

SEPTA Economic Impact Update

Methodology Report

April 2020

Econsult Solutions, Inc. (ESI) undertook a comprehensive study of the economic impact of the Southeastern Pennsylvania Transportation Authority (SEPTA) on the Commonwealth of Pennsylvania, which was released in [March 2018](#).

This methodology report updates many of the calculations from that study, utilizing more recent data within the existing analytical framework.

Updated calculations are presented in the following categories through the course of this report:

- 1) **Economic Activity and Population Share** documents the contributions of the southeast region of Pennsylvania to total activity in the Commonwealth.
- 2) **Share of General Fund Revenue** estimates the relative contribution of the southeast region to Pennsylvania's General Fund revenues.
- 3) **Population Growth Trends** compares recent growth patterns within the southeast region to the remainder of the state, and looks at the relationship between transit service and growth and development patterns within the city of Philadelphia.
- 4) **SEPTA's Economic Footprint** calculates the annual direct and spillover economic activity, employment, earnings and tax revenues attributable to SEPTA's recent operating and capital expenditures.

Since 2018, ESI has also undertaken a range of additional studies which document additional facets of SEPTA's economic impact, including its contribution to property values, catalytic growth and development, and equitable distribution of opportunity and cost savings. Information on each of these analyses is available online at:

<https://econsultsolutions.com/case-studies/septa-economic-intelligence/>

1 Economic Activity and Population Share

Southeastern Pennsylvania is a key engine for the Commonwealth’s economy in large part due to the concentrations of population, people and ideas that enable economic productivity. Despite occupying just five percent of Pennsylvania’s land area, the five-county region represents 32 percent of Pennsylvania’s population, 33 percent of its private sector employment and 42 percent of its gross economic product (see Figure 1.1).¹

Figure 1.1: Southeastern Pennsylvania Share of the Commonwealth

Category	Five-County Region	Commonwealth of Pennsylvania	Five-County Share	Data Source
Land Area	2,156 sq miles	44,743 sq miles	4.8%	Census Bureau (Census 2010)
Population	4.135 million	12.802 million	32.3%	Census Bureau (2019 Pop Est)
Private Sector Employment	1.721 million	5.194 million	33.1%	BLS QCEW (2018)
Gross Product	\$331.3 billion	\$797.2 billion	41.6%	IMPLAN (2018)

Densities of people and economic activity are not possible without a transportation network that moves people efficiently throughout the region. Southeastern Pennsylvania’s businesses count on a network of reliable and frequent transit services to directly transport employees as well as to reduce traffic congestion on the region’s highway and road network. All residents of the region benefit from SEPTA, including those who are not direct users of the service, because it is critical to the area’s economic vibrancy and its transportation network.

Share of Activity - Methodology

Calculations for each category are drawn from most recent available estimates from data sources providing comprehensive county level and statewide data. Results for the five counties in southeastern Pennsylvania are summed and calculated as a share of statewide results.

Land Area

Data from the US Census Bureau (2010) are used to estimate county and state land areas, which have not changed since that time.

Population

County and state level data from the 2019 vintage of the US Census Bureau’s Population estimates (released in March 2020) are utilized. This source provides population estimates as of July 1 of each year (most recently 2019).

Private Sector Employment

Private sector employment is estimated using the most recently completed year of data (2018) available from the Bureau of Labor Statistics’ Quarterly Census of Employment and Wages, which provides average annual employment over the course of each calendar year.

Economic Activity

The southeastern region’s share of Pennsylvania’s Gross Regional Product (GRP) is estimated using 2018 data reported by IMPLAN. This industry-standard tool for economic modeling relies on a base set of economic data drawn from government sources and refined by the Minnesota IMPLAN Group through additional analysis.²

¹ The five-county southeastern region considered in this analysis is comprised of: Bucks, Chester, Delaware, Montgomery and Philadelphia counties

² IMPLAN data is the basis for the input-output modeling within the economic impact calculations in Section 4 of this report.

2 Share of General Fund Revenue

This component of the analysis estimates the share of Pennsylvania’s General Fund revenues attributable to the southeastern region of the state in Fiscal Year 2019. Government and private data sources are utilized to analyze the revenues that flow to the General Fund from the five-county southeastern region.

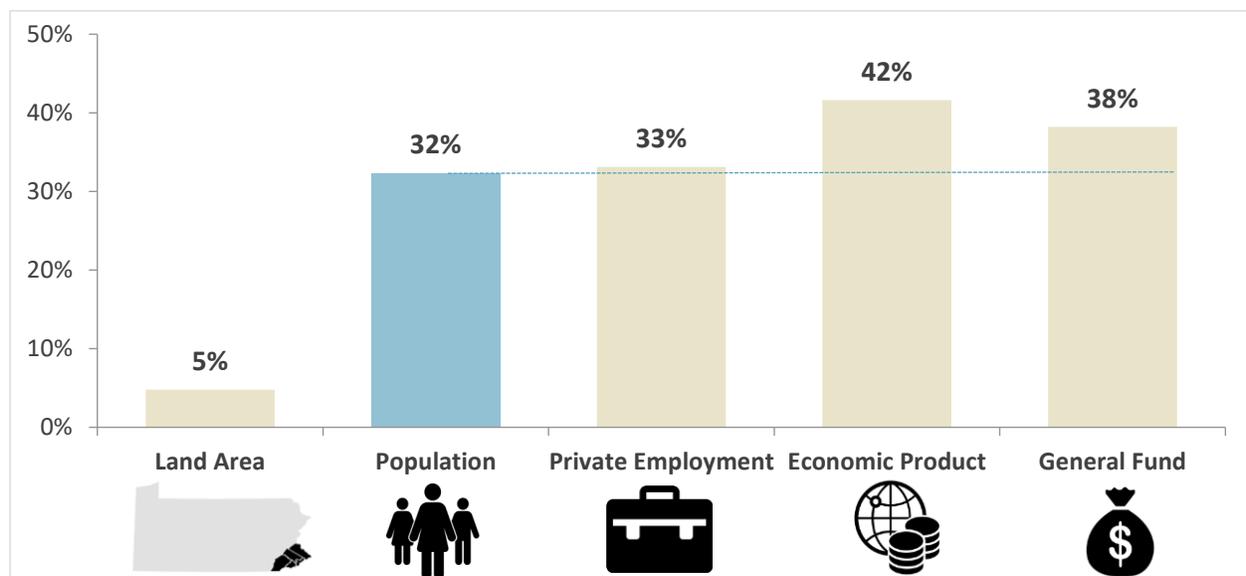
The southeast region is estimated to generate 35 percent of statewide sales tax, 40% of statewide income tax, 42% of statewide corporation tax, and 40% of statewide estate and realty transfer tax.³ Collectively, 38 percent of the commonwealth’s General Fund revenues are estimated to originate in the five-county southeast region, or \$13.3 billion of the Commonwealth’s \$34.9 billion General Fund for FY 2019 (see Figure 2.1).

Figure 2.1: Estimated Southeastern Pennsylvania Contribution to Pennsylvania General Fund, FY 2019

Revenue Source	Pennsylvania Total FY 2019	Est 5-County FY 2019	Est 5-County Share
Sales and Use Tax (\$M)	\$11,100	\$3,913	35.3%
Other Consumption Taxes (\$M)	\$1,654	\$583	35.3%
Income Tax (\$M)	\$14,096	\$5,592	39.7%
Corporation Tax (\$M)	\$5,511	\$2,291	41.6%
Estate and Realty Transfer Tax (\$M)	\$1,588	\$634	39.9%
Non-Tax / Other Revenues (\$M)	\$910	\$294	32.3%
General Fund Total (\$M)	\$34,858	\$13,307	38.2%

The southeast region is an outsized contributor to Pennsylvania’s tax base and its economy relative to its population due to the level of productivity enabled in part by the region’s density (see Figure 2.2).

Figure 2.2: Southeastern Pennsylvania Share of Statewide Activity



³ Note that the consumption-based sales tax share for the southeast are somewhat lower than the share of the other asset-based taxes due to leakage in consumption by residents of the region to nearby states (New Jersey, Delaware, Maryland).

Notably, similar dynamics exist in the Pittsburgh region, the second largest metropolitan area in Pennsylvania, which is served by its second largest transit operator, the Port Authority of Allegheny county. Allegheny County, which includes the city of Pittsburgh and surrounding suburbs, sits on less than 2% of Pennsylvania’s land area. Based on the same data sources and approach outlined for the southeast region, Allegheny County represents 9.5% of Pennsylvania’s population and generates 12% of private employment, 13% of economic product, and 11% of General Fund revenues.

Collectively, the six counties served by Pennsylvania’s two largest transit operators (SEPTA and Port Authority) account for 42% of Pennsylvania’s population, 50% of General Fund revenues, and 55% of Pennsylvania’s economic product.

Change over Time

The contribution of the southeast region to statewide activity has risen in recent years. Utilizing a consistent methodology with the data sources described in this report, it is possible to calculate changes in the region’s share of population, economic activity and tax base contributions over time.

Figure 2.3 presents these calculations as of FY 2013 (prior to the passage of Act 89), FY 2016 and FY 2019. Land area of the southeast region remains fixed as no county boundaries have changed. The southeast’s share of Pennsylvania’s population, employment, economic product and General Fund revenue have all grown steadily over the time period. The southeast’s share of state economic product grew from 40% in FY 2013 to 41% in FY 2016 to 42% in FY 2019.⁴ Accordingly, the southeast’s contribution to the Commonwealth’s General Fund relative to the rest of the state has also grown. Revenues from the southeast region comprised 36.0% of the General Fund in FY2013, which grew to 36.4% in FY2016 and to 38.2% in FY2019.

Figure 2.3: Southeastern Pennsylvania Share of Statewide Activity: Change over Time

Category	FY 2013	FY 2016	FY 2019
Land Area	4.8%	4.8%	4.8%
Population	31.8%	32.1%	32.3%
Private Sector Employment	32.4%	32.7%	33.1%
Economic Product	39.7%	40.7%	41.6%
General Fund Contribution	36.0%	36.4%	38.2%

Each percentage point of General Fund contribution equates to \$350 million in state revenue. This means that if the southeast region’s relative contribution remained at FY 2013 levels, it would decrease General Fund revenues by \$770 million.

Similarly, each percentage point in GRP equates to \$8 billion in economic product. If the southeast share remained at FY 2013 levels, it would decrease statewide economic activity by \$15 billion.

⁴ FY 2013 calculations are based on calendar year 2012 GRP estimates from IMPLAN, while FY 2016 estimates are based on calendar year 2015 GRP and FY 2019 estimates on calendar year 2018 GRP.

Share of General Fund - Methodology

The subsections that follow detail the data sources utilized to estimate the county by county contribution to each revenue source, and the proportion of Commonwealth revenues from each source estimated to originate in southeastern Pennsylvania.

Sales and Use and Consumption Taxes

Sales tax revenue represents nearly one-third of Pennsylvania’s General Fund (\$11.1 billion in FY 2019). Total sales tax remittance is comprised of three separate categories in Pennsylvania – sales tax, motor vehicle sales tax, and miscellaneous / Liquor Control Board sales tax. Data from the Pennsylvania Treasury available in the statistical supplement to the Pennsylvania FY 2018-2019 Tax Compendium tracks the remittance of non-Motor Vehicle and Motor Vehicle Sales Tax by county. Miscellaneous and Liquor Control Board (LCB) Sales Tax remittance is provided only at the state level. The proportion of each county’s taxable income (as reported by the Compendium) is used to estimate its share of state Miscellaneous and LCB Sales Tax. Total sales tax remittance by county is estimated by summing the county’s contributions to the three categories of Sales Tax. This methodology is replicated for analysis of FY 2013 and FY 2016 data as reported by the statistical supplements to the Pennsylvania FY 2012-2013 and FY 2015-2016 Tax Compendiums, respectively.⁵

The southeast region of Pennsylvania generates an estimated \$3.9 billion in total sales tax revenue, which represents 35 percent of the Commonwealth’s total sales tax revenue. These shares are also applied as a proxy measure to allocate additional consumption (most notably cigarette and liquor) taxes, which represent additional types of sales activity. These consumption taxes total an additional \$1.65 billion statewide for FY 2019, of which \$583 million is allocated to the southeast region (see Figure 2.4).

Figure 2.4: Estimated Distribution of Pennsylvania Sales and Use & Consumption Tax Revenue, FY 2019

	PA	5-County	5-County Share	Bucks	Chester	Dela	Mont	Phila
Sales Tax Remittance (\$M)	\$4,189	\$1,323	32%	\$214	\$205	\$195	\$338	\$371
Motor Vehicle Sales Tax Remittance (\$M)	\$1,483	\$437	29%	\$80	\$68	\$59	\$107	\$123
Miscellaneous/LCB Sales Tax (\$M)	\$5,428	\$2,153	40%	\$407	\$390	\$312	\$607	\$438
Sales and Use Tax Total (\$M)	\$11,100	\$3,913	35%	\$701	\$663	\$566	\$1,052	\$932
Consumption Tax Total (\$M)	\$1,654	\$583	35%	\$104	\$99	\$84	\$157	\$139

Income Tax

Income tax revenue accounts for approximately one third of the Commonwealth’s General Fund. The Pennsylvania Treasury’s statistical supplement to the Pennsylvania FY 2018-2019 Tax Compendium provides data tracking the remittance of personal income tax by county based on income tax filings for calendar year 2017. This data is used to calculate the relative income tax contributions by county. These proportions are then applied to the total reported income tax collections statewide for FY 2019 to develop allocations by county and for the southeast region in aggregate. The same approach is taken to estimate income tax revenue in FY 2013 and FY 2016, using

⁵ In FY 2014, the Department of Revenue adjusted sales tax remittance reporting based on updated address information and county codes. To maintain consistency and allow for comparability of results, sales tax remittance by county for FY 2013 is estimated using the relationship between income and sales tax remittance by county for 2016. This ratio is matched with FY 2013 income tax data by county to estimate sales tax remittance by county in FY 2013.

data reported by the statistical supplements to the Pennsylvania FY 2012-2013 and FY 2015-2016 Tax Compendiums, respectively.

The southeast region is a major driver of income tax revenue to the Commonwealth, generating \$5.6 billion in income tax revenue which represents approximately 40% of Pennsylvania’s income tax revenue (see Figure 2.5).

Figure 2.5: Estimated Distribution of Pennsylvania Income Tax Revenue, FY 2019

	PA	5-County	5-County Share	Bucks	Chester	Dela	Mont	Phila
Income Tax (\$M)	\$14,096	\$5,592	40%	\$1,057	\$1,011	\$811	\$1,575	\$1,137

Corporation Tax

Corporation tax revenue represents approximately 15 percent of the Commonwealth’s General Fund. The Pennsylvania Treasury reports corporation tax remittance at the state rather than county level.⁶ Therefore, data from IMPLAN calendar year 2018 for Real Gross Regional Product by county is used as a proxy for each county’s contribution to the state’s corporation tax collections in FY2018-19. Each relevant county’s GRP as a share of the Pennsylvania GRP in 2018 is calculated using this data, and shares are used to allocate corporation tax remittance by county. A consistent approach is used to estimate Corporation Tax remittance by county in FY 2013 and FY 2016. GRP shares for FY 2013 are based on calendar year 2012 GRP estimates from IMPLAN and FY 2016 shares are based on calendar year 2015 estimates from IMPLAN. State level remittance data for FY 2013 and FY 2016 is based on the statistical supplements to the Pennsylvania FY 2012-2013 and FY 2015-2016 Tax Compendiums, respectively

The southeast region is estimated to generate \$2.3 billion in corporation tax revenue, which represents 42 percent of the Commonwealth’s total corporation tax revenues (see Figure 2.6).

Figure 2.6: Estimated Distribution of Pennsylvania Corporation Tax Revenue, FY 2019

	PA	5-County	5-County Share	Bucks	Chester	Dela	Mont	Phila
Corporation Tax (\$M)	\$5,511	\$2,291	42%	\$248	\$310	\$245	\$596	\$890

Estate and Realty Transfer Tax

Inheritance (estate) and realty transfer tax combined account for approximately five percent of the Commonwealth’s General Fund revenues. The Pennsylvania Treasury’s statistical supplement to the Pennsylvania FY 2018-2019 Tax Compendium reports the remittance of estate tax and realty transfer tax by county. This data is used estimate the share of estate tax and realty transfer tax associated with each county. These proportions are then applied to the total reported combined estate and realty transfer tax collections statewide for FY 2019 to develop allocations by county and for the southeast region in aggregate. A consistent approach is used to allocate remittance for FY 2013 and FY 2016 using data from the statistical supplements to the Pennsylvania FY 2012-2013 and FY 2015-2016 Tax Compendiums, respectively.

⁶ A county-level analysis would also face challenges due to the inconsistent relationship between the location of business activity and the physical address where corporations are headquartered, which itself may be chosen for advantageous tax purposes.

The southeast region of Pennsylvania generates \$634 million in combined estate and realty transfer tax which represents 40 percent of the Commonwealth’s total estate and transfer tax revenue of \$1.59 billion (see Figure 2.7).

Figure 2.7: Estimated Distribution of Pennsylvania Estate and Realty Transfer Tax Revenue, FY 2019

	PA	5-County	5-County Share	Bucks	Chester	Dela	Mont	Phila
Estate Tax (\$M)	\$1,054	\$391	37%	\$70	\$59	\$67	\$120	\$75
Realty Transfer Tax (\$M)	\$534	\$243	45%	\$39	\$39	\$30	\$55	\$80
Total (\$M)	\$1,588	\$634	40%	\$110	\$98	\$97	\$175	\$155

Non-Tax and Other Revenue

The tax revenue sources outlined above account for more than 97 percent of General Fund revenues for FY 2019, with remaining sources comprising \$910 million out of the \$34.9 billion total. Remaining funds come primarily from non-tax revenues, which accounted for \$801 million in FY 2019. These revenues come through a variety of mechanisms, making a tax base difficult to define. Accordingly, these remaining funds are allocated proportionally by population across each county for the purpose of the relative tax base calculation.

Based on population proportions, the southeast region is allocated a contribution of \$294 million of these revenues (see Figure 2.8).

Figure 2.8: Estimated Distribution of Pennsylvania non-Tax and Other Revenues, FY 2019

	PA	5-County	5-County Share	Bucks	Chester	Dela	Mont	Phila
Non-Tax and Other (\$M)	\$910	\$294	32%	\$45	\$37	\$40	\$59	\$113

General Fund Totals and Shares

County-level contributions from each source outlined above are aggregated and a weighted sum is calculated for each county in order to reflect the relative contribution to the total Pennsylvania General Fund.

For FY 2019, the southeast region is estimated to account for \$13.3 billion of the state’s \$34.9 billion General Fund, or 38.2% (see Figure 2.9). Parallel calculations are also shown for FY 2016 and FY 2013. For FY 2016, the southeast region was estimated to account for \$11.3 billion of the state’s \$30.9 billion General Fund, or 36.4% (see Figure 2.10), while for FY 2013, the southeast region was estimated to account for \$10.3 billion of the state’s \$28.6 billion General Fund, or 36.0%

Figure 2.9: Contribution to the Pennsylvania General Fund by County, FY 2019

Revenue Source	PA Total (\$M)	5-County (\$M)	5-County Share (%)	Bucks	Chester	Dela	Mont	Phila
Sales and Use	\$11,100	\$3,913	35.3%	6%	6%	5%	9%	6%
Other Consumption	\$1,654	\$583	35.3%	6%	6%	5%	9%	6%
Income	\$14,096	\$5,592	39.7%	7%	7%	6%	11%	7%
Corporation	\$5,511	\$2,291	41.6%	5%	6%	4%	11%	5%
Estate & Realty Transfer	\$1,588	\$634	39.9%	7%	6%	6%	11%	7%
Non-Tax / Other	\$910	\$294	32.3%	5%	4%	4%	6%	5%
General Fund Total (%)			38.2%	6%	6%	5%	10%	6%
General Fund Total (\$)	\$34,858	\$13,307		\$2,265	\$2,218	\$1,844	\$3,614	\$2,265

Figure 2.10: Southeastern Pennsylvania General Fund Contribution, FY 2016

Revenue Source	PA Total (\$M)	5-County (\$M)	5-County Share (%)
Sales and Use	\$9,659	\$3,054	31.6%
Other Consumption	\$1,285	\$406	31.6%
Income	\$12,506	\$4,832	38.6%
Corporation	\$5,138	\$2,090	40.7%
Estate & Realty Transfer	\$1,444	\$603	41.7%
Non-Tax / Other	\$870	\$279	32.0%
General Fund Total	\$30,902	\$11,264	36.4%

Figure 2.11: Southeastern Pennsylvania General Fund Contribution, FY 2013

Revenue Source	PA Total (\$M)	5-County (\$M)	5-County Share (%)
Sales and Use	\$8,894	\$2,764	31.1%
Other Consumption	\$1,360	\$423	31.1%
Income	\$11,371	\$4,376	38.5%
Corporation	\$5,190	\$2,058	39.7%
Estate & Realty Transfer	\$1,184	\$472	39.9%
Non-Tax / Other	\$648	\$206	31.9%
General Fund Total	\$28,647	\$10,299	36.0%

3 Population Growth Trends

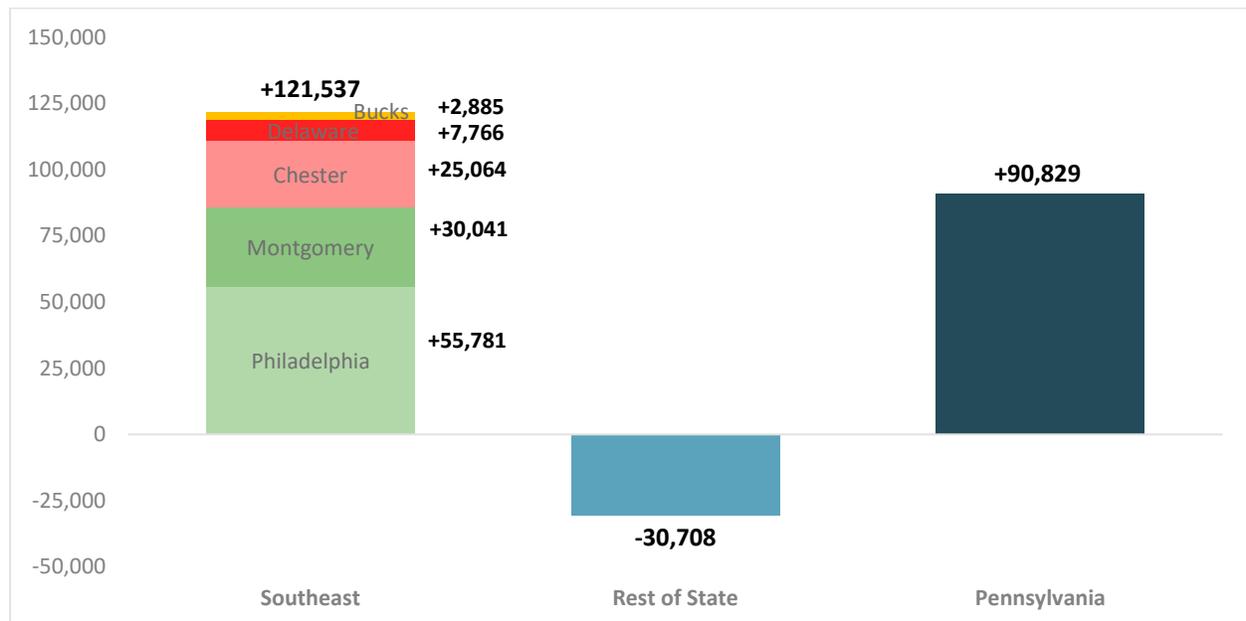
Pennsylvania

The southeast region has also been the major driver of population growth in Commonwealth in recent years. Population estimates from the US Census Bureau show that the southeast region has grown by more than 121,000 residents from July 1, 2010 to July 1, 2019, while Pennsylvania’s population grew over that time period by close to 91,000.⁷ This means that the remainder of the state has experienced a net population loss during this period of more than 30,000 residents (see Figure 3.2).

Figure 3.1: Pennsylvania Population Growth, 2010-2019

Geography	2010	2019	Growth 2010-2019
Bucks	625,385	628,270	2,885
Chester	499,925	524,989	25,064
Delaware	558,981	566,747	7,766
Montgomery	800,874	830,915	30,041
Philadelphia	1,528,283	1,584,064	55,781
Pennsylvania	12,711,160	12,801,989	90,829
Southeastern PA	4,013,448	4,134,985	121,537
Rest of State	8,697,712	8,667,004	(30,708)

Figure 3.2: Net Population Growth, 2010-2019



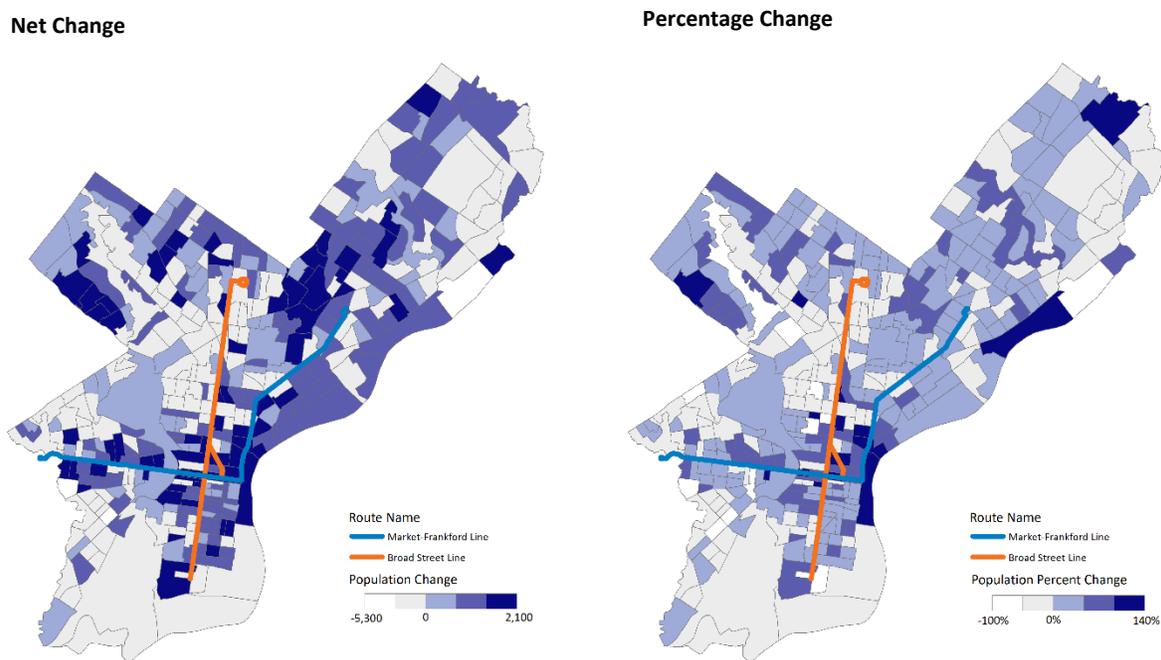
⁷ Population estimates are drawn from the 2019 Vintage of the US Census Bureau population estimates program. The release of each new vintage includes revised estimates of the July 1 population by county and statewide for each year from 2010-2019, which supersede prior estimates for those years.

Philadelphia

Within Philadelphia, the majority of population growth has taken place in proximity to SEPTA’s service, particularly along the spine of rail service provided by the Broad Street Line (BSL) and Market Frankford Line (MFL). MFL and BSL stations have provided a catalyst for development, providing an attractive option for Center City workers to live within close proximity to their jobs, with a relatively short commute on SEPTA’s network.

Figure 3.3 below shows population change from 2010-2018 for each Census tracts in Philadelphia in terms of both the net change (in people) and the relative change (in percentage terms). Census tracts in proximity to the to the BSL and MFL account for 23% of the city’s population, but represented 46% of the population growth from 2010-2018 period.⁸ This means that these tracts grew at 2x the rate of the city over this period.

Figure 3.3: Philadelphia Population Change by Census Tract, 2010-2018



⁸ The most recent available data on population growth at the Census Tract level comes from the 2018 American Community Survey (ACS), released in December 2019. This analysis relies on data from the 5-year ACS sample. Citywide figures vary slightly from the county and state population estimates presented above, due to both differences in the analysis year and to differences between Census data products.

Just as residents are attracted to locations with transit access, commercial development is attracted to locations that are well-served by transit, which allows large concentrations of workers to cluster at specific locations without overwhelming the street grid and highway network with congestion.

Much of the new large-scale commercial development and relocations in recent years have been in close proximity to SEPTA's service hubs. Further, new office towers have often featured limited onsite parking, allowing for more space to be dedicated to commercial activity and indicating that employers are anticipating that a significant share of the workforce will commute without a private vehicle.

- Major employers such as Thomas Jefferson University and Morgan Lewis have relocated their corporate headquarters to transit-friendly locations within Philadelphia's downtown, and cited SEPTA service as a motivating factor in their location.¹⁰
- Comcast has developed two towers and its headquarters campus directly on top of SEPTA's suburban station by creating a pedestrian connector that directly links thousands of its employees and visitors to its corporate headquarters.¹¹
- Large-scale planned development in University City such as Schuylkill Yards and Wexford's uCity Square are highly reliant on the density of transit service flowing through 30th Street station.

"We timed the walk (from 30th Street Station to 2222 Market). It was important for us to test. We don't know what the future holds but we can imagine it with fewer cars. Many of our associates don't own cars and live in the city. For people who live outside of the city, commuting on the train is how they get to work."

— Sarah Bouchard, Managing Partner for Morgan Lewis' Philadelphia Office⁹

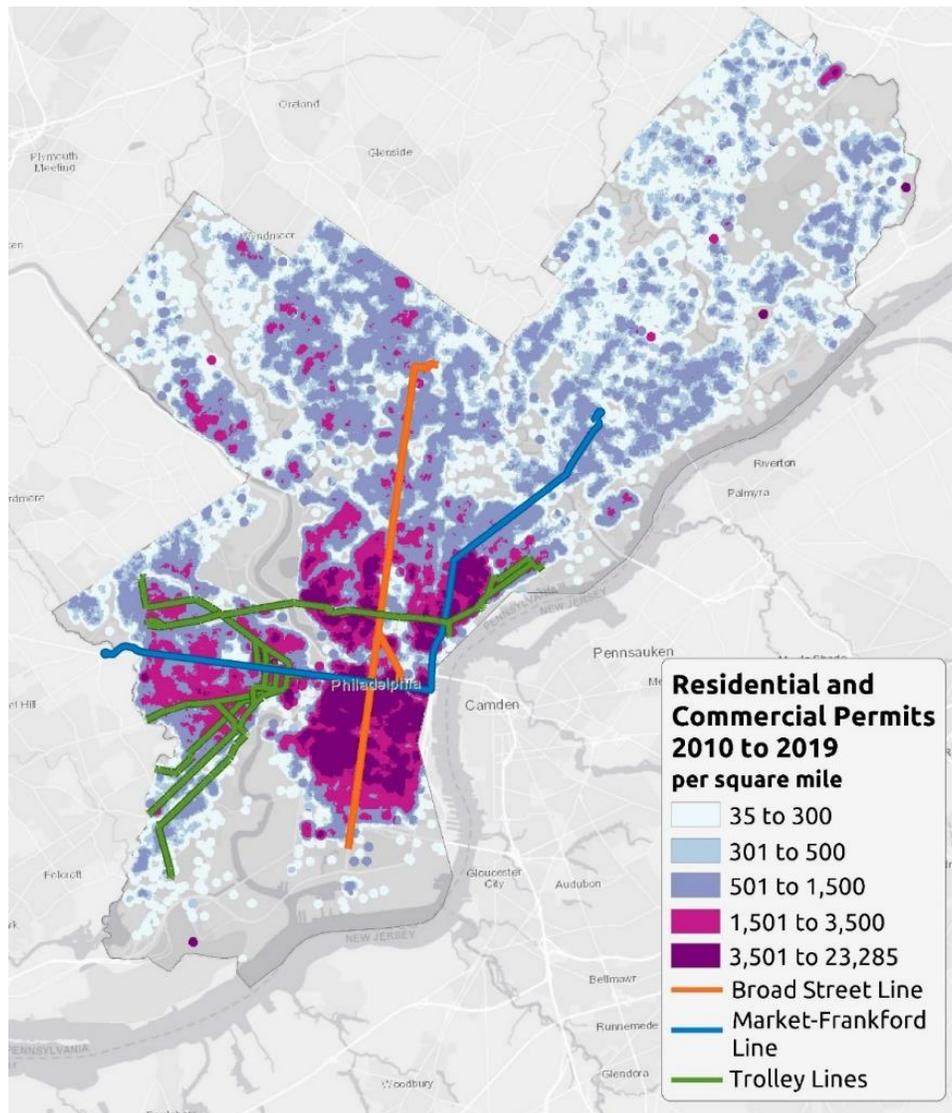
Similar to the population growth trends along SEPTA's major service lines, the spatial distribution of new commercial and residential building permits issued by the city over the past decade tracks closely with SEPTA's major service lines (see Figure 3.4).

⁹ Kostelni, Natalie, "Morgan Lewis signs deal to kick off new \$200M Center City office tower," *Philadelphia Business Journal*, January 21, 2020, <https://www.bizjournals.com/philadelphia/news/2020/01/21/morgan-lewis-signs-deal-to-kick-off-new-200m.html>.

¹⁰ Kostelni, Natalie, "How Jefferson went from 30 possible sites to 110 Market for new HQ," *Philadelphia Business Journal*, December 26, 2017, <https://www.bizjournals.com/philadelphia/news/2017/12/26/jefferson-health-new-hq-1101-market-street-search.html>.

¹¹ Comcast, "Welcome to Our Home, accessed April 16, 2020, <https://comcastcentercampus.com/campus>.

Figure 3.4: Philadelphia Building Permit Density, 2010-2019



The city's and regional transportation network is a crucial differentiator in its competitiveness as a region, and accordingly a major facilitator of regional productivity and economic growth. Increased density within a metropolitan core has a demonstrated relationship with increased productivity and knowledge spillover (often described as "agglomeration effects") that enhance a region's competitiveness and yield further growth in a reinforcing cycle. Because congestion and extended commute times have an economic and quality of life cost for regional residents and businesses, robust transit service is crucial to a balanced transportation network that can deliver a significant volume of daily commuters into an area with a limited footprint without enduring costly congestion delays.

4 Economic Footprint

In addition to its role in facilitating regional productivity and growth, SEPTA is itself an economic generator through its capital and operating expenditures each year. SEPTA is a major initiator of capital investments for the maintenance and expansion of its network. SEPTA is also a major hub of employment throughout the region and procurement activity throughout the region and Commonwealth through its day to day mission as a transportation operator.

These direct expenditures on capital and operating activity in turn generate significant “spillover impacts” through SEPTA’s suppliers and through the recirculation of labor income supporting employment in a range of sectors across the economy. SEPTA’s total economic footprint within each county, the region and the Commonwealth economy are the sum of these direct and spillover effects. This activity also generates considerable tax revenues for government jurisdictions, most notably the Commonwealth of Pennsylvania and City of Philadelphia.

Results show below reflect average annual levels of economic and tax revenue impacts over the past five fiscal years (FY 2015-2019). A detailed methodology description follows the presentation of results.

Annual Economic Impact from Capital Investments

SEPTA’s capital investments generate nearly \$1.1 billion in direct and spillover economic impact within Pennsylvania each year, supporting nearly 7,200 jobs and \$414 million in employee earnings. Figure 4.1 below shows the breakdown of economic impact, employment, and earnings by county.

Figure 4.1: Annual Economic Impact from SEPTA’s Capital Investments, FY 2015 to FY 2019 (in \$2019)

Impact Type	PA	5-County	Bucks	Chester	Dela	Mont	Phila
Direct Output (\$M)	\$492	\$469	\$89	\$22	\$109	\$52	\$195
Indirect & Induced Output (\$M)	\$589	\$508	\$65	\$65	\$73	\$123	\$181
Total Impacts (\$M)	\$1,081	\$977	\$154	\$87	\$182	\$176	\$376
Employment Supported	7,190	6,600	1,090	540	1,290	1,100	2,570
Employee Compensation (\$M)	\$414	\$381	\$63	\$31	\$75	\$63	\$149

Annual Economic Impact from Ongoing Operations

SEPTA’s operating expenditures generate more than \$2.3 billion in direct and spillover economic impact in Pennsylvania each year, supporting more than 18,600 jobs and more than \$1.4 billion in employee earnings. Figure 4.2 below shows the breakdown of economic impact, employment, and earnings by county.

Figure 4.2: Annual Economic Impact from SEPTA’s Ongoing Operations, FY 2015 to FY 2019 (in \$2019)

Impact Type	PA	5-County	Bucks	Chester	Dela	Mont	Phila
Direct Output (\$M)	\$1,303	\$1,274	\$54	\$44	\$123	\$120	\$933
Indirect & Induced Output (\$M)	\$1,042	\$984	\$90	\$46	\$172	\$148	\$529
Total Impacts (\$M)	\$2,345	\$2,258	\$144	\$90	\$294	\$268	\$1,462
Employment Supported	19,340	18,630	1,180	820	2,320	2,330	11,970
Employee Compensation (\$M)	\$1,441	\$1,415	\$64	\$40	\$154	\$122	\$1,035

Combined Annual Economic Impact from Capital Investments and Ongoing Operations

Combined, the annual economic impacts from SEPTA’s capital investments and ongoing operations generate more than \$3.4 billion in direct and spillover economic impact in Pennsylvania each year, supporting more than 26,500 jobs and nearly \$1.8 billion in earnings. Figure 4.3 below shows the breakdown of economic impact, employment, and earnings by county.

Figure 4.3: Annual Economic Impact from SEPTA’s Capital Investments and Ongoing Operations, FY 2015 to FY 2019 (in \$2019)

Impact Type	PA	5-County	Bucks	Chester	Dela	Mont	Phila
Direct Output (\$M)	\$1,795	\$1,743	\$143	\$66	\$231	\$173	\$1,128
Indirect & Induced Output (\$M)	\$1,631	\$1,492	\$155	\$111	\$245	\$271	\$710
Total Impacts (\$M)	\$3,426	\$3,235	\$298	\$177	\$476	\$444	\$1,838
Employment Supported	26,530	25,230	2,270	1,360	3,610	3,430	14,540
Employee Compensation (\$M)	\$1,855	\$1,797	\$127	\$71	\$229	\$185	\$1,184

Annual Tax Revenue Impact from Capital Investments and Ongoing Operations

The direct and spillover economic activity from SEPTA’s capital investments and ongoing operations also yield significant returns to local governments and to the Commonwealth of Pennsylvania in the form of tax revenues. While SEPTA is not directly subject to any sales, income or property tax, the wages that it pays its employees and the income indirectly generated by its activity contribute to the income tax base for local governments and for the Commonwealth. In addition, the indirect and induced impact of SEPTA’s activity as it ripples throughout the economy occurs broadly within the private sector of the economy, and is therefore tax generating.

On an annual basis, the total economic activity (including direct, indirect and induced impacts) from SEPTA’s capital investments and ongoing operations generates \$41 million in tax revenue for the Commonwealth of Pennsylvania and well \$71 million in revenue for the City of Philadelphia (see Figure 4.4).

Figure 4.4: Combined Annual Tax Revenues Impacts from Capital Investments and Ongoing Operations, FY 2015 to FY 2019 (in \$2019)

Tax Type	City of Philadelphia			Commonwealth of Pennsylvania		
	Operations	Capital	Total	Operations	Capital	Total
Income Tax (\$M)	\$28	\$4	\$32	\$32	\$8	\$40
Sales Tax (\$M)	\$3	\$1	\$3	\$16	\$7	\$23
Business Tax (\$M)	\$4	\$1	\$5	\$5	\$2	\$8
Total (\$M)	\$35	\$6	\$41	\$53	\$18	\$71

Importantly, these tax revenue impacts are reflective only of the activity related to SEPTA’s economic footprint (as reviewed throughout this section), and do not include the significant fiscal implications for local government and for the Commonwealth of SEPTA’s catalytic impacts on property value and development. These benefits are detailed within additional analyses that ESI has undertaken for SEPTA.¹²

¹² See: <https://econsultsolutions.com/case-studies/septa-economic-intelligence/>

Methodology – Economic Impact

Economic impact calculations are generated through a three-step process:

- 1) Estimating the initial amount of direct activity occurring within the five-county region and Commonwealth of Pennsylvania in each category,
- 2) Using input-output models to translate this direct economic activity into the total amount of economic activity (direct and spillover) that it supports within those geographies, as well as the tax revenue impacts of this activity.
- 3) Allocating regional estimates to each county within the region using a “sharedown” approach to ensure that the sum of county level results equate to regional results.

This section describes the scope and data inputs used in the analysis, summarizes the methodologies and tools used to construct, use, and interpret the input-output models, and details the approach used to allocate regional impacts to the county level.

Scope of Analysis

The analysis seeks to quantify the current annual level of economic activity associated with SEPTA, using the most appropriate and recent data available for each component of the analysis. Throughout the analysis, the approach seeks to quantify the most representative available inputs for SEPTA’s *current* impact level, rather than aligning precisely to a specific twelve-month period.

Where available, averaged data over multiple years is utilized to avoid allowing large-scale or unusual activity in a given year from unduly influencing the annualized activity level. Capital investment and operating impacts are expressed as an annualized averaged of the five most recent fiscal years (FY 2015-2019). All results are expressed in inflation-adjusted dollars (\$2019) to allow for appropriate comparison.

Data utilized throughout this analysis are largely provided by SEPTA, and match publicly reported budgetary figures. Other data has been derived from public sources, or from within the IMPLAN economic modeling framework.

Economic impacts are calculated for the five-county region served by SEPTA (Bucks, Chester, Delaware, Montgomery, and Philadelphia counties) and for the Commonwealth of Pennsylvania. This includes direct impacts, which are modeled within the geography in which they occur, as well as indirect and induced impacts, which capture spillover effects within the relevant geographies. Tax revenue impacts are calculated for the City of Philadelphia and Commonwealth of Pennsylvania. Impacts occurring outside of these geographies are excluded, as are additional local property tax revenue effects within suburban jurisdictions.

Direct Activity from Capital Investments

SEPTA provided information on annual capital expenditures by contract type for Fiscal Years 2015 to 2020 Q1.¹³ Expenditures for FY 2015 and FY 2016 were converted to current dollars using the Consumer Price Index from the Bureau of Labor Statistics.¹⁴ Annualized expenditure amounts in \$2019 were then averaged for the FY 2015-2019 period (yielding an annual average of \$557.1 million in nominal terms and \$570.1 million in \$2019) (see Figure 4.5).

Figure 4.5: Annual Capital Investments (Nominal and in \$2019)

Fiscal Year	Nominal Spend (\$M)	Inflation-Adjusted Spend (\$2019)
2015	\$447.9	\$483.8
2016	\$550.3	\$588.8
2017 to 2020 (Q1)	\$2,190.4	\$2,190.4
2017 – Q1 2020 Annualized	\$588.7	\$588.7
Annualized Average	\$557.1	\$570.1

Budget detail provided by SEPTA was utilized to categorize the expenditures by type. Soft constructions costs (for services like architecture and engineering) and hard construction costs represented contracted dollars to external vendors (which in turn is spent on a mix of labor, goods and services). Additionally, SEPTA pays internal employees for capital activity. Finally, SEPTA directly purchases a range of materials and supplies.

The direct construction activity modeled within the analysis takes place within the five-county region and is therefore considered local, regardless of where contractors or employees may be headquartered or reside.¹⁵ However, some large scale capital purchases may be sourced from outside of the region (most notably vehicle purchases, which are largely sourced externally with the exception of Silverliner V train cars manufactured in the region). These non-local materials are excluded from the regional economic impact.

In addition, some portion of purchasing takes place in the remainder of the Commonwealth outside of the five-county region. The proportion of these purchases is estimated from geographic analysis of SEPTA purchasing data. Due to this adjustment, the volume of local materials for the Pennsylvania analysis exceeds the volume of local materials included in the regional analysis.

The sum of activity from soft and hard construction costs, labor, and local materials represents the total volume of direct activity that is modeled within the local economy. Modeled expenditures represent 84 percent of total expenditures within the region and 88 percent of total expenditures within the Commonwealth (see Figure 4.6).

¹³ Capital expenditures data were provided up to 2020 Q1, and were utilized to calculate annualized levels and activity patterns. Throughout this memo, we refer to from an investment period of 2015 to 2019.

¹⁴ This calculation is done by applying the ratio between the CPI-U index in 2019 and the activity year to the nominal values, which expresses the purchasing power in \$2019 terms.

¹⁵ These leakages are accounted for in the modeling of indirect and induced spending.

Figure 4.6: Modeled Annualized Capital Investments (\$2019)

Category	Five-County Region	Commonwealth of Pennsylvania
Soft Costs (\$M)	\$59.7	\$59.7
Hard Construction Costs (\$M)	\$173.1	\$173.1
Labor (in-house) (\$M)	\$94.1	\$94.1
Materials/Supplies (\$M)	\$242.3	\$242.3
Local Materials (%)	31%	37%
Non-local (excluded) (%)	(69%)	(63%)
Modeled Materials/Supplies (\$M)	\$75.1	\$98.0
Total Modeled (\$2019M)	\$477.1	\$500.0
Total Modeled (%)	84%	88%

Direct Activity from Ongoing Operations

Operating activity for the FY 2015-2019 time period is modeled based on budget detail provided by SEPTA.¹⁶ All expenditures are converted to current dollars based on the Consumer Price Index from the Bureau of Labor Statistics. Annualized expenditure amounts in \$2019 were then averaged for the FY 2015-2019 period, yielding an annual average of \$1.35 billion in nominal terms and \$1.40 billion in \$2019 (see Figure 4.7).

Figure 4.7: Annual Ongoing Operations (Nominal and in \$2019)

Fiscal Year	Nominal Spend	Inflation-Adjusted Spend (\$2019 M)
2015	\$1,257	\$1,358
2016	\$1,323	\$1,416
2017	\$1,345	\$1,399
2018	\$1,449	\$1,478
2019	\$1,350	\$1,350
2015-2019 Average	\$1,345	\$1,400

Expenditures are sorted by category based on SEPTA’s budget information. Deductions from these annual expenditures by category are taken to remove spending that does not take place within the modeled geographies (five-county region and Commonwealth of Pennsylvania).

All employee compensation paid by SEPTA is considered local, since work activity takes place within the five-county region.¹⁷ The remaining purchases of materials and services were reviewed to determine the extent to which they were sourced within the region and Commonwealth. For some large-scale goods, direct purchasing data was available to determine the proportion taking place within the geography. For other goods, the local

¹⁶ Activity is segmented by fiscal year on a cash basis.

¹⁷ Leakage of induced spending due to employees that live outside of the region or Commonwealth is accounted for the impact modeling described below.

purchase percentage estimated by IMPLAN modeling software for the relevant categories was used to estimate the proportion of expenditures taking place within the region (see Figure 4.8).

Figure 4.8: Local Purchase Proportions within Greater Philadelphia by Sector

Category	Local Purchase %	Expenditures (\$2019 M)	Modeled Expenditures (\$M)
Purchased Transportation	94.2%	\$104.1	\$98.0
Services	87.4%	\$75.2	\$65.7
Insurance	84.8%	\$16.9	\$14.4
Materials and Service	69.9%	\$65.2	\$45.6
Fuel Transportation	2.4%	\$32.3	\$0.8
Financing / Depreciation / Taxes	<i>(excluded)</i>	\$43.3	\$0.0
Propulsion Power	91.2%	\$32.6	\$29.7
Water & Sewer	71.2%	\$11.1	\$7.9
Natural Gas	11.5%	\$5.1	\$0.6
Vehicle and Facility Rental	99.5%	\$6.1	\$6.1
Tires and Tubes	17.4%	\$3.0	\$0.5
		\$394.9	\$269.3

The volume of purchasing taking place outside of the region but within the Commonwealth of Pennsylvania was determined through a geographic analysis of SEPTA purchasing data. Through this approach, it is estimated that 68 percent of materials and services were purchased within the region, and 76 percent within the Commonwealth over the FY 2015-2019 period. These local expenditures are summed with labor and fringe benefits to yield total modeled expenditures. Modeled expenditures represent 91 percent of total expenditures within the region and 93 percent of total expenditures within the Commonwealth (see Figure 4.9).

Figure 4.9: Modeled Operating Expenditures

Category	Five-County Region	Commonwealth of Pennsylvania
Labor and Fringe (\$M)	\$1,005.3	\$1,005.3
Materials and Services	\$269.3	\$269.3
Local	68%	76%
Non-local (excluded)	(32%)	(24%)
Modeled Activity	\$269.3	\$298.3
Total Modeled (\$2019M)	\$1,274.6	\$1,303.6
Total Modeled (%)	91%	93%

Input-Output and Fiscal Modeling

Expenditures within a given geography give rise to “spillover” impacts when those dollars are recirculated to suppliers and to employees within the Pennsylvania economy. In so doing, they also support additional employment and earnings, and generate tax revenue for local governments and for the Commonwealth.

ESI has constructed an input-output model of the Pennsylvania economy using IMPLAN software to estimate the total impact of these net expenditures on the Commonwealth’s economy. The detail that follows explains briefly the theory behind input-output modeling, the mechanics of utilizing it to estimate economic and employment impacts, and the fiscal model utilized to estimate tax revenue impacts to the City of Philadelphia and Commonwealth of Pennsylvania governments from SEPTA’s direct and spillover economic activity.

Input-Output Modeling Overview

Economic impact estimates for annualized capital and operating activity are generated by utilizing input-output models to translate an initial amount of direct economic activity into the total amount of economic activity that it supports. Spillover effects are generated by multiple waves impacts generated by spending on goods and services and by spending of labor income by employees.

In an inter-connected economy, every dollar spent generates two types of spillover impacts:

- First, some amount of the proportion of that expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is called the “*indirect effect*,” and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, some amount of the proportion of that expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the “*induced effect*,” and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating a local economy.

The role of input-output models is to determine the linkages across industries in order to estimate the magnitude and composition of the spillover impacts to all industries of a dollar spent in any one industry. SEPTA’s economic impact from capital and operating activity is the sum of its own direct economic footprint, plus the indirect and induced effects generated by that direct footprint in each geography of interest (see Figure 4.10).

Figure 4.10: Economic Impact Modeled by Geography

Geography	Direct Activity	Indirect / Induced Activity
Five-County	Five-County Region	Direct: Five-County → Spillover: Five-County + Direct: Rest of PA → Spillover: Five-County
Rest of Pennsylvania	PA (net of Five-County)	Direct: Rest of PA → Spillover: Rest of PA + Direct: Five-County → Spillover: Rest of PA
Pennsylvania (total)	Five-County + Rest of PA	Five-County + Rest of PA

Input-Output Model Mechanics

To model the impacts resulting from the direct expenditures ESI developed a customized economic impact model using the IMPLAN input/output modeling system. IMPLAN represents an industry standard approach to assess the economic and job creation impacts within a given geographic area.

IMPLAN has developed a social accounting matrix (SAM) that accounts for the flow of commodities through economics. From this matrix, IMPLAN also determines the regional purchase coefficient (RPC), the proportion of local supply that satisfies local demand. These values not only establish the types of goods and services supported by an industry or institution, but also the level in which they are acquired locally. This assessment determines the multiplier basis for the local and regional models created in the IMPLAN modeling system. IMPLAN takes the multipliers and divides them into 546 industry categories in accordance to the North American Industrial Classification System (NAICS) codes.

The IMPLAN modeling system also allows for customization of its inputs which alters multiplier outputs. Where necessary, certain institutions may have different levels of demand for commodities. When this occurs, an “analysis-by-parts” (ABP) approach is taken. This allows the user to model the impacts of direct economic activity related to an institution or industry with greater accuracy. Where inputs are unknown, IMPLAN is able to estimate other inputs based on the level of employment, earnings, or output by an industry or institution.

Tax Revenue Impacts

The direct, indirect and induced economic output from SEPTA’s capital investments and annual operations produce increases in various tax bases, which in turn lead to increased tax revenue collections for local governments and for the Commonwealth. While IMPLAN produces estimates of these tax revenue amounts, ESI’s does not utilize these results directly. Instead, we utilize a custom fiscal model that relies on the known relationships between various types of economic activity and tax collections (i.e. effective tax rates) to translate the increases in activity estimates by IMPLAN into attendant tax revenue results. These calculations are performed independently for the City of Philadelphia and Commonwealth of Pennsylvania.

For a non-profit entity such as SEPTA, care must also be given to ensure that taxable and non-taxable activity types are properly distinguished. Most notably, SEPTA’s direct activity is not subject to any sales, income or property tax. However, income generated by SEPTA’s employment footprint is subject to local wage tax and Pennsylvania income tax. In addition, the indirect and induced impact of SEPTA’s activity as it ripples throughout the economy occurs broadly within the private sector of the economy, and is therefore understood to be tax generating.

It is important to note that while the Philadelphia economy is wholly contained within the Pennsylvania economy, the City and Commonwealth governments are separate and distinct entities with distinct tax bases and revenues. Therefore, fiscal impacts do not overlap – each represents distinct tax revenues generated to the respective governments.

In addition, it is acknowledged that SEPTA’s operations and capital investments also generate taxable activity within and therefore tax revenues to additional jurisdictions besides the City of Philadelphia and Commonwealth of Pennsylvania, including within suburban jurisdictions throughout Pennsylvania and at the state and local level in New Jersey and Delaware. These amounts are not calculated within this analysis. Finally, no estimate of the catalytic impacts of SEPTA’s presence in the city and region (such as investment by private sector entities) or of the property value impacts from SEPTA’s service are included in these tax revenue calculations.

Impacts by County

As described above, direct, indirect and induced impacts are modeled for the five-county region and the Commonwealth as a whole, and results are expressed at the aggregate level. Next, five-county results are allocated to the individual counties using a “share down” approach. This framework utilizes known direct activity levels by county as well as proxy measures of relative economic activity within those counties to allocate the proportion of impact by category to each county. Each proportion is expressed as each county’s share of the five-county region such that the sum of the individual county totals is equivalent to the modeled five-county total.

Separate proxies are developed for direct, indirect (supply chain) and induced (labor income) impacts for capital investments, employee costs within the operating budget, and expenses within the operating budget. These proportions are applied to employment and earnings in addition to output.

Figure 4.11 below shows the proportions utilized to allocate this activity by county, and the data sources utilized to estimate this distribution.

Figure 4.11: Geographic Distribution by Economic Impact

Category	Bucks	Chester	Del	Mont	Phila	Distribution Basis
Capital Investment						
Direct	19%	5%	23%	11%	42%	Location of major projects, FY 2017 - 2020
Indirect	11%	11%	14%	26%	39%	Gross Regional Product (IMPLAN 2018)
Induced	14%	14%	15%	23%	34%	Workers Residing in County (LEHD 2017)
Operations - Employee Costs						
Direct	3%	2%	9%	5%	82%	Operating Subsidies Formula (2017)
Indirect	11%	11%	14%	26%	39%	Gross Regional Product (IMPLAN 2018)
Induced	8%	2%	19%	11%	61%	SEPTA Employee ZIP Codes
Operations – Expenses						
Direct	11%	11%	14%	26%	39%	Gross Regional Product (IMPLAN 2018)
Indirect	11%	11%	14%	26%	39%	Gross Regional Product (IMPLAN 2018)
Induced	14%	14%	15%	23%	34%	Workers Residing in County (LEHD 2017)

The shares of activity by category and county are then applied to the five-county impacts (including output, employment and earnings) in each category.

This step generates impact results by category for each county. These results can then be aggregated into total countywide impacts (see Figure 4.12).

Figure 4.12: Annualized Economic Activity by County, FY 2015-2019 (\$2019)

Category	5-County Total	Bucks	Chester	Del	Mont	Phila
Capital Investments (\$2019M)	\$977	\$154	\$87	\$182	\$176	\$376
Direct	\$469	\$89	\$22	\$109	\$52	\$195
Indirect	\$200	\$22	\$21	\$27	\$52	\$78
Induced	\$308	\$43	\$43	\$46	\$71	\$104
Operations - Employee Costs (\$2019M)	\$1,721	\$82	\$28	\$220	\$132	\$1,260
Direct	\$1,005	\$25	\$15	\$86	\$50	\$828
Indirect	\$11	\$1	\$1	\$1	\$3	\$4
Induced	\$705	\$55	\$12	\$132	\$79	\$428
Operations - Expenses (\$2019M)	\$537	\$63	\$62	\$75	\$136	\$201
Direct	\$269	\$29	\$29	\$36	\$70	\$104
Indirect	\$131	\$14	\$14	\$18	\$34	\$51
Induced	\$137	\$19	\$19	\$21	\$32	\$46
Total (\$2019M)	\$3,235	\$298	\$177	\$476	\$444	\$1,838

Comparison Pre and Post Act 89

ESI’s [March 2018](#) impact analysis established the annualized economic impacts from SEPTA’s before and after the Act 89 Pennsylvania transportation funding legislation, which was signed into law in November 2013. Pre Act 89 impact levels were established through analysis of fiscal years 2012-2014, with results expressed in \$2017. These results are updated below to a common basis with the current analysis of Post Act 89 annual impacts (calculated as FY 2015-2019) by adjusting for inflation to convert Pre Act 89 results from \$2017 to \$2019 terms.

Direct annual activity from capital expenditures have effectively doubled (in common dollar terms) since the passage of Act 89. Accounting for direct and spillover activity, total economic impact from SEPTA’s annual capital activity has increased by 126% since Act 89, with similar increases in employment and earnings supported (see Figure 4.13).

Figure 4.13: Annual Economic Impact from SEPTA’s Capital Investments, Pre and Post Act-89 (in \$2019)

Impact Type	Pre Act 89 (FY 12-14 Avg)		Post Act 89 (FY 15-19 Avg)		% Growth	
	Pennsylvania	5-County	Pennsylvania	5-County	Pennsylvania	5-County
Direct Output (\$M)	\$247	\$239	\$492	\$469	99%	96%
Total Impacts (\$M)	\$479	\$445	\$1,081	\$977	126%	119%
Employment Supported	3,250	3,070	7,190	6,600	121%	115%
Employee Compensation (\$M)	\$190	\$180	\$414	\$381	118%	112%

In inflation-adjusted terms, annual impacts from SEPTA’s operating activity are effectively unchanged from pre Act 89 levels (see Figure 4.14). This means that SEPTA has increased its capital activity without significant additions to its operational footprint and spending.

Figure 4.14: Annual Economic Impact from SEPTA’s Operating Expenditures, Pre and Post Act-89 (in \$2019)

Impact Type	Pre Act 89 (FY 12-14 Avg)		Post Act 89 (FY 15-19 Avg)		% Growth	
	Pennsylvania	5-County	Pennsylvania	5-County	Pennsylvania	5-County
Direct Output (\$M)	\$1,269	\$1,233	\$1,303	\$1,274	3%	3%
Total Impacts (\$M)	\$2,324	\$2,230	\$2,345	\$2,258	1%	1%
Employment Supported	17,520	16,890	19,340	18,630	10%	10%
Employee Compensation (\$M)	\$1,419	\$1,370	\$1,441	\$1,415	2%	3%

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