

Estimating state and local revenue impacts from meeting Phase 1 space needs for HQ2 (if Pittsburgh had won)

Part II. Corporate Income Taxes

Center for Economic Development
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Introduction

What might the revenue impact on state, county, municipal, and school district budgets have been if Amazon had come to Pittsburgh under the original terms of HQ2 (“winner takes all”)? This is the second report in a series intended to answer that question.

Our first report found that total local property tax yields for an HQ2 corporate office building could have varied widely, from \$640K to \$12M for the first year of operations, depending on the size of the building constructed, how its property value was ultimately assessed and/or appealed, the municipality it was located in, and whether tax increment financing applied.¹

This report shifts the analysis to the state level and attempts to estimate the first-year marginal yield from the state’s corporate income tax if HQ2 came to Pennsylvania.

General approach

Our analysis assumes that only one city (Pittsburgh) would have “won” HQ2, as was originally “advertised”. Our estimate is limited to the direct marginal impact on corporate income tax revenues for the first HQ2 facility built alone, with other investments, and all relevant indirect effects from such investments ignored.

We make no attempt here to predict what Amazon's corporate income would actually have been in its first year of operations, nor did we attempt to isolate what portion of its income would be subject to Pennsylvania's corporate income tax.

Instead, the question we attempt to answer is: if “X” of Amazon’s corporate income were taxable in PA, such that its tax payment was “Y”, how would “X” and “Y” change if the state “won” HQ2? To keep the exercise manageable, our analysis makes the strong assumption that Amazon files its tax returns with the state as a single corporate entity.² We also ignore the possibility of incentives that might have reduced Amazon’s corporate income tax liability, as none were offered in Pittsburgh’s bid.

For the most part, our analysis uses figures and policies applicable as of 2017, the year the HQ2 RFP was released. We make no claim that what follows would have been 100% accurate, but we do feel it is a plausibly correct estimate.

¹ “Estimating state and local revenue impacts from meeting Phase 1 space needs for HQ2 if (Pittsburgh had won): Part 1. Property Taxes”, Center for Economic Development, Carnegie Mellon University, link: <https://www.heinz.cmu.edu/ced/file/hq2-part-1-report.pdf>. Tax increment financing does not reduce tax liability, but does redirect tax revenues away from local general funds so long as it is in force.

² Given that Pennsylvania does not require unitary combined reporting, and that, according to Lexis-Nexis Corporate Affiliations, there are 92 entities associated with Amazon, including 41 subsidiaries and 40 non-operating entities, it is quite possible that some of those entities with a nexus in Pennsylvania separately. As tax returns are private, and we do not know how Amazon files with the state. Again, this possibility is ignored here.

Key findings

Ceteris paribus, we find that landing HQ2 would have no short run impact on the amount of corporate income tax Amazon paid to the state.

Although adding a 500,000 sq. ft. class A office building with, say, 3,000+ employees would certainly produce property tax gains to local government and personal income tax gains to the state in the first year, their effect on Amazon's corporate income tax bill would have been negligible.

We also find that even if HQ2 were fully built out as "promised" in Amazon's original RFP, with \$5B in capital investment and 50,000 employees over 15+ years, that corporate income tax revenues would still be minimally impacted.

The reason for this can be traced back to Pennsylvania's adaption of the single sales factor approach to the apportionment of corporate net income from multi-state companies for tax purposes. Whereas if Pennsylvania still used an approach that equally weighted sales, payroll, and property within the state to apportion the net income of multi-state firms, then it at least seems plausible that the state might have captured more of Amazon's net income for taxation via an increased national share of payroll or property, if HQ2 had driven such an outcome.

Since the state relies instead on in-state sales alone to apportion income, landing HQ2 confers no such benefit. This fact may help explain why Pittsburgh's bid did not include an incentive specific to Amazon's corporate income tax liability. If the move to PA was not expected to increase its corporate income taxes, the case for granting such incentives would have been weak.

Report overview

This report contains: a brief overview of Pennsylvania's corporate income tax; a summary of recent trends in Amazon's revenue, income, and tax liabilities, along with the factors that influence them; and short run vs. "built out" estimates of HQ2's likely impact on the firm's state corporate income tax liability for PA. The report also includes a brief description and history of apportionment methods, including their evolution in Pennsylvania. Appendix A, a separate document, describes some examples of past and present state economic development deals involving Amazon, major tax breaks on corporate income, or both.³

³ Many more issues concerning the corporate income tax deserve to be discussed that we cannot cover here. We do not consider alternative (lower) CNI tax rates. Since they are neither in place nor enforced in Pennsylvania, this report also ignores the possible implications of mandatory combined reporting, Joyce v. Finnigan rules, and throwback or throwout rules for "nowhere income" or other untaxed corporate income that might be recaptured by the state. For example, for the last two years, Governor Wolf's administration has proposed moving the state to mandatory combined reporting along with reductions to the CNI rate. However, neither proposed change has yet to pass into law.

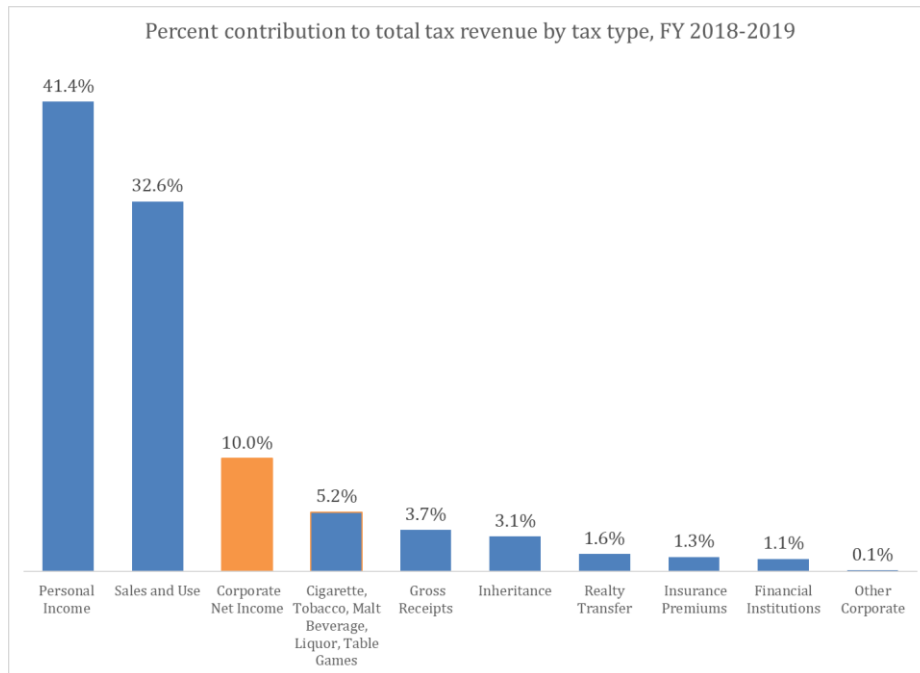
Pennsylvania's corporate income tax

Domestic (incorporated in Pennsylvania) and foreign (incorporated outside of Pennsylvania) corporations are subject to corporate income tax for the privilege of doing business in Pennsylvania, having capital or property employed or used in Pennsylvania, or owning property in Pennsylvania.⁴ Taxable business income in Pennsylvania is based on an adjusted version of federal taxable income. As described by the Pennsylvania Tax Compendium:

*This tax is levied on federal taxable income, without the federal net operating loss deduction and special deductions, and modified by certain additions and subtractions. To arrive at Pennsylvania taxable income, all taxes imposed on or measured by net income which are expensed on the federal corporate income tax return are added back, while the foreign dividend gross-up and net interest income and gains on United States government securities are deducted.*⁵

Pennsylvania's corporate income tax rate is 9.99%, which is one of the highest rates for a tax of its kind in the country. Coincidentally, the tax contributed 9.98% of total revenues from all state taxes in 2018-2019.⁶

Figure 1



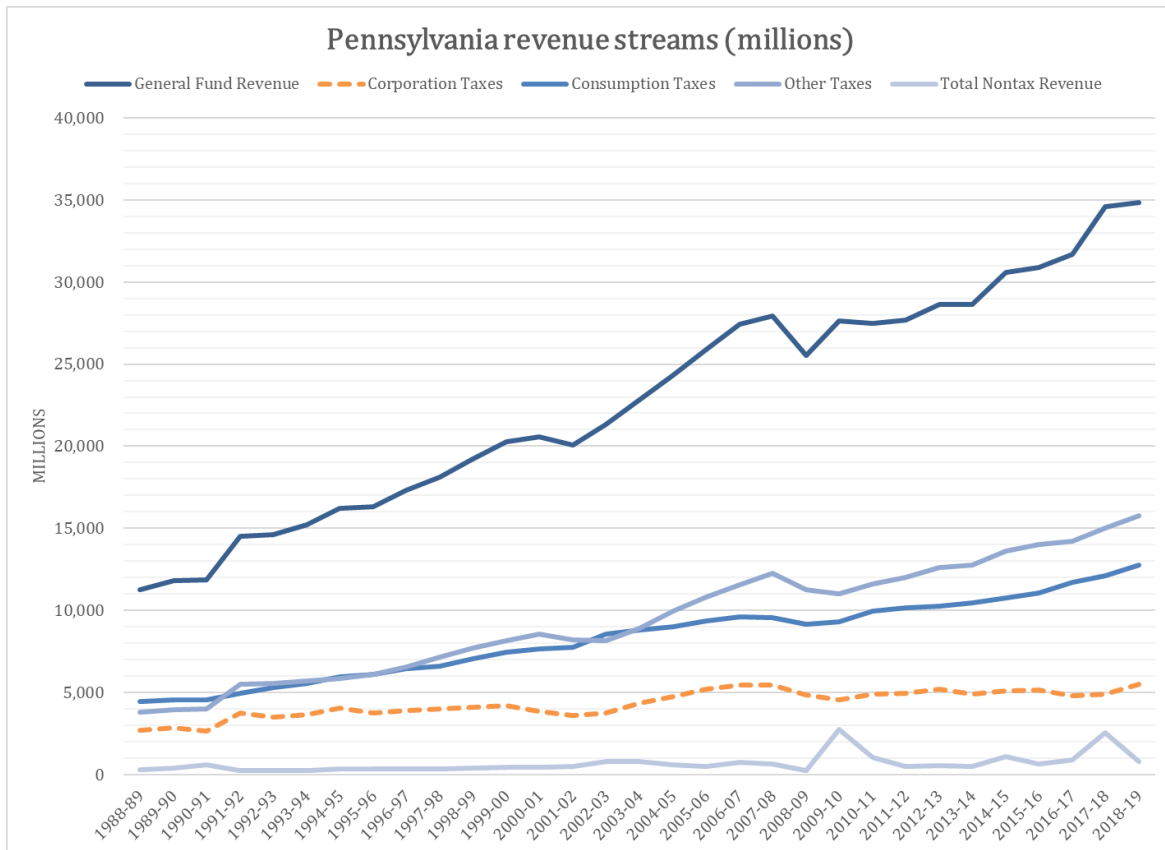
⁴ Paraphrased from the Pennsylvania Tax Compendium: February 2019, Pennsylvania Department of Revenue, p 1., link: https://www.revenue.pa.gov/GeneralTaxInformation/News%20and%20Statistics/ReportsStats/TaxCompendium/Documents/2018_tax_compendium.pdf, accessed 5/7/2019.

⁵ Ibid.

⁶ All revenue statistics derived from data from the Independent Fiscal Office of Pennsylvania. Link: http://www.ifo.state.pa.us/download.cfm?file=/Resources/Documents/Public_Data-General_Fund.xlsx, accessed 8/13/2019. Calculations in the chart exclude non-tax revenues, although these are represented in the General Fund Revenue trend in Figure 2. Certain minor categories have been aggregated (as with vice related taxes) or omitted.

Trends in revenues from major categories of taxes for Pennsylvania are shown in Figure 2. As reported by Pennsylvania’s Independent Fiscal Office, corporate taxes for Pennsylvania currently include the corporate income tax (CNI), the gross receipts tax (levied on the gross receipts of a limited set of industries), taxes on banks and insurance companies, and a property tax on utility companies.⁷ Combined these revenue streams comprised 25% of the state’s total revenues as recently as 1995. This was something of a highwater mark as revenues from these taxes were subsequently outpaced by consumption taxes, driven by Pennsylvania’s sales and use tax, and the “other” tax category, driven by the state’s personal income tax.

Figure 2

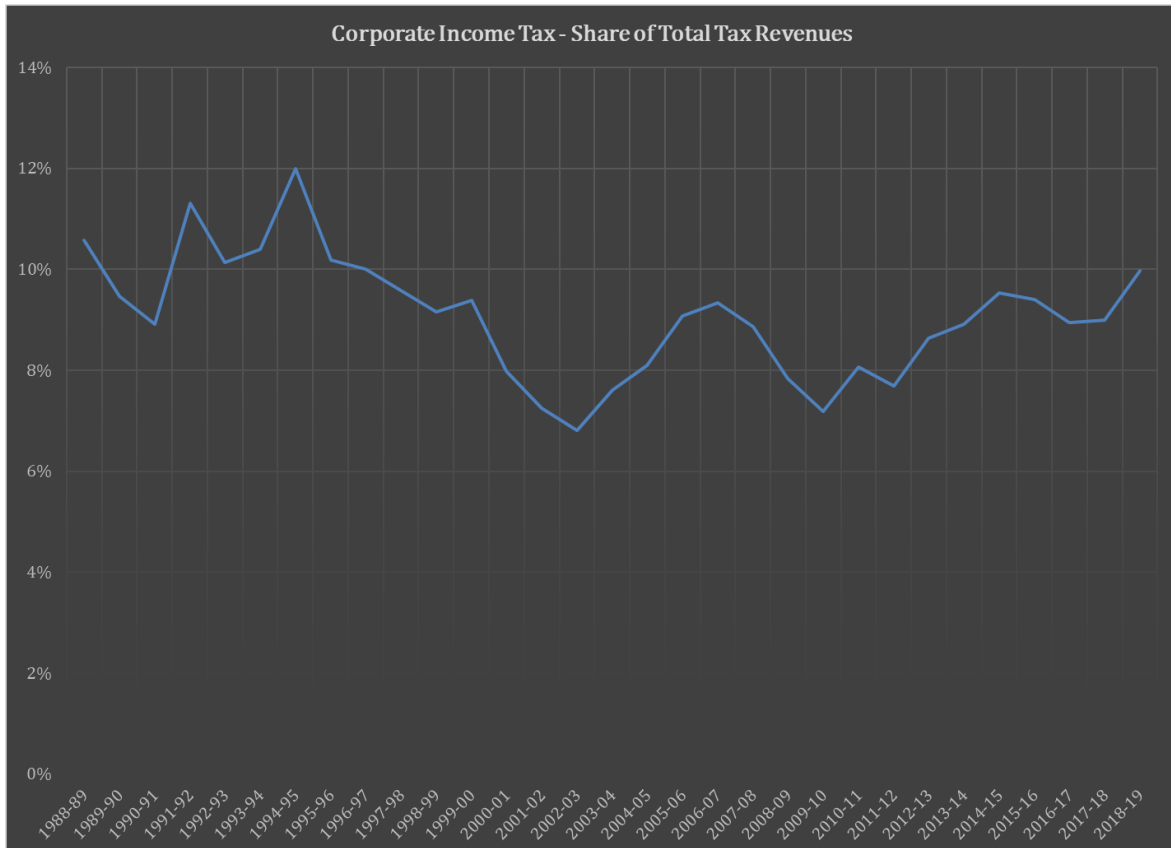


As of the 2018-2019 fiscal year, the corporate tax category comprised just 16% of revenues, or about \$5.5B, \$3.4B of which was due to the CNI tax alone. As shown in Figure 3, the relative contribution of the CNI tax to all state tax revenues has waxed and waned over the years. After hitting a low of 7% in the aftermath of the Great Recession, its share of revenue has climbed since, reaching nearly 10% of revenues in FY 2018-2019 for the first time since FY 1996-1997. Thus, while

⁷ Ibid.

somewhat eclipsed in magnitude by other revenue streams, the CNI still serves an important pillar of funding to the state budget.

Figure 3



The tax allows for losses to be carried forward and deducted from future taxable income for up to 20 years.⁸ However, there is a cap, or maximum amount of losses that may be carried forward for this purpose. As of 2016, the cap on annual net operating losses (NOLs) that could be carried forward was \$5M or 30% of taxable income a year. However, in 2017, in the case of *Nextel Communications v. PA Department of Revenue*, the Pennsylvania Supreme Court found that the design of these two cap options effectively created two classes of taxpayers among corporations, and thus represented a violation of the Pennsylvania Constitution’s Uniformity Clause.⁹ The Court required that the flat cap deduction be severed from state statute on net loss carryovers, leaving only the 30% cap standing. That same year Act 2017-43 was signed into law, which dictated that for tax years after 2017,

⁸ Ibid., p 1-2.

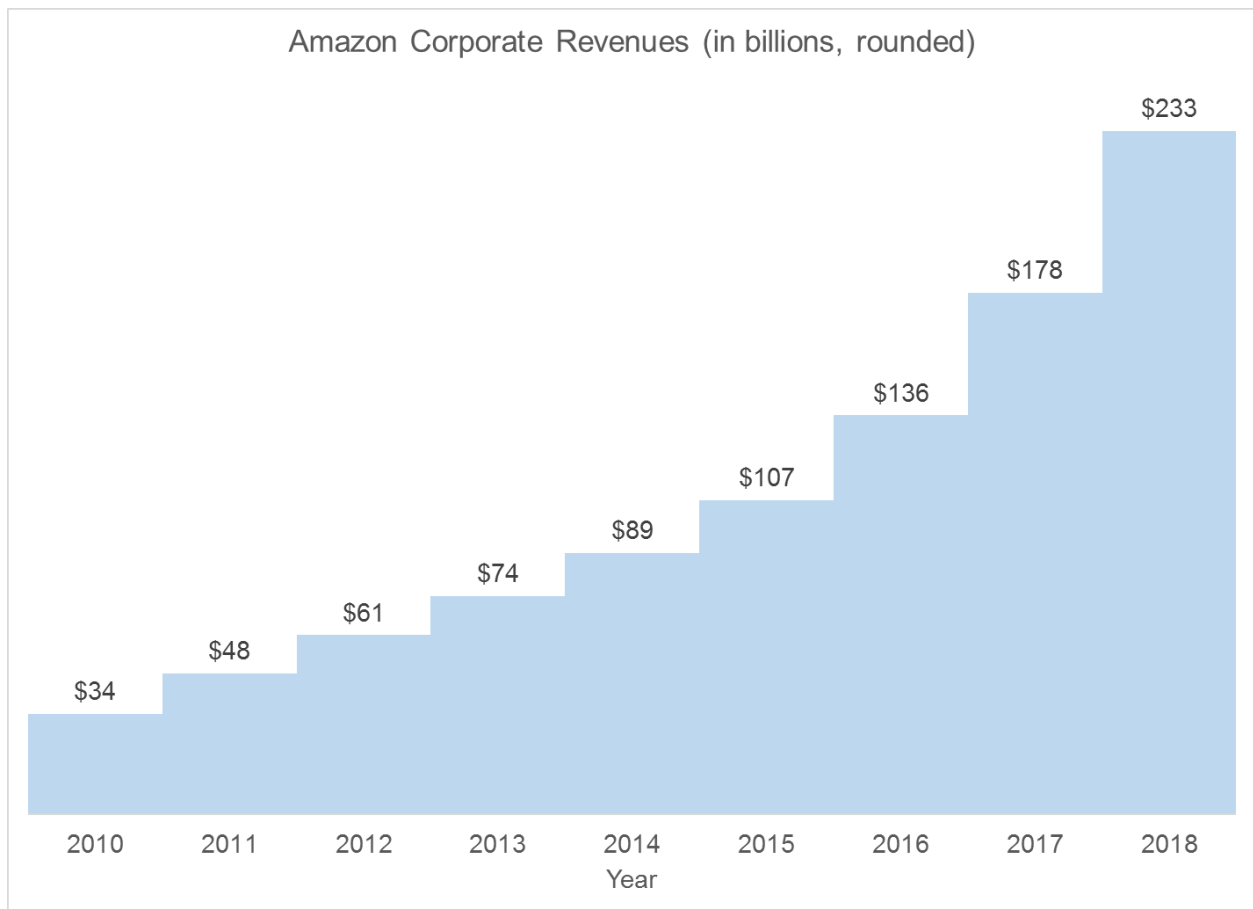
⁹ See <https://caselaw.findlaw.com/pa-supreme-court/1877814.html>, accessed 5/14/2019. Technically, this case dealt with net losses from the tax year of 2007, which under the law at that time had a flat cap of \$3M and a percentage of taxable income of 12.5%. Currently, state guidance allows for different caps on NOL carryforward deductions to be used depending on the tax year in which the NOL occurred. See “Corporate Tax Bulletin 2018-2”, PA Department of Revenue, link: https://www.revenue.pa.gov/GeneralTaxInformation/TaxLawPoliciesBulletinsNotices/TaxBulletins/CT/Documents/ct_bulletin_2018-02.pdf, accessed 5/14/2019. For a brief overview of the Uniformity Clause, see Appendix B of Part 1. of this report series (link: <https://www.heinz.cmu.edu/ced/file/hq2-part-1-appendices.pdf>).

35% of losses could be carried forward, and that after 2018, 40% of losses could be carried forward.¹⁰

Amazon's corporate income

Net operating losses have not been a problem for Amazon for some time, at least with respect to its domestic business. Amazon continues to make lots of money. The firm reported corporate-wide *revenues* of almost \$233B in 2018, nearly a 31% increase over 2017.¹¹ This figure is now a staggering 6.8 times the \$34B in revenue the firm reported in 2010.

Figure 4

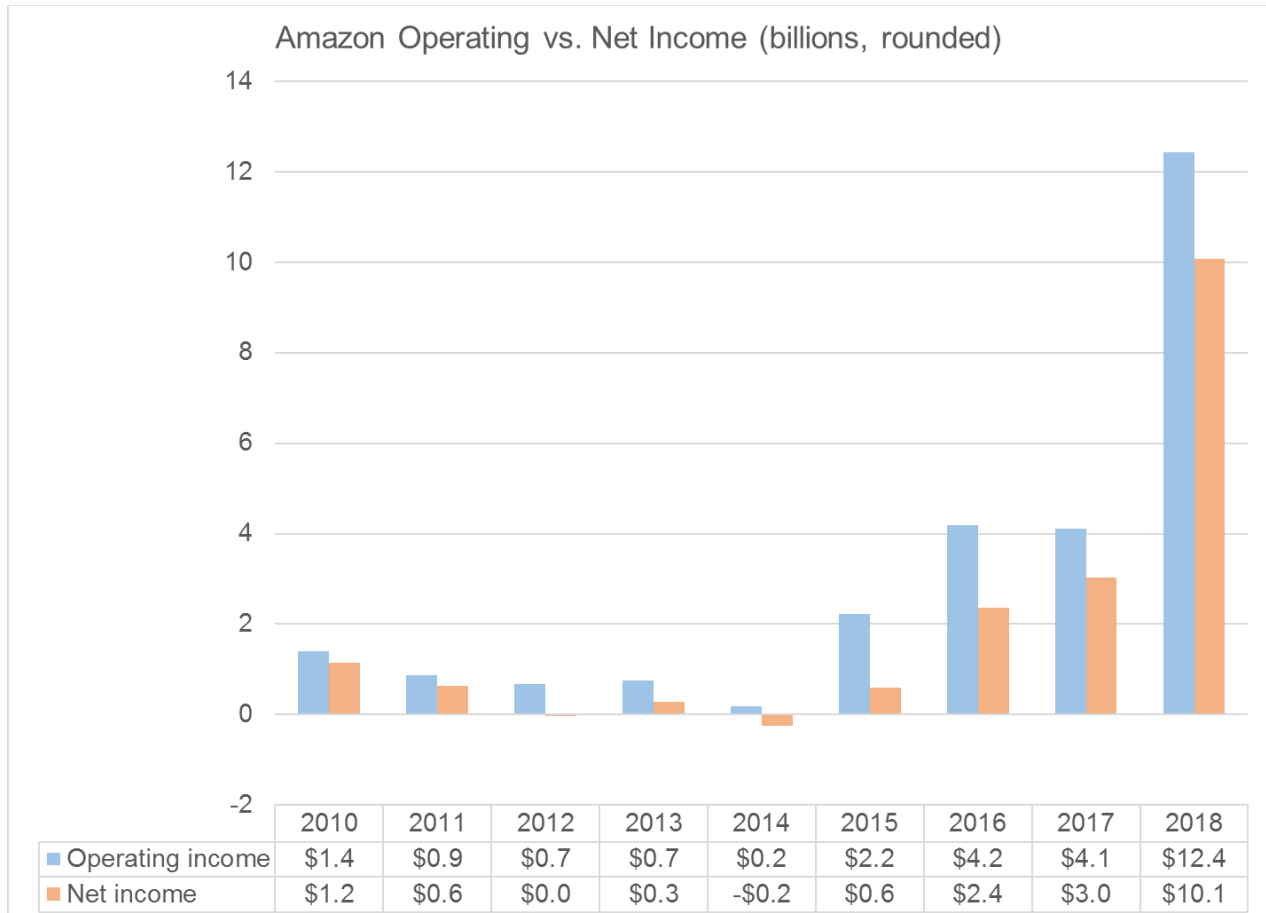


¹⁰ Ibid., p 2.

¹¹ Income statement data from S&P Capital IQ, downloaded 5/14/2019.

As shown in Figure 5, Amazon's *profit* growth has not been as relentless as its revenue growth. Still, after posting a loss in 2014, the firm's reported net income has climbed steadily, and recently spiked at over \$10B for the 2018 fiscal year.¹²

Figure 5



We do not know what Amazon currently pays to the Commonwealth of Pennsylvania in corporate income taxes, which is private information.

Generating even a roughly accurate estimate or forecast of Amazon's tax payments a year out would be exceedingly difficult. As one of the premier stocks on Wall Street, Amazon gets a lot of individual time and attention from stock market analysts, who routinely make quarterly, annual, and multi-year forecasts of firm earnings using both sophisticated financial models and intelligence gathering. But even consensus forecasts generated from multiple analysts are often "surprised".¹³

¹² Ibid.

¹³ We make no serious attempt to gauge the accuracy of analyst earnings forecasts here. The point is that forecasting earnings is hard. A good discussion of the problem can be found here: "Why market forecasts are so bad: analysts' predictions are frequently less accurate than random guesses", Joe Light, Wall Street Journal, December 20, 2013, via ProQuest, link: <https://search-proquest-com.proxy.library.cmu.edu/docview/1469835382?accountid=9902>, accessed 8/9/2019.

State taxes paid would depend on the firm's net income earned in the United States, which in turn is tied to the overall health of the U.S. consumer economy, at least with respect to Amazon's e-commerce, marketplace, and retail businesses, and their respective success in beating the competition for consumer dollars. But not just consumer dollars. Amazon's bottom line is also closely tied to *business* spending. Its overall financial picture is currently strongly dependent on the performance of Amazon Web Services (AWS), its cloud services business, and its most profitable division in recent years.¹⁴

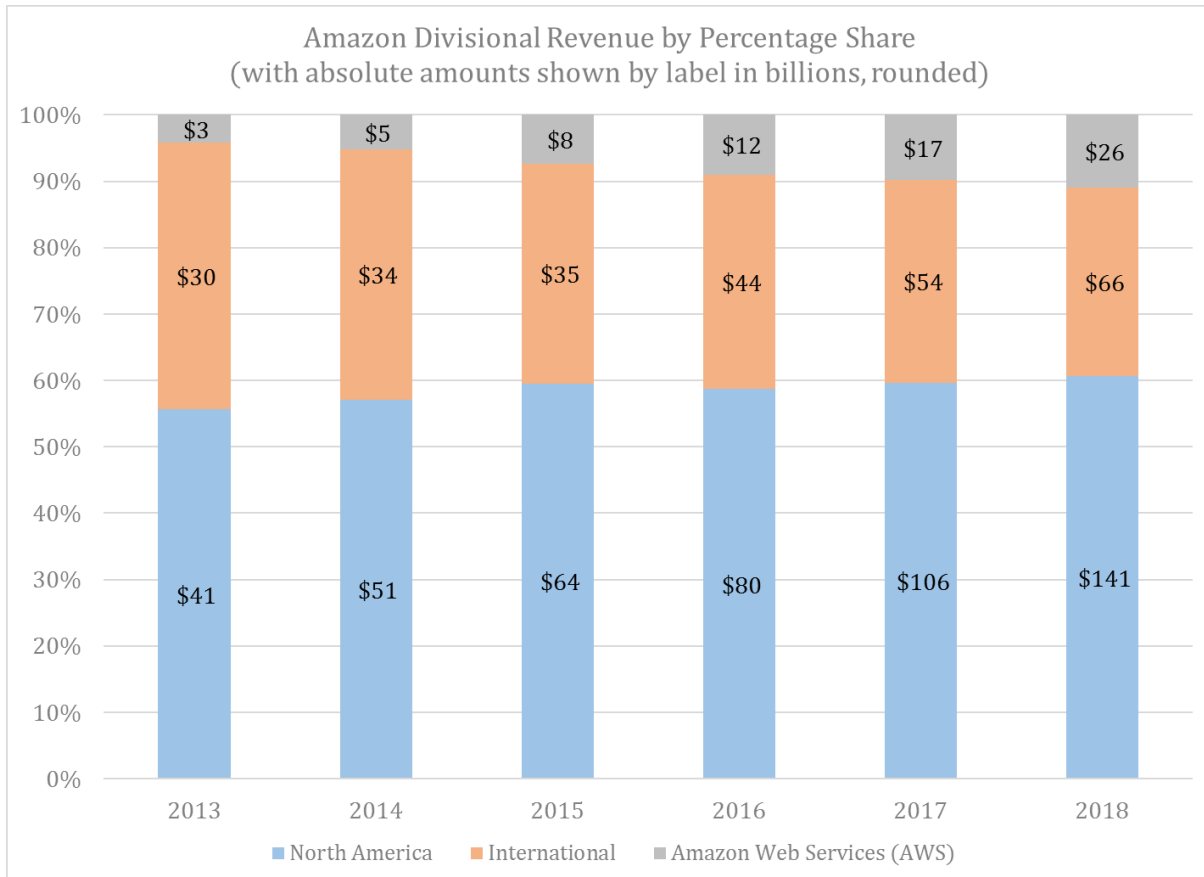
Of course, not all of Amazon's revenue is earned in the U.S. As a global enterprise, Amazon also depends on consumer and business spending from other countries. Its taxes are also impacted by the way revenue and/or income from its international operations are treated under federal and state tax laws.

It seems reasonably safe to assume that almost all of the revenue from its international segment is earned abroad.¹⁵ Since Amazon started to report revenue by segment in 2013, sales for its international division have grown, but not as rapidly as the North American or AWS segments have. As a result, the international share of its total revenues has slowly declined.

¹⁴ By one estimate, 50% of Amazon's reported operating income for the first quarter of 2019 was due to the AWS division. Source: "Amazon Web Services revenue grew 41% in the first quarter", Ari Levy, www.cnbc.com, April 25 2019, link: <https://www.cnbc.com/2019/04/25/aws-earnings-q1-2019.html>, accessed 5/14/2019. See also "In 2018, AWS delivered most of Amazon's operating income", Stephanie Condore, www.zdnet.com, January 31 2019, link: <https://www.zdnet.com/article/in-2018-aws-delivered-most-of-amazons-operating-income/>, accessed 5/14/2019. According to one source, in 2017 the number of active AWS users exceeded 1M, mostly small and medium sized companies, but at least 10% of which were enterprise sized firms. For a list of the larger firms, see "Who is Using Amazon Web Services", Benjamin Wooton, Jan 6 2017, Contino (a web services consulting firm), www.contino.io, accessed 5/21/2019.

¹⁵ There is apparently a bit of overlap. Amazon's 10-K filing for 2018 describes its three primary business segments as follows: "The North America segment primarily consists of amounts earned from retail sales of consumer products (including from sellers) and subscriptions through North America-focused online and physical stores. This segment includes export sales from these online stores... The International segment primarily consists of amounts earned from retail sales of consumer products (including from sellers) and subscriptions through internationally focused online stores. This segment includes export sales from these internationally focused online stores (including export sales from these online stores to customers in the U.S., Mexico, and Canada), but excludes export sales from our North America-focused online stores... The AWS segment consists of amounts earned from global sales of compute, storage, database, and other service offerings for start-ups, enterprises, government agencies, and academic institutions." "..." indicates omitted text. Source: Amazon.com Inc., Form 10-K for the Fiscal Year Ended December 31, 2018, Note 10: Segment Information, p. 65. Retrieved from S&P Capital IQ, 5/15/2019.

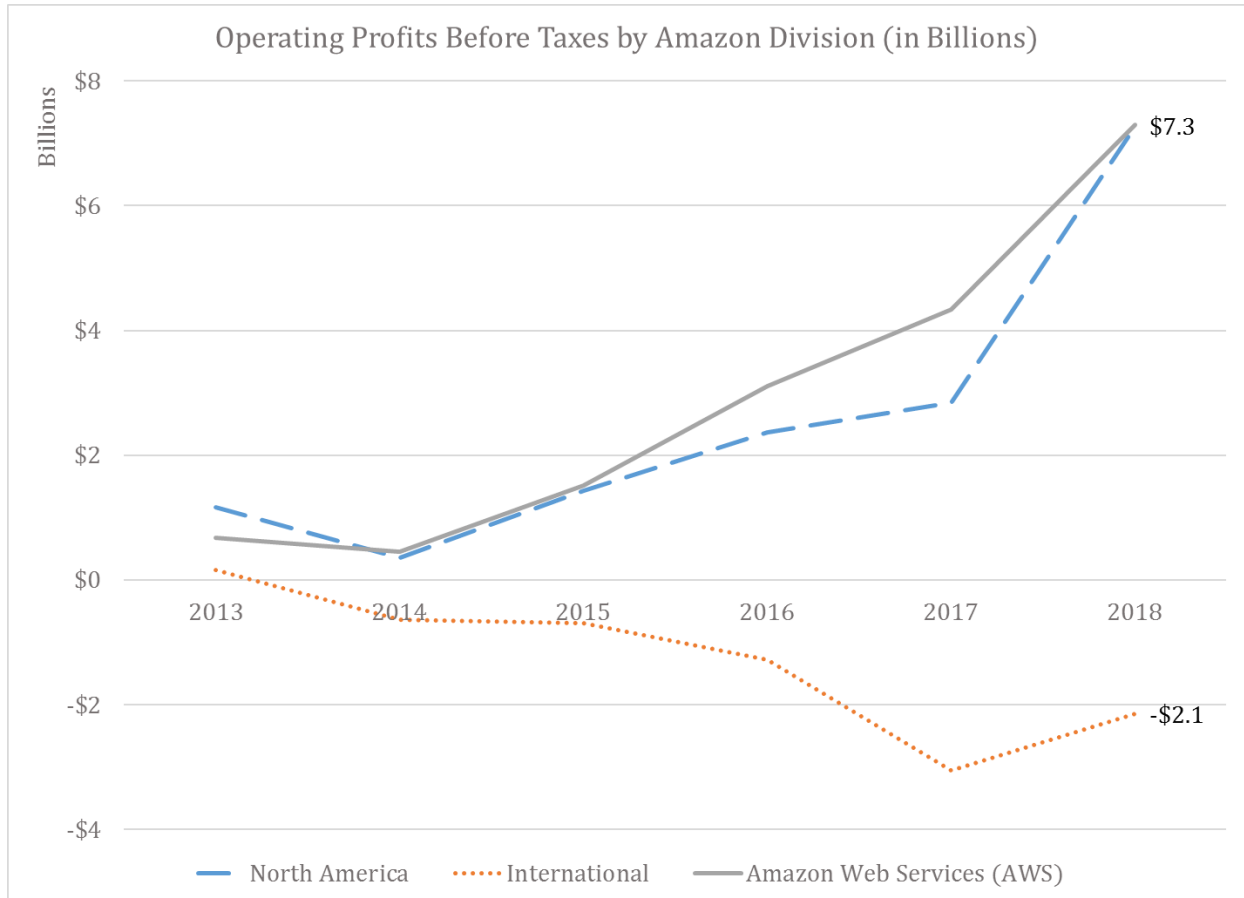
Figure 6



Amazon's international division saw \$154M in operating income before taxes in 2013. Since then this figure has been in the red, including a reported loss of \$2B in 2018.¹⁶ Meanwhile after exceeding the North American division's contribution to operating profits for several years, as of 2018, the AWS segment still appeared to contribute at least as much to Amazon's bottom line as the North American segment. Both contributed just over \$7B in operating profits before taxes in 2018.

¹⁶ Operating income figures and chart from S&P Capital IQ.

Figure 7



Whereas the North American and AWS divisions are profitable, not all their income is earned in the United States. The North American division includes revenues earned in Canada and Mexico, and the cloud computing infrastructure of AWS includes data centers and clients across the globe.

Unlike many other nations, the U.S. (through the IRS) taxes the earnings that domestically based multinational firms make in foreign countries. However, the treatment of this income varies by case, with earnings often taxed at lower effective rates than domestically generated earnings.¹⁷

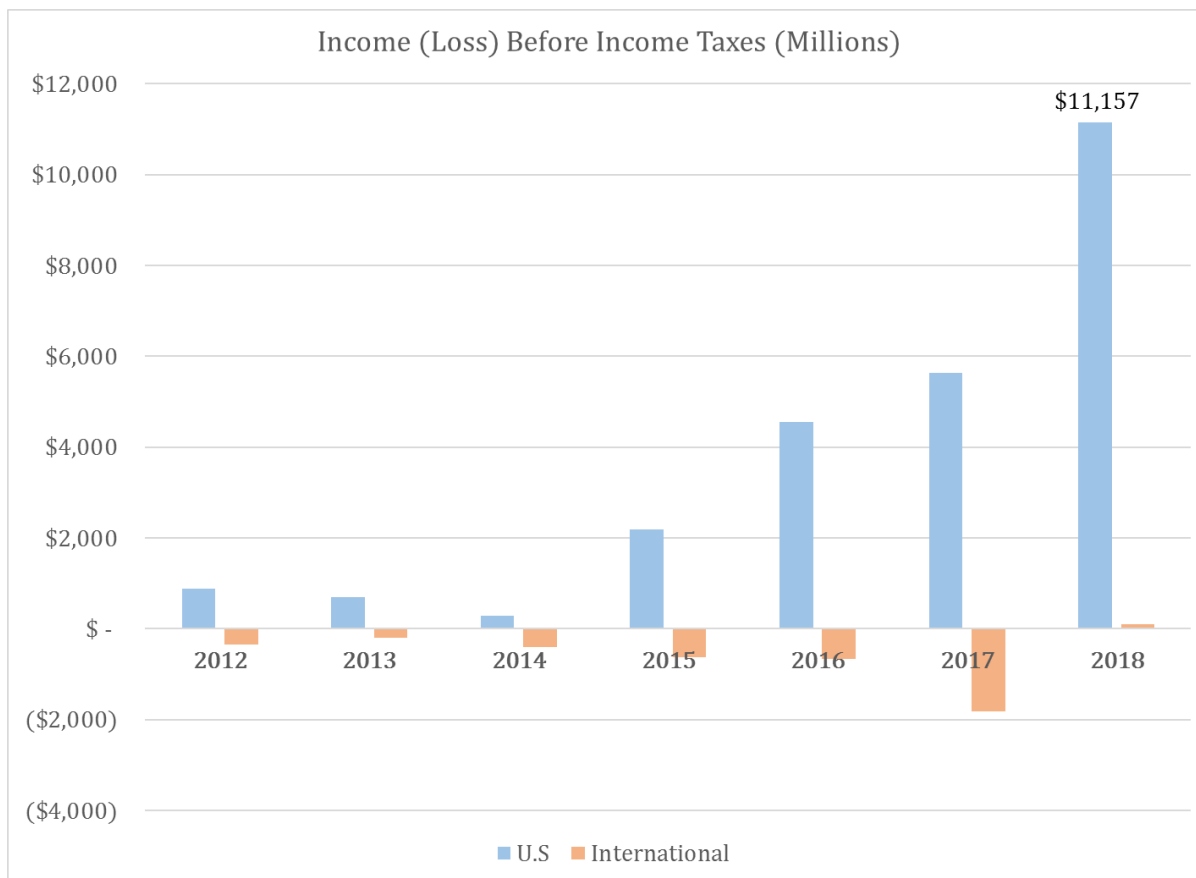
Corporate income (and thus tax payments) would also depend on the extent to which Amazon continued its modus operandi of reinvesting significant amounts of operating income back into its lines of business (old and new). The expenses (including depreciation) associated with these investments (such as building out its systems of fulfillment centers or data centers, or funding new products and services)

¹⁷ U.S. treatment of foreign earnings is complicated. The following is a brief introduction to the subject “How does the current system of international taxation work?”, *Tax Policy Briefing Book: Key Elements of the US Tax System*, Tax Policy Institute (Brookings Institution and Urban Institute), link: <https://www.taxpolicycenter.org/briefing-book/how-does-current-system-international-taxation-work>, accessed 5/15/2019.

suppress net income (and taxes) sooner in the hope that the investments will pay off with increased revenues and profits later.

Again, all these factors make producing a practical prediction of the amount of corporate income tax base exposed to state corporate income taxes a difficult proposition. For what it is worth, through its filings with the SEC, Amazon does report the component of its pretax income subject to federal taxes (vs. international tax authorities). As shown in Figure 8, this reached \$11B in 2018.

Figure 8

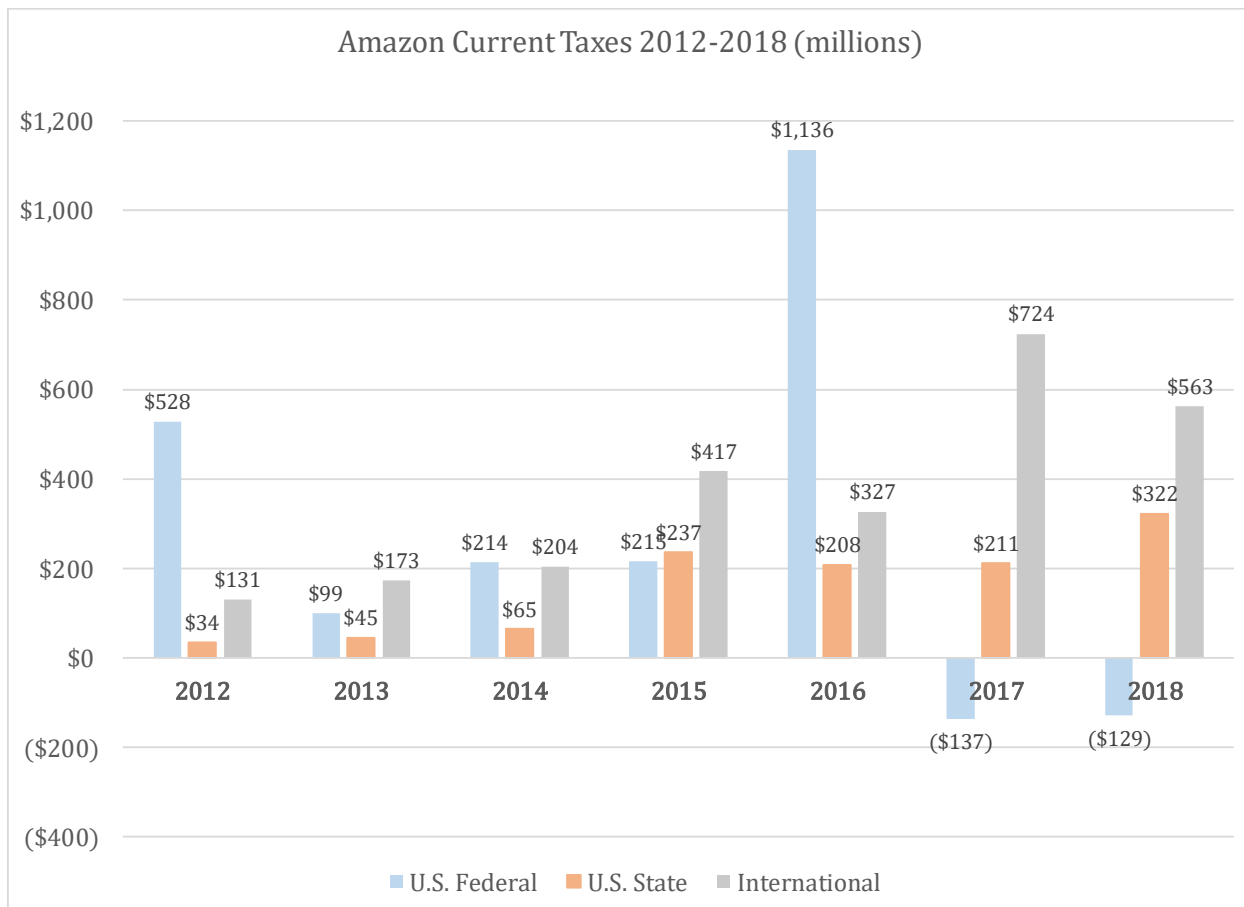


Finally, total income taxes paid to the state would certainly be impacted by how the state apportions income for multi-state firms and any tax incentives the state offered, any other tax breaks Amazon’s activities or investments would qualify for, any other strategies Amazon or its agents deployed, or loopholes they exploited, any of which could legally reduce the firm's corporate income tax bill. This last point is best exemplified by the fact that Amazon apparently paid zero dollars in *federal* income taxes on corporate income in both 2017 and 2018.¹⁸

¹⁸ The full story behind this fact is best told elsewhere. See for example: “Amazon Inc. Paid Zero in Federal Taxes in 2017, Gets \$789 Million Windfall from New Tax Law”, Matthew Gardner, Institution on Taxation and Economic Policy (ITEP), link: <https://itep.org/amazon-inc-paid-zero-in-federal-taxes-in-2017-gets-789-million-windfall-from-new-tax-law/>. See also: See for example “Amazon in Its Prime: Doubles Profits, Pays \$0 in Federal Income Taxes”, Matthew Gardner, ITEP, link: <https://itep.org/amazon-in-its-prime-doubles-profits-pays-0-in-federal-income-taxes/>; “Despite record profits, Amazon didn't

But state taxes are the focus here, and according to its SEC filings, Amazon did owe state taxes for both 2017 and 2018. The amount of taxes Amazon owed to state governments has been reported on its 10-K back to 2012, although these figures are not broken down by state. As of 2018 the firm's reported state tax bill was \$322M, the bulk of which we assume is corporate income and related business taxes.¹⁹

Figure 9



We assume, but did not confirm, that this figure excludes local taxes. The amount of this figure that redounded to Pennsylvania is unknown.

pay any federal income tax in 2017 or 2018”, Chris Isidore, CNN Business, cnn.com, Feb 15 2019, link: <https://www.cnn.com/2019/02/15/tech/amazon-federal-income-tax/index.html>; and “Why Amazon May Pay No Federal Income Taxes This Year”, Rey Mashayekhi, [www.fortune.com](http://fortune.com), March 1 2019, link: <http://fortune.com/2019/03/01/amazon-federal-corporate-income-tax/>, all accessed 5/15/2019.

¹⁹ Amazon collects state sales and use taxes in Pennsylvania on behalf of its customers. We assume these figures do not include such taxes.

How much more income tax would Amazon have paid to the Commonwealth if HQ2 came to Pittsburgh?

We assume Pennsylvania received a cut of this \$322M. Amazon already maintains a significant physical foothold in the state, including fulfillment centers across the Commonwealth, an R&D focused “tech hub” office in Pittsburgh, and fifteen Whole Foods stores across the state.^{20,21,22,23}

Thus, the firm already would appear to have a sufficient presence or “nexus” within the state for the corporate income tax to apply.²⁴ To keep the exercise manageable, we will assume Amazon takes a unitary approach to filings its tax return to the state, rather than having its affiliated companies file and (establish nexus) separately.²⁵

Barring loss carryforwards, tax incentives, or other strategies and loopholes, the firm should already be paying some amount of income tax to the state. Would the *addition* of HQ2, a major corporate headquarters, *increase* the amount of income tax Amazon would owe the Commonwealth, whatever its net income might be?

We believe the answer is no, and the reason for this has less to do with any applicable carryforwards, loopholes, and incentives than the way Pennsylvania currently *apportions* corporate income for tax purposes. To explain how this came to pass, we need to take a brief dive into the subject and history of apportionment.

²⁰ Amazon’s actual facility footprint at any given moment is not always crystal clear. This source, limited to its fulfillment centers, suggests there are 11 in the state. “Unfulfilled promises: Amazon fulfillment centers do not generate broad-based employment growth”, Janelle Jones and Ben Zipperer, Economic Policy Institute, Appendix Table 3, link: <https://www.epi.org/publication/unfulfilled-promises-amazon-warehouses-do-not-generate-broad-based-employment-growth/>, accessed 5/15/2019.

²¹ This source suggests there are six warehouses in PA. “Even without HQ2, Amazon’s already a big employer in Pennsylvania”, Mark Belko, *Pittsburgh Post-Gazette*, February 2 2018, link: <https://www.post-gazette.com/business/career-workplace/2018/02/02/Pennsylvania-Amazon-big-employer-headquarters-bid-pittsburgh/stories/201802040057>, accessed 6/10/2019.

²² This source suggests a larger footprint, at least if smaller distribution/sortation facilities are included. Figures from “Amazon Global Fulfillment Center Network”, MWPVL International, link: http://www.mwpvl.com/html/amazon_com.html, accessed 6/10/2019.

²³ Whole Food store count from <https://www.wholefoodsmarket.com/stores/list>, accessed 6/12/2019.

²⁴ A “nexus” is a “sufficient presence within the jurisdiction of a taxing authority.” *Dictionary of Business and Economic Terms: Fifth Edition*, Jack Friedman, Barron’s, 2012, p. 474

²⁵ Again, tax returns are private, and we do not know how Amazon files its taxes with the state. If it does so separately, then the reality would be much more complicated than the one painted here. According to Lexis-Nexis Corporate Affiliations, there are 92 child entities associated with Amazon, including 41 subsidiaries and 40 non-operating entities, some of which are foreign.

Three factor apportionment of corporate income for multistate companies

In the 1950s, a model state tax law called the Uniform Division of Income for Tax Purposes Act (UDITPA) was developed in order to, among other things, simplify and standardize the treatment of taxes for corporations located in multiple states.²⁶

One key issue the model was intended to address was the problem of *apportioning* a corporation's income across the states in order to determine what share of its income would be subject to the corporate income tax in each state.²⁷

Apportionment would not be necessary if a firm's workers, operations, and customers all resided in a single state. In such a case, the state's income tax rate could simply be applied to the entirety of the firm's bottom line. The challenge was figuring out a standard and fair way to divide the income of firms with operations across multiple states, each with different taxation rates and apportionment rules.

The model's answer to this problem was a *three-factor apportionment* formula. Researchers Gupta and Hoffman proposed a generalized expression of this formula as follows.²⁸

$$x_i = \left(w_i^S * \frac{S_i}{S} \right) + \left(w_i^L * \frac{l_i}{L} \right) + \left(w_i^P * \frac{p_i}{P} \right) * \pi * r^i$$

Where:

x^i = corporate income tax for state i

π = taxable income of a given firm

r^i = tax rate for state i

s_i, l_i, p_i = the firm's sales, payroll, and property in state i

S, L, P = the firm's total (company-wide) sales, payroll, and property

w_i^S, w_i^L, w_i^P = the factor weights in state i for sales, payroll, and property (must sum to 1)

Operational definitions of sales, payroll, and property

While the precise definition of each apportionment factor (s, l, and p) can vary from state to state, guidance from the Multistate Tax Commission (MTC) recommends how each should be defined and measured. State statutes do not follow these guidelines to the letter, and the instructions for defining and adjusting each factor can get complicated and technical; but a brief description of each factor follows.²⁹

²⁶ The Great American Jobs Scam: Corporate Tax Dodging and the Myth of Job Creation, Greg LeRoy, Good Jobs First, Berrett-Koehler, 2005, p. 105-106. Chapter 4 of this book includes a brief history of the UDITPA model and SSF.

²⁷ Ibid.

²⁸ The formula and its description are adapted directly from "The Effect of State Income Tax Apportionment and Tax Incentives on New Capital Expenditures", Sanjay Gupta and Mary Ann Hoffman, Journal of the American Tax Association, Vol 25, Supplement 2003, p. 5. Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=247256, accessed 7/1/2019.

²⁹ Description of factors based on "Model General Allocation & Apportionment Regulations as of July 25, 2018", Multi-State Tax Commission, link: [http://www.mtc.gov/getattachment/Uniformity/Adopted-Uniformity-Recommendations/FINAL-APPROVED-2018-Proposed-Amendments-to-General-Allocation-and-Apportionment-Regulation-\(1\).pdf.aspx?lang=en-US](http://www.mtc.gov/getattachment/Uniformity/Adopted-Uniformity-Recommendations/FINAL-APPROVED-2018-Proposed-Amendments-to-General-Allocation-and-Apportionment-Regulation-(1).pdf.aspx?lang=en-US), accessed 5/23/2019

According to the MTC *property* is defined as “real and tangible personal property” that is or could be used during the tax year in the regular course of trade or business. This includes land, buildings, machinery, and stocks of goods and equipment, but not coin or currency. Property is valued and measured based on its undepreciated *original* cost, adjusted by subsequent improvements etc. For cases in which a firm leases property, the MTC recommends that the property be valued at eight times its net annual rental rate.³⁰

The MTC defines *payroll* as the total amount paid in compensation to employees, where compensation is defined as “wages, salaries, commissions and any other form of remuneration paid to employees for personal services”.³¹ In practice states vary in their inclusion of other forms of compensation (ex: bonuses) and payments to independent contractors (as opposed to full time employees).

Finally, as defined by the MTC sales or *receipts* means “all gross receipts ... received from transactions and activity in the regular course of the taxpayer’s trade or business; except that receipt of a taxpayer from hedging transactions and from the maturity, redemption, sale, exchange, loan or other disposition of chase or securities”.³²

According to the MTC, determining the state that receipts should be assigned to for apportionment purposes depends on the nature of the transaction. For example, if the receipt involves the sale of *tangible personal property* (this would include produced, wholesaled or retailed physical goods), the sale should be assigned to its *destination* state, i.e. the state in which the property was delivered or shipped to its purchaser, as opposed to the *origin* state, where the order was taken and/or shipped from.

If the receipt was instead for the sale, rental, or lease of *real property*, according to the MTC, the resulting sales revenue should be assigned to the state in which the property is located. Services should be assigned to the state in which they were delivered, and so on.³³ Despite these guidelines, state laws vary in their treatment of different types of transactions, based on nature of what was sold, the industry involved, and other factors.

Factor weighting systems

While the generalized formula by Gupta and Hoffman implies that a variety of weight values could, in theory, be assigned to apportionment factors, in practice three types of weighting are used by the states: equally weighted factors, double (or super) weighted sales factor, and single sales factor.

³⁰ Ibid. pp. 39-42.

³¹ Adapted from <http://www.mtc.gov/The-Commission/Multistate-Tax-Compact>, accessed 5/23/2019.

³² Ibid.

³³ Ibid.

The original version of the UDIPTA formula weighted each factor share equally. With equal weights applied, Gupta and Hoffman's formula can be expressed as follows.

$$x_i = \left(\frac{\frac{S_i}{S} + \frac{L_i}{L} + \frac{P_i}{P}}{3} \right) * \pi * r^i$$

Let us consider an example. Suppose we have a firm that markets its products nationwide, operates several plants across three states, and happens to have its headquarters in state "i", as well as two plants. Suppose that 75% of its payroll is paid, 50% of its property is owned, and 5% of its receipts are earned in state i, and that its presence in state i is adequate to establish a nexus for corporate income tax purposes. Suppose its corporate-wide net income for a given year is \$5M. Finally, let us assume state i's corporate income tax rate is 5%. Plugging these numbers into the formula above gives the following result.

$$x_i = \left(\frac{.05 + .75 + .50}{3} \right) * \$5M * .05$$

$$x_i = (.4333) * \$5M * .05$$

$$x_i = \$108,333$$

As noted by Gupta and Hoffman, as early as 1983, 35 states used this *equal weighted factor approach* to apportion corporate income for tax purposes. By 1996, only 15 did.³⁴ One reason was the rise of the *double-weighted sales approach*. According to Gupta and Hoffman, the use of this approach grew from about six states in 1983 to 24 states by 1996. This method effectively doubles the value of the sales factor, and divides the results by 4 rather than 3, as follows.

$$x_i = \left(\frac{\left[\frac{S_i}{S} * 2 \right] + \frac{L_i}{L} + \frac{P_i}{P}}{4} \right) * \pi * r^i$$

As applied to our example firm, the following results.

$$x_i = \left(\frac{[.05 * 2] + .75 + .50}{4} \right) * \$5M * .05$$

$$x_i = (.3375) * \$5M * .05$$

$$x_i = \$84,375$$

Thus, the double-weighted sales factor formula shifts the tax burden away from payroll and property factors to the sales factor. For firms where the in-state payroll

³⁴ Based on Figure 1 in Gupta and Hoffman, page 6.

and property footprints are significant, but the in-state sales footprint is small or even insignificant (as might be true for a manufacturer that exports most of its production out of state), the result is a substantially smaller tax bill. In this case, the firm's tax bill is reduced by 22%.

Finally, there is the *single sales factor (SSF)* approach. As its name implies, this approach apportions corporate income for tax purposes on the sales factor alone. Restated again, the formula is:

$$x_i = \frac{S_i}{S} * \pi * r^i$$

And in the case of our imaginary firm the new tax bill is:

$$x_i = .05 * \$5M * .05$$

$$x_i = \$12,500$$

Thus, the single sales factor bill reduces the original hypothetical firm's (equally weighted factor based) tax bill by 88%.

Per Gupta and Hoffman, in 1983 less than five states relied on the SSF approach.³⁵ As recounted by Greg Leroy, a new wave of state use of SSF apportionment kicked off with the adaption of SSF for defense contractors by Massachusetts in 1995, a policy which was soon expanded to manufacturing firms and mutual fund companies.³⁶ In 2005, LeRoy reported that ten states had enacted SSF. Eight of these had SSF in place by 2001, with two states having passed laws that would put SSF in place soon after 2005. That said, at the time Leroy also noted that some states limited the application of SSF to manufacturing firms.³⁷

State transitions to SSF continued after 2005. According to the Federation of Tax Administrators (FTA), as of 2019, out of 50 states plus the District of Columbia, about twenty-seven states and D.C. used SSF apportionment for manufacturing (for all or some manufacturing industries), or at least provided it as an option.³⁸ According to the FTA by 2019 only eight states relied on double weighted sales apportionment, while three appeared to rely on variants of the double weighted formula that put extra weight on the sales factor. Whereas the double weighted formula uses a 50% weight for the sales factor, these states used triple weighting (60%) or heavier weights (66%, 75%, etc.)

³⁶ LeRoy, pp. 98-100. As of 2019 SSF still only appears to apply to these industries in MA. See: <https://www.mass.gov/service-details/single-sales-factor>.

³⁷ Ibid.

³⁸ "State Apportionment of Corporate Income", web document, Federation of Tax Administrators, link: <https://www.taxadmin.org/assets/docs/Research/Rates/apport.pdf>, accessed 5/29/2019. These results should be considered approximate and incomplete, as the FTA did not examine treatment of non-manufacturing firms. Getting a clear, current, and complete picture of how states apportion income by industry requires an industrious close examination of state statutes, something we were not able to undertake for this report.

As of 2019 only *seven* states appeared to mainly use equally weighted three factor apportionment for manufacturing firms. Recall that in 1983 *thirty-five* states used equally weighted factor apportionment. While the FTA’s figures only account for treatment of the corporate income of manufacturing firms, we assume that the number of states using equally weighted three factor apportionment for other or all industries has also dropped significantly. To round out the count, as of 2019, five states did not have a traditional corporate income tax. This group includes Washington State, home of Amazon’s HQ1.

Pennsylvania and SSF

Pennsylvania adapted SSF for most industries in 2012, starting with the 2013 tax year, but its transition to SSF did not happen overnight. The table below, adapted from the Pennsylvania Tax Compendium, lays out the changes made to state tax law over the years that altered factor weights.³⁹

Table 1

| Taxable Year | Sales Factor Weight | Property Factor Weight | Payroll Factor Weight | Year enabling legislation was passed | Signed by governor... |
|----------------|---------------------|------------------------|-----------------------|--------------------------------------|-----------------------|
| 1994 and prior | 33% | 33% | 33% | n/a | |
| 1995-1998 | 50% | 25% | 25% | 1995 | Ridge (R) |
| 1999-2006 | 60% | 20% | 20% | 1999 | Ridge (R) |
| 2007-2008 | 70% | 15% | 15% | 2006 | Rendell (D) |
| 2009 | 83% | 8.5% | 8.5% | 2009 | Rendell (D) |
| 2010-2012 | 90% | 5% | 5% | 2009 | Rendell (D) |
| 2013 | 100% | 0% | 0% | 2012 | Corbett (R) |

While equally weighted three factor apportionment had been in use in the Commonwealth for and prior to the 1994 tax year, this began to change in 1995, when the sales factor weight was increased from 33% (equal weighting) to 50%, i.e. a double-weighted sales factor approach. From that point forward, successive laws began to “superweight” the sales factor share. In 1999 the sales factor weight was set to 60%, or three times the value of the property or payroll weights. This *triple-weighted* the sales factor share as follows.

$$x_i = \left(\frac{\left[\frac{S_i}{S} * 3 \right] + \frac{L_i}{L} + \frac{P_i}{P}}{5} \right) * \pi * r^i$$

This formula remained in place until 2006, when legislation was enacted that increased the sales factor weight further to 70%. In 2009 legislation was passed that increased the sales factor to 83% and then again to 90% by the 2010 tax year.

³⁹ Table adapted from Tax Compendium: February 2019, Pennsylvania Department of Revenue, page 2, link: https://www.revenue.pa.gov/GeneralTaxInformation/News%20and%20Statistics/ReportsStats/TaxCompendium/Documents/2018_tax_compendium.pdf, accessed 5/30/2019.

Finally, in 2012, Act 85 transitioned the Commonwealth to the SSF approach for the 2013 tax year forward.⁴⁰

Guesstimating corporate income tax yields for HQ2 under SSF

So, to return to our million-dollar question: how much more corporate income tax would Pennsylvania receive if HQ2 came to Pittsburgh, *ceteris paribus*?

We believe under SSF the answer would be near zero. Our reasoning is simply this: despite the fact that Amazon already has a substantive property and payroll footprint in the state, and despite the fact that as originally outlined, Amazon's HQ2 program would have substantially increased both of those footprints, as of 2013 only its sales footprint matters for figuring corporate income taxes.

Given that our analysis is limited to the direct impact of HQ2 we do not believe that HQ2's presence alone would increase Amazon's own sales footprint within the state enough to significantly affect the amount of the firm's income apportioned for tax purposes, whatever it may be currently or moving forward.

A crude estimate of Amazon's "current" sales share for PA

While Pennsylvania's actual share of Amazon sales is unknown, based on the nature of its e-commerce, marketplace, and physical retail platforms alone, one rough but reasonable way to estimate its sales share is to simply substitute the state's share of the U.S. population. While crude, the approach is defensible because *lots* of people use Amazon. One marketing firm recently estimated that, as of 2018 Amazon had over 100 million Prime subscribers in the United States alone.⁴¹ Admittedly, this approach ignores any possible differences in Amazon's market penetration, and real differences in purchasing power and preferences (not everyone shops at Whole Foods) from state to state, but it serves as a reasonable approximation.

As of 2017, Pennsylvania's estimated population was 12.8M, or about 3.93% of the U.S. population of 325.7M.⁴² This figure can serve as a crude approximation of Amazon's sales factor share for PA. Before moving on, we should acknowledge another weakness with this estimate. While population share surely has some bearing on Amazon's consumer sales, it does not account for sales earned from the

⁴⁰ Four years later, Pennsylvania also eliminated the state capital stock and foreign franchise taxes on in and out of state firms doing business in Pennsylvania. The tax, technically considered a property tax, was levied on the apportioned capital *stock* value of applicable firms. While its rate peaked at 13 mills (i.e. .013) in 1991, it declined almost every successive year thereafter until 2015, the last taxable year it applied to, in which the rate had fallen to .45 mills (.00045). Source: [Tax Compendium: March 2017](https://www.revenue.pa.gov/GeneralTaxInformation/News%20and%20Statistics/ReportsStats/TaxCompendium/Documents/2017_tax_compendium.pdf), Pennsylvania Department of Revenue, link: https://www.revenue.pa.gov/GeneralTaxInformation/News%20and%20Statistics/ReportsStats/TaxCompendium/Documents/2017_tax_compendium.pdf, accessed 6/6/2019.

⁴¹ This estimate is not based on actual customer data, but on a survey of 500 people who reported they had purchased with Amazon recently. "Amazon Exceeds 100 Million U.S. Members", press release, Consumer Intelligence Research Partners (CIRP), link: <https://files.constantcontact.com/150f9af2201/a37a79a7-0eff-4a38-b05a-ce3c459addc2.pdf>, accessed 6/6/2019.

⁴² U.S. Census Bureau, link: <https://www.census.gov/quickfacts/PA>.

AWS segment, which is likely distributed across the states (and other countries) differently than e-commerce and retail store revenues. While this distribution remains unknown, our best guess is that Amazon's AWS sales share is probably much lighter in PA than its consumer-centric businesses. If true, one way to interpret our estimate of 3.93% is an upper bound.⁴³

With that said, let us (arbitrarily) assume that for a given taxable year, \$5B in Amazon's net income is subject to state apportionment. Using our estimated sales factor share, and ignoring (for now) carryforwards, loopholes, tax breaks, and reduction strategies etc., a rough estimate of Amazon's corporate income tax paid to the Commonwealth could be as follows:

$$x_i = \frac{S_i}{S} * \pi * r^i$$

$$x_i = .0393 * \$5B * .0999$$

$$x_i = \$19.6M$$

Estimating the marginal yield for HQ2

That is a sizable number. How much would it change if HQ2 came to Pittsburgh? Not much, at least if only the effect of Amazon's direct HQ2 employment on the sales factor share is considered.

Amazon's RFP implied that the firm's first immediate real estate need for HQ2 was (at minimum) a 500,000 sq. ft. of office building. Let us assume that Amazon needed 150 sq. ft. of office space per employee.⁴⁴ This implies a starting footprint of 3,333 hires for the first building. Let us assume that Amazon staffed the building to capacity within a year, and that 100% of these workers are Amazon employees (not contractors) that *are* new to the state, rather than current residents.

While these employees would have higher than average purchasing power (it is probably safe to assume they are also Amazon Prime members), their addition to the state would seem to have next to no impact on the share of U.S. sales that Amazon draws from Pennsylvania, and so our estimated sales factor would barely budge.

Even if the 2017 US population were held constant, and we added all 3,333 employees to the state's population, the resulting implied sales factor barely changes by .00001. This number would not change much if we assumed that some brought spouses, partners, or families along with them.

⁴³ It is a peculiarity of apportionment, but if one treats all sales from all of Amazon's major divisions in a unitary fashion (i.e. as one tax filer), the fact that half of the firm's net income actually derived from AWS does not actually influence to how said income is apportioned. Here only the sales matter.

⁴⁴ We are ignoring the question of whether Amazon builds, acquires, or leases the building, as well as the issue of what unit of measure Amazon's RFP intended the 500K sq. ft. to be, whether gross building area, rentable sq. ft., or useable sq. ft. leasable area. ft., etc. Different measures would produce different employee estimates. The 150 sq. ft. per worker ratio was suggested as an "average" corporate office ratio by Lauren Gilchrist, Senior Vice President, Senior Director of Research at JLL Philadelphia. E-mail exchange, November 2018.

Before: $12.8\text{M} / 325.7\text{M} = .039300$
 After: $(12.8\text{M} + 3,333) / 325.7\text{M} = .039310$
 Difference: $.00001$

Multiplying this change by \$5B and the tax rate yields of just \$4,995 more in corporate income taxes to the state. This is about .025% of our base estimate of \$19.6M, but for convenience let us just call it zero.

Marginal Yield: $\$5\text{B} * .000010 * 9.99\% = \5K

Even if one assumed that 50,000 Amazon employees (the upper bound number originally implied by the HQ2 RFP), arrived for the first year of operations, and that all were new arrivals to the state, the marginal yield is still relatively small. Adding 50,000 employees to the state's population increases the sales factor by about .000154. The following marginal yield results.

Before: $12.8\text{M} / 325.7\text{M} = .039300$
 After: $(12.8\text{M} + 50\text{K}) / 325.7\text{M} = .039453$
 Difference: $.000154$

Marginal Yield: $\$5\text{B} * .000154 * 9.99\% = \76.9K

\$76.9K in additional taxes is an improvement, but still only about .39% more than the base scenario of \$19.6M.

Admittedly, this estimate is limited to the effects of *direct* hires on Amazon's sales factor share. It ignores the additional sale share that might have occurred from the indirect business and consumer spending effects HQ2 might have had on current state residents and firms, not to mention the increased sales from long term increases in population from in-migration and business attraction and formation that would likely have ensued. Constructing a detailed estimate of the impact of all this on the sales factor is beyond the scope of this report, but for illustration purposes only, we can attempt a very crude guess at the population effect.

How much did the population of King County WA grow as Amazon scaled up its headquarters in Seattle ("HQ1")? In 2007, when Amazon announced its move from its original headquarters from the Seattle neighborhood of Beacon Hill to what is now its South Lake Union campus, estimates on the actual number of employees it maintained in the Seattle area were hard to find. But media reports suggest that it was something less than 10,000 in the Seattle area (out of a reported 17,000

worldwide at the time).⁴⁵ As of March 2018, Amazon itself reported that it employed 45,000 in its hometown (presumably, once again, the Seattle “area”).⁴⁶

During this same time frame, King County grew by about 375K residents.⁴⁷ Let us assume, naively, that this implies the addition of 35K Amazon jobs led to a net increase in 375K residents. We might also naively assume that all the gain resulted from in-migration rather than natural increase. Following this logic, we might pretend that every Amazon job “encouraged” the addition of 10.7 new residents to King County and Washington State, and that this migration was exclusively due, directly or indirectly, to Amazon; not due to any other firm or reason (clearly not true, but bear with us). If we assumed the same fixed ratio applied to HQ2 in Pittsburgh, it implies that Allegheny County’s population would grow by at least 535K in 10 years, assuming the 50K build out was achieved. Let us assume that Amazon’s in-state sales grew in tandem with the population. Once again, we will unrealistically hold the PA and US populations constant except for this change.

Before: $12.8\text{M} / 325.7\text{M} = .039300$
After: $(12.8\text{M} + 535\text{K}) / 325.7\text{M} = .04094$
Difference: $.001643$
Marginal Yield: $\$5\text{B} * .001643 * 9.99\% = \820.6K

At a yield of \$820K, we are now up to 4%+ of the original base estimate of \$19.6M. In yet another way this exercise was naive, it pointedly ignores the possibility that relative trends in state population growth (or retail trends) across the nation driven by factors other than HQ2 might have moved the result in entirely different directions. But putting this aside, while unrealistic, we hope the exercise shows how steep the climb would have been if one relied on relative sales share growth from HQ2 alone to increase the corporate income tax yield.

⁴⁵ The 10,000 figure is implied by “Amazon puts its stamp on downtown Seattle”, Eric Pryne, Seattle Times, December 26 2012, link: <https://www.seattletimes.com/business/amazon-puts-its-stamp-on-downtown-seattle/>, accessed 6/19/2019. The 17,000 figure is from Amazon’s 10-K for that year (Amazon.com Inc., Form 10-K for the Fiscal Year Ended December 31, 2007, p. 6).

⁴⁶ Source: <https://blog.aboutamazon.com/job-creation-and-investment/45000-and-counting>, accessed 6/19/2019.

⁴⁷ Based on U.S. Census Bureau, Resident Population in King County WA, link <https://fred.stlouisfed.org/series/WAKING5POP>, accessed 6/19/2019. This source is in turn based the Census Bureau's Population Estimates Program. See: <https://www.census.gov/programs-surveys/popest.html>.

Conclusion

We do not believe that winning HQ2 would have resulted in an immediate higher state tax yield from Amazon's corporate income. The fact that a marginal increase would not have occurred probably helps to explain why Pittsburgh's bid lacked any offer of a break on Pennsylvania's corporate income tax. While it might have made the offer more attractive, fiscally (and probably politically) it would have been easier for the state to offer a tax break if Amazon's corporate income liability had actually been expected to increase significantly, than to agree to forgo revenue from the state's "flat" apportioned share of that base in 2017/2018, whatever that might have been.

About Heinz College

The Heinz College of Information Systems and Public Policy at Carnegie Mellon University was established in 1968 and renamed in 1992 in honor of the late U.S. Senator from Pennsylvania, John Heinz III. Heinz College improves the ability of the public, private and nonprofit sectors to address important problems and issues facing society. The College is home to two internationally recognized graduate-level institutions at Carnegie Mellon University: the School of Information Systems and Management and the School of Public Policy and Management. This unique colocation combined with its expertise in analytics set Heinz College apart in the areas of cybersecurity, health care, the future of work, smart cities, and arts & entertainment. In 2016, INFORMS named Heinz College the #1 academic program for Analytics Education.

About the CED

The Center for Economic Development at the College exists to help local institutions and the public understand the economic and community development challenges facing the Pittsburgh region and the Commonwealth of Pennsylvania. Since its inception under the College in 1987, the Center has followed an interdisciplinary approach to conduct research in economic, workforce, and community development. Through objective research and technical tools, the Center helps clients manage change through policy, strategy, and programming. Our toolkit includes economic, demographic, geographic, and institutional data analysis, economic and statistical modeling, survey design and analysis, performance measurement, program design and evaluation, and policy research. Since 2008, with the assistance of its EDO partners and C-level Executive Fellows, the CED has also provided a steady pipeline of academic, extracurricular, and experiential learning opportunities for master's students at the College interested in economic and community development in the U.S. context. For more information, please visit www.heinz.cmu.edu and www.cmu.edu/ced.

About this report

The conclusions and opinions of this report are the authors alone. This report does not represent the conclusions, views, or official positions of Carnegie Mellon University or any of its corporate officers.

General caveats

This report and its appendices attempt rough estimates of the marginal tax yields of a hypothetical building that will not ever be built. The scenario examined greatly simplified the realities, which are likely much messier than described. Thus, we can make no assurances as to the *accuracy* of our estimates which are, as of this writing, moot.