

Analysis of Revenue Proposals

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2018

FY 2018-19 EXECUTIVE BUDGET



INDEPENDENT FISCAL OFFICE



About the Independent Fiscal Office

The Independent Fiscal Office (IFO) provides revenue projections for use in the state budget process along with impartial and timely analysis of fiscal, economic and budgetary issues to assist Commonwealth residents and the General Assembly in their evaluation of policy decisions. In that capacity, the IFO does not support or oppose any policy it analyzes, and will disclose the methodologies, data sources and assumptions used in published reports and estimates.

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INDEPENDENT FISCAL OFFICE

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April 17, 2018

This document provides an analysis of the tax proposals included in the *2018-19 Executive Budget* released in February 2018. The Independent Fiscal Office (IFO) publishes this report to fulfill its statutory duties as provided under Section 604-B (a)(4) of the Administrative Code of 1929. The statute requires that the IFO “provide an analysis, including economic impact, of all tax and revenue proposals submitted by the Governor or the Office of the Budget.”

This analysis uses various data sources to derive estimates of the revenue proposals included in the budget. All data sources and methodologies used to derive those estimates are noted in the relevant sections of this document. The IFO would like to thank the various organizations that provided input to this analysis.

Questions or comments regarding the contents of this analysis may be submitted to contact@ifo.state.pa.us.

Sincerely,

MATTHEW J. KNITTEL
Director

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Introduction

This report provides revenue estimates for the tax proposals contained in the *2018-19 Executive Budget* released in February 2018. The Independent Fiscal Office (IFO) publishes this report to fulfill its statutory duties as provided under Section 604-B (a)(4) of the Administrative Code of 1929. The statute requires that the IFO “provide an analysis, including economic impact, of all tax and revenue proposals submitted by the Governor or the Office of the Budget.”

The report contains two sections. The first section analyzes the tax proposals included in the *2018-19 Executive Budget* and the corresponding impact on General Fund revenues over a five-year period. The text includes brief descriptions of the data sources and methodologies used to derive the revenue estimates and provides interstate comparisons or a discussion of tax incidence under proposed tax law. The second section analyzes the proposal to increase the state minimum wage from \$7.25 to \$12.00 per hour. It discusses potential employment effects, income effects and implications for General Fund revenues.

The analyses contained in this report are based on descriptions from the *2018-19 Executive Budget* and, when available, technical language provided by the administration. To the extent that parameters for a specific proposal were unavailable, the analyses incorporate reasonable assumptions, which are outlined in the two sections. If enacted, the proposals would not impact revenues for the current fiscal year.

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Tax and Revenue Proposals

The *2018-19 Executive Budget* proposes changes to the corporate net income tax and a new tax levy on the severance of natural gas. By fiscal year (FY) 2022-23, the analysis projects that the proposals would increase General Fund tax revenues by \$305 million. New revenues peak in FY 2019-20, but then begin to decline due to the phase-in of a corporate net income tax rate reduction.

Table 1.1
General Fund Revenue Impact Summary

	Fiscal Years				
	18-19	19-20	20-21	21-22	22-23
Corporate Net Income Tax	\$0	\$294	\$175	\$50	-\$115
Severance Tax	<u>210</u>	<u>277</u>	<u>379</u>	<u>400</u>	<u>420</u>
Total	210	571	554	450	305

Note: figures in dollar millions.

Corporate Net Income Tax

The administration's proposal (1) reduces the corporate net income tax (CNIT) rate from 9.99 percent to 9.49 percent for tax years beginning in 2020; 8.99 percent for tax years beginning in 2021; 8.49 percent for tax years beginning in 2022; and 7.99 percent for tax years beginning in 2023 and thereafter and (2) requires corporations that are members of a unitary business group to apportion their income via a combined annual report for tax purposes, a filing method commonly known as combined reporting, effective for tax years beginning in 2019 and thereafter.¹

¹ A unitary business is a single economic enterprise that is comprised of separate parts of a single business entity or of a commonly controlled group of business entities that are sufficiently interdependent, integrated and interrelated through their activities so as to provide a synergy and mutual benefit that produces a sharing or exchange of value among them and a significant flow of value to the separate parts. Source: "Allocation and Apportionment Regulations" Multistate Tax Commission (MTC) www.mtc.gov/uploadedFiles/Multistate_Tax_Commission/Uniformity/Uniformity_Projects/A_-_Z/AllocationandApportionmentReg.pdf.

Methodology

The CNIT proposal was analyzed in the following order: (1) rate reduction and (2) combined reporting. The stacking order does not affect the total net impact of the proposal, but it does change the relative magnitudes of the rate reduction and combined reporting estimates.

Rate Reduction

The estimate applies the proposed rate reduction to the IFO's most recent CNIT baseline projection (includes impact of the federal Tax Cuts and Jobs Act of 2017). The estimate includes a behavioral impact that partially offsets the revenue loss due to the lower rate because corporations have less incentive to use tax planning techniques to reduce Pennsylvania corporate tax liability if tax rates are reduced. In addition, when fully phased in, the 20 percent reduction in the tax rate could be sufficient to have a modest positive impact on firms' location decisions.

Combined Reporting

The estimate references an IFO report (2013) which used research from states that have implemented combined reporting during the previous decade to examine the revenue impact from that filing method.² The report found that combined reporting could increase revenues by roughly 9 to 13 percent. The IFO considered two factors in determining the appropriate parameter to apply to this estimate: (1) proposed restrictions on the use of net operating losses (NOLs) and (2) by FY 2023-24, the CNIT rate will have declined by 2.0 percentage points under the administration's proposal.³ In general, combined reporting could be less effective (i.e., a smaller relative base expansion and revenue impact) at lower tax rates because firms have less incentive to engage in tax planning. Therefore, a parameter on the higher end of the given range is used for this estimate (12 percent), but the percentage declines slightly as the tax rate falls (11 percent).

The combined reporting estimate reflects timing issues related to state or taxpayer challenges under the new reporting regime. It is not unusual for states or taxpayers to dispute the inclusion or exclusion of entities that comprise the unitary group. The resolution of that issue could take several years. The full implementation of the new reporting regime by a state tax authority will also require several years and additional staff for audit and enforcement purposes. The estimate assumes that additional resources would be made available for that purpose.

² See "Corporate Tax Base Erosion: Analysis of Policy Options," Independent Fiscal Office (March 2013) <http://www.ifo.state.pa.us./Releases.cfm>.

³ Under the administration's proposal, sharing of NOLs between members of a unitary business group is not permitted and the 40 percent NOL cap is applied to the member's apportionable share of the combined business income (essentially a separate company basis).

Revenue Impact

Table 1.2 displays the estimated net revenue impact of the CNIT proposal over the next five fiscal years. The proposal has no impact on FY 2018-19 and increases revenue by \$294 million for FY 2019-20. By the end of the five-year window, the net impact of the proposal is negative due to the significant CNIT rate reduction.

Table 1.2
Corporate Net Income Tax Revenues¹

	Fiscal Years				
	18-19	19-20	20-21	21-22	22-23
Rate Reduction	\$0	-\$38	-\$166	-\$312	-\$470
Combined Reporting	<u>0</u>	<u>332</u>	<u>341</u>	<u>362</u>	<u>355</u>
Total	0	294	175	50	-115

¹Estimates are net of refunds.

Note: figures in dollar millions.

Interstate Comparison

Table 1.3 provides an interstate comparison of the CNIT. The table includes (1) the state tax rate, or range of tax rates and (2) the applicable reporting method. Forty-four states currently levy a CNIT, with the highest statutory rate (12.00 percent) levied by Iowa and the second highest levied by Pennsylvania (9.99 percent). Fourteen states use a graduated rate structure, while 30 levy a single, flat rate. As of 2017, 24 states and the District of Columbia require combined reporting for businesses that meet unitary group standards. The most recent states to enact combined reporting were Rhode Island (2015) and Connecticut (2016). The remaining 20 states that levy a CNIT require separate reporting. Eight of the states that require separate reporting have processes in place where (1) the taxpayer can elect to use a different filing method (e.g., consolidated) or (2) the state tax authority can require a taxpayer to file a combined return based on audit results.⁴

⁴ Consolidated reporting is not the same as combined reporting. The unitary requirements that must be met for mandatory combined reporting do not extend to consolidated reporting. Consolidated reporting allows related affiliates/firms to combine tax reports into one filing, similar to the federal consolidated return, rather than combine income from all states in which the taxpayer may or may not have nexus.

Table 1.3
States With Corporate Net Income Tax

State ¹	Tax Rate ²	Method ³	State	Tax Rate	Method
Alabama	6.50%	Separate	Minnesota	9.80%	Combined
Alaska	0.00 - 9.40%	Combined	Mississippi	0.00 - 5.00%	Multiple ⁴
Arizona	4.90%	Combined	Missouri	6.25%	Separate
Arkansas	1.00 - 6.50%	Separate	Montana	6.75%	Combined
California	8.84%	Combined	Nebraska	5.58 - 7.81%	Combined
Colorado	4.63%	Combined	New Hampshire	8.20%	Combined
Connecticut	8.25%	Combined	New Jersey	9.00%	Separate
Delaware	8.70%	Separate	New Mexico	4.80 - 5.90%	Separate
Florida	5.50%	Separate	New York	6.50%	Combined
Georgia	6.00%	Separate	North Carolina	3.00%	Multiple ⁴
Hawaii	4.40 - 6.40%	Combined	North Dakota	1.41 - 4.31%	Combined
Idaho	7.40%	Combined	Oklahoma	6.00%	Multiple ⁴
Illinois	9.50%	Combined	Oregon	6.60 - 7.60%	Combined
Indiana	6.25%	Multiple ⁴	Pennsylvania	9.99%	Separate
Iowa	6.00 - 12.00%	Separate	Rhode Island	7.00%	Combined
Kansas	4.00 - 7.00%	Combined	South Carolina	5.00%	Multiple ⁴
Kentucky	4.00 - 6.00%	Separate	Tennessee	6.50%	Multiple ⁴
Louisiana	4.00 - 8.00%	Separate	Utah	5.00%	Combined
Maine	3.50 - 8.93%	Combined	Vermont	6.00 - 8.50%	Combined
Maryland	8.25%	Separate	Virginia	6.00%	Multiple ⁴
Massachusetts	8.00%	Combined	West Virginia	6.50%	Combined
Michigan	6.00%	Combined	Wisconsin	7.90%	Combined

¹Nevada, Ohio, South Dakota, Texas, Washington and Wyoming do not levy a corporate net income tax. Ohio, Texas and Washington levy a gross receipts tax on business activities.

²"State Corporate Income Tax Rates and Brackets for 2018," Tax Foundation (February 2018).

³"Combined-Reporting Study," Office of Fiscal Management and Analysis, Indiana Legislative Services Agency (October 2016).

⁴States that generally require separate reporting, but either allow taxpayers to elect another form of reporting, or may require combined reporting based on audits.

In 2018, the Rhode Island Department of Revenue Division of Taxation released an analysis of the effect of reforms enacted in 2014, including CNIT rate reduction (from 9.00 percent to 7.00 percent), mandatory unitary combined reporting, single-sales-factor apportionment and market-based sourcing.⁵ The analysis finds that corporate tax liabilities fell by 22.7 percent related to the 22.2 percent reduction in the tax rate. Based on

⁵ "Tax Administrator's Report: Impact of Corporate Tax Changes" Rhode Island Department of Revenue Division of Taxation (March 2018) http://www.tax.ri.gov/reports/Report_on_corporate_tax_changes_03_15_18.pdf.

a simulation of impacted firms, the results of the study imply a base expansion of roughly 20 percent due to the implementation of combined reporting.⁶

Natural Gas Severance Tax

The administration's proposal levies a tax on the severance of unconventional (i.e., shale) natural gas within the Commonwealth. The tax will be assessed as a fixed amount per thousand cubic feet (mcf) of natural gas severed. The rate would be determined by the average annual price of gas for the preceding calendar year according to the following schedule:

- \$0.00 to \$3.00 – 4.2 cents per mcf
- \$3.01 to \$4.99 – 5.3 cents per mcf
- \$5.00 to \$5.99 – 6.4 cents per mcf
- \$6.00 or greater – 7.4 cents per mcf

The average annual price is determined using the arithmetic mean of the New York Mercantile Exchange (NYMEX) one-month futures contracts. The proposed tax would be effective July 1, 2018 with the first payment due June 15, 2019. The initial year would cover production from the effective date through April 2019. After the initial year, the tax would be paid annually on June 15th, and would cover production from May of the previous calendar year to April of the concurrent year.⁷ The proposal does not change the Act 13 Impact Fee, nor is the fee allowed as a credit or deduction against the severance tax.

Methodology

The estimate is based on projected unconventional natural gas production in Pennsylvania and the average annual price of natural gas on the NYMEX. The analysis utilizes production estimates from Bentek Energy that were adjusted by the IFO. Projected tax collections equal the product of the assumed tax rate and unconventional natural gas production.

The price forecast assumes that (1) the average annual price of natural gas on the NYMEX will be within the price range for the 4.2 cents per mcf tax rate (\$3.00 or less) for FY 2018-19 and FY 2019-20 and (2) the price increases to the 5.3 cents per mcf range (\$3.01 to \$4.99) for FY 2020-21 to FY 2022-23. For 2018 and 2019, the annual price on the NYMEX is expected to be near the \$3.00 threshold. If the NYMEX price were to exceed the \$3.00 threshold in 2018 or 2019, the estimates for FY 2018-19 and FY 2019-20 would increase by \$54 million and \$73 million, respectively.

⁶ Simulation results as applied to the total tax base and adjusted for the rate reduction.

⁷ 2018-19 Executive Budget, pages C1-15 – C1-16.

The production forecast assumes fairly strong gains in 2018 due to (1) stabilizing regional prices and (2) increasing production capacity as a result of projects throughout the state that will connect regional hubs to other markets. The projection also assumes a reduction in output from the imposition of the new severance tax, which reduces demand if most of the tax is passed forward to final consumers through higher prices.⁸

Revenue Impact

Table 1.4 displays the assumed tax rate, projected taxable production and estimated revenue collections for the proposed severance tax from FY 2018-19 to FY 2022-23. For FY 2018-19, the analysis projects \$210 million of tax revenue, growing to \$420 million by FY 2022-23.

Fiscal Year	18-19	19-20	20-21	21-22	22-23
Assumed Rate (cents/mcf) ¹	4.2	4.2	5.3	5.3	5.3
Taxable Production (billion cubic feet) ²	4,999	6,599	7,149	7,552	7,928
Severance Tax (\$ millions)	\$210	\$277	\$379	\$400	\$420

¹Tax rate based on average annual NYMEX price of natural gas.

²Unconventional production projected by Bentek Energy, adjusted by the IFO. Includes production from May to April, except for the initial year, which includes production from July to April.

Tax Burden Measurement and Comparisons

Policymakers and the general public are interested in metrics that will help them to (1) evaluate the tax burden imposed by the proposed severance tax and (2) compare Pennsylvania's existing impact fee and proposed severance tax with the severance taxes imposed by other states. The computation of an effective tax rate (ETR) is useful for these purposes because it reduces the multiple factors influencing collections to a summary metric. Generally, the ETR is equal to the severance tax or impact fee revenues for a specified period divided by the market value of natural gas production for the same period.

There are two distinct types of ETRs (annual vs. lifetime) that can be analyzed, and each one has advantages and disadvantages based on the intended use. The annual ETR is best used to examine trends within a state, while the lifetime ETR is best used to make interstate comparisons of tax structure. The remainder of this subsection provides additional information on the characteristics and uses of the two ETRs.

⁸ The analysis assumes that the new tax reduces production by 3 to 4 percent.

Annual ETR

The annual ETR, which may be the more familiar metric, can be computed historically (or prospectively) based on the revenues collected (or projected) in a fiscal year divided by the market value of the natural gas production associated with those collections. The following text addresses (1) factors that influence annual fluctuations (volatility) of the ETR, (2) uncertainty regarding the estimation of market value, which is a major component of the ETR computation and (3) the history and projections for the ETR of Pennsylvania's impact fee and proposed severance tax.

1. Fluctuation of the Annual ETR

The annual ETR can fluctuate significantly from one year to the next (even within the same state) based on (1) changes in price, (2) changes in volume extracted, (3) the age of the wells from which natural gas is extracted, (4) the number of new wells drilled and (5) the drilling and completion costs for the wells in operation. The following bullets provide additional detail.⁹

- Price. For volume-based taxes, such as the proposed Pennsylvania severance tax and the existing taxes levied by Louisiana and Ohio, the ETR will move in the opposite direction of price. Pennsylvania's impact fee is not imposed based on volume, but its ETR also (1) is sensitive to changes in price and (2) moves in the opposite direction of price.
- Volume. The ETR for per-well fees, such as Pennsylvania's impact fee, will move in the opposite direction of volume. No other state imposes a similar fee.
- Special Tax Rates. Some states provide for special rates based on the age of the well at the time the gas was extracted. Other states provide a special rate until certain thresholds based on drilling and completion costs are reached.
 - Pennsylvania's impact fee schedule imposes a higher fee on newer wells. The per-well fee declines as the well ages, and the effect of this feature on the ETR will depend on the volume of production from new wells versus production from older wells. However, the lower fee for older wells generally exerts downward pressure on the ETR.
 - Arkansas provides a significantly reduced tax rate for natural gas extracted in the first three years (or four years under certain conditions) of a well's production, and Oklahoma's lower rate applies to the first three years of a well's production. Texas levies a reduced rate for the first ten years, but the time period can be extended (see below). These special tax rates reduce the ETR below the statutory rate. The share of production eligible for the special rate determines the gap between the statutory rate and the ETR in any one year.

⁹ The effect on the ETR for each listed factor assumes all other factors remain constant.

- Louisiana provides a reduced volume-based tax rate if the operator's market revenue does not exceed drilling and completion costs. The ten-year reduced rate levied by Texas can be extended until the cumulative value of the reduction exceeds one-half of the drilling and completion costs.

Fluctuations in the annual ETR make the metric less useful for interstate comparisons because the evaluation could change simply based on the year selected for evaluation. The metric is best used to examine how changes in price, volume, new wells and, in some cases, local drilling and completion costs, affect the average tax burden within a state over time.

2. Uncertainty of Market Value Estimates

A limitation of the annual ETR is the uncertainty surrounding the estimated market value of natural gas extracted. While the metric relies heavily on this estimate, it is not possible to know with certainty the actual value received by extractors unless the information has been collected by state tax authorities and published. In the absence of such data, the market value can be estimated based on (1) volume extracted as reported by state agencies or the U.S. Energy Information Administration, (2) prices in the relevant spot market(s) and (3) estimates of the post-production costs incurred by extractors. These components could differ from the actual amounts produced, received or incurred by extractors. The greatest differences tend to occur with regard to prices and post-production costs, and those elements of the estimate are discussed below.

The spot price is the market price at which the natural gas can be purchased for immediate delivery. The spot price is hub-specific because prices often differ based on location, and those prices can be volatile.¹⁰ Other methods that extractors use to sell their gas include the month-ahead market and long-term contracts (hedging) that reduce the impact of short-term fluctuations in price. Sales on the spot market comprise a relatively small share of total natural gas sales, but the spot price generally is visible to the public while received prices are known only to the parties to a transaction. An estimated market value computed using the spot price is a good proxy for the actual market value when it closely approximates the average prices received by extractors. This is more likely to occur when markets are relatively stable and without large, short-term fluctuations in price.

Deductions for post-production costs (e.g., gathering, processing and transportation) are standard for state severance taxes, and the market value for ETR purposes is adjusted to account for these costs. These expenses can vary significantly from firm to firm, but public data on which to base an estimate are scarce. The analysis uses an

¹⁰ For example, there is a large disparity between the national price as measured by spot prices on the Henry Hub and regional spot prices at the hubs at which Pennsylvania natural gas is traded.

estimate of 80 cents per mcf for post-production costs.¹¹ The estimated market value and ETR are sensitive to this assumption, especially in a low-price environment. Post-production costs do not vary based on the price of natural gas, so their effect on net market value increases as prices decline.

Regional (e.g., Pennsylvania and West Virginia) spot prices experienced a dramatic decline in 2015 and 2016. The analysis uses West Virginia as an example to illustrate how the disparities between (1) spot and received prices and (2) estimated and actual post-production costs could affect estimated market value and the ETR.¹² For fiscal year ending (FYE) 2016, West Virginia reported collections of \$62.6 million from the market value portion of their severance tax. Dividing those collections by the market value tax rate of 5.0 percent implies a net taxable market value of \$1.3 billion and an ETR of 5.0 percent. An alternative computation of market value (using the methodology typically used to compute the annual ETR) arrives at a market value of \$769 million and an ETR of 8.1 percent.¹³ Much of the disparity between the two methods for FYE 2016 (\$482 million of market value and 3.1 percentage points of ETR) can be attributed to the difference between the actual price that extractors received and the reported spot price in the region as well as differences between estimated and actual post-production costs.¹⁴

3. Pennsylvania Annual ETRs: History and Forecast

While the annual ETR has limitations, it can be a useful tool to examine trends within a state to determine how changes in price, volume, new wells and tax structure might affect the average tax burden over time. For example, Table 1.5 (next page) displays a six-year history of the impact fee ETR for Pennsylvania, and projects the impact fee ETR along with the ETR of the proposed severance tax in future fiscal years. The table also

¹¹ Estimated post-production costs are based on a review of an investor presentation for a large Pennsylvania extractor and certain filings with the U.S. Securities and Exchange Commission.

¹² West Virginia's severance tax is imposed at a rate of 5.0 percent on market value exclusive of post-production expenses and transportation costs. The absence of special rates or major incentives make the state ideal for this illustration. The computation excludes revenue from the volume-based tax dedicated to the worker's compensation fund. That portion of the levy has since been eliminated.

¹³ The result is obtained by multiplying the taxable production for FYE 2016 (1,323 billion cubic feet) by the regional wellhead price for the same time period (58 cents per mcf). Production used in this computation is reported by the U.S. Energy Information Administration (EIA). The price used is the average for the Dominion South trading hub from June 2015 to May 2016, net of estimated post-production costs (80 cents per mcf). This method does not deduct any market value associated with low-volume wells, qualified shut-in wells or gross value provided to property owners. Therefore, this method would slightly overstate the taxable net market value based on West Virginia law and therefore understate the disparity between the methods.

¹⁴ The same analysis using FYE 2017 data reveals that the computed ETR based on production volume and observed spot prices was very close to 5.0 percent for that year. The result suggests that there was a much smaller difference between the average spot price and average price actually received by extractors due to hedging or other activities. In general, firms hedge prices one or two years into the future, and the hedged prices will adjust to market conditions during that time as old agreements expire and firms enter into new contracts.

displays the wellhead price used to calculate the market value for the impact fee ETR.

As shown in Table 1.5, historical impact fee ETRs have fluctuated along with the regional price of natural gas. When the average price declined by \$1.73 (73 percent) from FY 2014-15 to FY 2015-16, the impact fee ETR increased by 4.0 percentage points. Then, as prices stabilized through FY 2017-18, the ETR declined precipitously. In the out-years, the ETR of the severance tax is projected to increase from 2.2 percent in FY 2018-19 to 2.5 percent in FY 2022-23. The impact fee ETR is projected to decrease modestly from 2.2 percent to 1.9 percent in the same period.

The projected ETR for both the impact fee and severance tax combined for FY 2018-19 is 4.4 percent, increasing to 4.9 percent in FY 2020-21 and then declining back to 4.4 percent by FY 2022-23. The severance tax and total ETR will be sensitive to changes in the assumed tax rate. For example, if the assumed tax rate were changed from 4.2 cents to 5.3 cents for the first year, the severance tax ETR would increase from 2.2 percent to 2.7 percent, while the total ETR would increase from 4.4 percent to 4.9 percent.

Table 1.5
Pennsylvania Annual ETR History & Projection

Fiscal Year	Impact Fee Wellhead Price¹	Impact Fee ETR²	Severance Tax ETR³	Total
2012-13	\$1.93	5.1%		5.1%
2013-14	2.74	2.7		2.7
2014-15	2.38	2.3		2.3
2015-16	0.65	6.3		6.3
2016-17	0.75	4.5		4.5
2017-18	1.40	2.9		2.9
2018-19	1.57	2.2	2.2%	4.4
2019-20	1.62	2.2	2.4	4.7
2020-21	1.94	2.3	2.6	4.9
2021-22	2.10	1.9	2.6	4.5
2022-23	2.18	1.9	2.5	4.4

¹Dollars per mcf. Price is a weighted average of spot prices at the Dominion South and Leidy trading hubs in the preceding calendar year, net the deduction of estimated post-production costs.

²The impact fee ETR is calculated based on the revenue collected in April of the fiscal year. For example, the impact fee revenues collected in April 2018 are assigned to FY 2017-18.

³The severance tax ETR is calculated based on the revenue collected on June 15th of the specified fiscal year. For example, revenues collected on June 15th, 2019 are assigned to FY 2018-19. The severance tax ETR is based on the average wellhead price from May to April of the reporting year, which will differ from the impact fee wellhead price.

Note: All calculations by the IFO.

Lifetime ETR and Interstate Comparisons

In contrast to the annual measure, the lifetime ETR is the average effective tax rate over all production years for a newly-drilled well. It is a prospective measure that divides the net present value of projected severance taxes that would be remitted over the lifetime of the well by the net present value of the market value of natural gas extracted. The lifetime ETR reflects current production technology and anticipated prices in the future. While the annual ETR allows price, volume and other characteristics to vary by state, the lifetime ETR controls for those differences by using the same (1) start date for production, (2) life of the well, (3) production profile, or decline curve, and (4) price for each jurisdiction analyzed.¹⁵ The only difference between wells is the drilling cost and the tax structure that determines severance tax collections. This method also overcomes the problem estimating market value that occurs with the variance between spot prices and received prices by assuming that they are the same.

A primary advantage of the lifetime ETR is that it standardizes and facilitates interstate comparisons of severance tax structures. States that impose severance taxes generally base the tax on volume or market value (or both). The differences between these methods make them difficult to compare side-by-side, but the lifetime ETR compensates for this difficulty. For states that levy a volume-based tax, the lifetime ETR converts that tax rate to a standard rate based on market value that can be compared across states. For states that levy a market value-based tax, the metric accounts for special tax rates and incentives, as noted previously. Most importantly, the lifetime ETR isolates the differences caused by state tax structures by holding constant the other factors that could affect the computations (e.g., price and volume).

Another use of the lifetime ETR (for market value-based taxes) is to compare the relative difference between a state's statutory rate and its ETR. The difference between a state's statutory rate and its ETR reveals the value of the special tax rates or other incentives built into its severance tax structure. For example, the estimated lifetime ETR for Texas is about one-half of the statutory rate. (See Table 1.6.) The ETR for Arkansas is about three-quarters of the statutory rate, and the ETR for Oklahoma is about two-thirds of the statutory rate.

Table 1.6 (next page) shows the statutory tax rates and lifetime ETRs for the proposed Pennsylvania severance tax and six comparison states. The entry for Pennsylvania includes the total ETR and its components: the current natural gas impact fee and the proposed severance tax. The analysis finds that the total lifetime ETR for Pennsylvania would be 4.0 percent with the proposed severance tax. The current impact fee has a lifetime ETR of 1.6 percent. It should be noted that the computed lifetime ETRs are

¹⁵ For the lifetime ETR computations, the analysis applies the same parameters to each state: (1) the well is drilled in 2018 and begins production on January 1, 2019, (2) it produces 10 billion cubic feet of natural gas over a 30-year lifetime, (3) it has a production profile (decline curve) similar to a recently-drilled Marcellus shale well and (4) natural gas extracted from the well is valued at a blended spot price for Pennsylvania regional hubs.

dependent on a regional hub price that ranges from \$2.37 to \$2.98 per mcf from calendar year 2018 to 2022.

The analysis also finds that the total lifetime ETR for Pennsylvania (including the proposed severance tax) is comparable to the ETRs for Louisiana, Texas and Arkansas. West Virginia and Oklahoma are somewhat higher than Pennsylvania, while Ohio is lower. The current impact fee, by itself, has a lifetime ETR that is comparable to Ohio.

Table 1.6
Lifetime Effective Tax Rates

State	Statutory Tax Rate	ETR at Wellhead ¹
Arkansas ²	5.0%	3.7%
Louisiana ³	11.1 cents/mcf	3.8%
Ohio ⁴	2.5 cents/mcf	1.5%
Oklahoma ⁵	7.0%	4.8%
Texas ⁶	7.5%	3.7%
West Virginia ⁷	5.0%	5.0%
Pennsylvania ⁸	n.a.	4.0%
Current Impact Fee	n.a.	1.6%
Proposed Severance Tax ⁸	various	2.4%

¹The wellhead price excludes post-production costs, which are estimated to be 80 cents/mcf in 2018 and beyond.

²Arkansas levies a reduced value-based rate of 1.5 percent for the first three years, and a fourth if the operator's market revenue does not exceed the drilling and completion costs. Arkansas also levies a volume-based administrative fee of 0.9 cents/mcf.

³Louisiana levies a volume-based tax that is adjusted based on the level of the Henry Hub price during the previous year. A reduced volume-based tax rate, also determined by the Henry Hub price, applies for the first two years if the operator's market revenue does not exceed the drilling and completion costs. Louisiana also levies a volume-based administrative fee of 0.3 cents/mcf.

⁴Ohio levies a volume-based tax of 2.5 cents/mcf and an administrative fee of 0.5 cents/mcf.

⁵Oklahoma levies a reduced value-based rate of 2.0 percent for the first three years. Oklahoma also levies an excise tax of 0.095 percent and an administrative fee of 0.0015 cents/mcf.

⁶Texas levies a reduced value-based rate for the first ten years or until the cumulative value of the reduction equals half of the drilling and completion costs. Texas also levies a volume-based administrative fee of 1/15 of one cent/mcf.

⁷The former volume-based tax of 4.7 cents/mcf is no longer in effect.

⁸The proposed severance tax could levy one of four different rates depending on the annual price of natural gas.

Raising the Minimum Wage

The administration's proposal increases the state minimum wage from the federal minimum of \$7.25 to \$12.00 per hour. The proposal does not specify whether the minimum wage would increase immediately or over several years.¹⁶ In practice, states have phased-in material increases to the minimum wage over multiple years, and generally do not increase the minimum by more than one dollar in a single year. The parameters used by the analysis assume that the increase would be phased-in for Pennsylvania in a similar manner, except for a more significant increase (\$2.75) in the first year. The assumed three-year phase-in period would begin in 2019 with a minimum wage of \$10.00 per hour, and then increase \$1.00 per hour in 2020 and 2021. Without a phase-in, the proposal would cause significant labor market disruptions. The three-year phase-in allows firms to adjust resources and facilitates passing costs forward to final consumers as markets adapt to the higher wages.

Compared to the analysis of the same proposal in last year's *Executive Budget*, this analysis reflects the following technical changes:

- The three-year phase-in to \$12.00 per hour is modeled explicitly. Firms react to the phased-in higher wages over the three-year period and adjust their hiring and pricing policies. The phase-in allows markets to adjust and allows firms to push higher labor costs forward into the final prices that consumers pay. Due to the explicit phase-in, there is a smaller projected employment contraction.
- Workers in occupations that traditionally receive tips and report an hourly wage between \$7.25 and \$11.99 are excluded from the analysis, but were included last year. For 2017, there were 117,500 such workers (e.g., bartenders, hairdressers and hosts/hostesses). These workers may or may not be impacted by a higher minimum wage. This group is discussed later in this section.
- Compared to 2016, the 2017 survey data utilized in the analysis show a material reduction in the number of workers earning less than \$11.99 per hour. That technical change reduces the number of workers that receive a higher wage, as well as the number who lose employment. This reduction occurred for the U.S. as well.

¹⁶ The proposal also does not specify the treatment of tipped workers who receive a minimum wage of \$2.83 per hour, and the analysis assumes they are unaffected.

Minimum Wage Across States

For 2018, Pennsylvania and 20 other states do not require employers to pay a wage that exceeds the federal minimum of \$7.25 per hour. (See Table 2.1 on next page.) By contrast, 12 states and the District of Columbia require employers to pay an hourly wage of \$10.00 or more. By 2021, seven states and the District of Columbia will require employers to pay an hourly wage of \$12.00 or more under current law.

Currently, all surrounding states have a minimum wage that exceeds Pennsylvania by at least \$1.00 per hour for 2019, and two states (New York and Maryland) have a minimum wage that is at least \$2.00 higher. If Pennsylvania's minimum wage increases to \$12.00 per hour in 2021, it would rank eighth highest out of all states and the District of Columbia for that year. Compared to surrounding states, only New York would require employers to pay a higher minimum wage than Pennsylvania.

Table 2.1
Minimum Wage Rates by State

	2019 Rank	2018	2019	2020	2021
Washington D.C.	1	\$12.50	\$13.25	\$14.00	\$15.00
California ¹	2	11.00	12.00	13.00	14.00
Washington ¹	2	11.50	12.00	13.50	13.85
Colorado	4	10.20	11.10	12.00	12.31
New York ¹	4	10.40	11.10	11.80	12.50
Arizona ¹	6	10.50	11.00	12.00	12.31
Maine ¹	6	10.00	11.00	12.00	12.31
Massachusetts	6	11.00	11.00	11.00	11.00
Oregon ¹	9	10.25	10.75	11.25	12.00
Vermont	10	10.50	10.68	10.97	11.25
Rhode Island	11	10.10	10.50	10.50	10.50
Connecticut	12	10.10	10.10	10.10	10.10
Hawaii	12	10.10	10.10	10.10	10.10
Maryland ¹	12	9.25	10.10	10.10	10.10
Alaska	15	9.84	10.01	10.28	10.54
Minnesota	16	9.65	9.82	10.08	10.34
Michigan	17	9.25	9.41	9.66	9.91
South Dakota	18	8.85	9.00	9.24	9.48
Nebraska	18	9.00	9.00	9.00	9.00
New Jersey	20	8.60	8.75	8.98	9.21
West Virginia	20	8.75	8.75	8.75	8.75
Arkansas	22	8.50	8.50	8.50	8.50
Montana	23	8.30	8.44	8.67	8.89
Ohio	23	8.30	8.44	8.67	8.89
Florida	25	8.25	8.39	8.62	8.84
Nevada	25	8.25	8.39	8.62	8.84
Delaware	27	8.25	8.25	8.25	8.25
Illinois ¹	27	8.25	8.25	8.25	8.25
Missouri ¹	29	7.85	7.98	8.20	8.41
New Mexico ¹	30	7.50	7.50	7.50	7.50
Pennsylvania	31	7.25	7.25	7.25	7.25
Other States ²	31	7.25	7.25	7.25	7.25

¹Has one or more local areas in the state with a different minimum wage than the state minimum wage.

²Other states include Alabama, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, New Hampshire, North Carolina, North Dakota, Oklahoma, South Carolina, Tennessee, Texas, Utah, Virginia, Wisconsin and Wyoming.

Note: Many states use a local CPI to automatically adjust their minimum wage rate and use various methods to make that computation. For simplicity, all CPI adjustments in this table use IHS Markit's U.S. CPI-U year-over-year growth rate to estimate the adjustment for future years.

Source: Economic Policy Institute. Minimum Wage Tracker. <http://www.epi.org/minimum-wage-tracker/>.

States that have raised their minimum wage often cite the reduced purchasing power of the fixed wage over time as a key factor that motivated the policy decision. For most items purchased by consumers, the price level will increase over time. One method to measure the reduced purchasing power of a fixed minimum wage is the growth in the consumer price index (CPI-U) during the relevant time period. The CPI-U is published by the U.S. Bureau of Labor Statistics (BLS) and is an index that reflects the price for a basket of goods and services typically purchased by consumers. The BLS also publishes detail for specific items included in the index, as well as their relative weights used in the computation.

Table 2.2 displays the cumulative growth of the index and certain components for the U.S., and the Pittsburgh and Philadelphia metro regions. Since the federal and Pennsylvania minimum wages were last increased in 2007, the U.S. CPI increased by 18.2 percent (average annual growth rate of 1.7 percent), the Pittsburgh CPI-U by 24.1 percent (2.2 percent) and the Philadelphia CPI-U by 14.6 percent (1.4 percent). The underlying detail shows that the price of certain items like rent and medical care have increased at a faster pace than general inflation, while others have been more subdued or actually declined (gasoline).

	U.S.		Pittsburgh		Philadelphia	
	Total	AAGR ¹	Total	AAGR ¹	Total	AAGR ¹
CPI-U All Items	18.2%	1.7%	24.1%	2.2%	14.6%	1.4%
Housing	19.9%	1.8%	22.5%	2.0%	13.0%	1.2%
Rent	31.3%	2.8%	24.9%	2.3%	19.4%	1.8%
Food at Home	18.6%	1.7%	26.4%	2.4%	15.4%	1.4%
Medical Care	35.4%	3.1%	53.7%	4.4%	26.2%	2.4%
Gasoline (all types)	-11.0%	-1.2%	-0.5%	-0.1%	-7.6%	-0.8%

¹ Average annual growth rate from 2007 to 2017.
Source: U.S. Bureau of Labor Statistics.

In order to counteract the impact of inflation and maintain purchasing power, some states link the mandatory minimum wage to the annual percentage increase in the CPI-U. As demonstrated by the difference between the Philadelphia and Pittsburgh metro regions, a single measure may not simultaneously reflect local conditions throughout a state. Therefore, some states allow localities (e.g., New York City, Seattle and Chicago) to use a regional CPI-U that more accurately reflects local conditions.

Workers Directly Affected by a Higher Minimum Wage

This analysis uses data from the Merged Outgoing Rotation Group dataset from the 2017 Current Population Survey (CPS).¹⁷ The CPS provides data on the labor force, employment levels, unemployment rates and various demographic characteristics. The monthly survey includes 60,000 U.S. households and is designed so that state-specific observations can be weighted to yield population totals for individual states.

The CPS asks respondents to report their hourly wage or weekly salary, occupation, number of hours worked per week, age, sex and other demographic information. Many hourly-paid workers report compensation that falls below the federal minimum and most are employees who traditionally earn tips, such as food servers and bartenders. Employers may pay less than the federal minimum if a tipped worker earns at least \$30 per month in tips or commissions and total compensation yields an hourly wage rate of \$7.25 or more. For Pennsylvania, such employees can be paid a wage as low as \$2.83 per hour.

For 2017, the CPS dataset for Pennsylvania represents 5.54 million workers: 3.42 million reported an hourly wage, and 2.12 million were non-hourly workers.¹⁸ The majority of workers affected by an increase in the minimum wage are hourly-paid workers. However, the analysis includes certain non-hourly paid workers if their computed hourly wage was less than \$12.00 per hour.¹⁹

For 2017, the data reveal that 58,000 workers reported a wage less than \$7.25 per hour and were employed in occupations that typically receive tips.²⁰ The analysis assumes those workers are not affected by the proposal. It should be noted that the data used for this analysis only reflect an individual's primary job, and not secondary jobs. Hence, the actual number of Pennsylvania residents who receive less than \$7.25 per hour because they are employed in secondary or part-time jobs such as wait staff will be higher.

¹⁷ The Current Population Survey is a survey sponsored jointly by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics.

¹⁸ Excludes self-employed individuals and workers who were not paid for their labor.

¹⁹ Following the convention used by the U.S. Congressional Budget Office (CBO), the analysis includes non-hourly paid workers who earn an effective hourly wage that is below the proposed \$12.00 minimum wage. For respondents who reported weekly earnings instead of an hourly wage, an effective hourly wage was computed as their reported usual earnings per week divided by their reported usual hours worked per week. See "The Effects of a Minimum Wage Increase on Employment and Family Income," CBO (February 2014).

²⁰ This figure is lower than a recent report issued by the Pennsylvania Department of Labor and Industry because the IFO analysis assumes that workers who reported a wage of \$7.00 to \$7.24 per hour misreported their wage and actually received the federal minimum. The approach follows the convention used by the CBO study. The adjustment applied to 14,200 workers, and the great majority were employed in occupations that did not receive tips. The analysis also corrected obvious errors in reported hourly wages, such as wage rates that were less than \$1 per hour. For those cases, other reported data or an industry-wide average for the occupation were used to determine an hourly wage rate. See "Analysis of the Pennsylvania Minimum Wage," Pennsylvania Department of Labor and Industry (March 2018).

Table 2.3
Workers Directly Affected by a \$12.00 Minimum Wage for 2017

	Employment Status (000s)			Impact
	Part-Time	Full-Time	Total	
Less than \$7.25	34	24	58	unaffected
Exactly \$7.25	33	16	49	direct
\$7.26 to \$9.99	227	194	421	direct
\$10.00 to \$10.99	148	171	319	direct
\$11.00 to \$11.99	80	156	236	direct
\$12.00 to \$13.49	106	384	490	indirect
\$13.50 to \$14.99	50	276	326	indirect
\$15.00 or more	<u>303</u>	<u>3,219</u>	<u>3,522</u>	unaffected
Total	982	4,440	5,421	
Directly-Affected Workers	488	537	1,025	

	Employee Gender (000s)			Impact
	Male	Female	Total	
Less than \$7.25	24	34	58	unaffected
Exactly \$7.25	22	27	49	direct
\$7.26 to \$9.99	182	238	421	direct
\$10.00 to \$10.99	118	201	319	direct
\$11.00 to \$11.99	81	155	236	direct
\$12.00 to \$13.49	226	264	490	indirect
\$13.50 to \$14.99	156	170	326	indirect
\$15.00 or more	<u>1,961</u>	<u>1,561</u>	<u>3,522</u>	unaffected
Total	2,771	2,650	5,421	
Directly-Affected Workers	403	621	1,025	

Note: Directly-affected workers removes 117,500 workers that likely received tips but reported an hourly wage between \$7.25 and \$11.99 per hour.

Source: U.S. Census Bureau, Current Population Survey and Merged Outgoing Rotation Group dataset (2017) compiled by the National Bureau of Economic Research.

The analysis defines “directly-affected” workers as those who earn a wage of \$7.25 to \$11.99 per hour. For 2017, the analysis finds 1.02 million workers would have been directly affected by a \$12.00 minimum wage and less than half (47.6 percent) of those individuals were employed on a part-time basis. (See Table 2.3.)

As noted, directly-affected workers excludes workers employed in occupations that receive tips, but reported an hourly wage that is greater than or equal to \$7.25 and less than \$12.00. For 2017, there were 117,500 workers employed as bartenders (12,300), food servers (68,200), other servers (11,500), taxi drivers (7,500), hairdressers (11,800), and other tipped occupations (6,200). It is unclear if these workers would be impacted by the proposal. If their combined wages plus tips at least equal the new minimum wage, then employers would not need to adjust their hourly wage.

Table 2.4
Tipped Workers

	Employment Status (000s)		
	Part-Time	Full-Time	Total
\$7.25 to \$8.99	34	17	51
\$9.00 to \$9.99	20	13	32
\$10.00 to \$10.99	12	12	24
\$11.00 to \$11.99	<u>5</u>	<u>6</u>	<u>11</u>
Total	70	48	118

Industry	Hourly Wage Rate (000s)		
	<\$7.25	\$7.25-\$11.99	\$12.00+
Food Service	36	68	28
Bartenders	3	12	6
Other Servers	6	12	5
Taxi Drivers	6	8	10
Hair Dressers	2	12	5
Other ¹	<u>5</u>	<u>6</u>	<u>6</u>
Total	58	118	60

¹Includes gaming service workers, bellhops and baggage porters, miscellaneous personal appearance workers, dishwashers, and other personal care workers.

Many analyses also discuss workers who might be “potentially affected” by a higher minimum wage. Employers may want to maintain wage differentials between certain workers, and may increase wages for those who currently earn somewhat more than \$12.00 per hour. In a 2014 report, the Congressional Budget Office (CBO) called these impacts “ripple effects.” For this analysis, it is assumed that workers who earn up to \$14.99 per hour could also be impacted by the proposal. For 2017, the CPS data reveal 816,000 such workers in Pennsylvania who could be potentially affected by the increase in the minimum wage. The CBO report notes that “available research suggests that the

average effect on the wages of those workers would be positive.”²¹ A more recent study from the University of Washington finds that workers who earn up to a few dollars above the minimum wage threshold also received hourly wage gains of two to three percent after the Seattle minimum wage was raised.²² The analysis assumes that workers with an hourly wage of \$12.00 to \$14.99 receive a wage increase of 2.0 percent that would not otherwise occur.

Potential Employment Impact of a Higher Minimum Wage

For revenue proposals included in the *2017-18 Executive Budget* (April 2017), the previous analysis used an employment elasticity parameter of -0.18 for employees earning between \$7.25 and \$8.99 per hour, and gradually reduced that responsiveness parameter as the hourly wage of affected employees approached \$12.00 per hour.²³ As noted in last year’s analysis, research finds some consensus for an adult employment elasticity of -0.1, and that result is generally consistent with a University of Washington study that examined the recent increase (2015) in the minimum wage from \$9.47 to \$11.00 for the City of Seattle.²⁴ In general, most results from academic studies are only pertinent for relatively moderate increases in the minimum wage. For example, the University of Washington study examined a 16 percent increase in the statutory minimum wage rate. By contrast, the administration’s proposal could effectively increase the average wage paid to workers earning under \$9.00 per hour by roughly 50 percent over one or more years.

Last year, the analysis assumed that the higher minimum wage was phased-in over multiple years, but did not model that process. For this analysis, similar elasticities to last year’s report are used, but the analysis models the phase-in period explicitly. Table 2.5 projects the impact on directly-affected workers over a three-year phase-in period beginning January 2019. To simplify the analysis, the number of employed Pennsylvanians is assumed to grow at 0.5 percent per annum from 2017 to 2019, after which the growth is held flat (excluding any reduction caused by the higher minimum wage). Table 2.5 displays (1) the average hourly wage across the four groups of directly-affected

²¹ “The Effects of a Minimum Wage Increase on Employment and Family Income,” CBO (February 2014).

²² “Report on the Impact of Seattle’s Minimum Wage Ordinance on Wages, Workers, Jobs and Establishments Through 2015,” The Seattle Minimum Wage Study Team, University of Washington (July 2016).

²³ An employment elasticity parameter of -0.18 implies that a 10 percent increase in the minimum wage would reduce employment levels of those directly affected by 1.8 percent. The analysis used a higher employment elasticity for those currently earning between \$7.25 and \$8.99 due to the significant increase in the hourly wage rate and the much higher proportion of teenagers in that group. Research finds a much higher employment response to mandated higher wages for teenagers than adults.

²⁴ Neumark, David, “The Effects of Minimum Wages on Employment,” Federal Reserve Bank of San Francisco Economic Newsletter (December 2015).

workers, (2) the percentage increase in the average hourly wage, (3) the employment response parameter (or elasticity) used to compute the impact on employment and (4) the projected employment impact.

Table 2.5
Projected Impact of Higher Minimum Wage on Employment

	Average Hourly Wage ¹	Percent Increase	Response Parameter	Number Affected (000s)	Higher Wage (000s)	Employment Reduction (000s)
2019: Increase to \$10.00						
\$7.25 to \$8.99	\$8.08	23.8%	-0.20	259	247	-12
\$9.00 to \$9.99	\$9.33	7.2%	-0.15	<u>216</u>	<u>213</u>	<u>-2</u>
Total Directly Affected				475	460	-15
2020: Increase to \$11.00						
\$10.00	\$10.00	10.0%	-0.15	460	453	-7
\$10.00 to \$10.99	\$10.29	6.9%	-0.15	<u>323</u>	<u>319</u>	<u>-3</u>
Total Directly Affected				782	772	-10
2021: Increase to \$12.00						
\$11.00	\$11.00	9.1%	-0.10	772	765	-7
\$11.00 to \$11.99	\$11.34	5.8%	-0.10	<u>238</u>	<u>237</u>	<u>-1</u>
Total Directly Affected				1,010	1,002	-8
Total Employment Change					1,002	-33

¹ Average hourly wages are based on 2017 CPS data and increased by inflation for future years.

In 2019, the analysis assumes the minimum wage increases from \$7.25 to \$10.00 per hour. For workers earning between \$7.25 and \$8.99 per hour, the analysis projects a 23.8 percent increase in the average wage paid to these employees and a reduction in employment opportunities for roughly 12,300. The latter figure is equal to the average wage increase (0.238) times the response parameter (-0.20) times the number of workers affected (259,000). For the 216,000 workers earning between \$9.00 and \$9.99 per hour, the analysis projects their average hourly wage increases by 7.2 percent for those who retain employment. Using an elasticity response parameter of -0.15, workers within this wage bracket would see employment opportunities decline by roughly 2,300 jobs.

In 2020, the minimum wage increases from \$10.00 to \$11.00 per hour. As a result, 460,000 workers that received a minimum wage increase in 2019 receive a 10.0 percent wage increase in 2020.²⁵ The application of the response parameter yields a 6,900 decline in employment opportunities for this group. In addition, the 323,000 workers with wages between \$10.00 to \$10.99 that retain employment receive an average 6.9 percent increase in their hourly wage. The application of the response parameter results in a contraction of roughly 3,300 employment opportunities.

In 2021, the minimum wage increases from \$11.00 to \$12.00 per hour. The 772,000 workers that received a wage increase in the previous two years are projected to receive a 9.1 percent increase to a \$12.00 minimum wage. Assuming an elasticity response parameter of -0.10, there is a 7,000 reduction in employment opportunities for this group. For those employees between \$11.00 to \$11.99 that had not previously received an increase in minimum wage, the analysis projects a 5.8 percent increase in wages following an increase in the minimum wage to \$12.00. Employment opportunities for this group are expected to decline by 1,400 with an assumed elasticity parameter of -0.10.

Table 2.5 displays a reduction in employment opportunities of 33,300 (-3.2 percent) over the three-year phase-in period, and a higher hourly wage paid to 1.0 million workers who retain employment. Any reduction in employment would not occur all at once, and would be realized through the failure to fill vacancies or create lower-wage jobs, the release of employees, and a slower rate of hiring compared to a counterfactual scenario where the minimum wage did not increase. The effects may even occur prior to the effective date of each wage increase (e.g., an employee departs and the employer doesn't backfill the position in anticipation of the pending increase in the minimum wage).

Income Effects for Affected Workers

Table 2.6 displays the potential income effect from a higher minimum wage given the employment response from Table 2.5. For those making an hourly wage between \$7.25 and \$8.99, the analysis projects that 241,000 workers would retain employment at a wage rate of \$12.00 per hour. The higher wage represents an average wage gain of \$3.92 per hour (\$12.00 - \$8.08). The data show that the typical work week for those workers is 28 hours, and the projected income gain across all workers in that group is \$1.37 billion ($241,000 * 28 \text{ hours per week} * 52 \text{ weeks} * \3.92).²⁶ However, the analysis also assumes an employment reduction of 18,000 for that group over three years, with an average wage of \$8.08 per hour. The reduction implies an income loss of \$214 million

²⁵ It is noted that these workers need not be the same individuals.

²⁶ Assumes that part-time workers work an average of 20 hours per week and full-time workers work an average of 40 hours per week.

(18,000 * 28 * 52 * \$8.08). The net income change for that group equals the difference, or \$1.16 billion.²⁷

Table 2.6
Potential Income Impact from a \$12.00 Minimum Wage

	Original Hourly Wage				Total
	\$7.25- \$8.99	\$9.00- \$9.99	\$10.00- \$10.99	\$11.00- \$11.99	
Receiving a Higher Wage (000s)	241	208	316	237	1,002
Typical Workweek (hours) ¹	28	30	31	33	31
Average Hourly Wage Gain	\$3.92	\$2.67	\$1.82	\$0.84	
Annual Income Gain (\$ millions)	\$1,374	\$869	\$920	\$344	\$3,506
Employment Reduction	-18	-7	-6	-1	-33
Typical Workweek (hours)	28	30	31	33	31
Average Wage ²	\$8.08	\$9.33	\$10.18	\$11.16	
Annual Income Loss (\$ millions)	-\$214	-\$108	-\$102	-\$27	-\$450
Total Income Change (\$ millions)	\$1,160	\$761	\$818	\$317	\$3,055
Exclude Employee Payroll Tax	\$1,071	\$703	\$756	\$293	\$2,822
Annual Income Gain for Indirectly-Affected Workers (\$ millions)					\$379
Total Income Change for Direct and Indirect Workers (\$ millions)					\$3,201

¹Assumes that part-time workers work an average of 20 hours per week and full-time workers work an average of 40 hours per week.

²The average wage is the weighted average of all individuals in that wage group. For example, the average wage of the \$10.00 to \$10.99 group includes all workers who reported an hourly wage between \$10.00 to \$10.99 and workers that reported an hourly wage of \$7.25 to \$9.99 who received an increase in the minimum wage to \$10.00. The average wage for the \$11.00 to \$11.99 group includes those who reported hourly wages between \$11.00 to \$11.99 and all workers who received a higher wage due to the assumed minimum wage increase to \$11.00 per hour.

²⁷ Some of these workers would receive unemployment compensation, which would offset their income loss. However, that would only occur in the near-term for certain workers who did not retain employment. In the longer-term, the reduction in employment opportunities would simply reflect less hiring, as opposed to the release of current employees. Moreover, many of those in the lowest wage group who do not retain employment would be teenagers with part-time employment, who do not qualify for unemployment compensation. Hence, the analysis does not include an offset from unemployment compensation.

Table 2.6 provides similar estimates for the other three groups of directly-affected workers. Across all directly-affected workers, the net wage gain is \$3.06 billion.²⁸ However, employers must withhold the employee's share of payroll taxes (7.65 percent) on the additional wage income, yielding a net income gain of \$2.82 billion that may be spent. Most workers would be liable for the state income tax (3.07 percent), while some may also incur federal income tax obligations on the additional income.

As noted, there will likely be cascading effects on workers who earn more than the \$12.00 minimum wage. Those gains are difficult to quantify, but most research finds they would be modest. This analysis assumes that workers earning \$12.00 to \$14.99 per hour receive an average wage gain of 2.0 percent that would otherwise not occur without the higher minimum wage. If that occurs, 824,000 workers would receive an average hourly wage gain of \$0.26, which would translate into an annual income gain of \$411 million before payroll tax, and \$379 million after the employee's share of payroll tax. (See Table 2.6.) It is likely that the incremental income would be subject to state and federal income tax and that impact is not shown in the table.

Other pertinent findings from the analysis are as follows:

- Slightly over half (18,000) of the employment reduction would be realized by part-time workers.
- Female wage earners comprise roughly 60 percent of workers (607,500) who receive a higher wage and the same proportion of projected income gains. Females comprise the same share of the projected employment reduction.
- The industries most impacted by the \$12.00 minimum wage are retail trade (27.2 percent of directly-affected workers), food services and drinking places (10.3 percent), and healthcare services, except hospitals (7.6 percent).

Potential Implications for General Fund Revenues

Many studies assume that higher minimum wage costs are pushed forward to final consumers, and a smaller portion reduces business profits.²⁹ Once fully phased-in, a higher minimum wage resembles an income transfer to lower-wage workers who retain employment from consumers and business owners who are indirectly affected through higher prices and/or lower profits. Non-residents would also absorb a portion of the higher wage cost, such as tourists who would pay higher prices at restaurants or retail outlets.

²⁸ For 2017, total wage income for all Pennsylvania residents was \$321 billion.

²⁹ Studies also assume that the higher wage manifests itself through reductions in non-wage benefits and training, business savings through lower turnover costs, changes in employment composition, improvements in efficiency, and wage compression. See "Why Does the Minimum Wage Have No Discernible Effect on Employment?" Center for Economic and Policy Research (February 2013).

In order to quantify the potential implications for General Fund revenues, the analysis should first identify the source of the income transfer to lower-wage workers. The exact sources of the transfer cannot be known for certain, and studies have used various assumptions. Many studies assume that the majority of the transfer is attributable to higher prices (which affects all consumers) and a smaller portion from a reduction in business profits (which affects higher-income residents or even non-resident shareholders). This analysis assumes that most of the wage increase is passed forward to consumers through higher prices (80 percent), while the residual (20 percent) is attributable to lower profits of pass-through entities (partnerships, S corporations and sole proprietors) and corporations.³⁰ Initially, this income transfer does not change the real size of the state economy, but alters relative prices and the income flows to workers and business owners.

Having identified the source and size of the income gain to lower-wage workers, the analysis considers the potential revenue implications. Consumer survey data suggest that the transfer would yield higher overall spending levels because lower-income workers have a higher propensity to spend any income they receive compared to higher-income consumers and business owners.³¹ This differential in the propensity to spend facilitates the higher spending levels identified by most minimum wage studies. Essentially, the income transfer unlocks savings or retains income within the state that may have otherwise flowed out of the state.

Revenue Implications from Initial Income Transfer

Assuming that the real size of the Pennsylvania economy does not change and focusing solely on the transfer of income to lower-income workers, the following factors would impact General Fund revenues:

- The analysis assumes that five percent of the higher wage cost is exported through tourism or exported goods and services. This represents a transfer from non-residents to residents and implies a \$5 million gain (\$3.2 billion times 5 percent times 3.07 percent) in PIT revenues.
- For Pennsylvania residents, any income transfer from higher to lower-income consumers and workers would be taxed at the same rate. However, the significant increase in the wage rate implies that some portion of income that qualifies for Tax Forgiveness would no longer qualify. Based on tax return data from 2015, the IFO estimates a \$10 million reduction in Tax Forgiveness for 2021 and a

³⁰ In general, if more of the income transfer is attributable to lower corporate profits, then that outcome implies a potentially larger economic impact. That outcome occurs because the corporate profits multiplier (i.e., the increase in GDP from an incremental \$1 of profits) is relatively low as corporations (1) retain earnings, (2) remit significant federal and state income tax and (3) pay dividends to higher-income shareholders who have relatively high propensities to save and may reside in other states.

³¹ The U.S. Bureau of Labor Statistics publishes data on the spending habits of consumers in the Consumer Expenditure Survey. See <http://www.bls.gov/cex/>.

commensurate gain in PIT revenues.³²

- The analysis assumes a net gain to sales and use tax (SUT) revenues (\$10 million) from the general transfer of income to lower-wage workers. Spending patterns for lower-wage workers suggest that a slightly higher share of any additional income could be spent on products subject to state sales tax compared to higher-income residents. Moreover, those workers are more likely to spend a greater share of their income in the state.
- Profits of pass-through entities are taxed at the same rate as wage income. Hence, there is no change in PIT revenues due to a trade-off of lower pass-through profits and higher wage income.
- Corporate profits are taxed at a much higher rate (9.99 percent) than wage income (3.07 percent). However, much of the impact could be mitigated by multi-state corporate apportionment factors that are based solely on in-state sales (i.e., the lower profits do not directly translate to the taxable base on a one-for-one basis). Due to this factor, the analysis includes a modest reduction from lower corporate profits (due to the tax rate differential) of -\$5 million.

The net result is a \$20 million increase to revenues, mainly due to lower Tax Forgiveness and an increase in sales tax revenues. That estimate does not grow over time if the Tax Forgiveness thresholds are not increased, and would actually decline by a small amount each year.

Revenue Implications from Increased Economic Activity

As noted, the proposal should also increase the real size of the Pennsylvania economy because lower-income wage earners are more likely to spend their entire earnings, and even borrow against those amounts. The analysis assumes that lower-income workers would spend all new income, while those indirectly affected through higher prices or lower profits spend a smaller share of incremental income. The expansion of the state economy implies more consumer spending and personal income subject to sales and income tax. The analysis estimates that General Fund revenues could increase by \$20 million due to gains in PIT and SUT revenues.

Overall, the projected impact on General Fund revenues from the income gains to lower-wage workers (\$20 million) and higher economic activity (\$20 million) is \$40 million. It should be emphasized that the latter effect would require several years to fully materialize. Hence, those revenues should not be included in near-term revenue estimates attributable to the proposal.

³² The simulation used the 2015 Personal Income Tax micro data file for filers who claimed Tax Forgiveness and reported compensation income.

A Final Note: The Latest Research on Minimum Wage

In June 2017, two studies were released that examined the phase-in of a higher minimum wage for the City of Seattle from \$9.47 to \$11.00 and then \$11.00 to \$13.00 per hour. The papers reach different conclusions and underscore the contentious nature of the debate that surrounds higher minimum wages. The first study used a unique dataset of administrative data that facilitated a more nuanced analysis. The analysis found that employers were very responsive to higher wage rates, especially for the second phase-in from \$11.00 to \$13.00 per hour. The study found employment response parameters that were much higher than results from existing empirical literature and the parameters used by this analysis. It also notes that “(t)heory suggests that the impact of raising the minimum wage depends critically on the starting point; Seattle started from the nation’s highest state minimum wage, and our own evidence indicates that the effects differed dramatically from the first phase-in period to the second.”³³ That is, the authors found a non-linear response by employers: as minimum wages continued to increase, the employment response grew stronger.

The second study used traditional data sources and methodologies and reached very different conclusions. Focusing solely on the food service industry which is comprised of a relatively high proportion of low-wage workers, the analysis found no material impact on overall employment levels for the industry, and substantial wage gains.³⁴ It should be noted that both studies were either funded or requested by the City of Seattle or the mayor’s office.

These reports demonstrate the sensitive nature of results from minimum wage studies that could vary greatly based on datasets used, industries examined and point of reference (i.e., what is the counterfactual without the higher minimum wage). This analysis discussed modest disemployment effects from a higher minimum wage, and opponents or proponents could point to other studies that find stronger or weaker effects on employment.

³³ Jardim et al., “Minimum Wage Increases, Wages, and Low-Wage Employment: Evidence from Seattle,” NBER Working Paper 23532 (June 2017).

³⁴ Reich et al., “Seattle’s Minimum Wage Experience 2015-16,” Center on Wage and Employment Dynamics, University of California, Berkeley (June 2017).