The Flat Tax and Housing Values

May 1996

By J.D. Foster, Ph.D.

Executive Director and Chief Economist
Tax Foundation
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Table of Contents

Introduction .................................................................................................................................. 1
The Flat Tax and Housing Values ......................................................................................... 1
The Home Mortgage Interest Deduction ............................................................................. 3
Home Mortgage Rates Under a Flat Tax ............................................................................. 8
Of Tax Rates and Standard Deductions ............................................................................. 8
Property Taxes and the Flat Tax ......................................................................................... 10
The Model of Housing Values .............................................................................................. 10
Housing Values Under a Pure Flat Tax ............................................................................. 13
Alternative Flat Tax Formulations ..................................................................................... 14
Sensitivity of Results to Varying Assumptions ................................................................ 17
Estimated Effect of the Flat Tax on the Value of the National Housing Stock .......... 21
Errant Arguments in the Debate ......................................................................................... 22
Conclusion .............................................................................................................................. 22
Appendix 1 ............................................................................................................................... 24
Appendix 2 ............................................................................................................................... 28
**Introduction**

As tax reform develops, there is no more compelling issue to millions of homeowners than the effect the new tax system will have on housing values. For many taxpayers, the equity built up in their home represents a large share of their total net worth. If tax reform reduced home values significantly, as some have suggested would occur, this could significantly affect consumption patterns and saving rates. The prospect of a loss in home value would also create a significant political obstacle to enacting tax reform. On the other hand, if it can be shown that tax reform would cause housing prices to rise, thereby increasing individuals' net worth, this would obviously improve the prospects for tax reform.

One of the leading tax reform proposals, the flat tax designed by Professors Hall and Rabushka of the Hoover Institute and introduced as legislation in the U.S. Congress by Representative Richard Armey (R-TX) and Senator Richard Shelby (R-AL), includes a number of changes that would clearly affect the value of the nation's housing stock. These changes include the elimination of the capital gains tax, the elimination of the home mortgage and property tax deductions, the elimination of the tax on interest income, a change in tax rates, and the elimination of the gift and estate tax. Each of these changes would affect housing prices, some offering the hope of greater appreciation, others clearly threatening to reduce housing values. This study attempts to work through these issues to net out the various tax changes' effects.

**The Flat Tax and Housing Values**

A home is many things. When it comes to setting its price, however, a home is an asset. Unlike a machine in a plant which produces a stream of income, a home produces a stream of housing services that are valued by the home owner, but which are difficult to quantify objectively. A home also carries various maintenance, mortgage interest, and tax costs that must be covered. And a home offers the possibility of economic gain in the form of price appreciation. In other words, as an asset, a home implies various income streams and expenses which the marketplace assesses in determining the value of the property. Specifically,

\[
\text{Home Price} = \text{Total Present Value of Housing Services} + \text{the After-Tax Present Value of Expected Appreciation} - \text{the Total Present Value of all Related Expenses}
\]

Fortunately, there is no reason to believe that a flat tax replacing an income tax would affect a prospective buyer's valuation of the home's housing services. Therefore we can focus our attention on the effects of a flat tax on the possibility of appreciation and on the home's costs.

**Appreciation of Housing Values**

Every careful prospective home buyer considers the potential for the appreciation of his or her home when making an offer. The greater the potential for appreciation, the more the buyer is willing to offer. Aside from this general observation, it is difficult to say very much else about a home buyer's expectations regarding appreciation.

Along with the home buyer's expected appreciation, there is also the question of the home buyer's expectations regarding the capital gains treat-
ment he or she will face. The tax imposed on capital gains from the sale of residential housing is subject to a number of complications, all of which can affect the effective capital gains tax rate. For example, taxpayers are able to defer tax upon the sale of a residence so long as they purchase another home of equal or greater value within two years.

Taxpayers over the age of 55 are allowed a one-time exclusion of $125,000 in taxable capital gain arising from the sale of a home. The current value of the exclusion depends on when the taxpayer expects to take it. The exclusion is not currently indexed for inflation, and so a further complication is whether the prospective home buyer believes the exclusion will be increased periodically to reflect the value-erosing effects of inflation.

A similar question is whether the home buyer believes the capital gains tax system overall will be more or less punitive to capital gains when he or she goes to realize a capital gain on the residence. Aside from adjusting the one-time exclusion, an annual general flat exemption amount may be enacted, the system may be indexed to eliminate tax on inflationary capital gains, or the tax rate could be lower, or higher, in the future than under current law.

The effective capital gains tax rate also depends on the current price of the home. A given percentage increase in the price of a home would result in a greater amount of capital gain in excess of the one-time exclusion for a more expensive home than for a less expensive one. For example, if all homes double in price over a given period, then a home originally bought at $200,000 would now be worth $400,000 for a capital gain over and above the one-time exclusion of $75,000. A home originally bought at $100,000, in contrast, would be worth $200,000 and the home owner would have no taxable capital gain after the exclusion.

The gift and estate tax, which would be repealed under a flat tax, can also play a role. When a residence is included in an estate, the cost of the property is reset for tax purposes to equal its current value (known as step-up in basis), so that the estate owes no capital gains tax on the property. And the decedent's estate may be small enough that no estate tax is owed because of the unified estate tax credit which offset up to $192,800 in estate tax liability in 1994 (the amount of the credit is indexed for inflation). However, if the estate is large enough to owe tax, the rates begin at 18 percent and rise to 55 percent.

Everything else held constant, any set of assumptions that increases the effective rate of tax on appreciation reduces the price a buyer would be willing to pay for the home under current law, and increases the value of the tax relief provided by the flat tax's elimination of tax on capital gains and the estate. On the other hand, the more punitive the current treatment, the greater the tax relief under the flat tax and the greater the immediate increase in initial home prices due to the changes in these provisions following the enactment of the flat tax.

Costs Affecting Housing Values

Four main changes that would take place in moving from an income tax to a flat tax dominate the cost side of the calculation of housing prices:

1) The elimination of the home mortgage interest deduction;
2) The decline in the interest rate on mortgages issued after the flat tax is introduced (due to the change in the exemption of interest receipts from the tax base, as discussed below);
3) Tax rates and the standard deduc-
tion; and,
4) The elimination of the deduction for state and local property taxes.

Each of these factors is considered in developing the model of housing values presented below.

The Home Mortgage Interest Deduction

Of the various tax changes contemplated, the deduction for mortgage interest may be the single most important provision to the 27 million taxpayers who claimed a total of $186 billion in mortgage interest expense in 1993. In the context of tax reform, this deduction is important even to those who own their homes outright as it significantly affects the ability of prospective buyers to purchase a home at its current price. Not surprisingly, few deductions have more political support or better organized defenders. It is important, therefore, to understand the tax policy motivations for the deduction under the current income tax and how those motivations change under the flat tax.

The Deduction Under the Income Tax

Since the inception of the modern income tax through the Tariff Act of 1913, individuals and businesses have generally been allowed to deduct their interest expense. Exceptions have crept into the law, such as: The phase-out of the deduction for individual interest expense as part of the 1986 Tax Reform Act; the elimination of the deduction for mortgage interest expenses incurred by individuals carrying mortgages on more than two homes; and, the limitations on the ability to deduct interest on home equity lines of credit. More recently, some have suggested that additional limitations be placed on the deductibility of mortgage interest. Despite these retrenchments, the mortgage interest deduction remains a fundamental feature of the federal personal income tax.

Even under current law, the mortgage interest deduction is not without its critics. Some say the deduction is a subsidy to home ownership. Some say it gives homeowners a special opportunity unavailable to renters to reduce their taxes. A corollary to this claim is that the deduction unfairly reduces the tax of middle- and upper-income taxpayers who are more likely to be homeowners at the expense of lower-income taxpayers who are more likely to be renters. Both the Treasury Department and the Joint Tax Committee list the mortgage interest deduction as a tax expenditure, which means that the deduction reduces taxpayers' tax liabilities below what the taxpayer would otherwise pay under a "normal income tax" as these respective organizations define such a system.

These criticisms, each in their own way, are based on a belief that the mortgage interest deduction violates the principle of tax neutrality. In simple terms, tax neutrality means that the tax code does not micromanage the economy either intentionally or unintentionally. More specifically, tax neutrality means that the tax system does not distort the prices of those items or activities that are subject to tax relative to those items or activities that are not subject to tax.

The Taxation of Interest Income and Tax Neutrality

One example of a non-neutral tax provision is the taxation of interest income. When an individual earns an after-tax dollar of labor income, he or she has a choice whether to use that dollar to pay for a dollar's worth of consumption or to defer the purchase of goods and services to another day, i.e., to save. In making
this choice, an individual will consider, among other factors, the real (after adjusting for inflation), after-tax return a dollar of saving can earn. Every investor has some minimum, required, after-tax rate of return.

When a dollar of saving is invested in an asset that produces income subject to tax, then the pre-tax return on the investment must be sufficient to pay the tax and still leave the investor with a return at least equal to his or her minimum, required rate of return. The difference between the pre-tax and the after-tax returns on the investment is called the tax wedge and is shown in Figure 1.

**Figure 1**

The Interest Rate Tax Wedge

Tax wedges are readily observable in the marketplace. For example, both taxable and income tax-exempt bonds, primarily municipal bonds, trade in the United States bond market. While the risk characteristics of these bonds may vary, there is a clearly observable tax wedge between the bonds that pay taxable interest and those that pay tax-exempt interest. For example, on March 28, 30-year Treasury bonds paid 6.68%; on that same day, the yield on 30-year municipal bonds was 5.3%. Since the Treasury bonds are generally regarded as risk-free while municipal bonds bear some risk, the tax wedge for municipal bonds was at least 1.38% on that date. In other words, if all interest income were tax free, then all currently taxable interest rates would have been at least 1.38 percentage points lower.

The effect of the tax wedge on interest income is to raise the rate of interest that must be paid by debt issuers. Thus, in the absence of any other provisions, the non-neutrality of the tax would be borne by borrowers. Fortunately, most borrowers are allowed under most circumstances to deduct their interest expense under the federal income tax which, assuming the borrower and lender pay the same marginal tax rates, exactly offsets the tax wedge and eliminates the non-neutrality imposed by taxing interest income.

For example, suppose the required, after-tax rate of return established in the market was 3.0% and that the marginal tax rate facing both borrower and lender was 25%. The minimum, pre-tax interest rate demanded by lenders would then be 4%. While borrowers would be paying 4% interest, the after-tax interest cost to the borrower would be only 3% (4% x (1 - .25) + 3%). The ability of the borrower to deduct interest expense in this example exactly offsets the tax wedge created by taxing interest income. The combined ef-
fect of allowing the deduction and taxing interest income is to leave the tax system neutral with respect to both borrowing and lending. Allowing a deduction for interest expense when the interest income to the lender is tax-exempt would create a tax incentive to borrowing; alternatively, disallowing the deduction while taxing interest income creates a tax disincentive to borrowing.

Many forces may disrupt the harmony of these two tax provisions and their joint tax neutrality. Like all prices, interest rates are set through the interaction of the marginal borrower and the marginal saver. Once these market participants are determined and their agreed-upon price is established, all other participants in the market operate off that price until something happens to upset this equilibrium. One disruption to the symmetry of the tax on interest income and the mortgage interest deduction arises when the marginal borrower and the marginal lender actually pay different marginal tax rates. Obviously the actual tax on interest income can only equal the tax value of the deduction if the tax rates of the borrow and the lender are identical. In the example above, if the tax rate paid by the marginal lender was 40% and the marginal borrower's rate remained 25%, then the pre-tax interest rate charged by the lender would be 5%. The value of the deduction to the borrower, however, would now leave the borrower paying an after-tax interest rate of 3.75%. If the debt in this case was a home mortgage, the interest deduction alone would actually be insufficient to achieve tax neutrality.

Unfortunately, there is little empirical evidence regarding the tax rate of the marginal lender in the U.S. capital markets. In practice, many very large participants in the U.S. bond markets pay little or no income tax. Foreign central banks and other foreign investors are heavy purchasers of debt issued by U.S. government entities and corporations. Also, domestic pension plans must invest and manage the deposits of their contributors. Pension plans, however, pay no income tax, meaning they do not need a premium on their investment returns to cover taxes owed.

Tax-exempt investors are able to underbid the returns demanded by taxable investors and therefore become the marginal investors — because they are tax-exempt, they do not require a tax premium and so drive pre-tax interest rates lower than they would otherwise be. Moreover, this effect works to one degree or another throughout the domestic capital markets, from U.S. Treasury notes to long-term corporate debt. The presence of U.S.-tax-exempt participants in the markets produces a tax wedge included in interest rates of about 1.4 percentage points, which is far less than the 2.2 percentage point tax wedge that would exist if the marginal lender's tax rate were 28 percent and the tax-exempt yield were 5.3 percent. If the tax wedge is about 1.4 percentage points, then this suggests the marginal lender's tax rate is about 20 percent. It also suggests that the mortgage interest deduction taken by a taxpayer whose own tax rate (combined federal, state, and local) exceeds 20 percent provides the borrower with a modest tax subsidy.

No one can be sure how far pre-tax interest rates would decline under a flat tax. As long as low-tax and tax-exempt investors, like foreign central banks, continue to invest heavily in U.S. debt, then it is likely the decline would be significant, but far less than the full amount of the tax wedge implied by current marginal income tax rates. What is clear is that there are many factors that can, and probably do, disrupt the tax neutrality harmony between taxable interest and
the deduction for mortgage interest. This
deduction is almost certainly necessary to
approximate tax neutrality, but it is un-
certain whether, on balance, the deduc-
tion actually creates an element of tax
subsidy to home ownership. [Note:
Other arguments are advanced regarding
the movement of interest rates under a
flat tax. These arguments are discussed
briefly in Appendix 2.]

Neutrality between Renters and
Home-Owners

The mortgage interest deduction is
often criticized as providing a tax benefit
available to home owners that is unavail-
able to individuals who rent. On its face,
this argument seems plausible since
home owners who itemize clearly benefit
from the deduction whereas renters may
not deduct the cost of their rental pay-
ments. The argument largely breaks
down, however, when examined more
closely.

Except in those jurisdictions where
rent controls exist, housing prices for
both owners and renters are determined
by normal market forces. As a general
rule, therefore, rental rates are deter-
mined in competitive markets. Whenever
a local ordinance raises a cost to land-
lords, landlords will pass those costs on
to renters in the form of higher monthly
rents. If the added municipal cost is
widespread, then landlords will usually
succeed in raising rents. If the cost is
very localized, however, as with a spe-
cific fine levied on a specific landlord,
then the landlord will likely have little op-
portunity to pass the cost on to its ten-
ants. Similarly, and most important for
our purposes, any factor in the market
that reduces landlords' costs through the
influence of market pressures will eventu-
ally be reflected in lower rents than
would otherwise occur.

The owners of rented housing are gen-
erally allowed to deduct as a regular busi-
ness expense the interest costs associated
with any debt incurred in purchasing the
housing, just as itemizing home owners
are generally allowed to deduct their inter-
est expenses. Market forces ensure that
these cost savings are passed along to
renters in the form of lower rents.

Landlords are also allowed to deduct
state and local property taxes as well as
any other government fees. And landlords
are allowed to take a deduction for the
depreciation of their property. All of
these tax deductions reduce the cost of
owning and operating the rented housing
and all are generally passed through to
tenants in the form of rents that are lower
than they would otherwise be. On the
other hand, landlords must pay tax on any
net rental income and this cost is also
passed along to tenants.

A complete, point-by-point compari-
son of the after-tax costs of home owner-
ship relative to renting is beyond the
scope of this paper, though such an analy-
sis would need to account for all the costs
listed above, as well as the value of home
services provided to the individual
homeowner. (A home owner may be
thought of as a property owner who hap-
pens to rent the property to himself). The
important point for purposes of this dis-
cussion is that, to a good first approxima-
tion, both the homeowner and the renter
receive essentially the same interest de-
duction tax benefit: the homeowner
through the mortgage interest deduction
and the renter through the landlords' de-
duction for interest expense.

Clearly there are no guarantees that
there will be tax neutrality with respect to
the taxation of interest income and with
respect to mortgage borrowers. Ideally, in
the context of a net income tax this de-
duction is essential to tax neutrality.
Equally clearly, any neutrality shortcoming is not attributable to the mortgage interest deduction per se, but rather to a disparity between the marginal tax rates paid by lenders and borrowers, particularly through the existence of non-income-tax-paying participants in the capital markets.

**The Home Mortgage Interest Deduction and the Flat Tax**

The flat tax would make dramatic changes in the federal tax system. The most obvious such change is the replacement of a variety of statutory and effective marginal tax rates with a two-tiered system including a zero rate for low-income wage earners and a positive rate for all other wage earners (typically falling between 17 and 22 percent, depending on the other provisions of the tax). An equally important change, however, is the exclusion of all capital income, e.g., interest, dividends, and capital gains, from individuals' taxable income. At the individual level, the flat tax imposes tax only on current wages and salary and on pension distributions.

Arguably the most important feature of the flat tax is that, at the individual level, it only taxes labor income; capital income, and interest income in particular, are not subject to tax. Since savers would no longer be subject to tax on the income from previous saving, they would no longer demand an interest premium to cover their tax liability. This means that the difference between pre-tax and after-tax interest rates — the tax wedge — would disappear with pre-tax rates falling to what would otherwise be after-tax rates.

The elimination of the tax wedge under a flat tax also leads to the elimination of the home mortgage interest deduction. Not surprisingly, this has caused widespread concern among homeowners and individuals in industries relating to homeownership.

Recall that, within the context of the income tax, the purpose of the mortgage interest deduction is to offset the tax wedge — since interest income is subject to tax, interest expense should be deductible. In the context of the flat tax, interest income is not subject to tax, so interest expense, including mortgage interest expense, should not be deductible. Allowing a mortgage interest deduction in a flat tax system without any other offsetting changes would inject a very clear tax advantage to home ownership.

The mortgage interest deduction is necessary for tax neutrality within the context of an income tax and its absence is necessary for neutrality within the context of a flat tax, with one exception. Clearly, existing home owners must see their mortgage interest deduction grandfathered in any transition from an income tax to a flat tax. These mortgages were agreed to based on interest rates established under the income tax. While interest rates on prospective mortgages under a flat tax would be lower due to the elimination of the tax wedge, the wedge would continue to exist on pre-tax-reform mortgages and thus it would be inappropriate to deny the deduction for these mortgages. Clearly this grandfathering would not apply to refinanced mortgages as the new mortgage rate would reflect the new interest rate structure.

It would also be unfair to deny the deduction under these circumstances. For a taxpayer in the 28 percent tax bracket today, $1,000 in monthly interest expense is worth $280 in monthly tax relief. For many homeowners, this tax relief is critical to their ability to afford their current homes. It would be grossly unfair to eliminate the deduction for existing home owners. Even with the de-
duction, a taxpayer at the 28 percent rate under the income tax would pay tax at a 20 percent (or 17 percent) rate under the Armey flat tax, which means the deduction would not be worth as much in tax relief under a flat tax than under an income tax.

**Home Mortgage Rates Under a Flat Tax**

The change in the price of a house following enactment of a flat tax would vary according to the income tax-based mortgage rate in effect prior to tax reform. Assuming a current mortgage rate of 7 percent and assuming a tax wedge as revealed in the marketplace and as discussed above of about 1.4 percentage points, then the mortgage rate under the flat tax would be 5.6 percent and the marginal tax rate giving rise to the tax wedge would be about 20 percent. I assume this effective tax rate would apply to whatever the income tax-based mortgage rate may be at the time the flat tax is implemented. Table 1 presents the mortgage rate pairs that would exist under this assumption and that are used in the analysis presented below:

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<tr>
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<tr>
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</tr>
</tbody>
</table>

**Of Tax Rates and Standard Deductions**

The goal of this study is to develop estimates of the equilibrium change in housing prices following enactment of a flat tax. Because taxpayers at different income levels pay different tax rates and receive disparate tax benefits relating to home ownership under current law, the uniform loss of those benefits will produce disparate effects on housing prices which may have discernible trends and patterns. The current income tax has five statutory rates beginning at 15 percent and rising to 39.6 percent, plus an effective zero tax rate for individuals who have no taxable income after account is taken of personal exemptions and the standard deduction. In addition, there is a 4 percent effective surcharge for taxpayers with adjusted gross incomes between $86,025 and $122,500 (1995 figures) as the personal exemption is phased out. The flat tax has one statutory tax rate, typically between 17 and 22 percent, and an effective zero tax rate for individuals whose total labor income is less than their family allowance.

The value of a tax deduction is directly related to the top marginal tax rate faced by the taxpayer. A family whose income is below the threshold for paying tax would receive no benefit from a deduction since they already pay no tax. A family in the 28 percent tax bracket however, would enjoy $28 in tax relief for every $100 in deductible expenses, while a family in the 39.6 percent bracket would see their taxes fall by $39.60 for every $100 in deductions. Thus, a change in tax rates in moving from an income tax to a flat tax will have different effects on taxpayers depending on their effective marginal tax rate under current law.

It stands to reason that families with more income are more likely to buy more
expensive homes. Since tax rates rise as a family's income rises, and since the value of the mortgage interest and property tax deductions rise as tax rates rise, it follows that these deductions tend to be more valuable in terms of their total tax relief to owners of more expensive homes than to owners of less expensive homes. It also follows, therefore, that the effect on a family's ability to buy a home of the loss of these deductions would be greater for more expensive homes than for less expensive homes.

At least as important to the determination of housing values as the change in tax rates is the interaction of the standard deduction and the mortgage interest deduction. For example, consider a couple purchasing their first home and suppose the home costs $100,000. Assume for ease of presentation that as newlyweds they have essentially no savings with which to make a downpayment. Finally, assume that $100,000 is the greatest amount for which the couple could qualify given their combined income and a mortgage rate of about 7 percent. These assumptions imply that the couple has about $40,000 in combined income and that their average annual interest expense over the course of the loan will be about $3,500. Assuming a property tax rate of 1 percent, and therefore an annual property tax liability of $1,000, and assuming the couple has no other significant itemizable expenses, their total itemizable deductions for the year would be about $4,500.

In this case, the couple's total itemized deductions would be less than their 1995 allowable standard deduction of $6,550 for a married couple filing jointly. Since the couple would choose to take the standard deduction over itemization, the loss of the mortgage interest and property tax deductions under a flat tax would have no affect on their ability to purchase the home.

Generalizing from this example, it follows that there are ranges of home prices and mortgage interest rates which would likely not generate sufficient interest expense and property tax payments to warrant a prospective home buyer's itemizing his or her deductions. The loss of the mortgage interest and property tax deductions under a flat tax, therefore, would have no affect on these housing prices.

Matters change significantly at higher current home prices and/or at higher mortgage interest rates. More expensive homes (and therefore larger mortgages) require larger monthly payments which, in turn, require more income. Clearly, someone just able to afford a $200,000 home will not be able to afford a $300,000 home. Similarly, someone just able to afford a $200,000 home at a 7 percent mortgage rate will be unable to afford the same home at an 8 percent rate. Higher home prices and higher mortgage rates obviously result in higher interest payments, thereby raising the likelihood the taxpayer would benefit from itemizing his or her deductions.

The option of taking a standard deduction in lieu of itemizing further complicates the issue of measuring the value of the mortgage interest deduction in that the marginal effect of the deduction may be less than the amount claimed as a deduction. Consider a married couple filing jointly who have $5,000 in itemizable deductions other than mortgage interest and $2,000 in mortgage interest. With a $6,550 standard deduction, this couple would choose to itemize deductions, but the mortgage interest deduction only reduces their taxable income at the margin by $450 ($7,000 - $6,550). Thus the marginal benefit of the mortgage interest deduction is $450, even though the couple would actually deduct $2,000 in mortgage interest.

Only in the case where the taxpayer's
other itemizable deductions exceed the standard deduction will the marginal tax relief provided by the mortgage interest deduction equal the amount of interest taken as a deduction. In the analysis presented below, depending on income levels a taxpayer is assumed either to take the standard deduction or to receive tax relief from the mortgage interest deduction equal to the amount of the deduction.

The combination of the change in tax rates and the interaction under current law with the standard deduction produces very different results for prospective home buyers in moving from an income tax to a flat tax. In general, it is likely that the loss of these deductions under a flat tax would have little or no effect on the price of modest homes, but would have a negative effect on more expensive homes and that this effect would increase in percentage terms for increasingly expensive homes.

**Property Taxes and the Flat Tax**

The pure flat tax does not allow taxpayers a deduction for state and local taxes paid. As a matter of tax policy, the decision to omit this deduction from the proposal is curious because the theoretical challenge to which the flat tax responds is to develop a tax system under which all income is taxed once and only once. Clearly, imposing federal tax on taxes collected by other jurisdictions is double taxation, whether the federal tax is an income tax or a flat tax. Allowing a deduction for state and local taxes paid, and particularly for property tax within a flat tax framework, would advance flat tax principles. In the analysis presented here, therefore, one option that is considered is a flat tax that allows a deduction for property taxes.

**The Model of Housing Values**

A simple model of housing values demonstrates the relevant issues and provides a reasonable basis for estimating the change, if any, in housing values following the enactment of a flat tax. In this model, the price a buyer is willing to pay for a house (P) is equal to the discounted present value of the housing services (S), plus the value of any real appreciation in housing values (A) after paying capital gains tax on that appreciation (t_g), less the after-tax costs of home ownership (C).

\[ P = S + A(1-t_g) - C \]

Considering each of these variables in turn, the value of housing services (S) is determined by each buyer and seller as the sum total of all benefits accruing to the owner. This amount is assumed not to change following the enactment of a new tax system. In other words, the value a potential buyer places on the satisfaction and benefits of a particular three-bedroom house on Cherry Lane is unlikely to be affected by a tax system.

If the enactment of a new tax system has an effect on the factors determining housing values, it may take some time before it is fully recognized by all market participants. Tax reform will take many months, and may take years to legislate. Therefore, market participants should have ample opportunity to digest its major effects. So any net effect on housing values may be fully manifested before the new system takes effect. Therefore, for these reasons and because the net effect is both a one time event and permanent, for purposes of measuring the magnitude of the change in housing values the model assumes the market responds instantaneously to the change in tax policy. In any case, there is no reason to believe that
this assumption affects the magnitude of
the net effect in any way.

One of the hopes of a home buyer is
that the value of the property will increase
in real terms, that is, after inflation. A
buyer would be willing to pay more for a
property to the extent there is some ex-
pectation that the property will appreci-
ate. Factor (A) in equation (1) represents
the premium such a buyer would be will-
ing to pay for the expected appreciation
following tax reform. Thus, if a flat tax
were enacted and had an initial net effect
on housing prices, (A) would represent the
expectation of subsequent appreciation or
depreciation. There is little reason to sup-
pose that housing values, that is, the price
of a particular house would rise or fall any
faster under a flat tax than under the cur-
rent income tax system once prices have
adjusted to the new tax regime.

The factor (t_e) denotes the effective tax
rate on appreciated housing. As discussed
in greater detail below, the effective rate
can vary significantly from the statutory
rate.

Suppose, for example, that the only net
effect of the flat tax on housing values
arose through the elimination of the capi-
tal gains tax on appreciated housing. Let
P_0 and A_o denote the current price and the
expected pre-tax appreciation of the
home, respectively, prior to the serious
prospect tax reform; and let P_t and A_t de-
note respectively the price and the ex-
pected appreciation after tax reform. The
elimination of the capital gains tax will in-
crease the after-tax value of future appre-
ciation, and this will be fully reflected in
an increase in the home price, (e.g. P_t = P_0
+ t_e A_o, assuming no other effects of tax
reform on the initial price). Once this one-
time increase has taken place and unless
the initial change in the price is dramatic,
the rate of future appreciation will closely
approximate the prior rate of appreciation.

The variable (C) in equation (1) repre-
sents all the costs and tax benefits accru-
ing from home ownership. Equation (2)
expresses these costs under an income
tax, where the binary variable (z) takes a
value of one if the taxpayer is able to
itemize his or her mortgage interest and
property tax deductions, and a value of
zero if the taxpayer's total itemizable de-
ductions are less than the standard deduc-
tion. Equation (3) represents these costs
under a flat tax. The variable (C) repres-
ents, therefore, the opportunity cost, if
any, of the downpayment on the house
(OCDP) plus the capitalized values of

- the monthly mortgage payment (M),
- the property tax payment (P_tax), and
- all other costs (OC),

less

- the value of the tax deduction for
  mortgage interest paid (T*Int), and
- for property taxes paid (T*P_tax).

(2) \[ C = OCDP + \text{Present Value of } \{ M + 
  P_tax + OC - z^*T^*[Int + P_tax] \} \]

under an income tax, or

(3) \[ C = OCDP + \text{Present Value of } \{ M + 
  P_tax + OC \} \]

under a flat tax.

There seems no reason to assume that
the costs of garbage collection, tree trim-
ming, mortgage insurance, or of buying a
new air conditioning unit will be materi-
ally affected by tax reform, so the variable
OC is assumed to be constant when mov-
ing from an income tax to a flat tax.

The Opportunity Cost of the
Downpayment

The downpayment on a home re-
fects a cost to the extent that the after-

\[ \text{\textbf{11}} \]
tax return on this invested saving is less than what the individual would receive in an alternative investment of comparable risk. If, for example, an individual expected the home to appreciate 4 percent annually tax free and the best he could do with a comparable investment is 3 percent after-tax, then the 1 percent difference would actually represent a benefit. On the other hand, if real estate prices were stable or declining, then any downpayment would impose a cost on the homeowner for which some compensation would be required and which would need to be reflected in equation (2), that cost being equal to the next higher return the homeowner could have gotten elsewhere, less the appreciation of the home.

To the extent the flat tax affects housing values, the effect will be a one-time and permanent event. Thus, in comparing the period in which there was little prospect of tax reform to the period after tax reform’s effects are fully manifested, there is little reason to believe the opportunity cost of the downpayment will change. There could, of course, be a significant opportunity cost during the period in which housing prices are altered to reflect tax reform’s effects, if any. These costs, however, are precisely those this model seeks to capture through its other variables.

**Property Taxes**

The model permits analysis of the full range of property tax rates. To simplify the calculations, the model assumes that the assessed value of the house changes as the market value of the property changes.

\[
\text{Ptax} = t \cdot P
\]

**Mortgage Rates**

Monthly mortgage payments reflect both the repayment of principal and the payment of interest which is, typically, a larger share of the total payment in the early years of the mortgage.

\[
M = \text{Portion of Principal} + \text{Interest Expense}
\]

The actual expression for (5) in terms of interest expense and principal repayment rates is quite cumbersome because of the front loading of interest. A more manageable approximation for (5) is equation (6), which is discussed in some detail in Appendix 1. The variable \( r_i \) in (6) is the mortgage interest rate under the income tax, while \( r_o \) is the after-tax discount rate, which is equal in this case to the mortgage rate under a flat tax.

\[
M = (P - D) \cdot r_0
\]

Assuming no change in the opportunity cost of the downpayment \( \text{OCDP}_0 = \text{OCDP}_1 \), the change in housing prices following a flat tax is therefore given by

\[
P_1 \cdot P_0 = S_1 \cdot S_0 + A_1 \cdot (1 - t_c) \cdot A_0 \cdot (1 - t_c) \cdot C_1 + C_0 = (C_1 \cdot C_0) + t_o \cdot A_0
\]

where the subscript (0) refers to the value under current law and the subscript (1) refers to the value under a flat tax. Under the assumptions presented here, [namely, \( S_1 = S_0, t_c = 0, \) and \( A_1 = A_0 \)], equation (7) can be rewritten as

\[
P_1 \cdot P_0 = t_o \cdot A_0 + \text{Present Value} \left[ M_0 + P_0 \cdot t \cdot z^* T_o \cdot \left[ \text{INT}_0 + P_0 \cdot t \right] - M_1 \cdot P_1 \cdot t \right]
\]

Solving yields

\[
P_1 \cdot P_0 = \left( (r_o - r_i)(1 - a) - z^* T_o \cdot r_o (1 - a) \right) + t \cdot P_0 + t_o \cdot A_0 \cdot r_i / r_i (2 - a) + t
\]
Equation (9) describes the change in the price of the house entirely in terms of the respective mortgage interest rates before and after tax reform, the downpayment rate, the present value of the expected capital gains tax on appreciation before tax reform, and the income and property tax rates. (Appendix 1 presents these derivations in greater detail as well as the extension of the model to the cases in which either the mortgage interest and/or property tax deductions would be allowed under a flat tax.)

Housing Values Under a Pure Flat Tax

As Equation (9) demonstrates, a change in housing prices following enactment of a flat tax would reflect a number of factors including how closely the enacted flat tax adheres to a pure flat tax in which there is no mortgage deduction and no deduction for property taxes, or whether some amount of either of these expenses is deductible. Table 2 presents the estimated dollar and percentage change in housing prices under a flat tax for houses currently worth between $100,000 and $500,000. These estimates are based on the following assumptions: a 7 percent mortgage rate for a 30-year fixed mortgage under current law, a 4.7 percent average marginal state and local income tax rate, a 10 percent downpayment, a 1 percent property tax rate, a rate of appreciation of 3 percent, (roughly to match expected inflation), and that the one-time exclusion for residential capital gains is indexed for one half of all inflation (this basic assumption set will be maintained throughout the following presentations unless otherwise noted). The importance of each of these assumptions is examined later in the paper as the effects of alternative assumptions is presented.

As the results presented in Table 2 indicate, considering all the changes in taxation that would result from the adoption of a flat tax, the expected percentage change in the price of a house varies significantly for different priced houses. Most importantly, Table 2 shows that, for homes valued around $100,000, a flat tax is likely to cause a significant increase in value due entirely to the decline in mortgage interest rates. The other changes in taxation from adopting a flat tax would likely not affect prospective buyers of homes in this price range. For example, homeowners carrying a $100,000 mortgage are unlikely to have enough itemizable deductions even with mortgage interest to benefit much, if at all, from itemizing their deductions under current law. Therefore, the loss of these deductions has no effect on the ability of a prospective buyer to afford the home. Similarly, the one-time exclusion of residential capital gains is sufficient under current law to prevent an owner of a lesser priced home from paying capital gains tax under our assumed rate of appreciation. Therefore, the elimination of the capital gains tax under the flat tax offers no relief in this case.

For homes currently priced around $200,000 a flat tax would have little or

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Value of Home Under Pure Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>$111,000</td>
<td>$11,000</td>
<td>11%</td>
</tr>
<tr>
<td>200,000</td>
<td>200,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>300,000</td>
<td>279,000</td>
<td>-21,000</td>
<td>-7</td>
</tr>
<tr>
<td>400,000</td>
<td>376,000</td>
<td>-34,000</td>
<td>-6</td>
</tr>
<tr>
<td>500,000</td>
<td>465,000</td>
<td>-35,000</td>
<td>-7</td>
</tr>
</tbody>
</table>
no effect because the negative net effect from the loss of the property tax and mortgage interest deductions is about equal to the positive effects of the decline in mortgage rates and the elimination of anticipated decline in future capital gains tax paid on appreciation.

For homes priced around $300,000 and above, however, the net effect is likely to be about a 7 percent decline. As homes become more expensive, prospective buyers are likely to have greater amounts of taxable income and therefore face ever higher marginal tax rates. At lower marginal federal income tax rates, assuming the taxpayer is able to itemize his or her deductions, the mortgage interest and property tax deductions are worth less in terms of tax relief, and so their elimination under a flat tax is less costly. At higher current law marginal tax rates, however, the loss of these deductions is more costly and so will have a greater negative effect on housing prices. These effects are partially offset by the greater amount of capital gains tax relief provided to owners of more expensive homes in moving to a flat tax.

**Alternative Flat Tax Formulations**

It is possible to enact a flat tax that allows for a mortgage interest deduction, a deduction for property taxes, or both. As discussed above, the normal formulation of a flat tax does not include a mortgage interest deduction because mortgage interest income is not taxed. Nevertheless, political support for the deduction is such that it may be included. In contrast, a truly neutral flat tax would include deductions for state and local taxes. It is worth exploring, therefore, the consequences for housing values of a flat tax that includes either, or both of these deductions. These cases are presented in Tables 3, 6, and 8 on the following pages.

Flat tax proposals include what are called “family allowances” which correspond to personal exemptions in the income tax. These family allowances are typically large enough so as to drop many current taxpayers from the tax rolls. Obviously, any deduction under the flat tax would be worthless to someone paying no tax. An implicit assumption in deriving the estimates presented below is that the taxpayer has sufficient income so that he or she continues to owe tax even after subtracting the family allowance.

**A Flat Tax With a Home Mortgage Interest Deduction**

For individual taxpayers, it would be a simple matter to include a mortgage interest deduction into the flat tax. It is important to realize, however, that allowing a mortgage interest deduction into a flat tax system can be extraordinarily troublesome if not handled correctly. Specifically, if the deduction was allowed and yet mortgage interest was not taxable to the recipient, then a tax subsidy to homeownership would be created and the revenue base would be eroded significantly. Table 3 presents the case where the mortgage interest deduction is allowed and no other change to the tax system insofar as it affects housing values would be made.

**Table 3**

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Value of Home Under Modified Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>$124,000</td>
<td>$24,000</td>
<td>24%</td>
</tr>
<tr>
<td>$200,000</td>
<td>$224,000</td>
<td>$24,000</td>
<td>12%</td>
</tr>
<tr>
<td>$300,000</td>
<td>$316,000</td>
<td>$16,000</td>
<td>5%</td>
</tr>
<tr>
<td>$400,000</td>
<td>$426,000</td>
<td>$26,000</td>
<td>6%</td>
</tr>
<tr>
<td>$500,000</td>
<td>$525,000</td>
<td>$25,000</td>
<td>5%</td>
</tr>
</tbody>
</table>
As the figures in Table 3 indicate, a 20 percent flat tax that allows a mortgage interest deduction would actually cause a significant increase in housing values for homes up to about $200,000, with the greatest increase occurring for those homes valued around $100,000 and less. The reason for this is two-fold. First, prospective buyers of less expensive homes are less likely to be able to itemize their deductions under current law, and so a flat tax that allows such a deduction would dramatically reduce the after-tax cost of home ownership. Second, a homeowner who is just able to afford a home currently priced around $200,000 or less likely faces a marginal federal income tax rate of 15 percent in addition to whatever state and local income tax may be assessed. In moving to a 20 percent flat tax, the value of the mortgage interest deduction increases in terms of the tax relief offered, thereby reducing the overall cost of home ownership and raising the price of the asset. (For example, a $100 deduction under a 15 percent tax rate is worth $15 in tax relief while the same deduction under a 20 percent tax is worth $20 in tax relief. In this case, the move to a flat tax represents a $5 reduction in costs per $100 in annual mortgage interest paid.)

Similarly, as housing values rise into the $300,000 to $400,000 range, a homeowner just able to afford such a home likely pays a 28 percent federal income tax rate, meaning the adoption of a 20 percent flat tax reduces the value of the deduction. A homeowner just able to afford a $500,000 home likely pays a 31 percent income tax rate and so the deduction is worth slightly less again relative to current law.

Another way of assessing the relative effects of a flat tax is to compare the effects on housing prices between a flat tax without a mortgage interest deduction and a flat tax that allows the deduction. This comparison is presented in Table 4 and indicates that housing prices would be between 11 and 13 percentage points higher under a flat tax with a mortgage deduction than they would be without it.

### Table 4

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Change Under Modified Flat Tax</th>
<th>Change Under Flat Tax w/ Home Mort. Deduction</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>11%</td>
<td>24%</td>
<td>13%</td>
</tr>
<tr>
<td>200,000</td>
<td>0</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>300,000</td>
<td>-7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>400,000</td>
<td>-6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>500,000</td>
<td>-7</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>

### A Revenue Neutral Mortgage Deduction

Allowing a home mortgage deduction in a flat tax system creates two serious problems. Under a flat tax, interest income is not generally taxable to the recipient. This, of course, means that the home mortgage deduction would create a clear and significant tax subsidy to home ownership. The second problem is that the deduction would significantly erode the tax base, thereby requiring some kind of offsetting change to maintain revenue neutrality.

Fortunately, the correct solution to the first problem also generally solves the second. If the flat tax is to have a mortgage interest deduction, then mortgage interest income must be taxed to the recipient. As long as the tax rates of the payor and payee are equivalent, then this symmetry reestablishes tax neutrality. Also, the reduction in the tax base created by allowing the deduction is offset...
by the increase in the base caused by taxing the interest income. Table 5 presents the estimated decline in housing prices under a flat tax that allows a mortgage interest deduction and taxes mortgage interest income to the recipient as under current law. In this case, the interest rate differential presented in Table 1 is assumed to disappear as the differential is attributed to the difference between taxable and tax-exempt debt instruments.

Table 5

Estimated Change in Housing Prices Under a Modified Flat Tax Allowing a Mortgage Interest Deduction

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Value of Home Under Pure Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>$112,000</td>
<td>$12,000</td>
<td>12%</td>
</tr>
<tr>
<td>200,000</td>
<td>206,000</td>
<td>6,000</td>
<td>3</td>
</tr>
<tr>
<td>300,000</td>
<td>293,000</td>
<td>-7,000</td>
<td>-2</td>
</tr>
<tr>
<td>400,000</td>
<td>396,000</td>
<td>-4,000</td>
<td>-1</td>
</tr>
<tr>
<td>500,000</td>
<td>498,000</td>
<td>-2,000</td>
<td>-1</td>
</tr>
</tbody>
</table>

The figures in Table 5 indicate that if mortgage interest was both taxable and deductible, then homes currently valued at around $100,000 would see a significant increase in price. This is largely due to the assumed inability of these home buyers to take the mortgage interest deduction under current law because of an inadequate amount of total deductions, whereas the home buyer is assumed in this example to be able to take the deduction under the flat tax. There would be a slight increase in the price of homes currently valued around $200,000 and a slight decrease for homes currently valued around $300,000 or more under this assumption.

A Flat Tax With a Property Tax Deduction

State and local taxes are among the many deductions usually eliminated in flat tax proposals. It is reasonable to suppose that they might be restored, however, as part of any serious tax reform effort. Federal tax imposed on income paid over to state and local governments constitutes double taxation. The elimination of double taxation is usually a goal of tax reform. It is worthwhile, therefore, to examine the effect on housing of a flat tax allowing a deduction for state and local property taxes. This analysis is presented in Table 6.

Table 6

Estimated Change in Housing Prices Under a Flat Tax Allowing a Deduction for Property Taxes

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Value of Home Under Modified Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>$113,000</td>
<td>$13,000</td>
<td>13%</td>
</tr>
<tr>
<td>200,000</td>
<td>206,000</td>
<td>6,000</td>
<td>3</td>
</tr>
<tr>
<td>300,000</td>
<td>289,000</td>
<td>-11,000</td>
<td>-4</td>
</tr>
<tr>
<td>400,000</td>
<td>390,000</td>
<td>-10,000</td>
<td>-3</td>
</tr>
<tr>
<td>500,000</td>
<td>480,000</td>
<td>-20,000</td>
<td>-4</td>
</tr>
</tbody>
</table>

The figures in Table 6 indicate that a flat tax that allows a property tax deduction but not a home mortgage deduction would have a significant, positive effect on homes valued around $100,000 and below, and a modest positive effect on homes valued around $200,000, and a modest negative effect on homes valued around $300,000 and above. As Table 7 indicates, allowing the deduction reduces the effect of the flat tax on housing prices by about 3 percentage points.
Housing Values Under a Flat Tax Allowing Home Mortgage and Property Tax Deductions

Many tax reform proposals have been introduced with a mortgage interest deduction. At some point, the deduction for state and local taxes is likely also to be considered. It is useful, therefore, to consider the effect on housing values of a flat tax allowing both deductions. These results are presented in Table 8.

Table 8
Estimated Change in Housing Prices Under a Flat Tax Allowing Both a Home Mortgage and Property Tax Deduction

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Change Under Pure Flat Tax</th>
<th>Change Under Modified Flat Tax</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>11%</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>200,000</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>300,000</td>
<td>-7</td>
<td>-4</td>
<td>2</td>
</tr>
<tr>
<td>400,000</td>
<td>-6</td>
<td>-3</td>
<td>3</td>
</tr>
<tr>
<td>500,000</td>
<td>-7</td>
<td>-4</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 7
Comparison of Housing Values Under a Flat Tax With and Without a Property Tax Deduction

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Change Under Pure Flat Tax</th>
<th>Change Under Modified Flat Tax</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>11%</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>200,000</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>300,000</td>
<td>-7</td>
<td>-4</td>
<td>2</td>
</tr>
<tr>
<td>400,000</td>
<td>-6</td>
<td>-3</td>
<td>3</td>
</tr>
<tr>
<td>500,000</td>
<td>-7</td>
<td>-4</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 9
Comparison of Housing Values Under a Flat Tax With and Without Home Mortgage and Property Tax Deductions

<table>
<thead>
<tr>
<th>Current Value of Home</th>
<th>Change Under Pure Flat Tax</th>
<th>Change Under Flat Tax with Deductions</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>11%</td>
<td>27%</td>
<td>16%</td>
</tr>
<tr>
<td>200,000</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>300,000</td>
<td>-7</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>400,000</td>
<td>-6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>500,000</td>
<td>-7</td>
<td>7</td>
<td>14</td>
</tr>
</tbody>
</table>

Sensitivity of Results to Varying Assumptions

The results presented above reflect a number of assumptions which the author believes to be reasonable. However, any one of these assumptions could be invalid due to changing economic conditions or public policies, and, of course, any one of these assumptions could be challenged. It is useful to consider, therefore, how the results presented above vary when changes are made to the underlying assumptions. For example, how would the results presented above change:

- If the mortgage interest rate prior to enactment was higher or lower than the 7 percent assumed here?
- If property tax rates were higher or lower in particular jurisdictions?
- If state income tax rates come
into play?
  • If the interest rate under a flat tax varies from that assumed here?, or
  • If there is greater or lesser rates of appreciation in home prices?

Varying Mortgage Rates

Table 10 presents the estimated changes in the price of a $200,000 home if the current income tax were replaced by a pure flat tax (no mortgage interest or property tax deduction) in the event that mortgage interest rates were higher or lower than the 7 percent assumed above. As the results indicate, the decline in the home price is more dramatic at higher interest rates. The explanation for this effect is that, at higher interest rates, the home buyer needs more income to afford a $200,000 home given a fixed downpayment rate. Under the current income tax, at higher income levels, eventually the home buyer faces higher marginal income tax rates, thereby raising the value of the home mortgage and property tax deductions under current law and increasing the cost of their repeal under a flat tax.

<table>
<thead>
<tr>
<th>Income Tax-Based Mortgage Rate</th>
<th>Value of Home Under Pure Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0%</td>
<td>$200,000</td>
<td>$0</td>
<td>0%</td>
</tr>
<tr>
<td>7.0</td>
<td>200,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8.0</td>
<td>186,000</td>
<td>-14,000</td>
<td>-7</td>
</tr>
<tr>
<td>9.0</td>
<td>186,000</td>
<td>-14,000</td>
<td>-7</td>
</tr>
<tr>
<td>10.0</td>
<td>186,000</td>
<td>-14,000</td>
<td>-7</td>
</tr>
</tbody>
</table>

Varying Property Tax Rates

Property taxes are deductible to itemizing homeowners under the current income tax, so the effect of the denial of the deduction under the flat tax is likely to have an important effect on housing values as described in Table 6. Different state and local jurisdictions impose their own property tax rates, however, so the effect of the loss of the deduction will likewise vary by jurisdiction. Table 11 demonstrates how the change in housing prices under a flat tax without a property tax deduction varies with the combined state and local property tax rate. This table is based on an $200,000 home purchased under current income tax law with a 10 percent downpayment and at a 7 percent mortgage interest rate.

<table>
<thead>
<tr>
<th>Combined State/Local Property Tax Rate</th>
<th>Value of Home Under Pure Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0%</td>
<td>$204,000</td>
<td>$4,000</td>
<td>2%</td>
</tr>
<tr>
<td>0.5</td>
<td>202,000</td>
<td>2,000</td>
<td>1</td>
</tr>
<tr>
<td>1.0</td>
<td>200,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.5</td>
<td>200,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.0</td>
<td>198,000</td>
<td>-2,000</td>
<td>-1</td>
</tr>
<tr>
<td>2.5</td>
<td>198,000</td>
<td>-2,000</td>
<td>-1</td>
</tr>
<tr>
<td>3.0</td>
<td>196,000</td>
<td>-4,000</td>
<td>-2</td>
</tr>
<tr>
<td>3.5</td>
<td>196,000</td>
<td>-4,000</td>
<td>-2</td>
</tr>
</tbody>
</table>

Varying Current Law Income Tax Rates

The federal income tax has five statutory tax rates of 15, 28, 31, 36, 39.6 percent, and a wide range of effective rates depending on whether the taxpayer is subject to the phase-out of the personal exemption or the Earned Income Tax Credit, or is subject to the Social Security Earnings Test. Forty-three states plus the District of Columbia also impose income
taxes at various rates, as do many local jurisdictions. As the results presented above repeatedly demonstrated, variations in the combined federal, state, and local tax rates can significantly influence the degree to which a particular type of flat tax would affect housing values. Table 12 demonstrates this effect based on a $200,000 home and the adoption of a pure flat tax.

### Table 12

<table>
<thead>
<tr>
<th>Combined Income Tax Rates (Current)</th>
<th>Value of Home Under Flat Tax</th>
<th>Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0%</td>
<td>$200,000</td>
<td>$0</td>
<td>0%</td>
</tr>
<tr>
<td>17.5</td>
<td>196,000</td>
<td>-4,000</td>
<td>-2</td>
</tr>
<tr>
<td>20.0</td>
<td>194,000</td>
<td>-6,000</td>
<td>-3</td>
</tr>
<tr>
<td>25.0</td>
<td>192,000</td>
<td>-8,000</td>
<td>-6</td>
</tr>
<tr>
<td>30.0</td>
<td>182,000</td>
<td>-18,000</td>
<td>-9</td>
</tr>
<tr>
<td>35.0</td>
<td>176,000</td>
<td>-24,000</td>
<td>-12</td>
</tr>
<tr>
<td>40.0</td>
<td>170,000</td>
<td>-30,000</td>
<td>-15</td>
</tr>
<tr>
<td>50.0</td>
<td>158,000</td>
<td>-42,000</td>
<td>-21</td>
</tr>
</tbody>
</table>

As Table 12 shows, the effect of a flat tax on housing prices increases with the combined marginal income tax rates. (The calculations assume no change in the state tax rate when the federal government moves to a flat tax.) The home mortgage and property tax deductions represent a greater reduction in tax liability at higher combined income tax rates and, therefore, represent greater reductions in the cost of home ownership. The loss of these deductions under a flat tax, therefore, increases the after-tax cost of home ownership at higher current tax rates and, consequently, the decline in housing values is greater.

### Varying Interest Rate Assumptions

Recall that the interest rate tax wedge is the difference between the interest rate of a taxable debt instrument and that of a tax-exempt debt instrument of identical risk and maturity characteristics. In U.S. markets, a lower bound for the tax wedge appears to be about 1.4 percentage points based on the spread between taxable 30-year Treasury Bonds and tax-exempt municipal bonds. This is a lower bound because Treasury Bonds are assumed to be essentially riskless and thus bear no interest rate premium to compensate the holders for risk. Municipal bonds, however, bear some amount of risk, and therefore pay a premium. Thus, if there were a riskless municipal bond, or if there were a Treasury Bond that paid interest that was not subject to tax, the interest rate on either of these instruments would be below that on current municipal bonds. Therefore, the true tax wedge would be the difference between the interest rate charged on taxable and tax-exempt Treasury Bonds. The true tax wedge would then exceed the calculated amount of 1.4 percentage points used in the analysis presented above.

Under a flat tax, capital income, and in particular mortgage interest income, is not subject to tax. Therefore, mortgage interest rates would fall exactly by the tax wedge if no other changes took place. It is possible, however, that other influences on interest rates will come to bear which will affect the amount by which mortgage rates fall following a flat tax. Table 13 presents the estimated effect of the adoption of a flat tax on a $200,000 home assuming a pre-reform mortgage rate of 7 percent, a 1 percent property tax rate, and a 15 percent federal marginal income tax rate.
Table 13
Estimated Effect on a $200,000 Home of Adopting a Flat Tax Under Varying Assumptions Regarding Change in Mortgage Interest Rates

<table>
<thead>
<tr>
<th>Assumed Mortgage Interest Rates</th>
<th>Value of Home Under Flat Tax Change in Value</th>
<th>Change in Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4%</td>
<td>$190,000</td>
<td>$-10,000</td>
</tr>
<tr>
<td>6.2</td>
<td>192,000</td>
<td>-8,000</td>
</tr>
<tr>
<td>6.0</td>
<td>196,000</td>
<td>-4,000</td>
</tr>
<tr>
<td>5.8</td>
<td>198,000</td>
<td>-2,000</td>
</tr>
<tr>
<td>5.6</td>
<td>200,000</td>
<td>0</td>
</tr>
<tr>
<td>5.4</td>
<td>204,000</td>
<td>4,000</td>
</tr>
<tr>
<td>5.2</td>
<td>208,000</td>
<td>8,000</td>
</tr>
<tr>
<td>5.0</td>
<td>210,000</td>
<td>10,000</td>
</tr>
<tr>
<td>4.8</td>
<td>214,000</td>
<td>14,000</td>
</tr>
<tr>
<td>4.6</td>
<td>218,000</td>
<td>18,000</td>
</tr>
</tbody>
</table>

As the results in Table 13 indicate, the assumption regarding the change in mortgage interest rates following the enactment of a flat tax can have a significant effect on the change in housing values. Declining mortgage rates obviously improve housing values. However, if the decline is modest, then this beneficial effect is outweighed by the negative effect of the loss of the deductions for mortgage interest or property taxes. If the decline in mortgage rates is greater, then the net effect on housing prices can become positive.

Capital Gains Relief and Housing Values

As noted above, the tax imposed on capital gains from the sale of residential housing is subject to a number of complications, which means the variable \( t_c \) in equation (1) refers to the expected, effective capital gains tax rate on gains related to residential housing rather than the current statutory rate of 28 percent. These complications include the ability to defer capital gains liability, a one-time $125,000 exemption, and a capital gains tax system that may vary significantly between the time of purchase and the time when taxable capital gains will be realized. In addition to these tax complexities, it is difficult to generalize about the expectations of a prospective homeowner regarding future appreciation of the property. The variable \( A \) in Equation (1) denotes the present value of this appreciation.

In general, any set of assumptions by the home buyer that increases the effective rate of tax on appreciation reduces the premium a buyer would be willing to pay for the home under current law, and increases the value of the tax relief provided by the flat tax's elimination of the capital gains tax. In short, the more punitive the current treatment, the greater the tax relief under the flat tax and the greater the increase in initial home prices due to these provisions following the enactment of the flat tax.

Table 14 demonstrates these effects for homes assumed to be owned for 30 years, at which time they are sold and the one-time exclusion is taken. In the baseline case of current law, the capital gains tax system is assumed to remain constant except that, in half the cases presented, the one-time exclusion is held constant for the entire period, whereas in the other half the exclusion is adjusted for inflation. In the case of the flat tax, the capital gains tax is assumed to be eliminated entirely. In each case, the nominal discount rate is assumed to be 3 percent. We consider the cases in which the home is assumed to appreciate at an average nominal annual rate of 2, 3, and 4 percent.
Table 14

Change in Price from Eliminating the Tax on Residential Capital Gains

<table>
<thead>
<tr>
<th>Rate of App.</th>
<th>$100,000</th>
<th>$200,000</th>
<th>$300,000</th>
<th>$400,000</th>
<th>$500,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in $) (in %)</td>
<td>(in $) (in %)</td>
<td>(in $) (in %)</td>
<td>(in $) (in %)</td>
<td>(in $) (in %)</td>
</tr>
<tr>
<td>2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0 0</td>
<td>2,000 1</td>
<td>8,000 3</td>
<td>14,000 4</td>
<td>20,000 4</td>
</tr>
<tr>
<td>Indexed</td>
<td>0 0</td>
<td>0 0</td>
<td>0 0</td>
<td>1,000 .5</td>
<td>7,000 1</td>
</tr>
<tr>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1,000 0</td>
<td>6,000 3</td>
<td>18,000 6</td>
<td>27,000 7</td>
<td>36,000 7</td>
</tr>
<tr>
<td>Indexed</td>
<td>0 0</td>
<td>0 0</td>
<td>8,000 3</td>
<td>16,000 4</td>
<td>25,000 5</td>
</tr>
<tr>
<td>4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>5,000 5</td>
<td>10,000 5</td>
<td>29,000 10</td>
<td>41,000 10</td>
<td>53,000 11</td>
</tr>
<tr>
<td>Indexed</td>
<td>0 0</td>
<td>5,000 2</td>
<td>20,000 7</td>
<td>32,000 8</td>
<td>44,000 9</td>
</tr>
</tbody>
</table>

As the figures in Table 14 demonstrate, if the one-time exclusion is assumed to be indexed for inflation, then the increase in the price of the home following the elimination of the capital gains tax is slight because the adjusted exclusion shields most of the capital gain from inflation under current law. If the exclusion is not assumed to be adjusted to reflect inflation, then the capital gains tax is more punitive and the elimination of the tax has a greater positive effect on housing prices. The figures also indicate that as the rate of expected appreciation increases the effectiveness of the exclusion shield declines, the tax becomes more punitive, and so its elimination under a flat tax becomes more favorable to housing prices. A comparison of the results for differently priced homes also demonstrates that at higher current housing prices the ability of the exclusion to shield capital gains declines, so the move to a flat tax would have a greater positive effect on more expensive homes by virtue of the elimination of this tax.

Estimated Effect of the Flat Tax on the Value of the National Housing Stock

An issue of obvious importance to current and potential home owners is the net effect a flat tax would have on housing values. Policy makers also need to have some sense of the effect on the value of the overall national housing stock if a flat tax were to be enacted. Based on the results presented above it is possible to develop a rough estimate of this overall effect. This estimate is, of course, based on a set of assumptions which are, hopefully, realistic. Specifically, in the basic assumption set used above the mortgage interest rate is 7 percent, the property tax rate is 1 percent, the average combined state and local income tax rates are 4.7 percent, and home buyers' downpayments are 10 percent of the purchase price. In addition, assume the rate of appreciation is 3 percent roughly to match inflation and that the one-time exclusion for residential capital gains is indexed for one-half of all inflation.
Using the distribution of the national private housing stock by price as described in the American Housing Survey for the United States in 1993 produced by the Department of Housing and Urban Development, it is possible to derive a weighted-average change in the price of the national housing stock. Using these weights and the assumptions described above, one could anticipate anywhere between a 3 percent increase, on average, to a 2 percent drop in the value of the national housing stock if a flat tax were adopted, with a point estimate of about a 1 percent increase. Overall, however, the safest conclusion to draw from these results is that, once all effects are defined, assessed, and netted out, and recognizing that the net effects differ according to the current value of specific homes in specific jurisdictions, the value of the nation’s housing stock would be unaffected by the adoption of a flat tax.

**Errant Arguments in the Debate**

Modern political economics is awash in poor arguments intended more to sway than to educate. The debate surrounding the flat tax generally has suffered from more than its share of these arguments from both advocates and opponents. Nor has the discussion about housing values under the flat tax been spared.

One of these arguments involves the process of setting housing prices. In response to the suggestion that housing values would decline under a flat tax, advocates sometimes argue, for example, that the price effect only occurs if there is a sale and a sale only occurs if the buyer and seller can agree on a price. If the seller cannot obtain a satisfactory price in the market, they argue, then he or she need not sell and the price will not fall. A great many individuals have purchased shares in the stock market who would be pleased if this line of reasoning were correct. Sadly for them, it is not. A seller does not create value in an asset by believing that it is worth more than the market will bear, that is, than buyers are willing to pay.

Another argument is that the flat tax will accelerate the growth in the economy generally, and in personal incomes in particular, which will leave buyers with more income with which to bid up the price of all housing. That a flat tax would accelerate economic growth seems likely. However, if the argument that faster economic growth leads to higher home prices were correct, then it would also be likely that increases in real incomes would encourage people to bid up the prices of automobiles, and of sports tickets, and of just about every other item they currently purchase. According to this reasoning, therefore, real income growth is inflationary! High real incomes may well induce potential buyers to spend more for housing, but only if they get more housing services. Higher real income makes one able to buy more, it does not make one foolish, willing to pay more today for the same article than they would have paid previously.

**Conclusion**

Fundamental tax reform will affect virtually every sector and every aspect of the economy. To the many millions of homeowners, the effect of tax reform on housing values is of crucial importance as the equity built up in their home often represents a very large share of their net worth. Because of the popularization of the flat tax, and the absence of a home mortgage deduction in the major flat tax proposals, this issue has been thrust to the forefront of the tax reform debate.

To be sure, homeowners and groups involved in the real estate industry have not been targeted as part of a concerted
tax reform effort as virtually all deductions are eliminated under the flat tax. Indeed, the elimination of the mortgage interest deduction naturally follows from the basic principles on which the flat tax, and most major alternative tax systems are based. Nevertheless, the apparent broad assault on the mortgage interest deduction has become a source of great consternation for many homeowners and political interests such as the homebuilders, the realtors, and the mortgage lenders. The question this study attempts to address is whether this concern is well-founded.

The results presented here indicate that owners of homes currently priced at around $100,000 or below should look forward to the enactment of a flat tax as they should expect a significant increase in the price of their asset. Owners of homes in the $200,000 range similarly have little to fear even with a pure flat tax as the net effect of the various changes seems to leave them with little hope of a windfall, but little fear of a significant loss. Owners of homes that cost in excess of about $300,000, however, may see a modest decline in the value of their homes following the enactment of a flat tax. The most important conclusion to be drawn from this work, however, is that claims of dramatic price shifts one way or the other are greatly exaggerated.
APPENDIX 1

The Development of the Model

This appendix describes the model in greater detail than was presented in the body of the paper. In this model, the price a buyer is willing to pay for a house (P) is equal to the value of the housing services (S), plus the value of any real appreciation in housing values (A) after paying capital gains tax on that appreciation (t), less the after-tax costs of home ownership (C).

\[ (1) \quad P = S + A(1-t) - C \]

Considering each of these variables in turn, the value of housing services (S) is determined by each buyer and seller as the sum total of all benefits accruing to the owner. This amount is assumed not to change following the enactment of a new tax system. In other words, the value a potential buyer places on the satisfaction and benefits of a three-bedroom house on Cherry Lane is unlikely to be affected by a tax system. If the enactment of a new tax system has an effect on the factors determining housing values, it may take some time before it is fully recognized by all market participants. Tax reform will take many months, and may take years to legislate, however, which should give market participants ample opportunity to digest its major effects, so any net effect on housing values may be fully manifested before the new system takes effect. Therefore, for these reasons and because the net effect is both a one time event and permanent, for purposes of measuring the magnitude of the change in housing values the model assumes the market responds instantaneously to the change in tax policy. In any case, there is no reason to believe that this assumption affects the magnitude of the net effect in any way.

One of the hopes of a home buyer is that the value of the property will increase in real terms, that is, after inflation. A buyer would be willing to pay more for a property to the extent there is some expectation that the property will appreciate. Factor (A) in equation (1) represents the premium such a buyer would be willing to pay for the appreciation following tax reform. Thus, if a flat tax were enacted and had a net effect on housing prices, factor (A) would represent the expectation of subsequent appreciation or depreciation. There is little reason to suppose that housing values, that is, the price of a particular type of house in a particular location, would rise or fall any faster under a flat tax than under the current income tax system once prices have adjusted to the new tax regime. The factor (t) denotes the effective tax rate on appreciated housing.

Suppose, for example, that the only net effect of the flat tax on housing values arose through the elimination of the capital gains tax on appreciated housing. Let \( P_0 \) and \( A_0 \) denote the current price and the expected pre-tax appreciation of the home, respectively, prior to the prospect of serious tax reform, and let \( P_1 \) and \( A_1 \) denote respectively the price and the expected appreciation after tax reform. The elimination of the capital gains tax will increase the after-tax value of future appreciation, and this will be fully reflected in an increase in the home price, (e.g. \( P_1 = P_0 + t_c A_0 \), assuming no other affects of tax reform on the initial price). Once this one-time increase has taken effect and unless the change in price is dramatic, the rate of future appreciation will closely approximate the prior rate of appreciation.
The variable \((C)\) in equation (1) represents all the costs, and tax benefits, accruing from home ownership. Equation (2) expresses these costs under an income tax, where the binary variable \((z)\) takes a value of one if the taxpayer is able to itemize his or her mortgage interest and property taxes, and a value of zero if the taxpayer's total itemizable deductions are less than the standard deduction. Equation (3) represents the costs under a flat tax. The variable \((C)\) represents, therefore, the opportunity cost, if any, of the downpayment on the house \((\text{OCDP})\) plus the capitalized values of

- the monthly mortgage payment \((M)\),
- the property tax payment \((\text{Ptax})\),
- and all other costs \((\text{OC})\),

less

- the value of the tax deduction for mortgage interest paid \((T^*\text{Int})\), and
- for property taxes \((T^*\text{Ptax})\).

\[
(2) \ C = \text{OCDP} + \text{Present Value of} \left\{M + \text{Ptax} + \text{OC} - zT^*[\text{Int} + \text{Ptax}]\right\}
\]

under an income tax, or

\[
(3) \ C = \text{OCDP} + \text{Present Value of} \left\{M + \text{Ptax} + \text{OC}\right\}
\]

under a flat tax.

There seems no reason to assume that the costs of garbage collection, tree trimming, mortgage insurance, or of buying a new air conditioning unit will be materially affected by tax reform, so the variable \(\text{OC}\) is assumed to be constant when moving from an income tax to a flat tax. The rate of interest \((r)\) used to calculate the present value of all flows in this model is equal to the after-tax interest rate on a similar type of investment. To simplify, we assume the flows continue indefinitely.

The Opportunity Cost of the Downpayment

The downpayment on a home reflects a cost only to the extent that the after-tax return on this invested saving is less than what the individual would receive in an alternative investment of comparable risk. If, for example, an individual expected the home to appreciate 6 percent annually tax free and the best he could do with a comparable investment is 5 percent after-tax, then the 1 percent difference would actually represent a benefit. On the other hand, if real estate prices were stable or declining, then any downpayment would impose a cost on the homeowner for which some compensation would be required and which would need to be reflected in equation (2), that cost being equal to the next higher return the homeowner could have gotten elsewhere less the appreciation of the home.

To the extent the flat tax affects housing values, the effect will be a one-time and permanent event. Thus, in comparing the period in which there was little prospect of tax reform to the period after tax reform's effects are fully manifested, there is little
reason to believe the opportunity cost of the downpayment will change. There could, of course, be a significant opportunity cost during the period in which housing prices are altered to reflect tax reform’s effects, if any. These costs, however, are precisely those this model seeks to capture through its other variables.

The Property Tax Rate

The model assumes that the property tax (t) is levied at the rate of 1 percent of the current value per annum. To simplify the calculations, the model assumes that the assessed value of the house changes as the market value of the property changes.

\[(4) \, P_{\text{tax}} = t \times P\]

Mortgage Rates

Monthly mortgage payments reflect both the repayment of principal and the payment of interest which is, typically, a larger share of the total payment in the early years of the mortgage.

\[(5) \, M = \text{Portion of Principal} + \text{Interest Expense}\]

The actual expression for (5) is quite cumbersome because of the front loading of interest.

Suppose it is true, as often alleged, that there is a tax subsidy to home ownership. If so, then homeowners will be inclined wherever possible to borrow as much as possible when buying a new home or when refinancing an existing home as long as there are no other costs to doing so. In the extreme case, a homeowner would so arrange his affairs that, effectively, he never repaid principal. Assuming this were the case, his monthly payment would be all interest and would be given by

\[(5.1) \, M = \frac{(P - D) \times r_0}{r_1}\]

where \((D)\) is the amount of the downpayment and \((r_0)\) is the monthly mortgage rate under current law, and \((r_1)\) is the after-tax discount rate, which is equal in this case to the mortgage rate under a flat tax.

Because mortgage interest is heavily front-loaded in mortgage payments, meaning that the present value of early year interest payments greatly exceeds that of later year payments, the capitalized value of interest payments closely approximates

\[(6) \, M = \frac{(P - D) \times r_0}{r_1}\]

Any errors in measurement that might develop from using (6) instead of the actual formula are proportional to the difference in interest rates between current law and the future period with a flat tax. These errors would seem to be very slight and a small price to pay for the simplification achieved by using (6) in lieu of the actual formula im-
plied by equation (5).

Assuming no change in the opportunity cost of the downpayment (i.e. OCDP₀ = OCDP₁), the change in housing prices following a flat tax is therefore given by

\[ P₁ - P₀ = S₁ - S₀ + A₁ \cdot (1 - t_c₁) \cdot A₀ \cdot (1 - t_c₀) \cdot C₁ + C₀ = -(C₁ - C₀) + t_c₀ \cdot A₀ \]

where the subscript (0) refers to the value under current law and the subscript (1) refers to the value under a flat tax. Under the assumptions presented here, namely, \( S₁ = S₀, t_c₁ = 0, \) and \( A₁ = A₀ \), Equation (7) can be rewritten as

\[ P₁ - P₀ = t_c₀ \cdot A₀ + \text{Present Value} \left( M₀ + P₀ \cdot t \cdot z \cdot T₀ \cdot [\text{INT}_0 + P₀ \cdot t] - M₁ - P₁ \cdot t \right) \]

Solving yields

\[ P₁ - P₀ = \frac{[(r₀ - r₁)(1-a) - z \cdot T₀ \cdot [r₁(1-a) + t] \cdot P₀ + t \cdot A₀ \cdot r₁]}{r₁(2-a) + t} \]

A Flat Tax With a Home Mortgage or a Property Tax Deduction, or Both

As discussed in the paper, it is conceivable that a flat tax could be enacted that allowed a deduction for either mortgage interest, property taxes, or both. These cases are developed below. To consider these cases, we introduce the binary variables \( x \) and \( y \). The variable \( x \) takes a value of (1) when mortgage interest is deductible and (0) when it is not deductible. The variable \( y \) takes a value of (1) when property taxes are deductible and a value of (0) when they are not. Accordingly, equation (3) which represents the costs of home ownership under a flat tax is rewritten as

\[ C₁ = OCDP₁ + \text{Present Value of} \left( M₁ + P₀ \cdot t \cdot z \cdot T₁ \cdot [x \cdot \text{INT}_₁ + y \cdot \text{Ptax}_₁] \right) \]

Using (3.1) in place of equation (3), the change in housing prices following a flat tax is therefore given by

\[ P₁ - P₀ = t_c₀ \cdot A₀ + \text{Present Value} \left( M₀ + P₀ \cdot t \cdot z \cdot T₀ \cdot [\text{INT}_0 + P₀ \cdot t] - M₁ - P₁ \cdot t \right) \]

\[ T₁ \left[ x \cdot \text{INT}_₁ + y \cdot \text{Ptax}_₁ \right] \]

Home Mortgage Interest Deductible

Solving equation (8.1) for the case of a flat tax that allows a mortgage interest deduction but not a property tax deduction \( (x = 1, y = 0) \) yields

\[ P₁ - P₀ = \frac{[(r₀ - r₁)(1-a) - z \cdot T₀ \cdot [r₁(1-a) + t] + T₁ \cdot r₁(1-a)] \cdot P₀ + t \cdot A₀ \cdot r₁}{r₁ + r₁(1-a)(1-T₁) + t} \]

Property Taxes Deductible

Solving equation (8.1) for the case of a flat tax that allows a mortgage interest deduction but not a property tax deduction \( (x = 1, y = 0) \) yields
(9.2) \( P_1 - P_0 = \frac{[(r_o - r_1)(1-a) - z^T_o r_o(1-a) + t] + T_1 t]}{r_i(2-a) + t(1-T_1)} \times P_0 + t_1 \times A_0 * r_1 \)

**Property Taxes and Home Mortgage Interest Expense Deductible**

Solving equation (8.1) for the case of a flat tax that allows a mortgage interest deduction but not a property tax deduction (\( x = 1, y = 0 \)) yields

(9.3) \( P_1 - P_0 = \frac{[(r_o - r_1)(1-a) - z^T_o r_o(1-a) + t] + T_1 t]}{r_i(2-a) + t(1-T_1)} \times P_0 + t_1 \times A_0 * r_1 \)

**APPENDIX 2**

**Considerations Regarding Interest Rates Under Tax Reform**

A topic of much discussion in tax policy is the effect of tax reform on market interest rates. This is an exceptionally important issue in the current debate because all major tax reform proposals envision moving from the current hybrid federal income tax-consumption tax to a pure consumption tax, whether the structure of that tax be a flat tax, a national sales tax, or a subtraction-method Value-Added Tax. The primary motivation for moving to such a tax system is that it would reduce or eliminate the current system's heavy tax burden imposed on saving and investment. While there is little agreement about the magnitude of the effects, virtually all economists agree that reducing the tax burden on saving and investment will result in higher levels of these activities than would otherwise occur.

The theory of interest rates relied upon for the analysis presented in this paper is purely microeconomic in nature. Essentially, interest rates are determined through the choice by individual decision-makers as to their required, after-tax rate of return, their expectations regarding inflation, their beliefs regarding the underlying riskiness of the investment, and their assumptions regarding the tax treatment the income derived from saving will face. The latter of these determines the tax wedge described at the outset of the paper. There is no reason to believe that tax reform will affect any of these factors one way or another, except for the tax treatment of capital income itself as it affects the tax wedge.

An alternative argument that has been advanced is that a higher rate of saving following tax reform would cause a decline in nominal interest rates. In effect, the supply of saving available for investment would go up and, so the reasoning goes, therefore the cost of borrowing should decline. There are two great flaws in this line of reasoning. The first flaw is that the tax reform proposals under consideration also reduce the tax burden on investment. That is, the gross income a particular investment in plant and equipment is required to earn to cover all costs, including taxes, and still provide the investor an adequate return obviously declines if the taxes imposed on the income stream decline. Therefore, tax reform is also expected to cause an increase in the desired stock of capital. There is no way to predict whether the increase in saving over any period of time will exceed, match, or be less than the increase in investment, which means, using this line of reasoning, that interest rates may decline, remain constant, or even increase.
A greater flaw, however, is that the argument tying an increase in saving, or even in saving less investment, to declining interest rates implicitly assumes little or no international capital flows. In fact, these flows are enormous and virtually instantaneous, so that if a surplus of domestic saving relative to domestic investment were to arise, the excess would be exported into the capital markets outside the U.S. to finance foreign investment. Thus, an increase in net saving in the U.S. would finance the U.S. purchase of foreign assets, not reduce domestic interest rates.