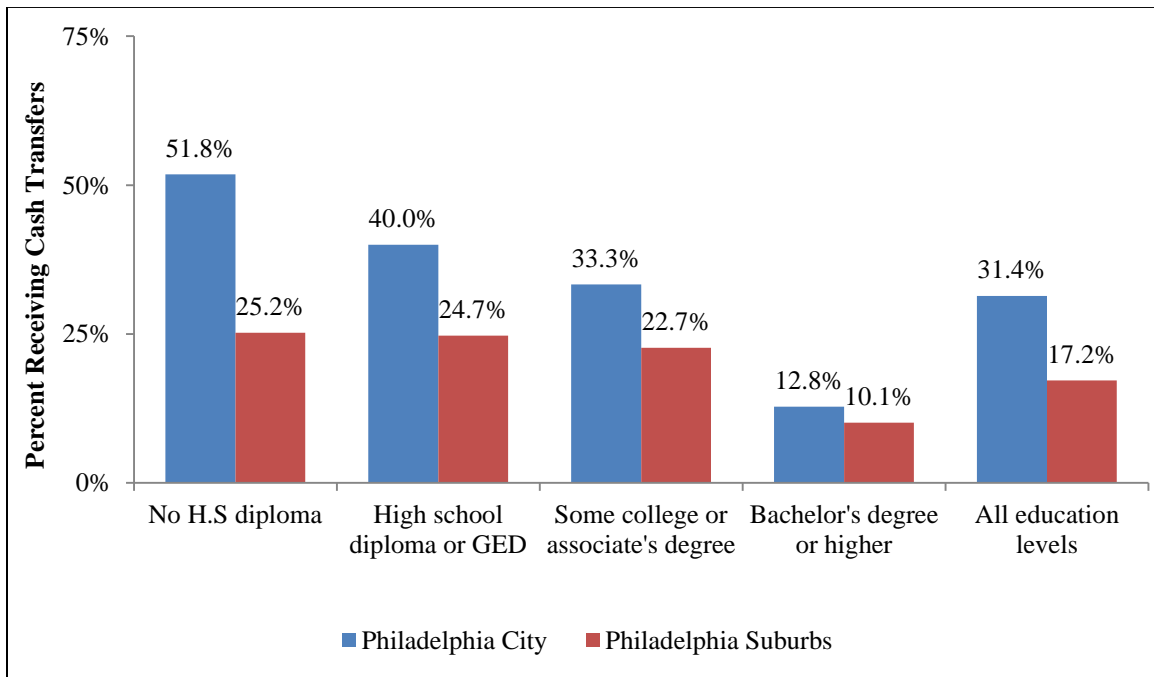
Among non-elderly individuals and families, those who have lower incomes are more likely to be eligible to receive both cash and non-cash government transfers. Given the lower levels of employment and earnings among poorly-educated individuals compared to their better-educated counterparts, poorly-educated individuals are more likely to be eligible for, and therefore more likely to receive, government transfers. In fact, the proportion of non-elderly adult residents of Philadelphia city and suburbs who received government transfers was highest among high school dropouts but declined sharply among better-educated residents.

We begin by estimating the share of the city’s non-elderly adult population who received money income or cash transfer income from a federal or state income transfer program. These cash programs include: earned income tax credit, TANF/AFDC payments, supplemental security income, veteran’s payments, unemployment insurance compensation, and workmen’s compensation payments. We also include those OASDI payments made to Philadelphia city residents under age 65. This includes cash payment to residents under the social security widows and survivors insurance programs as well as to those eligible for payment under the social security disability insurance program. In

addition, some residents between the ages of 62 and 64 received cash payments under social security’s old age retirement insurance program by opting to receive reduced retirement benefits relative to those available to them at the normal retirement age of 65.

The receipt of cash transfer payments varied widely across educational groups of Philadelphia city adults between the ages of 18 and 64. The least-educated adults were the most likely to receive cash transfer payments. Over one-half of high school dropout residents of the city (52%) received one or more cash transfer payments. Four out of ten high school graduates (with no postsecondary education) received one or more cash transfer payments, representing a 12 percentage point lower rate of receipt of cash transfer payments compared to high school dropouts.

Chart 6:
Percent of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs who Received Cash Transfers, by Educational Attainment, 4-Year Averages: 2014-2017



Source: March Supplement to the Current Population Survey, 2015, 2016, 2017, and 2018, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Philadelphia Metropolitan Area (within the boundaries of Pennsylvania) excluding Philadelphia city.

The share of cash transfer recipients was one-third among city residents with some college education below the bachelor’s degree level and 13 percent among college

graduates with a bachelor's or a higher college degree. Across all education levels, over 31 percent of 18- to 64-year-old city residents received one or more cash transfer payments per year over the 2014-2017 period. High school dropouts in the city were 4 times more likely than their counterparts with a bachelor's or a higher college degree, and 1.3 times more likely than high school graduates (without any postsecondary education) to receive one or more cash government transfer payments.

The receipt of cash transfer payments was much lower among high school dropouts who lived in suburban Philadelphia. Nearly 25 percent of suburban adults without a high school diploma or a GED had received at least one type of cash transfer payment; representing less than one-half of the rate of cash transfer receipt among their city counterparts (52%). The share of cash transfer payment recipients among suburban residents with a high school diploma or a GED was the same as their high school dropout counterparts (25%) and just slightly higher than the share of cash transfer payment recipients among suburban residents with some college education below the bachelor's degree level (23%). Among the best-educated residents of Philadelphia's suburbs (those with a bachelor's or a higher college degree) one in ten reported receipt of cash transfer payments annually on average over the 2014-2017 period. The overall cash transfer receipt among 18- to 64-year-old residents of suburban Philadelphia was 17 percent; a rate that was 55 percent lower than the 31 percent cash transfer receipt among their counterparts in the city. Underlying this difference was the better educational attainment of suburban residents and the lower receipt of cash transfer payments of suburban residents relative to city residents in each educational group.

Non-Cash Transfers

The share of adults receiving one or more in-kind or non-cash transfers²⁴ such as Medicaid, food stamps, or energy assistance was higher than the proportion of cash

²⁴ Two out of the three non-cash benefits, energy assistance and food stamps benefits, are household-based benefits and are therefore provided on the household record in the (Current Population Survey) data files that are the source of non-cash transfer benefits in Philadelphia city and suburbs presented in this paper. Therefore, the measure of the receipt of energy assistance and food stamps benefits among adult residents of Philadelphia city and suburbs presented in this paper is based on the household receipt of these benefits; that is, individuals who reside in households that receive energy assistance or food stamps are counted

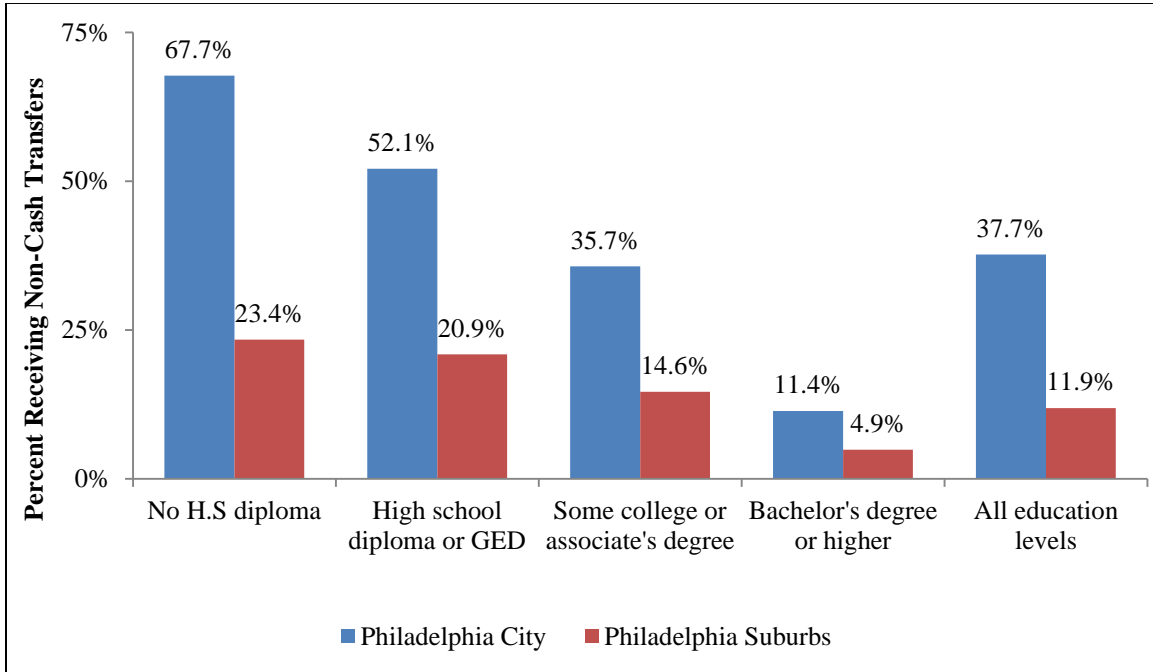
transfer recipients among all Philadelphians and among three out of the four educational subgroups. College graduates with a bachelor's or a higher academic degree are the only educational subgroup in the city with a somewhat lower receipt of in-kind or non-cash transfers than of cash transfers. On average about 38 percent of non-elderly adults in Philadelphia city received a non-cash transfer benefit. The rate of receipt of non-cash transfers in the city varied sharply by level of educational attainment. Two-thirds of the city's high school dropout residents received one or more in-kind transfers; 15 percentage points higher than the share (52%) of in-kind transfer recipients among high school graduates.

Among city residents who had completed some college education below the bachelor's degree level, 36 percent received one or more in-kind transfers. The incidence of non-cash benefit receipt was relatively lower among college graduates with a bachelor's or a higher academic degree; 11 percent of these best-educated city residents had participated in some type of in-kind benefit transfer program. High school dropouts in the city were nearly 6 times more likely than college graduates with a bachelor's or higher degree and 1.3 times more likely than high school graduates to receive non-cash transfer benefits during the year over the 2014-2017 period.

In suburban Philadelphia, about 12 percent of non-elderly residents had received one or more non-cash transfer benefit during the year over the 2014-2017 period; a rate of receipt that was only three-tenths as high as that among non-elderly residents of the city (12% versus 38%). Suburban residents who had dropped out of high school were more likely than better-educated residents to have received one or more non-cash transfer benefits. Less than one-quarter (23%) of high school dropouts in Philadelphia's suburbs had participated in a non-cash transfer program during the year, over the 2014-2017 period. Compared to high school dropouts, the rate of receipt of non-cash transfer benefits was 2 percentage points lower among high school graduates (21%), 8 percentage points lower among suburban residents who had completed some postsecondary education below the bachelor's degree level (15%), and 18 percentage points lower among college graduates with a bachelor's or a higher academic degree (5%).

among recipients of these non-cash benefits. The third non-cash benefit, Medicaid, is measured on the basis of individual receipt of the benefit.

Chart 7:
Percent of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of
Philadelphia City and Suburbs who Received Non-Cash Transfers, by Educational
Attainment, 4-Year Averages: 2014-2017



Source: March Supplement to the Current Population Survey, 2015, 2016, 2017, and 2018, U.S. Census Bureau, tabulations by authors.

*Philadelphia suburbs include Philadelphia Metropolitan Area (within the boundaries of Pennsylvania) excluding Philadelphia city.

In the Philadelphia suburban area, high school dropouts were 1.1 times more likely than high school graduates, 1.6 times more likely than those with below-bachelor’s level college education, and 4.8 times more likely than college graduates with a bachelor’s or a higher college degree to receive non-cash transfer benefits.

The Incidence and Costs of Institutionalization in Pennsylvania

After peaking at 1,000 inmates (including federal and state prisons and local jails) per 100,000 adults in 2006, 2007, and 2008, the nation’s incarceration rate has been declining steadily, reaching a low of 860 per 100,000 adults in 2016.²⁵ This decline is attributed to a variety of factors such as decline in crime rates and arrests as well as

²⁵ Kaeble Danielle and Mary Cowhig, *Correctional Population in the United States*, 2016, Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice, NCJ 251211, April 2018. (<https://www.bjs.gov/content/pub/pdf/cpus16.pdf>)

changes in criminal laws and sentencing patterns.²⁶ Despite the decline in the incarceration rate, the total number of inmates in the nation (which is based on the size of the adult population) continued to increase until 2014 when the number of inmates reached 2.225 million. Over the next two years the incarcerated population declined by 62,700 inmates, representing 2.8 percent decline. Despite this decline, in 2016, the incarcerated population was still quite high, 2.162 million. And the total correctional population which includes individuals on probation and parole in addition to incarcerated individuals, stood at 6.614 million, representing 2,640 per 100,000 adults or 1 in 38 U.S. adults.²⁷

Incarceration imposes considerable costs on society in the form of monetary costs of building and operating prisons and jails as well as human costs in the form of forgone wages of those who are institutionalized, reduced future opportunities for inmates after release, and many different types of social costs that are difficult to quantify. Incarceration is more likely to be concentrated among poorly-educated individuals, particularly high school dropouts. A large majority of the nation's inmates lack a high school diploma. The most recent national report on the educational attainment of prisoners was conducted by the Bureau of Justice Statistics in 2003. According to this report in 1997, 41 percent of the nation's incarcerated population had had dropped out of school and 24 percent had earned a GED; in other words, nearly two-thirds (65%) of the nation's incarcerated population did not have a high school diploma. The concentration of high school dropouts among inmates is considerably larger than the 18 percent share of high school dropouts in the general population age 18 or older during the same year (in 1997).²⁸

As noted in an earlier section of the paper, our methodology of computing incarceration costs involves the use of American Community Survey (ACS) data to compute the rate of institutionalization among residents of the area. The ACS count of the residents of an area includes residents of all group quarters located in the area. This

²⁶ Gramlich, John, *America's incarceration rate is at a two decade low*, Pew research Center, May 2, 2018. (<http://www.pewresearch.org/fact-tank/2018/05/02/americas-incarceration-rate-is-at-a-two-decade-low/>)

²⁷ Kaeble Danielle and Mary Cowhig, April 2018, *Op. cit.*

²⁸ Caroline Wolf Harlow, *Education and Correctional Populations*, Bureau of Justice Statistics, Special Report, January 2003, NCJ 195670.

means that if a jail or prison is located in an area, the area will have a higher institutionalization rate. Therefore, the use of ACS data will produce accurate rates of institutionalization only at the state level and not at the sub-state level. The institutionalization rate for sub-state areas would be highly sensitive to the location of jails and prisons resulting in an upward bias in the institutionalization rate for areas that house a prison or a jail within its boundaries. An upward bias in the institutionalization rate would produce an upwards bias in the cost of institutionalization per adult resident in the area. Therefore in this paper, we have used the institutionalization rates and costs by educational attainment in the entire state of Pennsylvania to represent incarceration costs per adult resident in Philadelphia city and suburbs.

We have estimated the rates of institutionalization of the non-elderly (18- to 60-year-old) population in Pennsylvania from combined public use data files of the 2015, 2016, and 2017 American Community Survey that interviewed residents of group quarters during the year. Group quarter residents in the ACS include persons who were in correctional facilities (jails and prisons), juvenile facilities, and nursing facilities/skilled nursing homes. The ACS public use data files unfortunately do not identify the type of institution in which group quarter residents lived at the time of the survey. However, a substantial majority of the adult institutionalized population under age 60 consists of inmates of correctional facilities.²⁹ Therefore we were able to use the ACS PUMS data files to estimate the incidence of institutionalization among 18- to 60-year-old residents of Pennsylvania by their educational attainment.

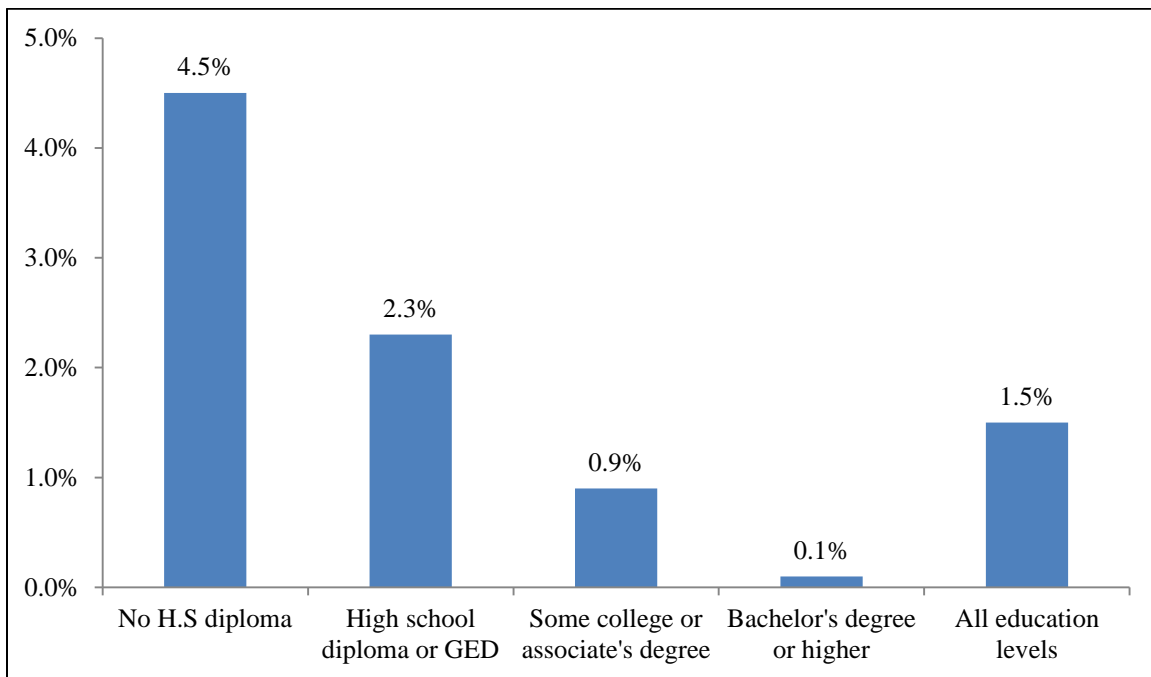
The findings presented in Chart 8 reveal that overall 1.5 percent of the 18- to 60-year-old population of Pennsylvania was institutionalized at the time of the 2015-2017 ACS surveys. The rates of institutionalization of these adults varied from a high of over

²⁹ The Census Bureau includes institutionalized population in four types of institutions: Correctional facilities for adults, juvenile facilities, nursing facilities/skilled nursing homes, and other institutionalized facilities. At the time of the 2010 Decennial Census, 57 percent of the institutional population was housed in correctional facilities for adults, 4 percent in juvenile facilities, 38 percent in nursing facilities/skilled nursing homes and 2 percent in other institutional facilities. (See: Group Quarters Population by Sex, Age and Type of Group Quarters, 2010, 2010 Census, Summary File 1 (<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>)).

Juvenile facilities house individuals below 18-years-old and nursing facilities and skilled nursing homes are most likely to house older individuals. Therefore 18- to 60-year-olds residing in institutionalized group quarters are most likely to include individuals housed in correctional facilities for adults—incarcerated individuals.

4.5 percent among high school dropouts, to 2.3 percent among those with just a high school diploma or a GED, to 0.9 percent and 0.1 percent, respectively, among adults with a college education below the bachelor’s degree level, and those with a bachelor’s or a higher college degree.

Chart 8:
Institutionalization Rates of 18- to 60-Year-Old Adults in Pennsylvania, by Educational Attainment, 3-Year Averages: 2015-2017
 (rates per 100 members of the 18- to 60-Year-Old population)



Source: 2015, 2016, and 2017 American Community Survey (ACS), Public Use Microdata Samples (PUMS) files, U.S. Census Bureau, tabulations by authors.

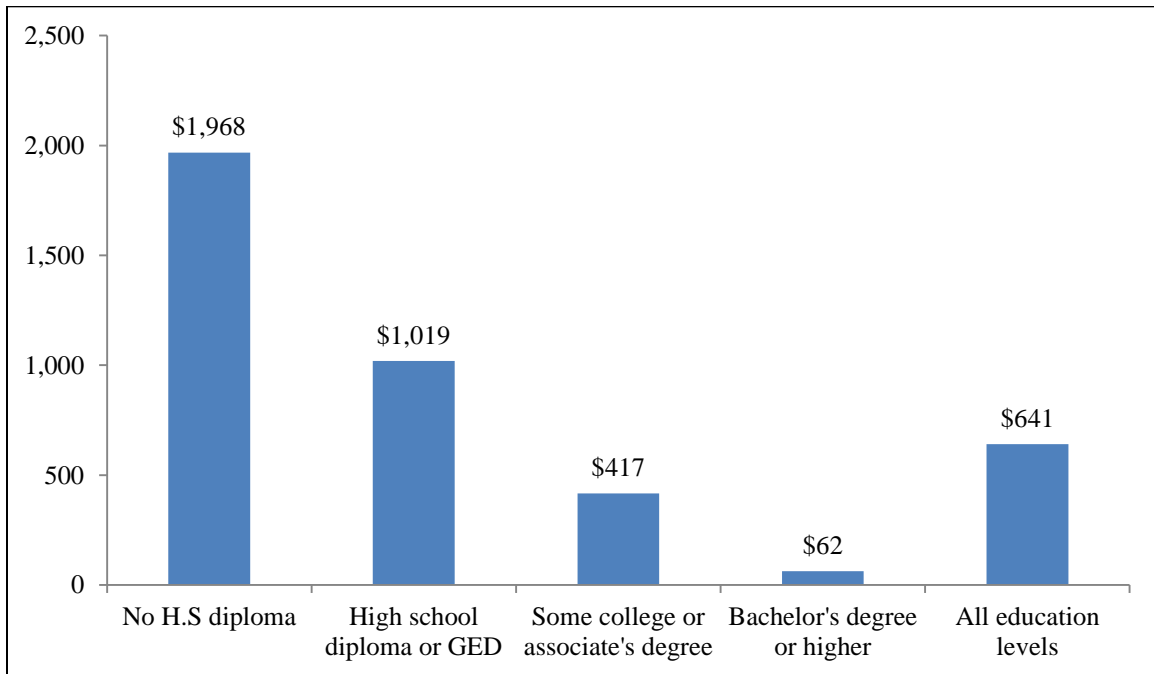
One of the components in our fiscal impact analysis is the per capita cost of institutionalization, that is, the cost per resident aged 18 to 60 in Pennsylvania associated with incarceration of an individual within that educational group. Utilizing the Bureau of Justice Statistics estimate of the annual expenditures per inmate for Pennsylvania in 2001 and adjusting this per inmate cost for inflation between 2001 and 2017, we have derived a per inmate cost of incarceration for Pennsylvania of \$44,170 in 2017. By multiplying this per inmate cost by the number of institutionalized adults in each educational group we derived the total institutionalization cost for that educational group. We then divided this total institutionalization cost in each educational group by the total number of adult

Pennsylvanians in the educational group to obtain mean per capita institutionalization cost (or mean institutionalization cost per person) in each educational group.

Findings presented in Chart 9 reveal wide differences in the average cost of institutionalization of adults by educational attainment. Since the institutionalization rate is higher among individuals with lower levels of education, the total and per capita costs of institutionalization are expected to be higher among poorly-educated adults in Pennsylvania than among their better-educated counterparts.

The high rate of institutionalization among high school dropouts resulted in a very high annual average cost of institutionalization per adult high school dropout in Pennsylvania (\$1,968). The annual institutionalization cost among adult high school graduates, with no college education, was much lower (\$1,019). Among college-educated adult residents of Pennsylvania, the average annual cost of institutionalization per person

Chart 9:
Mean Annual Costs of Maintaining 18- to 60-Year-Old Adults in Institutions in Pennsylvania, by Educational Attainment, 3-Year Averages: 2015-2017 (2017 Dollars)



Note: Jail and prison cost data are estimated for 18- to 60-year-olds from the 2015, 2016, and 2017 American Community Survey public use micro data files and the Bureau of Justice Statistics (BJS) cost estimates for 2001 adjusted for inflation to 2017 dollars.

was \$417 among adults with a below-bachelor's degree level college education, and \$62 per year among college graduates with a bachelor's or a higher academic degree.

The mean annual cost of institutionalization among Pennsylvania adults without a high school diploma was 1.93 times as high as that of high school graduates without any college education, and nearly 32 times higher than that of adults with a bachelor's or a higher academic degree.

Mean Net Fiscal Contributions of the Residents of Philadelphia City and Suburbs by Educational Attainment

Using the mean annual tax payments, mean values of annual cash and in-kind transfers, and mean per capita annual costs of institutionalization, we have estimated the net fiscal contribution to federal, state, and local governments for each educational group of adult (18- to 64-years-old) residents of Philadelphia city. Utilizing the same methodology, we have also produced the net fiscal contribution by educational attainment for all adult residents of Philadelphia's suburbs.

Findings presented in Table 10 reveal that over the 2014-2017 period, the mean annual tax payments per adult (18- to 64-years-old) resident of Philadelphia city was \$13,567 while the mean value of their cash and in-kind transfers and institutionalization costs was \$5,442 per adult, yielding a net per capita fiscal contribution of \$8,125. Among 18- to 64-year-old suburban Philadelphia residents, the mean annual tax payments were considerably higher than the city (\$23,962 in the suburbs versus \$13,567 in the city) and the mean value of cash and in-kind transfers and institutionalization costs was lower than the city (\$3,249 in the suburbs versus \$5,442 in the city), thus yielding a positive net fiscal impact in the suburbs of Philadelphia of \$20,713 that was 2.5 times higher compared to Philadelphia city (\$8,125).

The per capital net fiscal contribution of Philadelphia city and suburban residents varied widely by their level of educational attainment. Among city residents who had failed to complete high school, the per capita mean annual tax payment was \$3,999, while the mean per capita annual transfers and institutionalization costs was \$11,585. Thus the average net fiscal contribution of an adult city resident without a high school diploma was negative. The mean annual tax payments by this group of city residents

were \$7,586 lower than the mean value of their annual transfers and institutionalization costs.

City residents in the remaining three educational groups had positive net fiscal contributions albeit of varying magnitudes. These adults collected less in transfers and imposed smaller institutionalization costs than the amounts that they contributed in the form of tax payments. Adults with only a high school education (without any postsecondary education) contributed \$1,101 more annually in tax payments than the sum of what they received in the form of transfers and the costs that they imposed for institutionalization. The net fiscal contribution of adults with a below-bachelor's level college education was \$4,910 per adult per year. College graduates with a bachelor's or a higher academic degree in the city made sizable positive net contributions to federal, state

Table 10:
Mean Per Capita Values of Annual Total Tax Payments, Total Transfers and Institutionalization Costs, and Net Fiscal Contributions of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs, by Educational Attainment, 4-Year Averages: 2014-2017 (In 2017 Dollars)

Educational Attainment	(A) Mean Annual Total Tax Payments	(B) Mean Annual Total Transfers and Institutionalization Costs	(C) Annual Net Per Capita Fiscal Contributions (Col. A minus Col. B)
<u>Philadelphia City</u>			
No H.S diploma	\$3,999	\$11,585	-\$7,586
High school diploma or GED	8,131	7,120	1,011
Some college or associate's degree	10,425	5,515	4,910
Bachelor's degree or higher	25,612	1,377	24,235
All education levels	13,567	5,442	8,125
<u>Philadelphia Suburbs</u>			
No H.S diploma	\$8,735	\$6,849	\$1,886
High school diploma or GED	14,046	4,974	9,072
Some college or associate's degree	18,043	2,752	15,291
Bachelor's degree or higher	33,379	1,854	31,525
All education levels	23,962	3,249	20,713

and local governments (\$24,235). They collected less in transfers and imposed lower institutionalization costs (\$1,377) and paid much larger amounts in taxes (\$25,612), largely the result of better employment and earnings outcomes.

The net fiscal contributions of adults in each educational group in the suburbs were considerably larger than that of their Philadelphia city counterparts. High school dropouts in the suburbs had a small but positive net fiscal contribution of \$1,886 per year. The net fiscal contribution of suburban residents increased sharply with educational attainment ranging from \$9,072 among high school graduates with no postsecondary education, to \$15,291 among adults with college education below the bachelor's degree level, to \$31,525 among college graduates with a bachelor's or a higher academic degree.

The net fiscal contribution ratios (measured as the ratio of mean annual tax payments to the mean annual value of transfers and institutionalization costs) for each of the four educational subgroups of adult residents in Philadelphia city and suburbs are presented in Chart 10. The values of these ratios rose sharply with education in Philadelphia city—from just 0.35 among adults who did not complete high school, to 1.14 among high school graduates and 1.89 among residents of the city with college education below the bachelor's degree level, to 18.60 among city residents with a bachelor's or a higher academic degree.

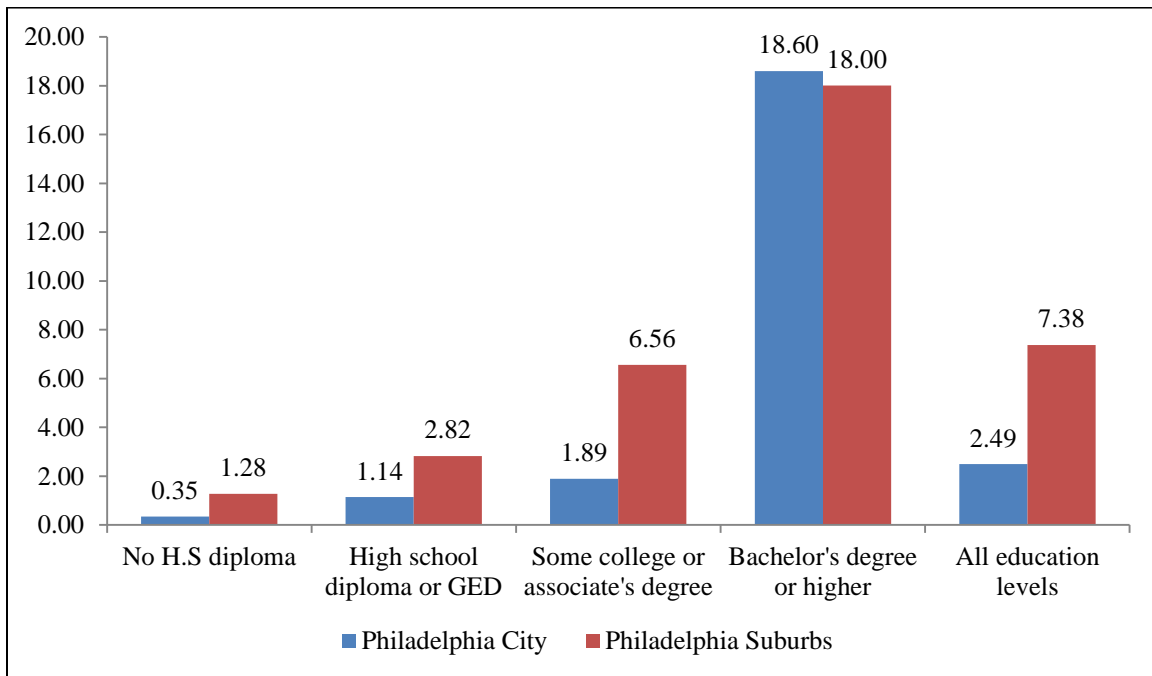
These ratios reveal that a high school dropout paid only \$0.35 for every \$1 received in the form of transfers and institutionalization costs. In contrast, an adult high school graduate resident of the city (without any postsecondary education) contributed \$1.14 in taxes for every \$1 of transfers and institutionalization costs. Those with a bachelor's or a higher level of education contributed \$18.60 for every \$1 received for transfers and institutionalization costs. Across all education levels, residents of Philadelphia city contributed \$2.49 for every \$1 of transfer income and institutionalization costs.

The net fiscal contribution ratio in suburban Philadelphia for all 18- to 64-year-old residents was considerably higher than it was in the city. On average, a suburban resident contributed \$7.38 in the form of tax payments for every \$1 received for transfers or institutionalization costs. In sharp contrast, the net fiscal contribution ratio among city

residents was only 2.49 (\$2.49 paid in taxes for every \$1 in received in transfer benefits or institutionalization costs). Underlying this difference in the net fiscal contribution ratio between city and suburban residents is larger tax payments and smaller transfer benefits of suburban residents in each educational subgroup of the population, and the considerably better education levels of suburban residents.

Chart 10:

Net Fiscal Contribution Ratios (Ratio of Mean Annual Tax Payments to the Combined Mean Annual Value of Cash and In-Kind Transfers and Institutionalization Costs) of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Philadelphia Suburbs, by Educational Attainment, 4-Year Averages: 2014-2017



The net fiscal contribution within each educational subgroup of the suburban adult population was positive with net fiscal contribution ratios ranging from 1.28 among high school dropouts, 2.82 among high school graduates without any postsecondary education and 6.56 among college graduates with a postsecondary education below the bachelor’s degree level, and 18.00 among those with a bachelor’s or a higher academic degree.³⁰

³⁰ The mean per capita tax payment of suburban residents with a bachelor’s or higher degree is 30 percent higher than that of their city counterparts (\$33,379 in the suburbs versus \$25,612 in the city). However the net fiscal contribution ratio of suburban college graduates (with a bachelor’s or higher degree) is slightly

Mean Lifetime Net Fiscal Contributions of the Residents of Philadelphia City and Suburbs by Educational Attainment

The net fiscal contributions presented in the previous section represent annual amounts of net fiscal impacts. The cumulative amounts of these annual fiscal impacts over the entire work life of each non-elderly adult resident could be sizable. We have converted the estimates of the mean annual net fiscal contributions of 18- to 64-year-old adults in each educational subgroup into estimates of lifetime net fiscal contributions per adult. Our estimates of lifetime net fiscal contributions are derived by multiplying the annual net fiscal contribution estimates by the total number of years in the work life of each educational group.

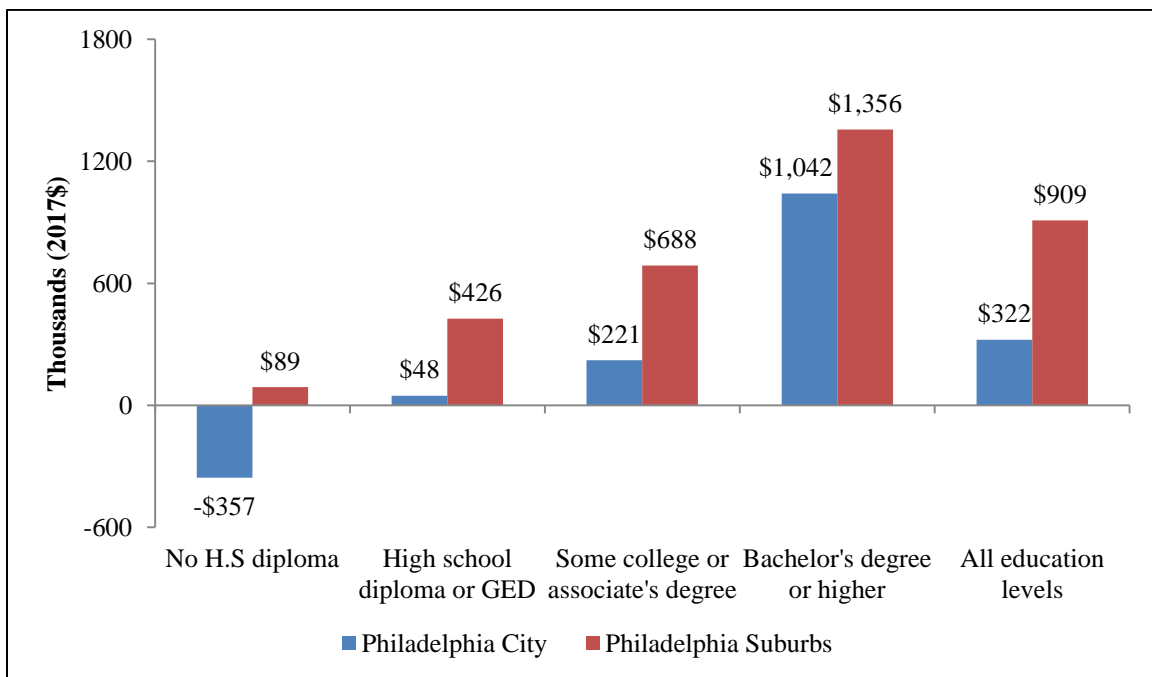
The work life of each educational subgroup was based on assumptions about the age at which they would begin their work life—which is the age when they are typically expected to earn their educational credentials. We have assumed that a high school graduate would begin their work life at the age of 18 when they earn their diploma; those with below bachelor's degree education would begin work at age 20, and college graduates with bachelor's or a higher academic degree would start their working careers at age 22. The work life span—the number of years between the age at which they complete their education and age 64 -- was thus computed as a 47 year period for high school dropouts and high school graduates, 45 years for those with some college education below the bachelor's degree level, and 43 years for individuals with a bachelor's or a higher academic degree.³¹

lower than that of their city counterparts (\$18.00 versus \$18.60). The reason for this is the \$477 difference between the mean annual transfers and institutionalization costs (the denominator of the ratio) between the two groups of college graduates (\$1,854 in the suburbs minus \$1,377 in the city equals \$477 higher in the suburbs). Upon closer examination of the components of these transfer payments we found that the entire \$477 difference is from higher amounts of cash payments to suburban college graduates (compared to city college graduates) from age-related transfers: payments from the social security widows and survivors insurance programs as well as from payments under the social security disability insurance program. The median age of 18- to 64-year-old college graduates was much higher in the suburbs (44 years) than the city (35 years). One-quarter of suburban college graduates were between 55- and 64-years-old compared to just 13 percent of their city counterparts. The older age of suburban college graduates compared to their city counterparts, which underlies some of the average earnings advantages among suburban college graduates compared to their city counterparts, is also attributable for their slightly higher (\$477) transfers (from age-related programs) compared college graduate residents of the city.

³¹ Since most graduate and post-graduate students mix schooling with full-time work we have assigned the same age as the beginning of work life (age 22 years) for individuals with a graduate or post-graduate degree as those with just a bachelor's degree.

The lifetime net contributions of adult residents of Philadelphia city rose sharply with education. The negative annual net fiscal contribution of the city’s adult residents who failed to complete high school would cumulate into a negative net fiscal contribution of -\$357,000 per adult over their working lives. Each high school dropout in the city is expected to cost \$357,000 more in the form of transfer benefits and institutionalization costs than the amount of their tax payments over their entire working lifetime. In contrast, a high school graduate (without any college education) is estimated to contribute a net amount of \$48,000 to the budgets of the federal, state, and local governments over the entire working lifetime. The mean lifetime net fiscal contributions of adults with some college (below a bachelor’s degree), and those with a bachelor’s or a higher academic degree are estimated, respectively, at \$221,000 and \$1,042 million.

Chart 11:
Net Lifetime Fiscal Contributions (Per Capita) of 18- to 64-Year-Old Residents (Excluding 18- to 24-Year-Old Students) of Philadelphia City and Suburbs, by Educational Attainment, 4-Year Averages: 2014-2017 (in Thousands of 2017 Dollars)



What would be the total impact of assisting a high school dropout to return to school and complete high school? If a resident completes high school and is removed

from the dropout category to the high school graduate category, the fiscal impact is twofold: a the removal of the net fiscal contribution of the high school dropout and the addition of the net fiscal contribution of a high school graduate. Each high school dropout in Philadelphia city is estimated to impose a lifetime cost (net fiscal impact) of \$357,000 due to their smaller tax payments compared to their government transfers and institutionalization costs. Each high school graduate (without any college education) in the city is expected to make a positive net fiscal contribution of \$48,000 over their working lives.

Reducing one high school dropout in Philadelphia city would save the estimated net lifetime fiscal cost of \$357,000 for a high school dropout in the city. Converting this high school dropout to a high school graduate would increase the number of high school graduates in the city by one resulting in a lifetime contribution of \$48,000 estimated for a high school graduate in the city. The sum of the two (a savings of \$357,000 plus an additional contribution of \$48,000 that equals \$405,000) represents the potential gain to the federal, state, and local governments for each successful graduation from a Philadelphia city high school of a student who would otherwise have dropped out of high school.

As noted in the sections discussed above, residents in the suburban Philadelphia area have performed better than their city wide counterparts on the fiscal ledger with higher tax payments and lower cash and in-kind transfer benefits and institutionalization costs in each educational subgroup as well as among all non-elderly suburban Philadelphia residents. The net fiscal benefits among different educational subgroups of suburban Philadelphia residents ranged from a net positive fiscal contribution of \$89,000 among high school dropouts, to \$426,000 among high school graduates (with no postsecondary schooling) and \$688,000 among those who had completed some college below the bachelor's degree level, to \$1.356 million among college graduates with a bachelor's or a higher academic degree.

The benefits that can be expected to accrue from each successful high school graduation of a high school dropout resident of Philadelphia suburbs was also quite large, albeit not as large as that in Philadelphia city (\$405,000 in the city versus \$378,000 in the

suburbs) due to the small but positive net lifetime contribution of high school dropouts (+\$89,000) in the suburbs versus a large negative net lifetime contribution (-\$357,000) in the city) and a smaller net positive contribution of high school graduates in Philadelphia city compared to Philadelphia's suburbs (\$48,000 in the city versus \$426,000 in the suburbs).

The net cost to the public coffers of each high school dropout in Philadelphia city is sizable. The labor market attachment and the level of earnings of high school dropouts in the city are very weak resulting in low levels of per capita tax payments by them. The mean combined annual tax payments of high school dropout residents of the city was only \$3,999, a level that was only half as high as that of high school graduates and only a sixth as high as the mean annual tax payments by the best-educated city residents (with a bachelor's or a higher college degree).

On the other side of the fiscal ledger, high school dropout residents of the city were much more dependent on cash and in-kind transfer benefits—over one-half reported receiving one or more cash transfer payments and two-thirds reported receipt of one or more in-kind or non-cash transfer benefits. The dollar value of the annual per capita cash and non-cash transfer benefits and institutionalization costs of high school dropouts in the city in the 2014-2017 period was \$11,585, a level that was 1.6 times as high as that of high school graduate residents and 8.4 times that of college graduate residents of the city with a bachelor's or a higher academic degree.

The net effect is that high school dropouts in the city are estimated to impose an annual cost of \$7,586, representing the amount by which their tax payments fall short of their transfer benefits and institutionalization costs. Over their working lifespan, these annual costs balloon to \$357,000 per high school dropout resident of Philadelphia city.

A high school dropout residing in the suburbs of Philadelphia also is estimated to make smaller tax payments and receive greater transfer benefits than better-educated suburban residents. However, the annual and lifetime net fiscal impacts of high school dropouts and of each educational group in the Philadelphia's suburbs are considerably better than those of their city counterparts.

Clearly, working-age adults who fail to complete high school impose very high costs upon the public coffers in the form of low tax payments, high rates and amounts of receipt of government transfer costs, and high institutionalization costs. These external costs are in addition to the sizable personal costs of dropping out of high school that are borne by the individuals themselves. The large gap between the lifetime net fiscal contributions of high school dropouts and their counterparts with just a high school education indicate that the monetary benefit to the public coffers of each successful high school graduation is indeed very large. Although the components in the measurement of net fiscal contributions estimated in this report encompass a wide array of taxes and transfers and costs, these estimates are still very conservative since they do not include non-quantifiable personal costs, health costs, and social costs of high school dropouts and the transmission of these costs to future generations through diminished resources available to their children.

The Relationship between Educational Attainment and Skills

The findings of this study reveal that the net fiscal contributions of Philadelphians rise with the level of educational attainment. Residents with less than a high school diploma will consume far more fiscal resources than they contribute. And, the attainment of a high school diploma results in a positive net fiscal contribution. The level of the net fiscal contribution is indeed associated with educational attainment. Most of this rise in the net fiscal contribution is linked with labor market gains associated with achieving an academic credential.

Our analysis finds that access to employment in higher paying industries and occupations is connected to more years of schooling. Chances of employment, full-time employment, and higher annual earnings are positively connected to higher levels of educational attainment. Poverty and deep poverty in the city are associated with a fundamental disconnection from the labor market that is most often found among those with fewer years of schooling.³²

³² Neeta Fogg, Paul Harrington and Ishwar Khatiwada, *Philadelphia's Detached: The Disconnection between the Poor and the Labor Market in Philadelphia*, Center for Labor Markets and Policy, Drexel University, June 2018.

The policy response to findings like these has increasingly focused on the singular goal of improving attainment rates through increased emphasis on high school dropout prevention, college enrollment for all high school graduates, and, more recently, on college completion. However, it is important to note that the level of educational attainment of a population serves as a proxy measure for a variety of human capital traits. Behavioral traits, social/negotiation skills, occupational proficiency, and foundational skills (literacy and numeracy) are all represented by educational attainment measures in most studies of the determinants of labor market outcomes.

Indeed, in Philadelphia, a number of efforts have been in place to raise the level of on-time high school completion and the results have been positive, as city-wide on-time high school cohort completion rates have improved over time. However, these gains have not been accompanied by a rise in the academic performance of students as measured by standardized tests of various dimensions of literacy and numeracy skills. Philadelphia schools have not fared well on measures of foundational skills—skills that are highly valued in the job market.

The National Assessment of Educational Progress (NAEP) places Philadelphia students near the bottom of the nation’s foundational skills distribution. The 2017 NAEP eighth grade reading scores found that Philadelphia students had a mean score that was sharply below those of the mean scores for eighth graders in the state (.56 standard deviation) and the U.S. (.50 standard deviation). Even when compared to the mean of the twenty large U.S. cities, the scores of Philadelphia’s eighth graders were modestly below

Table 11:
Mean Eighth Grade Reading Scores,
National Assessment of Educational Progress, 2017

	Average Reading	Difference Compared to Philadelphia	Difference as share of SD (SD=39)
Philadelphia	248	0	
Large City	254	6	0.15
Pennsylvania	270	22	0.56
U.S.	267	19	0.49

Source: “District Performance Compared to the Nation”, The Nation’s Report Card. <https://www.nationsreportcard.gov/profiles/districtprofile?chort=1&sub=MAT&sj=XQ&sfj=NL&st=MN&year=2017R3>

the twenty-city mean score. Similarly, there were large differences in eighth grade math proficiencies between Philadelphia test takers and their counterparts in the state, nation, and the twenty large urban areas.³³

Each year the Pennsylvania Department of Education administers Keystone exams that serve as ‘end of course assessments’ of subject areas including algebra and literature. Until recently, the algebra and literature exams (along with the biology exams) were to use as a high stakes measure of academic achievement that would determine if a student had developed sufficient skills to warrant a diploma award.³⁴

Each test score is assigned to one of the following four levels:³⁵

- Below Basic: Inadequate academic performance that indicates little understanding and minimal display of skills.
- Basic: Marginal academic performance that indicates a partial understanding and limited display of skills.
- Proficient: Satisfactory academic performance including a solid understanding and adequate display of skills.
- Advanced: Superior academic performance including an in depth understanding and exemplary display of skills.

The findings from the Keystone literature and algebra tests administered in 2018 are presented in the table below. These data reveal wide variations in test scores both in the state and in Philadelphia city. Statewide we find 10 percent of students achieved an advanced level score on the literature exam, a distinguished level of achievement, yet we find a nearly equal share (8.4%) of test takers in the state scoring at below basic level of

³³ There has been no improvement in 8th grade reading scores since 2009 when these measures became available for Philadelphia. The 8th grade math score declined slightly over the period.

³⁴ The need to achieve a passing grade on the Keystone exam has been diminished substantially as the legislature recently created a set of alternative pathways to a high school diploma that do not require students to display a given level of academic achievement in order to graduate.

³⁵ Data Recognition Corporation, *Guide to Keystone Exam Student Reports* Pennsylvania Department of Education

<https://www.education.pa.gov/Documents/K-12/Assessment%20and%20Accountability/Keystone%20Exams/Report%20Interpretation%20Guides/English%20-%20Keystone%20Report%20Interpretation%20Guides.pdf>

skill in literature. In Philadelphia the share of test-takers scoring at the advanced level is quite small; just 2.6 percent, while one in five test-takers in the city scored in the below basic level on the literature Keystone exam. Similarly, Philadelphia test-takers are much more likely to score at the basic level on the literature exam than their statewide counterparts (31.2% Philadelphia vs. 18.9% statewide).

Table 12:
Distribution of Test-Taker Scores from the
Pennsylvania 2018 Keystone Literature and Algebra Exam

	Literature	
Score Level	Pennsylvania	Philadelphia
Number Scored	121,508	10,184
% Advanced	10.0%	2.6%
% Proficient	62.7%	44.9%
% Basic	18.9%	31.2%
% Below Basic	8.4%	20.1%
	Algebra	
Score Level	Pennsylvania	Philadelphia
Number Scored	122,260	10,565
% Advanced	23.5%	8.3%
% Proficient	41.7%	26.3%
% Basic	25.1%	40.9%
% Below Basic	9.7%	24.5%

Source: “Keystone Exams.” The Pennsylvania Department of Education.
<https://www.education.pa.gov/Data-and-Statistics/Pages/Keystone-Exams-Results.aspx>

The performance of Philadelphia students on the algebra Keystone exam was also not strong. One in four algebra test takers in Philadelphia scored in the below basic level, compared to just one in ten test takers statewide scoring at this level. While 23.5 percent of algebra test-takers statewide scored at the advanced level, just 8.3 percent of Philadelphia test-takers achieved this level of proficiency in algebra.

The impact of these test scores on the likelihood of college enrollment, retention, and completion is substantial. Students with higher test scores, holding demographic,

socio-economic, in-school behavior and grade point average constant, are substantially more likely to succeed at the post-secondary level.³⁶

Literature and algebra test scores at the city and statewide level, while informative, mask a very wide range of performance across high schools. Our analysis of the data finds that Philadelphia has among the best performing high schools in Pennsylvania with respect to the Keystone algebra and literature test, but we also find a very substantial concentration of the Commonwealth's poorest performing high schools in Philadelphia.

In the table below we present a rank ordering by decile grouping of 695 public and charter high schools based on the share of students who scored at a basic or below basic level on the Keystone literature exam during 2018. We accomplish this task first by rank ordering each high school by its share of test-takers who scored at a basic or below basic level on the exam. These high school rankings are then divided into ten equal sized groups. So for example the first decile group, labeled lowest basic or below basic score share (Column A) is composed of 69 high schools (Column C) that had the lowest share of their test takers score at the basic or below basic level. These 69 schools have basic or below basic shares that ranged from zero to 10.8 percent of their students.

At the other extreme are schools concentrated in the 10th decile. This group is composed of 69 schools that had the highest share of student test-takers achieving a literature score in the basic or below basic level. The share of test-takers who scored at basic or below basic level among the 69 high schools in this group ranged from 64.4 percent to 100 percent. Findings on the distribution of schools on this measure are presented in the top half of Table 13. The bottom half of Table 13 presents the distribution of test-takers enrolled in the schools that make up each decile.

The top half of the table reveals that the Philadelphia share of schools with very low proportions of students attaining poor literature test scores was 8 percent, nearly equal to the top ten percent statewide. Philadelphia schools like Masterman and Central High Schools had very low shares of students scoring at a basic or below basic level.

³⁶ Neeta Fogg and Paul Harrington, *From Diplomas to Degrees: A Longitudinal Study of the College Enrollment and Graduation Outcomes of High School Graduates from the School District of Philadelphia*, Project U-Turn, December, 2015.

However, we find that a very large share of Philadelphia high schools are at the bottom of the statewide distribution of schools ranked by share of test-takers with poor literature scores.

Our analysis of this data found that 37 of 87 high schools in Philadelphia had between 64.4 percent and 100 percent of their student test-takers achieve literature scores at the basic or below basic level. Indeed, Philadelphia accounted for 54 percent of all the bottom-ranked schools statewide on this measure. At the 9th decile we find that 21.8 percent of Philadelphia high schools had between 46.4 percent and 64.1 percent of their students achieve a literature score at the basic or below basic level. When we examine the bottom two deciles, we find that these twenty percent of schools statewide had 46.4 percent or more of their test-takers score at the basic or below basic level, but in Philadelphia nearly two-thirds of high schools fell in the bottom two deciles of the statewide distribution of schools (with 46.4 percent or more of their test-takers scoring at the basic or below basic level).

Because high schools can be of different sizes it is useful to examine data on the relative number of student test-takers in each high school along the basic and below basic literature test score distribution. This information is presented in the bottom half of Table 13. The highest performing high schools in the both the city and the state tend to be larger high schools. Therefore, we find that the number of test-takers in the schools with the lowest share of students scoring at or below basic is disproportionately high. For example, the statewide we find that the ten percent of high schools with the lowest basic or below basic share of test-takers, enrolled 15 percent of all test-takers. In Philadelphia, this proportion was even higher, with 15.9 percent of all citywide test-takers enrolled in these top performing schools.

In each of the next seven deciles we find disproportionately smaller shares of students scoring at or below the basic level on the literature test. Instead, we find the majority of test-takers in Philadelphia enrolled in high schools in which the shares of students scoring at basic or below basic on the literature test place those schools in the bottom two (9th and 10th) deciles of the statewide distribution. We find that 35.3 percent of Philadelphia test-takers were enrolled in high schools where 64.4 percent to 100

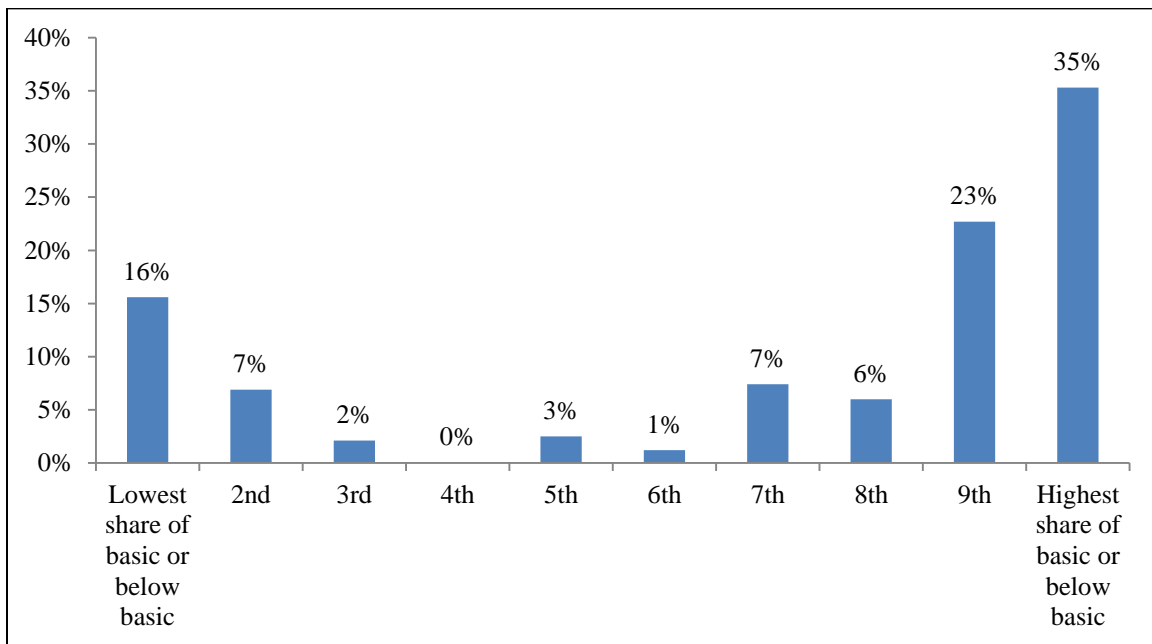
Table 13:
The Distribution of Pennsylvania and Philadelphia Publicly Funded Schools, Ranked by
the Share of High Schools and Test Takers with a Basic or Below Basic Score on the
Keystone Literature Exam, by Deciles, 2018

LITERATURE		Pennsylvania Schools		Philadelphia Schools	
Col. A Decile of % with Basic or Below Basic Score	Col. B Decile Range: % with Basic or Below Basic Score	Col. C Number	Col. D Percent Distribution	Col. F Number	Col. G Percent Distribution
Lowest Basic or Below Share	0.0%-10.8%	69	10%	7	8.0%
2nd	10.9%-15.4%	69	9.9%	6	6.9%
3rd	15.5%-18.8%	70	10.1%	2	2.3%
4th	18.9%-21.8%	69	9.9%	0	0.0%
5th	21.9%-25.0%	72	10.4%	2	2.3%
6th	25.2%-29.3%	67	9.6%	1	1.1%
7th	29.4%-35.6%	71	10.2%	7	8.0%
8th	35.7%-46.2%	69	9.9%	6	6.9%
9th	46.4%-64.1%	70	10.1%	19	21.8%
Highest Basic or Below Basic Share	64.4%-100%	69	9.9%	37	42.5%
	Total	695	100.0%	87	100.0%
Test-Takers		Pennsylvania Test-Takers		Philadelphia Test-Takers	
Col. A Decile of % with Basic or Below Basic Score	Col. B Decile Range: % with Basic or Below Basic Score	Col. C Number	Col. D Percent Distribution	Col. F Number	Col. G Percent Distribution
Lowest Basic or Below Basic Share	0.0%-10.8%	17,560	14.9%	1,585	15.6%
2nd	10.9%-15.4%	14,296	12.2%	707	6.9%
3rd	15.5%-18.8%	16,011	13.6%	214	2.1%
4th	18.9%-21.8%	13,105	11.1%	0	0%
5th	21.9%-25.0%	11,195	9.5%	258	2.5%
6th	25.2%-29.3%	8,784	7.5%	127	1.2%
7th	29.4%-35.6%	11,784	10.0%	754	7.4%
8th	35.7%-46.2%	10,282	8.7%	616	6.0%
9th	46.4%-64.1%	9,798	8.3%	2,303	22.7%
Highest Basic or Below Basic Share	64.4%-100%	4,845	4.1%	3,586	35.3%
	Total	117,660	100.0%	10,150	100%

Source: "Keystone Exams." The Pennsylvania Department of Education.
<https://www.education.pa.gov/Data-and-Statistics/Pages/Keystone-Exams-Results.aspx>

percent of students who took the literature test scored at a basic or below basic level. Statewide only 4,845 students or 4.1 percent were enrolled in these bottom performing schools. This means that 74 percent of all test-takers in the state who were enrolled in the most poorly performing schools in this measure were matriculating at a Philadelphia high school.

Chart 12:
Test-Taker Shares, by Statewide High School Literature Deciles in Philadelphia, 2018



The literature score findings reveal a bi-modal pattern of test-taker distribution. We find that about 16 percent of student test-takers in the city are enrolled in schools where students are very unlikely to score poorly on the Keystone literature exam. Yet at the other end of the distribution we find that 58 percent of students are enrolled in schools where students are quite likely to score poorly on the literature test.

The findings related to the same kinds of distributions for the Keystone algebra exam are provided in Table 14. The findings are somewhat more negative than those found for the literature score measures since the bottom decile is composed of schools where 79.2 percent or more of students scored at the basic or below basic level on the algebra test, compared to 64.4 percent of students who scored at the basic or below basic levels on the literature test.

Similar to the findings from the analysis of the Keystone literature test scores, data on the share of schools and student test-takers who scored at or below the basic level on the algebra tests indicates a disproportionate share of Philadelphia schools with very high shares of students scoring at the lower levels. We found that 43 percent of high schools in Philadelphia had between 79.2 percent and 100 percent of their student test-takers score at or below the basic level on the Keystone algebra test, while just 10 percent of schools statewide had 79.2 to 100 percent of their test-taker score at the basic or below basic level. These schools in the decile enrolled 34 percent of all Keystone algebra test-takers in the city. City schools in the 9th decile, populated by schools where between 61.1 percent and 78.9 percent of test-takers scored at or below the basic level on the Keystone algebra exam enrolled 22 percent of city’s high school algebra test-takers. Overall, more than 55 percent of test-takers in the city were enrolled in schools where more than 60 percent of students scored at the basic or below basic level on the Keystone algebra exam.

Findings on the performance of many Philadelphia students on a variety of fundamental skill score measures paint a disturbing picture. Analysis of NAEP scores finds that Philadelphia 8th graders about to enter high school have reading and math scores that are sharply below their counterparts in Pennsylvania and the nation. At the high school level we find that Philadelphia student scores on the statewide Keystone literature and algebra exams are also far below their counterparts across the Commonwealth. Further, we find very large disparities in the academic achievement of high school students in the city. A small number of high schools in the city have very strong literature and algebra performance, but there is a yawning achievement gap between these schools and the majority of high schools in Philadelphia.

Sadly, the evidence suggests that these achievement gaps at the high school level will likely persist well beyond high school and exert a very strong influence on important life outcomes associated with an individual’s skills—even after accounting for the level of educational attainment.

Table 14:
The Distribution of Pennsylvania and Philadelphia Publicly Funded Schools, Ranked by the Share of High Schools and Test Takers with a Basic or Below Basic Score on the Keystone Algebra Exam, by Deciles, 2018

ALGEBRA		Pennsylvania Schools		Philadelphia Schools	
Col. A Decile of % with Basic or Below Basic Score	Col. B Decile Range: % with Basic or Below Basic Score	Col. C Number	Col. D Percent Distribution	Col. F Number	Col. G Percent Distribution
Lowest Basic of Below share	0.0%-15.2%	69	9.9%	6	7%
2nd	15.3%-20.0%	69	9.9%	2	2%
3rd	20.1%-24.1%	70	10.1%	2	2%
4th	24.2%-27.8%	69	9.9%	2	2%
5th	28.0%-32.1%	72	10.3%	2	2%
6th	32.2%-39.1%	67	9.6%	3	3%
7th	39.2%-46.2%	71	10.2%	3	3%
8th	46.3%-61.0%	69	9.9%	7	8%
9th	61.1%-78.9%	70	10.1%	23	26%
Highest Share of Basic or Below Basic	79.2%-100%	70	10.1%	38	43%
	Total	696	100.0%	88	100%
		Pennsylvania Test-Takers		Philadelphia Test-Takers	
Col. A Decile of % with Basic or Below Basic Score	Col. B Decile Range: % with Basic or Below Basic Score	Col. C Number	Col. D Percent Distribution	Col. F Number	Col. G Percent Distribution
Lowest Basic or Below share	0.0%-15.2%	17,691	15%	1,470	14%
2nd	15.3%-20.0%	16,705	14%	178	2%
3rd	20.1%-24.1%	15,343	13%	383	4%
4th	24.2%-27.8%	10,941	9%	217	2%
5th	28.0%-32.1%	10,793	9%	227	2%
6th	32.2%-39.1%	10,446	9%	434	4%
7th	39.2%-46.2%	10,028	8%	219	2%
8th	46.3%-61.0%	13,224	11%	1,507	14%
9th	61.1%-78.9%	7,981	7%	2,369	22%
Highest Share of Basic or Below Basic	79.2%-100%	5,009	4%	3,537	34%
	Total	118,161	100%	10,541	100%

The Programme for the International Assessment for Adult Competencies (PIAAC) is an international effort to measure the foundational skills of adults in OECD countries and to examine the impact of those skills on a wide variety of life outcomes. PIAAC findings for the U.S. reveal sharply divergent literacy and numeracy skills among American adults across levels of educational attainment; as one might expect, but also very substantial variation in foundational skills proficiencies within a given level of educational attainment grouping.

Similar to the Keystone exam the PIAAC literacy and numeracy exam groups test scores into five different levels including:

- **Level 1 or below** reflects the ability to read a short text and locate a single piece of information or enter some personal information into a document. A score at this level signals skills in reading a paragraph, understanding basic vocabulary, and the meaning of sentences.
- **Level 2** reflects the ability to read more complex text, compare and contrast some information, and paraphrase and make low level inferences from a text.
- **Level 3** signals the ability to read more lengthy and dense texts. Individuals can identify, interpret, and evaluate pieces of information requiring more complex levels of inference. Those proficient at this level can identify and disregard irrelevant text to find the correct answer.
- **Level 4/5** is an indicator of the ability to integrate, interpret, and synthesize information from complex or lengthy documents. Complex inference and use of background knowledge is important to interpret and evaluate evidence and persuasive arguments.

The findings in Table 15 present the distribution of literacy and numeracy proficiencies of the U.S. population aged 16 to 65. These findings reveal that in general the skill proficiencies of the population rise with the level of educational attainment, in part as we found in Philadelphia, because of the important independent impact foundational skills have on the likelihood of an individual reaching a given level of attainment. However, when we examine each educational attainment group included in

the table we find considerable within-group differences in both literacy and numeracy skills.

The Educational Testing Service (ETS), the developer of the PIAAC skill measures, contends that Level 3 scores on both literacy and numeracy proficiency measures are necessary for a higher likelihood at success in a variety of economic, social, health, and civic related dimensions of life. Yet the data presented in the Table 15 reveal that even at the college degree level, a considerable share of adults do not achieve this level of foundational skills.

Table 15:
Percentage Distribution of the 16- to 65-Year-Old Population in the U.S.
by Literacy and Numeracy Skill Level, 2012

Literacy Level	Educational Attainment				
	Below High School	High School Credential	Associate's Degree	Bachelor's Degree	Graduate Professional Degree
Below Level 1	15	3	1	0	0
Level 1	31	17	6	4	2
Level 2	37	41	34	22	15
Level 3	15	33	46	50	50
Level 4/5	2	6	14	24	33
Numeracy Level	Educational Attainment				
	Below High School	High School Credential	Associate's Degree	Bachelor's Degree	Graduate Professional Degree
Below Level 1	30	9	3	1	0
Level 1	33	26	13	8	4
Level 2	28	40	42	27	20
Level 3	8	21	34	46	47
Level 4/5	1	4	8	18	29

Source: Madeline Goodman and Robert Finnegan, *Literacy, Numeracy and Problem Solving in Technology Rich Environments Among U.S. Adults: Results from the Program for the International Assessment of Adult Competencies 2012, First Look*, National Center for Education Statistics, U.S. Department of Education, 2014.

Most colleges and universities in the United States would claim that their graduates are expected to possess literacy and numeracy proficiency scores at Level 3. But PIAAC data finds that more than one in four bachelor's degree holders score below

Level 3 on the literacy skills measure, while 36 percent score below Level 3 on the numeracy skills measure.

Skill scores among college graduates have a powerful impact on their employment and earnings outcomes. As we saw in an earlier section of this paper, a substantial number of college graduates are mal-employed; that is, employed in occupations that generally do not use the knowledge, skills, and abilities associated with a college degree. These mal-employed college graduates have earnings that are about the same as their high school graduate counterparts and their literacy and numeracy proficiency scores are well below that of their counterparts employed in college level occupations. Even in college labor markets very substantial employment and earnings penalties are assigned to those with lower levels of foundation skills.³⁷

At the high school credential level, that includes persons who completed high school only as well as those high school graduates who enrolled in a post-secondary program, but never earned a degree, we find 61 percent of adults had failed to achieve a Level 3 literacy proficiency score, while 75 percent had not achieved a Level 3 numeracy score. A recent examination of the earnings outcomes of full-time workers in the U.S. using PIAAC data found large earnings premiums associated with stronger foundational skills. Even after statistically controlling for educational attainment as well as a number of demographic, socioeconomic traits, this research found large gains in earnings for those with better literacy skills as well as numeracy skills.

Poor literacy and numeracy skills do not bode well for the likelihood at a successful life for Philadelphia high school graduates. Literacy and numeracy skills play a central role in the labor market. American employers place a high value on these skills and are therefore effective in finding and rewarding workers with solid foundational skills.

Efforts to organize high school education to bolster completion are important, since graduating from high school can help pave the way for future success. However, it is important that such efforts be complementary to strategies that bolster student

³⁷ Neeta Fogg, Paul Harrington, Ishwar Khatiwada, *Skills and Earnings in the College Labor Market*, Educational Testing Service, Princeton, March, 2019.

foundational skills. A 2006 California appeals court decision regarding a state legislative requirement that students pass an exit exam to receive a high school diploma delineated the substantive difference between attainment and skills:

The purpose of education is not to endow students with diplomas, but to equip them with the substantive knowledge and skills they need to succeed in life. A high school diploma is not an education, any more than a birth certificate is a baby. Its purpose is to symbolize the holder's acquisition of a certain level of knowledge and skills. Students who successfully completed their high school educations, but who did not receive diplomas for some reason (for example, because their school records were destroyed in a natural disaster), would still in fact possess the same level of education as persons with high school diplomas. As we have observed earlier, on the other hand, students who did not successfully complete high school, but who were awarded their diplomas anyway, would not, in fact, have acquired a high school education.³⁸

None of this is to say that educational attainment is unimportant. Completing high school and college has significant, positive influences on employment and earnings, as well as a host of personal, familial, and civic life outcomes. But allowing students to attain degrees and diplomas with low levels of foundational skills diminishes the fundamental promise of education.

³⁸ O'Connell v. Superior Court, 141 Cal. App. 4th 1452, 1478, 47 Cal. Rptr. 3d 147, 167 (Cal. App 1 Dist. 2006)

Appendix A: Estimating the Annual Federal and State Income Taxes Paid by Husbands and Wives in Married Couple Families

In computing the annual value of federal and state income tax payments of adults in the March CPS Annual Social and Economic Supplement, the U.S. Census Bureau adopts a different practice for husbands and wives in married couple families than it does for all other individuals with incomes during the year. For married couple families, the U.S. Census Bureau adopts the assumption that the couple files a joint federal and state income tax return. Research staff then estimated the federal and state income tax liability for the married couple and entire federal and state income tax liability is assigned to the householder of the married couple family. The householder of this married couple family is self-reported by the respondent and can be either the husband or the wife. During 2015-2017, approximately 57 percent of householders in a non-elderly married couple family were males.³⁹

For all other individuals, whether living in families or in non-family households, the federal and state income tax liability appears on their personal record. Given the above practice in assigning income tax liabilities to the head of a married couple family, we cannot identify from the existing March CPS records the specific federal and state income tax liability of the husband and spouse in a married couple family. To avoid exaggerating the income tax payments of the heads of married couple families and underestimating the income tax payments of spouses in such families, we developed a set of computer programming instructions with the STATA statistical package that allowed us to generate separate estimates of the federal and state income tax liability of husbands and wives.

The procedures used to estimate husband/wife income tax liability can be summarized as follows. We first calculated the percentage shares of joint husband/wife income during the year by the family head and the spouse. The family head's percentage share of income was then multiplied by the estimated joint federal income tax liability of the married couple to estimate his (her) federal income tax payments. Suppose that the

³⁹ Our definition of a non-elderly family is one whose householder is an individual under the age of 65.

married couple's federal income tax liability was \$20,000 and the householder's share of the joint husband/wife income during the year was 70 percent. The head's federal income tax liability was computed to be $\$20,000 * .70 = \$14,000$. The remaining \$6,000 in federal income tax liability was then assigned to the spouse.⁴⁰ The same statistical procedure was used to compute the state income tax payments of the husband and wife.

⁴⁰ In a married couple family, the spouse can be either the husband or wife depending on which of the two was classified as the family householder.

Appendix B: Estimating Annual Property Taxes Paid by Householders

The 2015-2017 American Community Surveys (ACS) collected data on the characteristics of the homes occupied by responding households, including ownership status, the self-reported market value of owner-occupied homes, the year when the house was built, and annual property tax payments. The values of homes were reported on continuous basis by households. Data on estimated property tax payments were collected in a categorical form rather than in continuous form. The household was asked to choose from over 68 categories of their annual property tax payments ranging from \$0 to \$10,000 or more. We used mid property tax payment value to estimate average property tax paid by home owners. For example, those households who reported that they paid property tax in \$1-\$49 range were assigned \$24.50.

Appendix C: Estimating State Sales Tax Payments for Individuals

The U.S. Census Bureau does not provide any estimates of annual state sales tax payments for persons interviewed during the March CPS survey. In our fiscal impact analyses, we have estimated state sales tax payments for individual adults in Pennsylvania by using a combination of personal income data from the 2015-2017 ACS survey and sales tax tables for Pennsylvania published annually by the U.S. Department of Treasury’s Internal Revenue Service (IRS). In our analysis of state sales taxes, we applied a single person exemption to each individual respondent between the ages of 18 and 64 years with a positive income. For each person in our analysis, we assigned Pennsylvania state sales tax payment equal to the IRS sales tax deduction for a person in Pennsylvania with their annual income in 2015-2017. Below is a sample table of the allowable sales tax deductions for residents of Pennsylvania in 2017.

Table C-1:
Optional State Sales Tax Tables, Pennsylvania, 2017

Income		Exemptions					
At least	But less than	1	2	3	4	5	Over 5
\$0	\$20,000	234	246	254	260	264	270
\$20,000	\$30,000	364	384	396	405	412	422
\$30,000	\$40,000	434	457	472	482	491	502
\$40,000	\$50,000	495	521	538	550	559	573
\$50,000	\$60,000	550	579	597	611	621	636
\$60,000	\$70,000	600	631	651	666	677	693
\$70,000	\$80,000	646	680	701	717	729	746
\$80,000	\$90,000	689	725	748	765	778	796
\$90,000	\$100,000	730	768	792	810	824	843
\$100,000	\$120,000	784	825	851	870	885	906
\$120,000	\$140,000	855	900	928	949	966	988
\$140,000	\$160,000	922	970	1,001	1,023	1,041	1,065
\$160,000	\$180,000	983	1,035	1,067	1,091	1,110	1,136
\$180,000	\$200,000	1,042	1,097	1,131	1,156	1,176	1,204
\$200,000	\$225,000	1,103	1,161	1,197	1,224	1,245	1,274
\$225,000	\$250,000	1,169	1,231	1,269	1,297	1,320	1,350
\$250,000	\$275,000	1,232	1,296	1,336	1,366	1,390	1,422
\$275,000	\$300,000	1,291	1,359	1,401	1,432	1,457	1,491
\$300,000 or More		1,648	1,735	1,788	1,828	1,860	1,902

Source: Internal Revenue Service, “State and Local General Sales Taxes”, Publication 600: 2017, www.irs.gov.

Appendix D: Estimating the Annual Average Costs of Medicaid

The U.S. Census Bureau collects data on the Medicaid recipient status of respondents in a supplement to the March CPS survey. In the past, the Census Bureau used to apply a fungible value approach⁴¹ to estimate the market value of Medicaid benefits based on the family's annual income. The actual cost of providing Medicaid services is higher than the U.S. Census Bureau fungible or market value estimates. For this reason, the Census Bureau stopped estimating fungible value of Medicaid in the March CPS public use data files.

The actual annual fiscal outlays on Medicaid recipients vary considerably by age group and disability status. Appendix Table D-1 illustrates the methodology that was used by the Center for Labor Markets and Policy to estimate the average annual per capita cost of providing Medicaid to non-elderly adults in the U.S. Based on the March CPS supplement data; we first estimated the distribution of adult Medicaid recipients by their disability status. In Pennsylvania, nearly 68 percent of the Medicaid recipients were classified as adults with disabilities and the remaining 32 percent were non-disabled adults (Appendix Table D-1, first row). According to the Henry J. Kaiser Family Foundation, the costs of providing Medicaid services for disabled and non-disabled adults in Pennsylvania in 2014 were \$17,239 and \$3,154, respectively (Appendix Table D-1, second row).⁴² We calculated annual average Medicaid costs by multiplying the share of each Medicaid recipient group that was disabled by \$18,583 and the share of adults that were non-disabled by \$3,266 (Appendix Table D-1, third row). The annual average expected cost of Medicaid was estimated to be \$5,768 for disabled adults and \$2,211 for non-disabled adults (Appendix Table D-1, fourth row). We then summed the cost of

⁴¹ The U.S. Census Bureau describes fungible value as follows: "The fungible approach for valuing medical coverage assigns income to the extent that having the insurance would free up resources that would have been spent on medical care. The estimated fungible value depends on family income, the cost of food and housing needs, and the market value of the medical benefits. If family income is not sufficient to cover the family's basic food and housing requirements, the fungible value methodology treats Medicare and Medicaid as having no income value. If family income exceeds the cost of food and housing requirements, the fungible value of Medicare and Medicaid is equal to the amount which exceeds the value assigned for food and housing requirements (up to the amount of the market value of an equivalent insurance policy (total cost divided by the number of participants in each risk class))."
<http://www.census.gov/hhes/income/histinc/redefs.html>

⁴² These estimates were converted to 2017 CPI-U adjusted dollars since 2014 data were the latest available from the Kaiser Foundation.

Medicaid for disabled and non-disabled adults to obtain the total average annual cost of providing Medicaid for adults (Appendix Table D-1, fifth row). The total cost of providing Medicaid services to Pennsylvania adults was estimated to be \$7,979.

Finally, to estimate the taxpayer cost of providing Medicaid coverage to adults in Pennsylvania, we multiplied the average annual cost of providing Medicaid coverage to recipients of Medicaid by the percent of the members of the 18- to 64-year-old adult population that were Medicaid recipients (Table D-1, sixth row). Thus, the mean annual per capita costs of Medicaid for adults (18- to 64-years-old) in Pennsylvania was \$1,357. We repeated this process for each of the four educational subgroups of adults used in our analysis. We then added the estimated value of Medicaid in total value of non-cash transfer estimates that appear in this report.

Table D-1:
Estimates of the Mean Annual Per Capita Cost of Providing Medical Care to Non-Elderly Medicaid Recipients (18- to 64-Years-Old) in Pennsylvania in 2015-2017

Variable	Disabled	Non-Disabled
(A) % Distribution of Medicaid Recipients by Disability Status ⁽ⁱ⁾	32.3%	67.7%
(B) Annual Average Cost of Providing Medicaid (Administrative Data) ⁽ⁱⁱ⁾	\$18,583	\$3,266
(C) Annual Average Costs of Providing Medicaid (A * B)	\$5,768	\$2,211
(D) Sum of Costs (Disabled and Non-Disabled)	\$7,979	
(E) % Who Received Medicaid		17.0%
(F) Average Annual Per Capita Cost of Medicaid (D* E)		\$1,357

Sources: (i) March 2015 to 2018 CPS surveys, Work Experience and Income Supplement, public use files, tabulations by authors;
(ii) The Urban Institute and Kaiser Foundation Commission on Medicaid and the Uninsured estimates are based on data from Medicaid Statistical Information System (MSIS) reports from the Centers for Medicare and Medicaid Services (CMS), 2014, web site, <http://www.statehealthfacts.org/comparetable.jsp?ind=183&cat=4>

Appendix E: Estimating Jail/Prison Cost of Adults (aged 18-60)

To estimate rates of institutionalization among the non-elderly adult population of the state of Pennsylvania in 2015-2017, we analyzed the findings of the 2015-2017 American Community Surveys, which interviewed residents of group quarters for the first time during that year. The ACS survey identified the institutionalization status of each adult respondent. This group includes those persons who were under supervision in correctional facilities (jails/prisons), nursing/skilled nursing facilities, mental (psychiatric) hospitals, in patient hospice facilities, and group homes for juveniles. The public use files for the ACS survey unfortunately do not identify the specific type of institution in which these individuals were living at the time of the survey. Nationally, the U.S. Census Bureau's publication of institutionalization data from the 2017 ACS survey revealed that a substantial majority (89%) of the members of the institutionalized population between the ages of 15 and 64 were inmates of correctional facilities. Since our analysis of the costs of incarceration are restricted to adults aged 18-60, the share of institutionalized population that was in correctional facilities is expected to be larger than 89 percent since older adults who are institutionalized are more likely to be in nursing homes and less likely to be in correctional facilities.

The U.S. Bureau of Justice Statistics estimated the annual per state prison inmate costs for the entire nation in 2001.⁴³ Since these estimates have not been updated since 2001, we have used the 2001 per inmate cost estimate for Pennsylvania and adjusted it for inflation between 2001 and 2017 to derive the 2017 per inmate cost. By multiplying the institutionalization rate for each educational group of adults from the 2015-2017 American Community Surveys by the per inmate cost, we can estimate the average annual costs of institutionalization per adult in each educational attainment group. An example of the estimation of the average annual institutionalization cost for 18- to 60-year-old residents in Pennsylvania is provided in Table E-1.

⁴³ James J. Stephan, "State Prison Expenditures", Bureau of Justice Statistics, Special Report, U.S. Department of Justice, June 2004, <https://www.bjs.gov/content/pub/pdf/spe01.pdf>

Table E-1:
Mean Annual Cost of Maintaining 18- to 60-Year-Old
Pennsylvania Adults in Institutions, 2015-2017

(A) 2015-17 Institutionalization Rate	1.5%
(B) Cost of Incarceration in 2017	\$44,170
Average Annual Cost of Incarceration (A*B)	\$641

Appendix F: The Mean Lifetime Net Fiscal Contributions Adults by Educational Attainment

Estimates of lifetime net fiscal contributions are derived by multiplying the annual net fiscal contribution estimates by the total number of years in the work life of each educational group. The work life of each educational subgroup was based on assumptions about the age at which they would begin their work life—which is the age when they are typically expected to earn their educational credentials. We have assumed that a high school graduates would begin their work life at the age of 18 when they earn their diploma; those with below bachelor’s degree education would begin work at age 20, and college graduates with bachelor’s or a higher academic degree would start their working careers at age 22.

The work life span—the number of years between the age at which they complete their education and age 64 -- was thus computed as a 47 year period for high school dropouts and high school graduates, 45 years for those with some college education below the bachelor’s degree level, and 43 years for individuals with a bachelor’s or a higher academic degree.⁴⁴

⁴⁴ Since most graduate and post-graduate students mix schooling with full-time work we have assigned the same age as the beginning of work life (age 22 years) for individuals with a graduate or post-graduate degree as those with just a bachelor’s degree.

Appendix G: Estimating Per Capita City Wage Tax for Philadelphia

One of the components of our fiscal analysis ledger for Philadelphia city and Philadelphia suburbs is the city of Philadelphia wage tax.⁴⁵ Philadelphia city taxes all types of earned income, wage and salaries, commissions and other forms of compensation paid to workers.⁴⁶ There are two city tax rates- one for Philadelphia residents regardless of their place of work and the other is for non-residents of Philadelphia who commute to work in Philadelphia city. Philadelphia city residents are taxed at a higher rate on their earned incomes than their non-resident counterparts. For example, in 2017, city wage tax on earned income for Philadelphia residents was 3.89 percent versus only 3.46 percent for non-resident workers (Table G-1).

Table G-1:
Philadelphia City Wage Tax Rate for 2015, 2016, and 2017

Tax Rate Type	2015	2016	2017
Resident Tax Rate	3.92	3.90	3.89
Non-Resident Tax Rate	3.49	3.47	3.46

Source: Revenue Department, City of Philadelphia, web site,
<http://www.phila.gov/Revenue>.

We applied these tax rates for resident and non-resident workers of Philadelphia city on their earnings reported in 2015-2017 American Community surveys. For example, in 2017, the aggregate earnings of Philadelphia residents (18- to 64-years-old, excluding 18- to 24-year-old students) was \$30.9 billion. Applying resident city wage tax rate of 3.8907 percent in 2017 on these earnings yielded gross tax revenues of \$1.20 billion for the city. Since our measure is a per capita tax payment measure, we divided this gross tax revenue by the number of 18- to 64-year-old residents of Philadelphia city, yielding a per capita city wage tax of \$1,284 in 2017.⁴⁷ We repeated this calculation for each of the five educational subgroups in our analysis with 2015-2016-2017 ACS data. We also repeated

⁴⁵ The city wage tax is the continuation of the Pennsylvania General Assembly Act passed in 1932 that authorized the city of Philadelphia to impose taxes on wages. This particular act was passed to help city of Philadelphia to financially cope with the economic depression.

⁴⁶ The city wage tax is not levied on unearned income.

⁴⁷ We took 3-year averages (ACS 2015-2017) in our analysis.

these sets of calculations to estimate per capita wage tax paid by residents of Philadelphia suburbs who worked in city of Philadelphia.