The Effects of the Flat Tax Reform Proposal on the U.S. Housing Market

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Abstract:

This paper analyzes the effects of the *Armey-Shelby* tax reform proposal among the flat tax proposals on new owner-occupied housing market in USA on the basis of partial equilibrium. The effects in the short- and long-run are examined based on the *Kenneth T. Rosen*'s regression results focusing on the effects of the user costs on home ownership. The Armey-Shelby plan would cause housing price in the short run to decrease with unchanged quantity because of nondeductibility of mortgage interest and property tax payments in the short-run. But the plan would cause housing market in the long run to be more activated, that is, increase in housing quantity and decrease in housing price, through lower interest rate caused by untaxed savings and investments that mean tax neutrality against savings and investments.

Ⅰ. Introduction

A citizen is subject to the federal individual income tax on taxable income. Under the current tax code, taxable income equals the taxpayer's total income less certain exclusions, exemptions, and deductions. The appropriate tax rates ranging from 15 percent to 39.6 percent are then applied to a taxpayer's taxable income to determine individual income tax liability. A taxpayer may reduce individual income tax liability

by any applicable tax credit. On the other hand, the flat tax label generally applies to any tax system with only one marginal tax rate and a broad base. That is, one could construct a flat tax out of the current individual income tax by eliminating all but one marginal rate bracket and repealing provisions that impose higher marginal rates by reducing other deductions and exclusions.

In this paper, after background on flat tax is examined, the Armey-Shelby tax reform proposal among the flat tax proposals will be analyzed. The analysis will be focused on the effects of the Armey-Shelby tax reform proposal on new owner-occupied housing market on the basis of partial equilibrium (*"housing"* used here after in this paper means new owner-occupied housing).

Ⅱ. Background of Flat Tax

(Joint Committee on Taxation, 1995, pp. 10-14)

Many of the flat tax proposals that have been developed do more than simply one rate to the current individual income tax base. In addition, they redefine the base of the tax. There are two main approaches: a consumption base and an income base. The gross income of a taxpayer in any year is simply the sum of the taxpayer's consumption and gross saving. Thus, the difference between these two bases is in the treating of saving. An income-based tax includes the return to saving in the tax base; a consumption-based tax does not.

There are a number of equivalent ways to construct a consumption base. One is to measure directly all acts of consumption by the taxpayer. While straightforward in theory, it would be difficult in practice. Another equivalent way to measure consumption that would build on current practice and definitions is suggested by the fact that consumption equals income minus saving. A base that includes income from all sources and then allow deductions for saving results in only consumption being subject to tax. The third way to implement a consumption tax is to include in the

base only earned income. Taxpayers claim no deduction for savings, but their returns to saving, whether in the form of interest, dividends, rents, royalties, or capital gains, are excluded from the base of the tax and thus are received tax-free.

Many flat tax proposals do more than just change the rates and the base of the individual income tax. These proposals also integrate business taxation and individual taxation through the application of a consumption tax on all businesses at the same marginal rate as that applies to individuals.

What makes a given business tax a consumption tax is its reliance on cash-flow accounting principles to define the tax base. By contrast, income taxes use accrual accounting principles to measure the base. Cash-flow accounting principles treat real business activity similar to one of the approaches to constructing a consumption-based individual tax: saving is deducted from the base and returns to saving are included upon withdrawal. In the business context, expenses in the current period that yield revenues in future periods are saving; those future revenues are the return to saving.

In general, consumption-based taxes allow the immediate deduction expensing of the cost capital purchases. On the other hand, there are two options for treating interest expense under a consumption-based tax, which correspond to two alternative approaches to financial cash flows under such a tax. The approach that is generally used is to account only for cash flows based on real non-financial activity. Thus, financial receipts such as proceeds from a stock sale or a bank loan are not included in the base and outflows such as loan repayments and payments of interest and dividends are not subtracted from the base.

Ⅲ. The Armey-Shelby Tax Reform Proposal

The Armey-Shelby tax reform proposal (the "*Armey plan*") can be classified into an integrated business and individual tax with a consumption base.

According to the Armey plan (the Freedom and Fairness Restoration Act of 1996),

individuals pay 17 percent of all wages, salaries, and pensions, after subtracting family allowances. When fully phased in 1998, the family allowances will be $11,350 for a single person, $22,700 for a married couple filing jointly, and $5,300 for each dependent. These allowances are indexed to inflation. The flat tax replaces the current income tax system, but not Social Security and Medicare payroll taxes. Social Security benefits would not be taxed.

Also, all business income, whatever the source (corporate, partnership, sole proprietor, professional, farm, and rental profits and royalties) is taxed at the one low rate. Businesses pay 17 percent of the differences, if positive, between revenues and expenses. Expenses are defined as purchases of goods and services, capital equipment, structures, land, wages and contribution to employees retirement plans. No deductions are permitted for fringe benefits, interest, or payments to owners.

The Armey plan eliminates exclusions, deductions, and tax credits except personal allowances under the current tax code. Moreover, individual saving and investment income – interest on savings account, stock dividends, and profits on the sale of stock or other assets – would not be taxed under the Armey plan. Because saving and investment income would no longer be taxed, under the Army plan, individual might have strong incentives to save and invest. Therefore, new savings and investment would find its way to business through increased purchases in stock and bonds.

Also, the Armey plan does not adopt the *alternative minimum taxes* under the current tax system [that is, an individual (or a corporation) is subject to an alternative minimum tax which is payable, in addition to all other tax liabilities, to the extent that it exceeds the taxpayer's (or the corporation's) regular income tax owed, and the tax is imposed at rates of 26 and 28 percent (or a flat rate of 20 percent) on an alternative minimum tax income in excess of an exemption amount (or a $40,000 exemption amount.)]

Ⅳ. The Federal Income Tax and Owner-occupied Housing

In 1993, as seen in table 1, 64.5% of U.S. households were owner-occupants, up from 48% in 1945 (Bureau of Census, 1994). According to Hendershort and Shilling (1982), about one quarter of the increase in the home ownership rate was caused by the favorable tax treatment of home ownership (O'Sullivan, 1993, p. 405). Under the current tax system, owner-occupied housing receives favorable income tax treatment as follows(Rosen, 1985, p. 388):

① *Exclusion of net imputed rental* : The federal tax code does not require that the net value of the services received by owner-occupants from their homes be included as taxable income. If these same units were rented out, the income obtained would be taxed, after deductions for taxes, interest, maintenance, *etc.* In other words, because an investment in owner-occupied housing produces in-kind income rather than cash, that income is untaxed.

② *Deduction of mortgage interest* : Taxpayers can deduct from taxable income the full value of all interest payments, including the interest on home mortgage loans.

③ *Deduction of state and local property taxes* : Homeowners are allowed to deduct all state, local taxes paid on real property.

④ *Deferral of capital gains on home sales* : Excluded from taxable income are any capital gains from the sale of a principal residence when another residence costing at least as much is purchased within two years of the sale of the former one.

⑤ *One-time exclusion of $125,000 capital gains in home sales for taxpayers 55 years of age and older*

As a result, the favorable tax treatment of home ownership arises from the deductibility of some of the expenses of home ownership – property tax payments and mortgage interest payments – and the failure to tax the imputed income from

Table 1. Home ownership rates: 1985 to 1993(%).

1985	1986	1987	1988	1989	1990	1991	1992	**1993**
63.9	63.8	64.0	63.8	63.9	63.9	64.2	64.2	**64.5**

Source : U.S. Bureau of Census, *Statistical Abstract of the United States*, 1994.

Table 2. Tax expenditures for owner-occupied homes, by function: 1993 to 1996.

Description	1993 actual	1994 enacted	1995 proposed	1996 predicted
Deferral of capital gains	13,265	13,925	14,620	15,195
Exclusion of capital gains for persons age 55 and over	4,625	4,770	4,960	5,155
Deductibility of -- Mortgage interest payments	48,705	51,835	54,800	57,985
Property tax payments	13,055	13,865	14,655	15,545
Total	66,595	84,395	74,380	93,880

Source : U.S. Bureau of Census, *Statistical Abstract of the United States*, 1994.

owner-occupancy. As seen in table 2, tax expenditures for owner-occupied homes were totally predicted to reach at $93,800 million as of 1996.

V. The Army Plan and Owner-occupied Housing

The effects of the Armey plan would be manifest in housing market. First of all, the Armey plan eliminates the deductibility of property tax payments and mortgage interest payments differently from the current income tax system.

Thus, in the short run, disallowing the deductibility of property tax payments and mortgage interest payments would cause the user costs of owner-occupied housing to increase. Hence the Armey plan could induce significant changes in prices of existing

housing. That is, the capitalized reduction in the value of mortgage interest and property tax deductions could reduce existing housing values. Also the effects of the Armey plan would be most likely to negatively appear in new owner-occupied housing market.

On the other hand, the Armey plan does not tax individual saving and investment income. Hence the Army plan could encourage capital accumulation through increasing individual saving and investment, causing interest rates to drop. Therefore, price of housing could be lowered due to reduced capital cost to housing construction firms. Moreover, mortgage interest rates would drop due to lenders who would be willing to make loans at lower rates, since the interest they receive would not be taxable.

As a result, in the long run, lowered price of housing and fallen mortgage interest rates would offset the loss from the undeductibility of mortgage interest payments and property tax payments. Essentially, the most important effect of the Armey plan would be to be the decrease in the interest rates that would result from the increased capital intensity arising from eliminating saving and investment taxation.

VI. Analytical Framework

In general, the effect of a housing policy is to change the price of housing services facing a household, and perhaps its disposal income as well. The quantity of housing services demanded for the *i*th observation($Q_{hi}{}^{D}$) is defined with relation to some function $f(\ )$ of price (p_{hi}), income (Y_i) and a vector of demographic variables Z_i, that is assumed to be ***indifferent*** among households, (Rosen, 1985, pp. 381-382) as

$$Q_{hi}{}^{D} = f(P_{hi},\ Y_i,\ Z_i) \tag{6.1}$$

or as convenient form of log linear

$$\ln(Q_{hi}{}^{D}) = \alpha_0 + \alpha_1 \ln(P_{hi}) + \alpha_2 \ln(Y_i) + \beta Z_i + \varepsilon \qquad (6.2)$$

Most estimates of the price elasticity fall between -0.75 and -1.20 (Ellwood and Polinski, 1979, pp. 199-205). The consensus is that demand is slightly price inelastic (O'Sullivan, 1993, p. 409). Here the price elasticity of demand (*i.e.*, α_1) for housing is assumed to be **-1.0**.

There have been dozens of studies of the income elasticity of demand for housing, and there is a consensus on three points (O'Sullivan, 1993, p. 408). First, the overall income elasticity is about 0.75 (Ellwood and Polinski, 1979, pp. 199-205). Second, the income elasticity for renters is less than that for owner-occupants. Third, the income elasticity increases with income. According to Ihlanfeldt (1982), the elasticity for low-income households is between 0.14 and 0.62, and the elasticity for high-income households is between 0.72 and 1.10. Here the income elasticity of demand (*i.e.*, α_2) for housing is assumed to be **0.80.**

It is difficult to estimate the supply elasticity because it is difficult to measure the quantity of housing services. The existing studies of housing supply suffer from a number of statistical problems (O'Sullivan, 1993, p. 394). Here, in the short-run, the supply curve is assumed to be ***perfectly inelastic***. And a market supply curve in perfectly competitive market is perfectly elastic and represents the marginal costs of individual firms (Hyman, 1993, pp. 326-330). Therefore, in the long-run, under the conditions of perfect competition and constant return to scale, it is assumed that the implied supply curve of housing services is ***perfectly elastic***.

But the supply of housing might be affected by the conditions in the credit market through the flow of savings deposits received by savings and loan associations (Rosen, 1985, p. 384). In the corporate sector of owner-occupied housing construction, output is produced according to a Cobb-Douglas production function (Berkovec and Fullerton, 1992, p. 397):

$$Q^{s} = \phi K^{\rho} L^{1-\rho} + \mu \qquad (6.3)$$

where ϕ is a scalar, K is capital used in the corporate sector, ρ is the capital share parameter, L is total household labor supply, and μ is a random element with mean zero that induces uncertainty in the return to capital. Competitive behavior then implies

$$K = L(C_K/\rho\phi)^{1/(\rho-1)}, \quad w = \phi(1-\rho)(K/L)^{\rho} \tag{6.4}$$

and

$$P^S = MC = \eta_K C_K + \eta_L w \tag{6.5}$$

where P^S is the supply price, **MC** is the marginal cost to be composed with the capital cost and the gross wage, η_K and η_L are the capital and wage share parameters, C_K is the capital cost to the corporate sector, w is the gross wage to be assumed as constant (in fact, under the Armey plan, labor cost would increase due to nondeductibility of fringe benefits). Here it is assumed that the ***output effect*** dominates. That is, there is ***no substitution effect*** due to the changes in input prices (*i.e.*, the capital costs).

To calibrate the impact of tax provisions on the demand for owner-occupied housing, it is helpful to define the *after-tax user cost of home ownership*. That is, the net effects of the Armey plan on incentives for tenure choice and for housing consumption could be formalized in comparison with the after-tax user costs of owner-occupied housing under the current tax system.

The after-tax user cost of home ownership under the current tax system measures the marginal cost of an incremental amount of owner-occupied housing, including the foregone return on the owner's equity (Poterba 1994). It is defined as

$$C_H = [(1-\theta)\{(i-\pi)+\tau_p\} + \delta + \alpha + m - \pi_e] P, \tag{6.6}$$

where i is the nominal interest rate, π is the inflation rate, τ_p is the property tax rate

per dollar of property value, θ is the household's marginal federal income tax rate, δ is the physical decay rate for the property, α is the risk premium for housing investments, m is the cost of home maintenance as a fraction of house value, π_e is the expected rate of house price appreciation, and P is the real price of owner-occupied housing. This expression applies only to households who itemize for federal income tax purpose. For the nearly 40% of all homeowners who do not itemize, the marginal user cost sets $\theta = 0$ in the equation (6.6).

The user cost of home ownership varies across households and, for itemizers, is inversely related to a household's marginal tax rate. Although it reflects the marginal cost of additional housing purchases, it may not reflect the average cost. The latter is the key determinant of whether owner-occupied or rental housing is the most cost-effective way for a given household to obtain housing services.

The distinction between average and marginal costs arises because some households may itemize if they are homeowners, but not if they are renters. Many such households have itemized deductions excluding housing costs equal to less than the standard deduction; they forgo the tax saving associated with the standard deduction when they become homeowners.

Since the Armey plan would not permit the deductibility of mortgage interest payments and property tax payments, the equation (6.6) could be modified as

$$C_H' = [(i-\pi)+\tau_p+\delta+\alpha+m-\pi_e]P. \tag{6.7}$$

In the short-run, the user costs under the Armey plan would increase by $\theta\{(i-\pi)+\tau_p\}$. That is, the higher the marginal tax rate(θ) under the current tax code, the higher the user costs under the Armey plan. In the long-run, since i would be lowered, increased user costs in the short-run would be reduced.

To calibrate the impact of tax provisions on the cost of capital to the corporate of owner-occupied housing construction — the cost the corporate incurs as a consequence of owning an asset, it is helpful to define the *after-tax user cost of*

capital. That is, the net effects of the Armey plan on the cost of capital could be formalized in comparison with the after-tax user costs of capital under the current tax system.

The after-tax user cost of capital under the current tax system measures the marginal cost of an incremental amount of capital, including both the opportunity cost of forgoing other investments and direct costs such as depreciation and taxes. Under the current tax code, the corporation's interest payments are deducted from the tax base, and dividends are subject to both the corporation income tax and the individual income tax(Rosen, 1995). Therefore, the after-tax user cost of capital is defined as

$$C_K = \frac{\{i(1-\mu)-\pi+\delta\}(1-\Psi\mu-k)}{(1-\mu)(1-\theta)} \tag{6.8}$$

where i is the nominal interest rate, μ is the corporate tax rate, π is the inflation rate, δ is the economic rate of depreciation, Ψ is the rate of the depreciation allowances, k is the rate of investment tax credits (in fact, to be eliminated by the 1986 Tax Reform), and θ is the individual tax rate.

Under the Army plan, the corporation's interest payments would not be deducted from the tax base, dividends received by the individual would be untaxed, and all of the investments would be treated as one-shot expensing. That is, $i(1-\mu) = i$, $\Psi = 1$, $k = 0$, and $\theta = 0$. As a result, the equation (6.8) could be modified as

$$C_K = i-\pi+\delta \tag{6.9}$$

or as real interest rate(r)

$$C_K = r+\delta \tag{6.10}$$

In effect, the cost of capital could not be affected by the tax, that is, tax neutrality. In general, every dollar invested under the current tax code is recognized to have a tax burden of about 30 cents (*Herald American*, Feb. 4, 1996). Hence the cost of

capital under the Armey plan would be reduced. Moreover, in the long-run, since the Armey plan could swell the capital pool through the incentives to individual savings, the interest rates would drop. Consequently, the corporate could provide owner-occupied housing with lower prices due to reduced cost of capital.

Ⅶ. Static Analysis

As seen in the equations of (6.6) and (6.7), the user costs of home ownership under the Armey plan would increase by $\theta\{(i-\pi)+\tau_p\}$ in the short-run. In contrast, in the long-run, the user cost would decrease due to lowered interest rate.

Since the user costs of home ownership to household take a big portion of household's income (*i.e.*, on average, 21percent as of 1990; *Annual Date Metro, City, and County*, 1994), household's income would be seriously affected by the user cost of home ownership.

Here it is assumed that the ***income effect*** dominates. That is, an increase in the user costs to household would cause an equivalent decrease in household's income. Also it is assumed that the user cost of home ownership accounts for ***one-fifth*** of income. Hence 10 percent change in the user cost is expected to cause 2 percent change in income.

Furthermore, as seen in the equation (6.1) or (6.2), the demand for housing is affected by household's income. As assumed previously, since the income elasticity of demand for housing (i.e., a_2) is 0.8, the percentage change in the demand for housing is expected to be equal to 0.8 multiplied by the percentage change in household's income. Hence 10 percent change in household's income would cause 8 percent change in housing demand.

On the other hand, although precise results depend on the tax experiment, simulation evidence suggests that the percentage change in house prices is approximately half as large, and of opposite sign, as the change in user costs (Poterba,

1990, p. 149). That is, 10 percent change in the user cost would cause 5 percent change in housing price (*i.e.*, housing value or marginal benefit of housing services).

Additionally, Kenneth T. Rosen (1989, pp. 11-12) suggests two kinds of regression results based on time series and cross-section analyses focusing on the effects of the user cost on home ownership. First, the OLS regression results based on a time series econometric model of the tenure choice estimated from 1970-1988 are shown below.

$$\ln(\text{home ownership}) = -.191 + .0045 \ln(\text{household income}) + .032 \ln(\text{persons per household}) - .0032 \ln(\text{user cost of owning relative to renting}) + .726 \ln(\text{lagged home ownership}) \quad (7.1)$$

That is, 10 percent change in the user cost causes 0.032 percent change in home ownership. Second, the regression results based on a similar cross-section equation estimated on a state basis is shown below.

$$\ln(\text{home ownership rate}) = -.330 + .178 \ln(\text{real income}) + .310 \ln(\text{persons per household}) - .044 \ln(\text{real user cost}) \quad (7.2)$$

That is, 10 percent change in the user cost causes 0.44 percent change in home ownership.

As seen in the equations of (6.8)-(6.10), the user cost of capital under the Armey plan would decrease from $\{i(1-\mu)-\pi+\delta\}\ (1-\Psi\mu-k)/(1-\mu)\ (1-\theta)$ to $(i-\pi+\delta)$ in the short-run and would be more reduced due to lowered interest rate in the long-run.

Since the user cost of capital measures the marginal cost of an incremental amount of capital, the marginal costs to both the corporate and non corporate builders would be lowered under the assumptions of constant wage rate and no substitution effect.

However, it is more reasonable assumption that both the corporate and non corporate builders, who are not affected by the corporation tax reform, would not entirely reflect reduced capital costs into the housing prices but would adjust housing prices after taking into account previous housing price and demand. As a result, the

housing supply would be dependent on the builders' willingness to lower housing price.

As seen in the equation (6.1) or (6.2), the demand for housing is affected by housing prices. As assumed previously, since the price elasticity of demand for housing (*i.e.*, α_1) is 1.0, the percentage change in the demand for housing is expected to be equal to the percentage change in housing price. Hence, if the housing builders lower housing price by 10 percent, the demand for housing would increase by 10 percent. Furthermore, as assumed previously, in the short-run, the supply curve is ***perfectly inelastic***. Also, in the long-run, under the conditions of perfect competition and constant return to scale, the supply curve of housing services is ***perfectly elastic***.

Based upon the housing demand and supply indicated above, let the equilibrium in the short-run housing market graphically illustrated. As figure 1 shows, the decreased income due to increased user cost would cause the demand curve to be shifted downward from D to D' by ab equal to lowered housing prices the percentage change in which is half of the percentage change in user costs. Consequently, since the supply curve assumed is perfectly inelastic, the equilibrium quantity of housing would be set at q' equal to q (that is, unchanged) and the equilibrium price would be lowered from p to p'.

As indicated previously, in the long-run, the interest rates under the Armey plan would be lowered because of untaxed savings and investments. As a result, as seen in the equations of (6.7) and (6.9), the user costs of home ownership and the user cost of capital would be reduced. Hence downward-shifted demand curve in the short-run would be shifted upward due to an increase in household's income caused by lowered user costs.

On the other hand, the supply curve being assumed to be perfectly elastic would be horizontal and the supplier's price would be originally set at p'' equal to p' of the short-run equilibrium price. Moreover, both the corporate and non corporate builders would lower the housing price to reflect reduced capital costs and to adjust to reduced demand in the short-run.

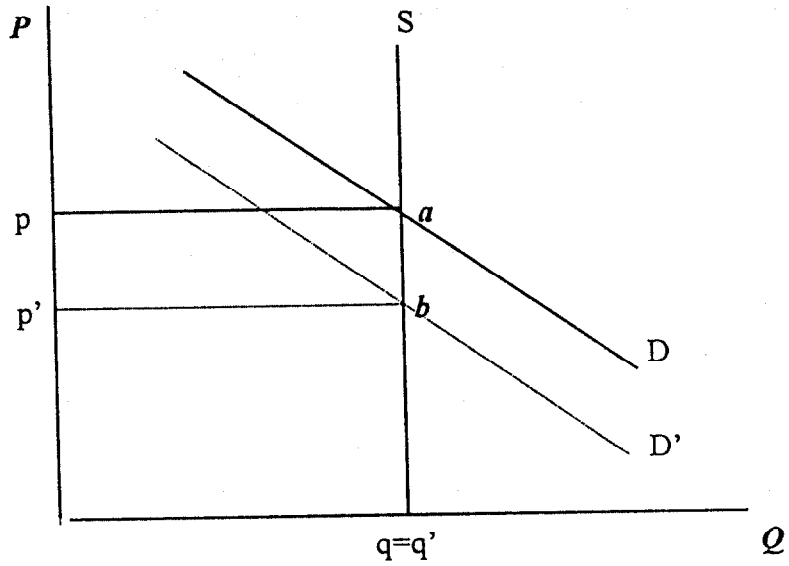

Figure 1. The equilibrium in the short-run housing market.

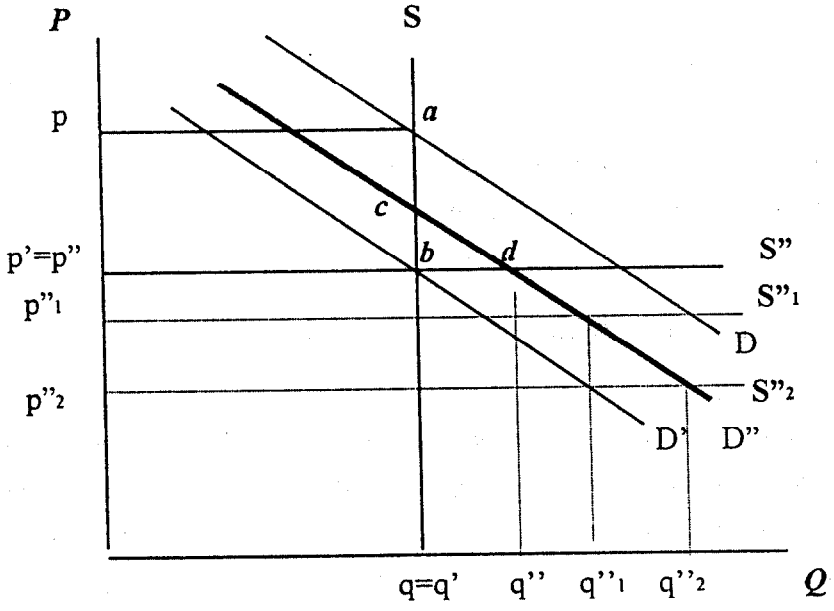

Figure 2. The Equilibrium in the Long-run Housing Market.

Based upon the housing demand and supply indicated above, let the equilibrium in the long-run housing market graphically illustrated. As figure 2 shows, the increased income due to decreased user cost would cause the demand curve to be shifted upward from D' to D'' by bc equal to increased housing prices the percentage change in which is half of the percentage change in user costs.

In the case of the supply side, even though supplier's housing price would be finally lowered by the extent to which the capital cost would be reduced, there are several possibilities. First, if builders do not lower housing price (S'' case), the equilibrium quantity would increase from q' to q'' by bd of increased quantity of demand the percentage change in which is equal to 0.8 multiplied by the percentage change in household's income caused by lowered user costs of home ownership. And the equilibrium price would be set at p'' equal to p' (that is, unchanged). Second, if builders lower housing prices (S''_1 or S''_2 cases), households would increase the demand for housing according to the equation (1) or (2). Since the price elasticity assumed is 1.0, the percentage change in quantity demanded would be equal to the percentage change in housing price. As a result, the equilibrium quantity would increase to q''_1 or q''_2 from q'. And the equilibrium price would be lowered to p''_1 or p''_2 from p''.

Consequently, in the long-run equilibrium of housing quantity and price would depend on the degree to which the builders lower housing price.

Ⅶ. Assessment of the Effects of the Army Plan

As stated previously, in the short-run, the user cost of home ownership would increase due to nondeductibility of mortgage interest and property tax payments. On the other hand, in the long-run, the user cost increased in the short-run would be reduced owing to lowered interest rate resulting from untaxed savings and investments.

First of all, for the purpose of examining the effects of the Armey plan on the user

cost of home ownership according to the equations of (6.6) and (6.7), let basic assumptions set up as follows:

① i (nominal interest rate) : As seen in Tables 3 and 4, 87 percent of new privately owned one-family houses in 1993 were financed by mortgage. And conventional mortgages accounted for 71 percentage. Therefore, according to 7.69 percent of national weekly average interest rate for 30-year conventional mortgages (*Herald American*, April 7, 1996) and 6.7 percent of expected Ten-year Treasury Note rate (Congressional Budget Office, 1995), let nominal interest rate set ***0.08*** including interest rate for opportunity cost. The Armey plan would lower the nominal interest rate in the long-run. Here three cases of the nominal interest rate lowered in the long-run (*i.e.*, ***0.07, 0.06, 0.05***) are examined.

② π (inflation rate) : According to the economic outlook made by Congressional Budget Office (1995), inflation rate is expected to be ***0.03*** (in fact, 0.032). Here the inflation rate is assumed to be fixed.

③ τ_p (the property tax rate per dollar of property value), δ (the physical decay rate for the property), α (the risk premium for housing investments), m (the cost of home maintenance as a fraction of house value), and π_e (the expected rate of house price appreciation) : According to Poterba's assumptions (1990, 148-150), each value of four parameters is assumed to be ***0.02, 0.014, 0.04, 0.025***, and ***0.03***, respectively, and to be constant.

Also for convenient calculations three kinds of households (*i.e.*, lower-income class: AGI $50,000, middle income class: AGI $100,000, higher-income class : AGI $200,000) with 28%, 31%, and 36% of the marginal tax rates, respectively, are examined. Based on the above assumptions, let the effects of the Armey plan on the demand for housing examined as follows:

As seen in Table 5, the Armey plan would not have different effects on different income classes in the long-run but have the greatest effect on higher income class in

Table 3. Median Sales Price of New Privately Owned One-Family Houses Sold.

(in dollars)

1985	1986	1987	1988	1989	1990	1991	1992	1993
84,300	92,000	104,500	112,500	120,000	122,900	120,000	121,500	126,500

Source : U.S. Bureau of Census, *Statistical Abstract of the United States*, 1994.

Table 4. Characteristics of New Privately Owned One-Family Houses Completed.

Characteristics	1970	1980	1990	1992	1993
Total Houses (in thousands)	793	957	966	964	1,039
Financing	100	100	100	100	100
– **Mortgage**	**84**	**81**	**82**	**86**	**87**
FHA-insured	30	16	14	10	9
VA-guaranteed	7	8	4	5	6
Conventional	47	55	62	69	71
FHA	–	3	2	1	1
– Cash or equivalent.	16	18	18	14	13

Source : U.S. Bureau of Census, *Statistical Abstract of the United States*, 1994.

the short-run. That is, the user cost to higher income class would increase from 0.0938 to 0.119 by 27 % in the short run. 27% increase in the user cost would cause 5.4% (= 27%*0.2) decrease in income and 13.5% (= 27%*0.5) decrease in housing price. In the long-run, according to the degree to which interest rate would be lowered, the user cost to each income class would be reduced from 0.119 to 0.109~0.089 by 8%~25%. As a result, income, demand for housing, and housing prices would increase by 1.6%~5%, 1.28%~4%, and 4%~12.5%, respectively.

Consequently, if only the demand side for housing is taken into account, more than 3% decrease in interest rate could offset nondeductibility of mortgage interest and property tax payments.

Table 5. User Cost, % Changes in Income, Quantity, and Price under the Armey Plan.

AGI	Current Tax Code	Armey plan			
		Short-run	Long-run		
		i = 0.08	i = 0.07	i = 0.06	i = 0.05
User cost					
$50,000	0.0994	0.119	0.109	0.099	0.089
*(% change)**	–	20	-8	-17	-25
$100,000	0.0973	0.119	0.109	0.099	0.089
(% change)*	–	22	-8	-17	-25
$200,000	0.0938	0.119	0.109	0.099	0.089
(% change)*	–	27	-8	-17	-25
% change in income**					
$50,000	–	-4	1.6	3.4	5
$100,000	–	-4.4	1.6	3.4	5
$200,000	–	-5.4	1.6	3.4	5
% change in quantity***					
$50,000	–	-3.2	1.28	2.72	4
$100,000	–	-3.52	1.28	2.72	4
$200,000	–	-4.32	1.28	2.72	4
% change in price****					
$50,000	–	-10	4	8.5	12.5
$100,000	–	-11	4	8.5	12.5
$200,000	–	-13.5	4	8.5	12.5

* % changes in the long-run user costs under the Armey plan are to be compared to the short-run user costs under the Armey plan.

** In calculating % changes in income, user cost of home ownership is assumed to be one-fifth of income.

*** In calculating % changes in quantity, the income elasticity of demand is assumed to be 0.8. These changes would take a effect on the demand curve. In the case of perfectly inelastic supply curve, these changes would result in changes in housing price.

**** In calculating % changes in price, the percentage change in house prices is assumed to be half, and of the opposite sign, of the change in user costs.

As stated earlier, the user cost of capital would decrease due to treating investments

as one-time expensing and further lowered interest rates resulting from untaxed savings and investments. Now for the purpose of examining the effects of the Armey plan on the user cost of capital according to the equations of (6.8) and (6.9), let the basis of basic assumptions set up as follows:

First, i (the nominal interest rate), π (the inflation rate), δ (the economic rate of depreciation) are assumed to be the same as those being assumed in calculating user cost of home ownership. Second, μ (the corporate tax rate) and θ (the individual tax rate) are assumed to be 35 % and 39.6% (that is, marginal tax rate for upper-income class), respectively. Finally, Ψ (the rate of the depreciation allowances) is assumed to be 0.1. But since investment tax credits were eliminated by the 1986 Tax Reform, k (the rate of investment tax credits) is zero. Based on the above assumptions, let the effects of the Armey plan on the supply side examined as follows:

As Table 6 shows, the user cost under the Armey plan would decrease from 0.088 to 0.054~0.034 by 27.3%~61.4% according to the extent to which interest rate would be lowered. However, as indicated previously, both the corporate and non corporate builders would not entirely reflect reduced capital costs into the housing prices but would adjust housing prices after taking into account previous housing price and demand. As a result, the housing supply would be dependent on the builders' willingness to lower housing price.

Suppose that the share of capital cost is a half of total input costs. Hence, according to the equation (6.5), the housing builders under the Armey plan could lower housing price by roughly 10% to 30%. Since the price elasticity of demand is 1.0, the percentage change in demand for housing would be equal to the percentage change in housing price.

In the short-run, since the supply curve assumed is perfectly inelastic, the quantitprice under the Armey plan would decrease to $112,585 by 11%, that is, they would be unchanged and housing price would decrease by 10% to 13.5% according to income level. As seen in Appendixes 9 and 11, since median sales price of 667,000 new privately owned one-family houses sold in 1993 was $126,500, median sales

Table 6. The User Cost of Capital Under the Armey Plan.

		Armey plan			
	Current tax code	$i = 0.08$	$i = 0.07$	$i = 0.06$	$i = 0.05$
User cost	0.088	0.064	0.054	0.044	0.034
(% change)*	–	27.3	38.6	50	61.4

* % changes in user costs under the Armey plan are to be compared to user cost under current tax code.

percentage change in price in the case of middle income class, and the quantity would be fixed at 667,000 housing units.

In the long-run, the equilibrium quantity and price would be dependent on the degree to which housing builders would lower housing price. Because the supply curve assumed is perfectly elastic and the price elasticity of demand assumed is 1.0, the equilibrium quantity and price could be estimated according to several assumptions of supplier's housing prices lowered as follows:

As Table 7 shows, if housing builders reflect reduced capital cost into housing prices, the quantity would increase by the percentage changes in quantity induced by not only decrease in housing prices but also increase in demand due to increased income caused by lowered user cost of home ownership. That is, in the case of 10% decrease in price under the condition of 7% interest rate, the quantity would increase by 11.28% (1.28% + 10%). Therefore, if median housing price is lowered from $112,585 of the short-run equilibrium price to $101,327 by 10%, the quantity under 7% interest rate would increase from 667,000 units to 74,224 units by 11.28%.

On the other hand, according to the equation (7.2) of Kenneth T. Rosen's cross-section results, since average percentage increase in the user cost of home ownership under the Armey plan in the short-run is 23% [= (20% + 22% + 27%)/3] indicated in table 5, home ownership rate would decrease from 64.2% (in 1991) to 63.55% by 1.012% (= 23%*0.044). Therefore, as seen in Table 8, since total owner-occupied housing as of 1991 was 59,796,000 units, total owner-occupied

Table 7. The Housing Quantity under the Armey Plan in the Long-run.

	i = 0.07	i = 0.06	i = 0.05
% change in quantity due to increased demand (A)*	1.28	2.72	4
% change in quantity due to lowered price (B)**			
10% decrease in price	10	10	10
20% decrease in price	20	20	20
30% decrease in price	30	30	30
total % change in housing quantity (A+B)			
10% decrease in price	11.28	12.72	14
20% decrease in price	21.28	22.72	24
30% decrease in price	31.72	32.72	34

* % change in quantity due to increased demand, as seen in table 5, are the same across the income level.

** The price elasticity of demand for housing is assumed to be 1.0 for every income level.

Table 8. Occupied Housing Units by Tenure (in thousands).

Tenure	1970	1980	1991
Occupied units, total	63,445	80,390	93,147
Owner occupied	39,886	51,795	59,796
(%)	(62.9)	(64.4)	**(64.2)**
Rental occupied	23,560	28,595	33,351

Source : U.S. Bureau of Census, *Statistical Abstract of the United States*, '94.

housing would decrease to roughly 59,191,000 units by 605,000 units or 1.012%.

Also, since average percentage change in the user cost under the condition of 7% interest rate in the long-run is -8%, home ownership rate would increase from 63.55% (in the short-run) to 63.77% by 0.352% (= 8%*0.044) according to the equation (12).

Therefore, total owner-occupied housing would increase from 59,191,000 units (in the short run) to roughly 59,399,000 units by 208,000 units or 0.352%.

IX. Conclusion

The Armey plan would have a great impact on housing market. In the short-run, households would decrease their demand for housing services due to increased user cost of home ownership caused by nondeductibility of mortgage interest and property tax payments. Higher income class would be greatly affected by the Armey plan because of higher marginal tax rates. In the end, housing price would decrease by more than 10% and housing quantity would not be changed.

In the long-run, the user costs of home ownership and capital would be reduced owing to lowered interest rate resulting from untaxed savings and investments. Especially, the capital cost to the corporate builders under the Armey plan would be reduced by more than 25% without further lowered interest rate. Households would increase housing demand due to reduced user costs but housing builders would not entirely reflect reduced capital costs into housing prices. In effect, the housing market in the long-run would depend on the extent to which housing builders would lower housing prices. Since the price elasticity of demand for housing is assumed to be 1.0, 10% decrease in housing price under the condition of 7% interest rate would cause more than 10% increase in housing quantity.

In sum, the Armey plan would cause housing price in the short run to decrease with unchanged quantity because of nondeductibility of mortgage interest and property tax payments in the short-run. But the Armey plan would cause housing market in the long run to be more activated, that is, increase in housing quantity and decrease in housing price, through lower interest rate caused by untaxed savings and investments that mean tax neutrality against savings and investments.

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