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***Impact of Tax  
Reform  
Options on  
Owner-  
Occupied  
Housing***  
Prepared for the  
National  
Association of  
REALTORS®

May 15, 2017



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# ***Table of Contents***

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1. Executive Summary	3
2. Introduction	7
3. Economic Projections	8
4. Impact of Tax Reform	13
<hr/>	
4.1. Revenue Impact of Option	13
4.2. Distributional Impact	14
<hr/>	
5. Impact on Housing Prices	18
<hr/>	
5.1. Short-term Impact on Home Prices	18
5.2. Responsiveness of Housing Supply to Price Changes	19
<hr/>	
6. Appendix	21
<hr/>	
6.1. PwC's Individual Tax Model	21
6.2. Housing Price Model	22

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# 1. Executive Summary

The National Association of REALTORS® (NAR) engaged PwC to review the impacts of the comprehensive tax reform option described below.

## *Mortgage Interest under Current Law*

Under our projections, in 2018, 35.4 million households will claim itemized deductions for mortgage interest, and 13.6 million of them (or 38 percent) will have outstanding loans of between \$100,000 and \$200,000. Almost three-quarters of households with mortgage interest deductions have incomes between \$50,000 and \$200,000 (25.3 million).

Homeowners also are able to deduct state and local property taxes. In 2018, an estimated 40.7 million taxpayers will report itemized deductions for property taxes of \$206 billion. The majority of these deductions, or 70 percent in 2018, are estimated to be claimed by taxpayers with adjusted gross income (AGI) between \$50,000 and \$200,000.

## *Description of Tax Reform Option*

The tax reform option analyzed in this report is an illustrative comprehensive tax reform option that would lower and consolidate marginal tax rates to three rates with a top rate of 33 percent, double the standard deduction, eliminate all itemized deductions other than charitable contributions and mortgage interest, eliminate personal exemptions, eliminate the Alternative Minimum Tax, and cap the tax rate on pass-through business income at 25 percent. This option is similar to a number of comprehensive reform proposals that have been introduced in recent years.<sup>1</sup>

## *Revenue Estimates of Proposals*

The revenue estimates in this report are based on the conventional scoring methodologies used by the Joint Committee on Taxation (JCT) and the Congressional Budget Office (CBO), which incorporate behavioral responses but hold the overall size of the economy constant.<sup>2</sup> Dynamic revenue estimates that incorporate macroeconomic changes could be materially different. The proposal is assumed to be effective January 1, 2018.

**Table E1. Budget Impact of Proposal, 2018-2027**  
(Fiscal Years, Amounts in \$Billions)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2018-2027
Comprehensive Tax Reform Option	-\$89	-\$115	-\$114	-\$116	-\$114	-\$119	-\$123	-\$126	-\$133	-\$141	-\$1,189

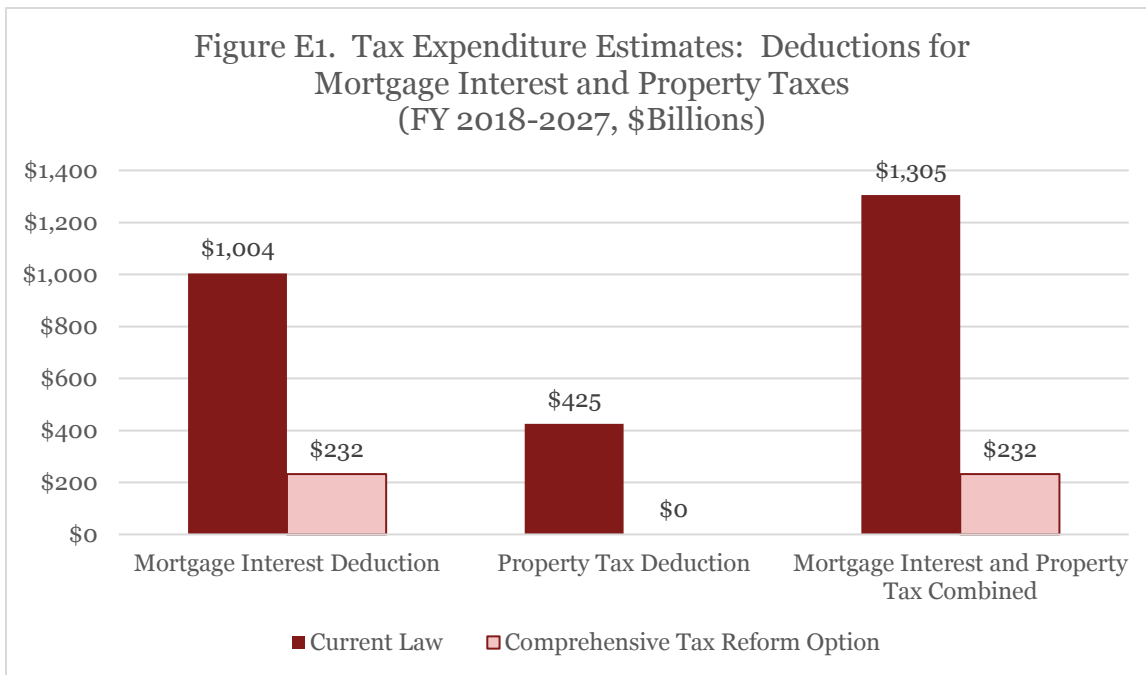
Source: PwC Individual Tax Microsimulation Model (Version 0417-1).

<sup>1</sup> See, for example, the Simplified Income Tax from the President's Advisory Panel on Federal Tax Reform from 2005; the Bipartisan Tax Fairness and Simplification Act of 2011 from Senators Ron Wyden and Dan Coats; former House Ways and Means Committee Chairman David Camp's H.R. 1, introduced in 2014; and the House Republican Tax Reform Task Force Blueprint, released in June 2016.

<sup>2</sup> The specific behavioral response in the model assumes taxpayers reallocate their investment portfolio if they no longer claim the mortgage interest deduction. They are assumed to transfer funds out of interest-bearing assets and into housing equity by paying down mortgages.

*Impact on Tax Expenditure Budget*

One way to measure the level of support provided through the tax code to homeowners is the tax expenditure associated with homeownership. Tax expenditures measure the amount of foregone government revenues from Federal tax laws that allow a special exclusion, exemption, or deduction from gross income or which provide a special credit, a preferential rate of tax, or a deferral of tax liability. The mortgage interest deduction and the property tax deduction are identified by the Joint Committee on Taxation and the US Treasury Department as tax expenditures that support homeownership. We estimate the tax expenditure for the mortgage interest and property tax deductions would fall from \$1.3 trillion under present law to \$232 billion under the comprehensive tax reform option, or by 82 percent (see Figure E1).<sup>3</sup>



Source: PwC Individual Tax Microsimulation Model (Version 0417-1). Note: The sum of the estimates for the individual provisions exceeds the combined estimate because of interactions of the provisions with other elements of the tax code. For example, the elimination of both provisions make it more likely that taxpayers will claim the standard deduction, which would limit the revenue increase.

*Distributional Impact*

The illustrative tax reform option would increase income taxes for some households and reduce income taxes for others:

- Taxpayers (including both homeowners and non-homeowners) with AGI between \$75,000 and \$250,000 would on average pay higher income taxes, with other income categories experiencing tax reductions.

<sup>3</sup> Tax expenditure estimates differ from revenue estimates in two primary ways. First, tax expenditure estimates exclude behavioral impacts that are incorporated in revenue estimates. Second, tax expenditure estimates measure the change in taxpayer liabilities rather than Federal revenues. Revenue estimates reflect timing differences in collections under the proposal under analysis.

- Households with mortgage balances between \$100,000 and \$500,000 would see an income tax increase on average.
- Taxpayers with mortgages greater than \$500,000 on average would see a net tax decrease in income tax liability. This occurs because of the greater tax reduction for high-income taxpayers, with the majority of the benefit concentrated in households with AGI of \$1 million or more.
- On a per return basis, taxpayers with AGI under \$50,000 would see average tax reductions of under \$100, taxpayers with AGI over \$200,000 would see average tax decreases of over \$15,000. Homeowners with AGI between \$50,000 and \$200,000 would see an average tax increase of \$815. Non-homeowners with AGI in the same range would see an average tax reduction of \$516.
- Non-homeowners, across all income categories, would see tax decreases on average.

### *Impact of Tax Reform on Housing Prices*

The comprehensive tax reform option will impact the demand for owner-occupied housing by reducing the number of homeowners who claim the mortgage interest deduction, eliminating the itemized deduction for property taxes, and decreasing marginal tax rates. The after-tax cost of homeownership will increase while the opportunity cost of home equity (relative to alternative investments) will rise. These factors will lead to a decline in housing prices in the short run as housing becomes a less attractive investment.

Based on the model, home prices in the short run would fall by 10.2 percent as a result of the comprehensive tax reform option. This represents an overall average value. The price impacts in specific localities will vary based on the different parameter values applicable to the jurisdiction. Based on sensitivity tests with alternative values, price impacts generally are estimated to be within 2 percentage points of the base estimate, that is, between 8 percent and 12 percent.

In the long run, the price impacts could be smaller as the supply of owner-occupied housing responds to the lower demand. The ultimate price response depends on by how much the stock of housing changes in response to the reduced housing demand. If the long-run supply of owner-occupied housing is perfectly elastic, the supply of housing would decrease by enough to meet the lower demand and the price of owner-occupied housing would rise back to its original level. This adjustment could take several years. If the long-run supply of owner-occupied housing is less elastic, a decrease in price could persist into the future. After the initial drop, prices would rise, but the supply would not fall enough to restore the pre-reform level.

### *Methodology*

Analysis was undertaken with PwC's Individual Tax Model (PwC ITM), a microsimulation model based on taxpayer data that has been augmented with other population data. Potential price impacts were estimated using generally accepted economic models for the user cost of homeownership. Economic projections rely on the Congressional Budget Office (CBO) January 2017 forecast wherever possible. Mortgage amounts and home values are assumed to grow steadily over the 10-year federal budget window, 2018 to 2027. Interest rates are expected to rise under current law, which will push up average mortgage rates and overall levels of mortgage interest.

The user cost model we utilize to estimate price changes evaluates the impact of the tax code on the decision by homeowners to buy or rent a home. Parameters consistent with the PwC ITM values were used to calibrate the model and its impacts.

### *Caveats*

The analysis presented here represents the direct impacts of the comprehensive tax reform option on personal income taxes. However, other elements of tax reform would impact the tax burdens of households under the new policy, such as:

- The full impact of tax reform incorporates changes in personal and business taxes. While this analysis includes a reduction in pass-through tax rates, it does not include other business tax changes, such as depreciation or changes in corporate rates. Households are generally believed to bear the corporate tax as owners of businesses and workers at businesses. As a result, business tax reductions would impact the overall tax burden of households and their demand for housing.
- Broader changes in the economy caused by tax reform could influence housing prices, such as changes in interest rates. Interest rates under current law likely reflect elements of the tax code, and reform could lead to lower interest rates. Alternatively, if tax reform leads to increased federal budget deficits or more rapid economic growth, interest rates could rise. Changes in interest rates would affect demand for mortgage debt and housing prices.
- Changes in taxpayer behavior beyond those modeled here could impact tax burdens and price impacts. While we have incorporated certain behavioral changes, broader impacts like household consumption decisions and financing decisions would impact tax burdens and housing demand.
- Tax reform could impact the overall size of the economy, which could affect household incomes and housing demand.
- Other supply-side reactions to tax reform, such as changes in the level of economic activity in the residential real estate sector, have not been incorporated.

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## ***2. Introduction***

The National Association of REALTORS® (NAR) engaged PwC to review the impacts of a comprehensive tax reform option.

The illustrative comprehensive tax reform broadly follows the design of recent tax reform proposals. These proposals would lower individual marginal tax rates, significantly increase the standard deduction, and eliminate selected itemized deductions. They also lower tax rates on business income that is passed through to individual income tax returns. Relevant examples include the Simplified Income Tax from the President's Advisory Panel on Federal Tax Reform from 2005; Bipartisan Tax Fairness and Simplification Act of 2011 from Senators Ron Wyden and Dan Coats; former House Ways and Means Committee Chairman David Camp's H.R. 1, introduced in 2014; and the House Republican Tax Reform Task Force Blueprint, released in June 2016.

The comprehensive tax reform option analyzed in this report would consolidate the number of marginal tax rates to three with a top rate of 33 percent; repeal the 3.8% Net Investment Income Tax and the Individual AMT; double the standard deduction; eliminate all itemized deductions other than those for mortgage interest (including home equity loans) and charitable contributions; eliminate personal exemptions; provide a preferential rate on interest income along with domestic dividends and capital gains; and limit the tax on pass-through business income to 25 percent.

The estimated impact of the proposal was developed using PwC's Individual Tax Model (PwC ITM), a microsimulation model based on taxpayer data that has been augmented with other population data. The model calculates tax liability for a sample of US households based on tax return and other financial and demographic characteristics. Weights are assigned to each taxpayer to project results for the entire population of taxpayers at the national level. The modeling approach and data sources are similar to those used for revenue and distributional analysis by the Congressional Budget Office (CBO), Joint Committee on Taxation (JCT), and Treasury's Office of Tax Analysis (OTA).<sup>4</sup>

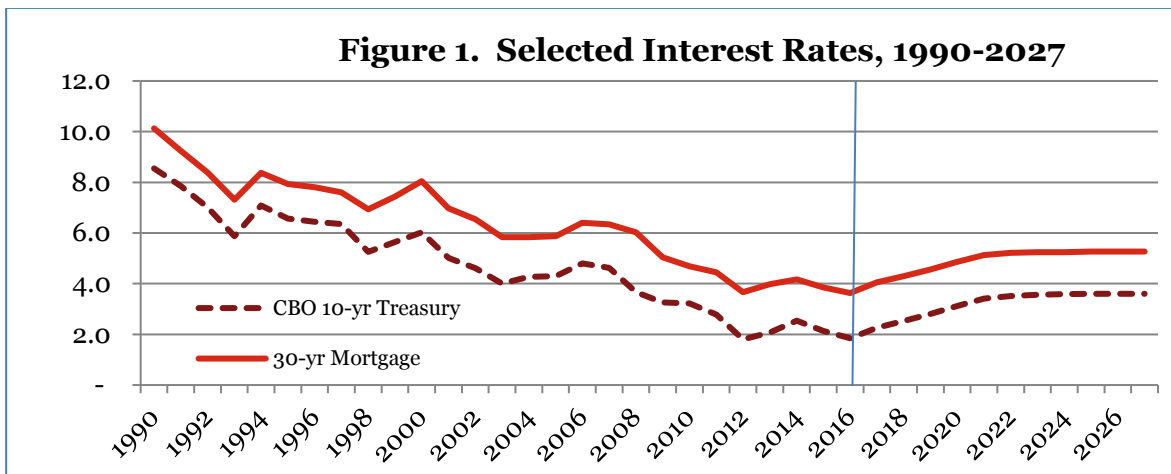
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<sup>4</sup> The base file used by JCT, CBO, and Treasury is more complete than the public-use file (PUF) used in the PwC ITM, as certain tax return data fields (such as names, Social Security numbers, and ages) are eliminated by the IRS to prevent disclosure. The IRS further employs a process known as "blurring" to obscure certain individual data (such as wages and salaries) without significantly altering aggregate totals for the items that are blurred. The IRS also modifies or removes certain codes and fields for high-income returns.

### 3. Economic Projections

We projected certain aggregate economic variables over the current budget period, 2018 through 2027, and calibrated the PwC ITM to be consistent with those variables. These projections were developed to be consistent with economic projections from the Congressional Budget Office from January 2017. Certain key variables from CBO are described here.

- CBO expects inflation-adjusted economic growth to rise to 2.3 percent in 2017, drop to 1.5 percent by 2020, then settle at its long-term level of 1.9 percent by 2022. Household incomes and the value of owner-occupied real estate are assumed in our modeling to follow a similar pattern.
- CBO expects the interest rate on Treasury debt to increase steadily through 2022 and remain flat thereafter. Household mortgage rates are assumed in our modeling to follow a similar pattern, with the 30-year rate reaching 5.2 percent by 2022 (see Figure 1).



Source: CBO January 2017; Federal Reserve; PwC calculations for mortgage rate projections.

In addition, our projections incorporate the following assumptions:

- Total mortgage debt in our modeling will grow more slowly than the value of owner-occupied real estate, as aggregate loan-to-value ratios are expected to continue the current downward trend from their recent elevated levels.
- Values for second homes were developed through the Survey of Consumer Finances and are assumed to follow the growth of owner-occupied homes, with loan-to-value ratios remaining at current levels (which are more consistent with historic levels). Second homes do not include investment property.

Table 1 presents the projections for selected variables over the projection period. In 2018, there are estimated to be 154.6 million tax returns filed, and 35.4 million returns (23 percent of the total) claiming the mortgage interest deduction. By 2027, the number of returns with mortgage interest deductions are estimated to rise to 40.8 million, or 24 percent of the total number of returns filed. An estimated 40.7 million taxpayers will report itemized deductions for property taxes in 2018, in the amount of \$206 billion. By 2027, an estimated 43.7 million taxpayers will report property tax deductions, for \$299 billion.



Table 2 summarizes the distribution of certain mortgage-related variables by outstanding mortgage amount and income class in 2018. Overall, 35.4 million taxpayers are estimated to take the mortgage interest deduction and 40.7 million the property tax deduction under current law in 2018.

The total amounts of mortgage deductions and property tax deductions are concentrated in filers with incomes between \$100,000 and \$200,000, and outstanding mortgages balances between \$200,000 and \$500,000.

Two current law provisions limit the itemized deductions that homeowners can claim. First, interest on mortgage amounts in excess of \$1 million is not deductible. Second, itemized deductions are subject to a phase-out once AGI exceeds certain levels (\$313,800 for a joint filer in 2017). These limitations are more likely to impact upper income taxpayers, limiting the deductions they can claim on their tax returns.

Overall, homeowners are responsible for a significant share of personal income taxes. In 2018, an estimated 83 percent of personal income taxes come from homeowners.

**Table 1. Baseline Projections of Key Variables (Calendar Years, All Dollar Amounts in Billions)**

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gross Domestic Product (CBO January 2017)	\$17,040	\$17,383	\$17,680	\$17,953	\$18,271	\$18,616	\$18,972	\$19,335	\$19,703	\$20,074	\$20,451
Total Number of Tax Returns Filed (Thousands)	153,037	154,568	156,114	157,676	159,096	160,530	161,976	163,436	164,909	166,197	167,497
Total Number with Mortgage Interest Deductions (Thousands)	33,683	35,419	37,186	38,290	38,672	39,058	39,447	39,840	40,238	40,514	40,791
Total Mortgage Interest Deduction	\$327	\$359	\$393	\$426	\$456	\$486	\$516	\$545	\$573	\$599	\$625
Total Number with Property Tax Deductions (Thousands)	40,119	40,711	41,809	42,531	42,527	42,699	42,809	43,289	43,508	43,526	43,724
Total Property Tax Deduction	\$196	\$206	\$217	\$227	\$236	\$246	\$256	\$266	\$277	\$287	\$299
Outstanding Value of Mortgages	\$10,851	\$11,227	\$11,583	\$11,944	\$12,352	\$12,798	\$13,268	\$13,763	\$14,275	\$14,812	\$15,371
Primary Residence	\$9,700	\$10,034	\$10,351	\$10,672	\$11,036	\$11,433	\$11,852	\$12,293	\$12,749	\$13,228	\$13,726
Second Homes	\$360	\$374	\$387	\$401	\$416	\$432	\$449	\$467	\$486	\$505	\$525
Home Equity Lines	\$791	\$818	\$844	\$870	\$900	\$933	\$967	\$1,003	\$1,040	\$1,079	\$1,120
Value of Property											
<i>Primary Residence</i>											
All Households (i.e., tax units)	\$25,574	\$26,581	\$27,539	\$28,506	\$29,578	\$30,741	\$31,957	\$33,235	\$34,548	\$35,920	\$37,343
Households with Mortgage Interest Deduction	\$15,492	\$16,399	\$17,050	\$17,630	\$18,439	\$19,140	\$19,970	\$20,766	\$21,738	\$22,798	\$23,732
Households with Property Tax Deduction	\$17,030	\$17,789	\$18,544	\$19,243	\$20,020	\$20,772	\$21,569	\$22,316	\$23,294	\$24,269	\$25,208
<i>Second Homes</i>											
All Households (i.e., tax units)	\$2,925	\$3,040	\$3,150	\$3,283	\$3,383	\$3,517	\$3,671	\$3,825	\$3,951	\$4,108	\$4,271
Households with Mortgage Interest Deduction	\$1,907	\$2,023	\$2,099	\$2,169	\$2,215	\$2,295	\$2,373	\$2,473	\$2,546	\$2,630	\$2,719
Households with Property Tax Deduction	\$1,896	\$2,008	\$2,078	\$2,148	\$2,190	\$2,268	\$2,343	\$2,443	\$2,514	\$2,597	\$2,683

Source: CBO, PwC Individual Tax Microsimulation Model (Version 0417-1).

**Table 2. Households with Mortgage and Property Tax Deductions: Tax Characteristics, 2018**  
(Dollar Amounts in Millions)

Total Value of Outstanding Loans (Primary Residence, Second Homes, and Home Equity Lines)	AGI Class								Total
	Under \$10,000	\$10,000 to \$25,000	\$25,000 to \$50,000	\$50,000 to \$75,000	\$75,000 to \$100,000	\$100,000 to \$200,000	\$200,000 to \$500,000	\$500,000 and over	
<b>Number of Returns with Mortgage Interest Deduction</b>									
Less than \$50,000	27,414	104,556	237,911	288,627	345,129	657,956	317,074	93,064	2,071,731
\$50,000 under \$100,000	58,134	226,136	666,228	1,097,183	792,351	1,457,443	326,077	51,948	4,675,500
\$100,000 under \$200,000	72,549	311,127	1,163,184	2,785,309	2,907,065	5,171,446	1,013,083	135,806	13,559,570
\$200,000 under \$500,000	49,843	154,881	657,098	1,353,412	1,846,733	5,514,411	2,739,733	336,453	12,652,564
\$500,000 under \$750,000	9,851	16,640	49,733	88,091	94,751	545,735	568,066	162,697	1,535,563
\$750,000 under \$1 million	152	550	40	16,741	53,938	160,741	205,063	115,610	552,835
\$1 million and over	1,168	3,207	1,734	6,988	34,719	36,585	131,831	172,465	388,697
<b>Total</b>	<b>219,111</b>	<b>817,097</b>	<b>2,775,928</b>	<b>5,636,352</b>	<b>6,074,686</b>	<b>13,544,317</b>	<b>5,300,926</b>	<b>1,068,044</b>	<b>35,436,460</b>
<b>Amount of Mortgage Interest Deduction (Millions of Dollars)</b>									
Less than \$50,000	\$101	\$222	\$575	\$378	\$1,289	\$6,318	\$306	\$67	\$4,056
\$50,000 under \$100,000	\$362	\$1,161	\$3,300	\$5,558	\$3,801	\$6,318	\$1,060	\$145	\$21,706
\$100,000 under \$200,000	\$500	\$2,378	\$8,771	\$19,942	\$21,073	\$38,337	\$7,025	\$795	\$98,819
\$200,000 under \$500,000	\$675	\$1,982	\$8,380	\$17,231	\$21,520	\$69,533	\$36,441	\$4,410	\$160,173
\$500,000 under \$750,000	\$314	\$496	\$1,378	\$1,956	\$2,263	\$12,227	\$13,414	\$3,838	\$35,886
\$750,000 under \$1 million	\$7	\$26	\$2	\$591	\$1,315	\$4,597	\$6,506	\$3,448	\$16,493
\$1 million and over	\$213	\$284	\$97	\$1,357	\$1,240	\$1,624	\$5,982	\$10,978	\$21,775
<b>Total</b>	<b>\$2,172</b>	<b>\$6,548</b>	<b>\$22,503</b>	<b>\$47,014</b>	<b>\$52,501</b>	<b>\$133,753</b>	<b>\$70,734</b>	<b>\$23,681</b>	<b>\$358,906</b>
<b>Number of Returns with Property Tax Deduction</b>									
Less than \$50,000	127,611	394,595	870,599	1,096,898	984,272	1,679,118	783,485	302,717	6,239,295
\$50,000 under \$100,000	72,614	266,684	875,781	1,332,146	1,041,117	1,620,666	333,818	51,119	5,593,944
\$100,000 under \$200,000	76,994	324,075	1,243,782	2,928,244	3,108,257	5,293,194	1,016,356	133,498	14,124,400
\$200,000 under \$500,000	47,104	149,758	614,333	1,281,665	1,836,901	5,388,282	2,697,991	331,134	12,347,168
\$500,000 under \$750,000	9,637	11,037	48,262	77,527	94,399	534,088	558,442	160,009	1,493,402
\$750,000 under \$1 million	111	550	40	16,709	51,386	151,602	204,032	113,783	538,213
\$1 million and over	1,118	3,207	1,734	616	34,706	35,983	127,548	169,485	374,396
<b>Total</b>	<b>335,189</b>	<b>1,149,905</b>	<b>3,654,532</b>	<b>6,733,806</b>	<b>7,151,038</b>	<b>14,702,932</b>	<b>5,721,672</b>	<b>1,261,745</b>	<b>40,710,820</b>
<b>Amount of Property Tax Deduction (Millions of Dollars)</b>									
Less than \$50,000	\$263	\$975	\$2,035	\$2,859	\$3,179	\$7,304	\$4,682	\$4,354	\$25,650
\$50,000 under \$100,000	\$286	\$840	\$2,221	\$3,540	\$3,358	\$6,629	\$2,300	\$675	\$19,849
\$100,000 under \$200,000	\$331	\$1,085	\$3,900	\$9,092	\$10,726	\$22,534	\$6,591	\$1,663	\$55,923
\$200,000 under \$500,000	\$219	\$672	\$2,900	\$5,525	\$7,998	\$30,042	\$22,310	\$4,753	\$74,419
\$500,000 under \$750,000	\$59	\$94	\$527	\$482	\$605	\$4,116	\$6,299	\$2,676	\$14,857
\$750,000 under \$1 million	\$2	\$2	\$1	\$166	\$347	\$1,412	\$2,844	\$2,158	\$6,932
\$1 million and over	\$29	\$43	\$18	\$16	\$288	\$474	\$2,251	\$4,957	\$8,076
<b>Total</b>	<b>\$1,189</b>	<b>\$3,711</b>	<b>\$11,602</b>	<b>\$21,680</b>	<b>\$26,501</b>	<b>\$72,512</b>	<b>\$47,276</b>	<b>\$21,236</b>	<b>\$205,707</b>

Source: PwC Individual Tax Microsimulation Model (Version 0417-1).

Table 3 summarizes the distribution of total itemized deductions and mortgage interest deductions by detailed income group. Overall, mortgage interest represents approximately 25 percent of the total value of itemized deductions; of all taxpayers with itemized deductions, 78 percent report mortgage interest deductions. The mortgage interest share of the total value of itemized deductions is the highest for taxpayers with AGI between \$50,000 and \$200,000, for whom it ranges between 29 percent and 30 percent on average.

**Table 3. Current Law Mortgage Interest by Current Law Itemizing Status and Income Group, 2018**

(Number of Returns in Thousands, Amounts in \$Millions)

AGI Category	All Tax Units	Taxpayers with Annual Mortgage Interest					
		All Itemized Deductions		Mortgage Interest Itemized Deductions		Mortgage Interest Share of All Itemized Deductions	
		Returns	Amount	Returns	Amount	Returns	Amount
Less than \$10K	36,724	421	\$11,064	219	\$2,172	52%	20%
\$10-20K	23,908	944	\$15,827	445	\$3,582	47%	23%
\$20-30K	20,262	1,271	\$23,983	741	\$5,868	58%	24%
\$30-40K	15,308	1,735	\$30,065	963	\$7,750	56%	26%
\$40-50K	12,560	2,323	\$43,119	1,444	\$11,851	62%	27%
\$50-75K	22,232	7,964	\$161,905	5,636	\$47,014	71%	29%
\$75-100K	14,215	7,707	\$174,244	6,075	\$52,501	79%	30%
\$100-200K	20,599	15,765	\$443,988	13,544	\$133,753	86%	30%
\$200-250K	3,175	2,857	\$112,614	2,508	\$29,710	88%	26%
\$250-500K	3,511	3,252	\$177,796	2,793	\$41,025	86%	23%
\$500-1m	1,006	935	\$83,369	797	\$14,807	85%	18%
More than \$1m	456	412	\$146,790	271	\$8,875	66%	6%
<b>All</b>	<b>173,956</b>	<b>45,587</b>	<b>\$1,424,764</b>	<b>35,436</b>	<b>\$358,906</b>	<b>78%</b>	<b>25%</b>

Source: PwC Individual Tax Microsimulation Model (Version 0417-1).

## 4. Impact of Tax Reform

The impacts of the potential tax reforms have been modeled using PwC's ITM. The estimates are consistent with JCT and CBO conventional scoring methodologies, which incorporate behavioral impacts but assume the overall size of the economy remains the same.<sup>5</sup> Estimates that incorporate macroeconomic impacts could generate results that differ significantly. The proposal is assumed to be effective January 1, 2018.

The first section summarizes the revenue impact of the proposal over the budget window, FY 2018 to 2027. The second section provides detailed tables on the impacts of the comprehensive tax reform option for 2018.

### 4.1. Revenue Impact of Option

Some provisions of the comprehensive tax reform option would lower tax collections (such as decreased marginal tax rates) while others would raise taxes (such as eliminating certain deductions). Overall, the comprehensive tax reform option is estimated to decrease federal revenues by \$1.2 trillion over the FY 2018-2027 period. The annual impacts of the reform is summarized in Table 4.

**Table 4. Revenue Impact of Proposal, 2018-2027**  
(Fiscal Years, Amounts in \$Billions)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2018-2027
Comprehensive Tax Reform Option	-\$89	-\$115	-\$114	-\$116	-\$114	-\$119	-\$123	-\$126	-\$133	-\$141	-\$1,189

Source: PwC Individual Tax Microsimulation Model (Version 0417-1).

The estimates assume that households facing higher after-tax mortgage costs adjust their portfolios to pay down their mortgages with other liquid assets. Specifically, we assume that households are willing to use up to 90 percent of their interest-bearing assets to pay down mortgages.<sup>6</sup>

We also have estimated the amount in tax savings from provisions that encourage homeownership under current law and tax reform.<sup>7</sup> The tax savings associated with the itemized deductions for mortgage interest and real estate taxes will fall significantly under the comprehensive tax reform option. First, the deduction for property taxes would be eliminated. Second, the number of itemizers will fall as the standard deduction is increased and fewer categories of spending qualify as itemized deductions. Only a subset of households would continue to deduct mortgage interest under this tax reform. Approximately 6 million taxpayers would deduct mortgage interest under

<sup>5</sup> The specific behavioral response in the model assumes taxpayers reallocate their investment portfolio if they no longer claim the mortgage interest deduction. They are assumed to transfer funds out of interest-bearing assets and into housing equity by paying down mortgages.

<sup>6</sup> We assume households maintain some preference for a buffer stock of liquid assets and therefore do not shift all interest-bearing assets to their mortgages. Also, given the risk characteristics and tax implications of selling such capital assets, we assume they are not utilized to lower mortgage balances.

<sup>7</sup> These estimates are referred to as "tax expenditures" and are annually estimated and presented by JCT and OTA. Tax expenditure estimates differ from revenue estimates in two primary ways. First, tax expenditure estimates exclude behavioral impacts that are incorporated in revenue estimates. Second, tax expenditure estimates measure the change in taxpayer liabilities rather than Federal revenues. Revenue estimates reflect timing differences in collections under the proposal under analysis.

the proposal (4.1 percent of all filers), compared to 35 million under current law (23.1 percent). The total number of tax filers taking any itemized deductions under the proposal would be 7 million (4.7 percent), compared to 46 million under current law (29.7 percent).

Table 5 summarizes the estimates. Under current law over the FY 2018-2027 period, the combined tax savings for the two provisions that encourage homeownership amounts to \$1.305 trillion. Under the comprehensive tax reform option, the value of the tax savings from the provisions would fall to \$232 billion, or 82 percent smaller than the current law tax expenditure.

**Table 5. Tax Expenditure Estimates for Deductions for Mortgage Interest and Real Estate Property Tax, 2018, Under Current Law and Comprehensive Tax Reform Option**  
(\$Millions)

Fiscal Year	Under Current Law			Under Comprehensive Tax Reform Option		
	Mortgage Interest Deduction (MID) Alone	Real Estate Tax Deduction Alone	Real Estate Tax and Mortgage Interest Deduction	Mortgage Interest Deduction Alone	Percent Change, Relative to MID only	Percent Change, Relative to MID and Real Estate Tax Deduction
2018 Q2-Q4	\$55,642	\$26,128	\$73,896	\$11,072	-80%	-85%
2019	\$79,113	\$36,639	\$104,757	\$16,069	-80%	-85%
2020	\$85,519	\$38,683	\$112,624	\$17,928	-79%	-84%
2021	\$91,972	\$40,460	\$120,367	\$20,130	-78%	-83%
2022	\$98,808	\$42,367	\$128,661	\$22,395	-77%	-83%
2023	\$105,622	\$44,247	\$136,931	\$24,581	-77%	-82%
2024	\$112,383	\$46,093	\$145,122	\$26,918	-76%	-81%
2025	\$118,874	\$48,164	\$153,227	\$29,118	-76%	-81%
2026	\$125,205	\$50,155	\$161,048	\$31,118	-75%	-81%
2027	\$131,392	\$52,160	\$168,755	\$33,164	-75%	-80%
<b>2018-2027</b>	<b>\$1,004,530</b>	<b>\$425,097</b>	<b>\$1,305,387</b>	<b>\$232,494</b>	<b>-77%</b>	<b>-82%</b>

Source: PwC Individual Tax Microsimulation Model (Version 0417-1). Note: The sum of the estimates for the individual provisions exceeds the combined estimate because of interactions of the provisions with other elements of the tax code. For example, if eliminating either the mortgage interest deduction or the real estate tax deduction caused a taxpayer to claim the standard deduction, then no additional tax liability would result from eliminating both deductions.

## 4.2. Distributional Impact

While the illustrative reform proposal would lower federal revenues overall, the impact on specific groups of taxpayers would vary based on their characteristics.

Table 6 provides a breakdown of the impact of the reform proposal by income and outstanding mortgage level in 2018. Overall, taxes are estimated to fall by \$118 billion in 2018. By income group, taxpayers with AGI between \$75,000 and \$250,000 would see net tax increases, and other groups would get tax decreases on average. Households with mortgage balances between \$100,000 and \$500,000 also would see an overall tax increase on average. Taxpayers with mortgage balances greater than \$500,000 see net tax decreases on average. This occurs because of the greater tax reduction for high-income taxpayers.

**Table 6. Impact of Comprehensive Tax Reform Option on Total Tax Liability by Mortgage Balance and Income, 2018**  
(Number of Returns in Thousands, Amounts in \$Millions)

AGI Category	Outstanding Mortgage Balance Category												
	No Mortgage		Between \$0 and \$100k		Between \$100k and \$500k		Between \$500k and \$1 million		Over \$1 million		Total		Average per Return
	Returns	Amount	Returns	Amount	Returns	Amount	Returns	Amount	Returns	Amount	Returns	Amount	
Less than \$10K	28,884	-\$607	7,562	-\$109	263	-\$107	12	-\$41	2	-\$41	36,724	-\$905	-\$25
\$10-20K	17,890	-\$982	5,281	-\$342	720	\$16	14	\$0	3	\$0	23,908	-\$1,309	-\$55
\$20-30K	13,636	-\$767	5,895	-\$288	727	\$97	5	-\$2	0	\$0	20,262	-\$960	-\$47
\$30-40K	11,015	-\$2,051	2,599	-\$266	1,668	\$271	24	\$13	1	\$0	15,308	-\$2,033	-\$133
\$40-50K	7,564	-\$2,279	2,865	-\$516	2,105	\$254	25	\$2	1	\$0	12,560	-\$2,540	-\$202
\$50-75K	12,496	-\$4,390	3,105	-\$2	6,519	\$2,542	105	\$207	7	\$0	22,232	-\$1,644	-\$74
\$75-100K	5,925	-\$1,648	1,768	-\$200	6,313	\$3,227	175	\$328	35	\$109	14,215	\$1,817	\$128
\$100-200K	5,543	-\$1,677	2,400	\$1,494	11,756	\$17,278	860	\$3,049	40	\$75	20,599	\$20,218	\$982
\$200-250K	531	-\$130	319	\$196	2,067	\$6,696	233	\$1,419	25	\$130	3,175	\$8,312	\$2,618
\$250-500K	622	-\$4,239	367	-\$1,874	1,874	-\$2,675	542	\$412	107	-\$168	3,511	-\$8,544	-\$2,433
\$500-1m	184	-\$5,731	107	-\$2,949	390	-\$8,585	220	-\$3,720	105	-\$2,057	1,006	-\$23,041	-\$22,896
More than \$1m	168	-\$56,839	42	-\$6,626	103	-\$12,179	70	-\$9,286	72	-\$22,484	456	-\$107,414	-\$235,695
<b>All</b>	<b>104,459</b>	<b>-\$81,341</b>	<b>32,309</b>	<b>-\$11,482</b>	<b>34,505</b>	<b>\$6,834</b>	<b>2,285</b>	<b>-\$7,619</b>	<b>398</b>	<b>-\$24,436</b>	<b>173,956</b>	<b>-\$118,044</b>	<b>-\$679</b>

Source: PwC Individual Tax Microsimulation Model (Version 0417-1).

Table 7 summarizes the taxpayers with tax increases or tax decreases by homeownership status and income group. By AGI class, homeowners with AGI between \$30,000 and \$40,000 would see a small tax increase on average, and homeowners with AGI between \$50,000 and \$250,000 would see more significant tax increases on average. Non-homeowners, across all income categories, would see tax decreases on average.

On a per return basis, taxpayers with AGI under \$50,000 would see average tax reductions of under \$100, taxpayers with AGI over \$200,000 would see average tax decreases of over \$15,000. Homeowners with AGI between \$50,000 and \$200,000 would see average tax increases of \$815 and non-homeowners in the same income range would see average tax reductions of \$516.



**Table 7. Households with Tax Increase / Tax Decrease under Comprehensive Tax Reform Option by Homeowner Status, 2018**  
(Number of Returns in Thousands, Amounts in \$Millions)

	All Tax Units	Homeowners						Non-Owners					
		Returns with a tax increase		Returns with a tax decrease		Returns with no tax change	Average tax change per return	Returns with a tax increase		Returns with a tax decrease		Returns with no tax change	Average tax change per return
		Returns	Amount	Returns	Amount	Returns	Amount	Returns	Amount	Returns	Amount	Returns	Amount
<b>AGI Category</b>													
Less than \$10K	36,724	115	12	556	-308	7,359	-\$37	384	49	2,699	-658	25,611	-\$21
\$10-20K	23,908	1,207	189	2,168	-458	3,462	-\$39	2,473	364	7,112	-1,404	7,486	-\$61
\$20-30K	20,262	1,997	584	3,678	-759	2,205	-\$22	3,366	765	6,781	-1,551	2,237	-\$63
\$30-40K	15,308	1,752	961	3,028	-955	273	\$1	2,387	935	7,653	-2,975	215	-\$199
\$40-50K	12,560	2,087	1,434	3,284	-1,612	125	-\$32	1,431	870	5,578	-3,232	54	-\$334
\$50-75K	22,232	5,418	6,595	5,728	-3,575	56	\$270	2,048	2,674	8,960	-7,338	22	-\$423
\$75-100K	14,215	4,768	8,613	5,056	-4,390	9	\$430	751	1,645	3,627	-4,052	5	-\$549
\$100-200K	20,599	10,793	29,956	5,596	-6,691	5	\$1,419	878	3,168	3,326	-6,214	2	-\$724
\$200-250K	3,175	2,276	10,066	615	-1,466	0	\$2,974	50	622	233	-910	0	-\$1,015
\$250-500K	3,511	1,509	6,032	1,679	-12,168	0	-\$1,925	35	446	288	-2,854	0	-\$7,440
\$500-1m	1,006	88	743	835	-21,181	0	-\$22,128	6	169	76	-2,772	0	-\$31,474
More than \$1m	456	10	1,216	410	-101,999	0	-\$239,972	1	279	35	-6,909	0	-\$185,457
<b>All</b>	<b>173,956</b>	<b>32,020</b>	<b>66,400</b>	<b>32,632</b>	<b>-155,563</b>	<b>13,493</b>	<b>-\$1,141</b>	<b>13,810</b>	<b>11,987</b>	<b>46,369</b>	<b>-40,869</b>	<b>35,632</b>	<b>-\$301</b>
<b>Subtotal: \$50k - \$200K</b>	57,046	20,979	45,164	16,380	(14,657)	57,046	\$815	3,676	7,487	15,912	(17,604)	29	-\$516

Source: PwC Individual Tax Microsimulation Model (Version 0217-1).

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## ***5. Impact on Housing Prices***

To evaluate the potential impact of tax reform on property values, we utilized a model that evaluates the impact of the tax code on the decision by homeowners to buy or rent a home. Parameters consistent with the PwC ITM values were used to calibrate the model and its impacts.

Harris (2013) develops a model to estimate the short-run change in housing prices under tax reforms that impact the cost of homeownership. The model assumes that the supply of housing is fixed in the short-run. Households compare the present value of the after-tax cost of homeownership with the present value of the rental cost of a home. In equilibrium, the two will be equal. If the cost of homeownership rises under tax reform, more households will desire to rent homes instead of buying, which will decrease demand for owner-occupied homes and cause housing prices to fall.

Homeownership costs fall into three key areas: transaction costs associated with buying and selling the home, the opportunity cost of equity put into the home, and the tax treatment of costs like mortgage interest and property taxes. The current income tax code contains several provisions impacting these costs.

First, investment income in the form of dividends and capital gains receives a preferential tax rate compared to other forms of income. Therefore, the opportunity cost of investing in home equity is greater than if investment income were taxed at ordinary rates.

Second, mortgage interest and property taxes are allowed as itemized deductions under current law. As a result, the after-tax cost of borrowing to purchase a home and the costs of living in the home are decreased by the tax code. These tax benefits are assumed to be permanently “capitalized” into home prices.

In contrast to the short-run determination of housing prices, over the long run the supply of owner-occupied homes will react to the decreased demand, for example, by reductions in investment or conversions of owner-occupied housing into rental housing. The long-run impact on price will depend on the responsiveness of supply to changes in price and the speed by which the housing supply can adjust.

### ***5.1. Short-term Impact on Home Prices***

The comprehensive tax reform option will impact the demand for owner-occupied housing by reducing the number of homeowners who claim the mortgage interest deduction, eliminating the itemized deduction for property taxes, and decreasing marginal tax rates. The after-tax cost of homeownership will increase while the opportunity cost of home equity (relative to alternative investments) will rise. These factors will lead to a decline in housing prices in the short run as housing becomes a less attractive investment.

The magnitude of the short-run price adjustment will depend on several factors, including:

- Marginal tax rates before and after reform;
- State income tax rates;
- Average property tax rates;
- Annual rates of appreciation in housing prices;
- Expected home tenure;
- Average loan-to-value ratios for homes with mortgages; and
- Transaction costs on home sales.

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Values used for these parameters are summarized in the Appendix.

Based on the model, home prices in the short run would fall by 10.2 percent as a result of the comprehensive tax reform option. This represents an overall average change in value. The price impacts in specific localities will vary based on the different parameter values applicable to the jurisdiction. Based on sensitivity tests with alternative values, price impacts are generally within 2 percentage points of the base estimate, that is, between 8 percent and 12 percent.

The analysis presented here represents the direct impact of changes to statutory individual income tax rates and the treatment of mortgage interest and property taxes. However, other changes caused by tax reform could impact short-run prices, such as:

- Changes in the rental housing market, such as short-term changes in monthly rents caused by changes to the taxation of rental properties.<sup>8</sup>
- Broader changes in the economy caused by tax reform could influence the costs, such as changes in interest rates.
- Changes in taxpayer behavior with respect to the use of debt vs. equity in home purchases.
- The overall size of the economy and impacts on household incomes, which could affect housing demand.
- Other supply-side reactions to tax reform, such as changes in the level of economic activity in the residential real estate sector.

Long run price impacts would depend on market-specific conditions and broader impacts of tax reform on the economy.

## ***5.2. Responsiveness of Housing Supply to Price Changes***

A key determinant of the long-run price impacts will be the responsiveness of supply of owner-occupied housing to changes in demand. Following the fall in prices for owner-occupied homes, homebuilders and developers will have less of an incentive to provide homes intended for the owner-occupied portion of the market. The lower incentive will decrease the amount of owner-occupied homes. The quantity of owner-occupied housing supply may decrease over time in a number of ways, such as conversion to non-residential property, conversion into rental units, and a decrease in the quantity of land used for housing (i.e., new construction). Certain responses, such as conversions to other uses, could happen relatively quickly.

The ultimate price response depends on by how much the stock of housing changes in response to the reduced housing demand. If the long-run supply of owner-occupied housing is perfectly elastic, the supply of housing would decrease by enough to meet the lower demand and the price of owner-occupied housing would rise back to its original level. This adjustment could take several years.

If the long-run supply of owner-occupied housing is less elastic, a decrease in price could persist into the future. After the initial drop, prices would rise, but the supply would not fall enough to restore the pre-reform level.

The sensitivity of supply varies by local characteristics, e.g., zoning restrictions, other regulatory flexibility and the availability of land. Localities with more lenient zoning restrictions, more regulatory flexibility, and more available land will have supply that is more sensitive to changes in price. As a result, short-term price changes are less likely

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<sup>8</sup> Various authors have identified stickiness in the rental market that mutes the responsiveness of rental prices to changes in the housing market. See, for example, Xiaojin Sun and Kwik Ping Tsang (2017).

to persist. Alternatively, localities with the opposite characteristics are more likely to see short-term price changes that persist into the future.

Empirical studies have found mixed results on the elasticity of housing supply, likely because of the importance of local conditions in determining the sensitivity to price.<sup>9</sup>

Changes in business taxes enacted as part of tax reform also could impact this sensitivity as it may affect investment in residential real estate.

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<sup>9</sup> See Harris (2013), Holtz-Eakin (1996), and Hilber and Turner (2011).

## 6. Appendix

This section describes the two primary models used to develop the estimates presented above.

### 6.1. PwC's Individual Tax Model

The PwC Individual Tax Model (PwC ITM) calculates tax liability for a representative sample of households. The data sample includes over 150,000 records from the 2004 IRS Public Use File (PUF), which represents 132.2 million individual income tax returns.<sup>10</sup> Each PUF record contains 33 indicator codes and 176 quantitative fields. The indicator codes provide information such as tax filing status, the number of dependent exemptions, and whether certain forms (e.g., alternative minimum tax) are attached to the return. The quantitative fields include the various sources of income, adjustments to income, itemized deductions, and certain other information reported on the tax return.

The data sources are similar to those used for revenue and distributional analysis by Congressional Budget Office (CBO), Joint Committee on Taxation, and Treasury's Office of Tax Analysis (OTA).<sup>11</sup>

The tax return data were augmented in several aspects:

1. **Non-filers.** Non-filers were added to the database using a statistical match between the PUF and the Current Population Survey (CPS). CPS is a monthly survey of about 50,000 households conducted by the US Census Bureau. It includes employment, unemployment, earnings, house of work, and other indicators by demographic characteristics. In addition to providing information on non-filers, CPS was used to fill missing fields in the PUF, such as the age of the primary and secondary taxpayers and their dependents and to obtain information on sources of income that are not reported on tax returns (e.g., welfare benefits). The match with CPS records also is used to impute the division of wages between spouses for purposes of computing payroll tax liability because the tax return data from the PUF only show total wages of the tax unit. A total of 41 data fields were merged into the PUF data set.
2. **Consumer Expenditures.** Consumer expenditures were added to the database using a statistical match between the PUF and the Consumer Expenditure Survey (CEX). CEX is a continuous, rotating panel survey of US households. For each household in the survey, CEX includes income and demographic characteristics and detailed spending patterns in some 800 consumption categories. The detailed CEX categories were aggregated into 25 broad consumption categories and controlled to match the aggregate consumption level in the National Income and Product Accounts (NIPA).
3. **Wealth.** Wealth holdings were imputed by income group based on the Survey of Consumer Finances (SCF), which is widely regarded as the best available data on household wealth accumulation for a nationally representative sample. A regression-based approach was used for this imputation. Two equations were estimated for each asset and liability item: the first determines whether the household owns the item, and the second determines the amount held. Imputed items include: cash, tax-exempt

<sup>10</sup> Individuals filing Forms 1040, 1040A, and 1040EZ.

<sup>11</sup> The SOI file used by JCT, CBO, and Treasury is more complete than the PUF, as certain tax return data fields (such as names, Social Security numbers, and ages) are eliminated by SOI to prevent disclosure. SOI further employs a process known as "blurring" to obscure certain individual data (such as wages and salaries) without significantly altering aggregate totals for the items that are blurred. SOI also modifies or removes certain codes and fields for high-income returns.

bonds, taxable bonds, stock, retirement assets, cash value of life insurance, other financial assets, vehicles, personal residences, other real estate, farm assets including land, actively managed business assets, passively managed business assets, other nonfinancial assets, mortgage and home equity line of credit, real estate debt, farm debt, credit card balances, all other debt, employee contribution to tax deferred retirement savings plan, and employer's contribution to tax deferred retirement savings plan.

4. **Employer provided health insurance.** Employer contributions for health plans and life insurance were imputed based on data reported in the Insurance Component (IC) of the Medical Expenditure Panel Survey (MEPS).

The data in the model are extrapolated to 2027 based on CBO's January 2017 economic forecasts and the most recent individual income data published by the IRS. A two-stage "aging" procedure is used. In Stage I, dollar amounts on each record are inflated by applicable per capita growth rates. In Stage II, linear programming is used to adjust record weights to hit a set of preset "targets," including:

1. total number of returns by type;
2. total number of returns by age group;
3. income by major component;
4. number of dependent exemptions;
5. number of children under age 17;
6. total population;
7. total number of returns with (1) primary homes, (2) mortgage interest deductions, (3) vacation home loans, and (4) investment property loans;
8. total assets;
9. total financial assets;
10. total primary home loans;
11. total home equity line;
12. total vacation home loan;
13. total investment property loan;
14. total mortgage interest deduction;
15. total primary home value;
16. total vacation home value; and
17. total investment property value.

The model includes a detailed tax calculator that computes individual income taxes paid by all tax units. More than 400 parameters can be changed, including: statutory marginal tax rates and the associated bracket thresholds, dollar values for items such as personal exemptions, the standard deduction, the AMT exemption, and various credits; phase-in and/or phase-out rates and thresholds for various tax programs.

## ***6.2. Housing Price Model***

The housing price model is taken from Harris (2013). Households are assumed to equate the present value of the after-tax cost of owning a home over the average housing tenure with the present value of the rental cost of a home.

$$\sum_{t=1}^K R/(1+i)^t$$

$$= PT^0 + P \sum_{t=1}^K [(\lambda(1 - \alpha^m \tau^y) r^m + \tau^p (1 - \alpha^p \tau^y))/(1+i)^t]$$

$$+ P \frac{(1 - \lambda)((1 + r^{inv}(1 - \tau^{inv}))^K - (1 - \lambda))}{(1+i)^K} + P \left[ \frac{(1 + \pi)^K T^K}{(1+i)^K} \right]$$

Where  $R$  is the rental rate,  $T$  represents transaction costs as a percent of home price,  $P$  is the home price,  $\lambda$  is the loan-to-value ratio,  $\alpha^m$  is the portion of mortgage interest deducted under current law or the proposal,  $\tau^y$  is the marginal tax rate on ordinary income,  $r^m$  is the mortgage rate,  $\tau^p$  is the property tax rate,  $\alpha^p$  is the portion of real estate taxes deducted under current law or the proposal,  $r^{inv}$  is the return on outside investments,  $\tau^{inv}$  is the marginal tax rate on investment income,  $\pi$  is the home price appreciation,  $K$  is the length of home tenure, and  $i$  is the discount rate. The four terms on the right-hand side represent the up-front transaction costs, the after-tax cost of mortgage interest and property taxes, the opportunity cost of equity put into the home, and the back-end transaction costs, respectively.<sup>12</sup>

In equilibrium with no change in supply, relative prices after reform ( $P^1$ ) and before reform ( $P^0$ ) will be:

$$\frac{P^1}{P^0} = \frac{R/P^0}{R/P^0 + \frac{(TC^1 - TC^0)}{TC^0} * R/P^0}$$

Where  $TC = T^0 + \sum [(\lambda(1 - \alpha^m \tau^y) r^m + \tau^p (1 - \alpha^p \tau^y))/(1+i)^t] + \frac{(1-\lambda)(1+r^{inv}(1-\tau^{inv}))^K - (1-\lambda)}{(1+i)^K} + \left[ \frac{(1+\pi)^K T^K}{(1+i)^K} \right]$

The term  $TC$  is calculated using the pre-reform and post-reform values summarized in Table 8, and the percent change in price is determined by the ratio of the post-reform price over the pre-reform price.

<sup>12</sup> Note that the capital gains tax on the appreciation in home values is ignored, consistent with most studies on the topic. See Harris (2013) and Poterba and Sinai (2008).

**Table 8. Assumptions used in Home Price Calculations**

Parameters	Current Law	Proposed Law	Source
Expected Home Tenure (in years)	10	10	NAR Generational Trends Report
Deductible Portion of Mortgage Interest	75%	15%	PwC ITM
Deductible Portion of Property Tax	75%	0%	PwC ITM
Loan to Value Ratio (Proportion of Housing Value that is Financed)	59%	59%	PwC Projection
Average Mortgage Interest Rate	4.5%	4.5%	PwC Projection
Annual Appreciation in Housing Value	2.8%	2.8%	PwC Projection
Transaction Costs Paid upon Purchase	1.3%	1.3%	Harris (2013)
Transaction Costs Paid upon Sale	5.8%	5.8%	Harris (2013)
Property Tax Rate	1.3%	1.3%	Survey of Consumer Finances, 2013
Marginal Federal Tax Rate on Interest Deductions of Itemizers	21.5%	23.8%	PwC ITM
Marginal Federal Tax Rate on Investments of Homeowners	16.3%	15.1%	PwC ITM
State Income Tax Rate	6.0%	6.0%	Harris (2013)
Return on Alternative Investments	6.0%	6.0%	Harris (2013)
After-tax Discount Rate	4.72%	4.73%	PwC Assumption

We have tested the sensitivity of the results to different parameter estimates and summarized the results in Table 9. In general, the alternative parameters yield price changes that range from -8 percent to -12 percent. The price impact increases with state tax rates, property tax rates, expected housing tenure, and loan-to-value ratios. It falls as housing price appreciation rises.

**Table 9. Short-Run Average Impact of Comprehensive Tax Reform Option on Housing Prices, 2018**

	Average Impact on Short-Run Prices
<b>Base Assumptions</b>	
6% State Income Tax Rate	
1.3% Property Tax Rate	
2.8% Annual Housing Appreciation	
10-Year Expected Tenure	
58.6% Average LTV	-10.2%
<b>Alternative Assumptions</b>	
0% State Tax Rate	-8.1%
9% State Tax Rate	-11.2%
0.6% Prop Tax	-9.0%
2% Prop Tax	-11.1%
1% Housing Appreciation	-10.3%
5% Housing Appreciation	-9.9%
7 Year Expected Tenure	-9.7%
13 Year Expected Tenure	-10.4%
45% Average LTV	-8.7%
70% Average LTV	-11.4%
9% State tax rate, 2% property tax	-12.2%