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Housing Tax Policy: Comment

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Housing and Tax Policy: Comment

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Abstract

Alpanda and Zubairy (2016) examine the effects of permanent changes to four types of housing-related tax policies in the context of a multi-agent DGE model. They find long-run tax multipliers that range from -2.21 to -1.53. However, we find an error in their codes that has a significant impact on the size of these multipliers. We correct their error and re-simulate their model. The long-run multipliers we find are reduced almost in half—they now range from -1.25 to -0.84. We also compute short-run multipliers at a 20-quarter horizon and find much lower multipliers, ranging between -0.14 to -0.02.

Most work that aim to measure the effects of permanent changes in tax policies in the housing sector feature life-cycle models, and do so by comparing steady states. In contrast, Alpanda and Zubairy (2016) (AZ, hereafter) contribute to the literature by proposing a dynamic general equilibrium model, based on Iacoviello (2005), that allows them to take into account the transitional paths between steady states. Their framework is also well-suited to assess the spill-overs to other sectors than housing, and particularly the effects on GDP. Specifically, there are three types of agents: (i) patient households, which are the savers in the economy, (ii) impatient households, who borrow against the value of their homes, and (iii) renters, who are hand-to-mouth. They also introduce features of the US housing tax code, such as (i) the mortgage interest deduction, (ii) the absence of taxes on imputed rents, (iii) a property tax rate, and (iv) the deduction depreciation of rental property.

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TABLE 1: Long-run and short-run tax multipliers

Housing tax policy changes	Long-run multp.		Short-run multp.	
	AZ	Re-simulation	AZ	Re-simulation
Reduction of mortgage interest deductions	-1.53	-0.84	-0.74	-0.14
Instituting partial taxation of imputed rents	-1.96	-1.1	-0.9	-0.13
Property tax increase	-2.02	-1.13	-0.89	-0.1
Reduction of depreciation allowance	-2.21	-1.25	-0.84	-0.02

These four features are at the center of the experiments that they undertake. Specifically, the authors examine the effects of (i) a reduction in the mortgage interest deduction, (ii) a partial tax on imputed rents, (iii) a higher property tax rate, and (iv) a partial elimination of the deduction depreciation of rental property. They first assume that the economy is at its steady state in period 0, and then engineer permanent changes to the tax code so that the government raises 50% additional tax revenues in present value terms for all four experiments separately. The present value is taken over $T = 1,000$ quarters, and is measured as follows:

$$PV_{tax} = \frac{1}{tax_0} \sum_{t=0}^{T} \beta_P^t (tax_t - tax_0) \tag{1}$$

where β_P is the discount factor of patient households. Analogously, the present value of GDP is:

$$PV_y = \frac{1}{y_0} \sum_{t=0}^{T} \beta_P^t (y_t - y_0). \tag{2}$$

The long-run multipliers reported in the first two columns of Table 1 are computed in the following way: $-\frac{PV_y}{PV_{tax}} \frac{y_0}{tax_0}$. As claimed by AZ, they are around -2.

However, these multipliers are incorrect, since there is a error in their codes. The problematic equation is the following first order condition of the patient households with respect to capital, which appears on line 382 of their Dynare file:

$$\lambda_{P,t}\left(1+\kappa_{ik}\left(\frac{k_t}{k_{t-1}}-1\right)k_t/k_{t-1}\right)q_{k,t} = \beta_P E_t\left[\lambda_{P,t+1}\left(\begin{array}{l}\left(1-\delta_k+\kappa_{ik}\left(\frac{k_{t+1}}{k_t}-1\right)(k_{t+1}/k_t)^2\right)\mathbf{q_{h,t+1}} \\ +(1-\tau_k)r_{k,t+1}+\tau_k\delta_k\end{array}\right)\right] \tag{3}$$

where $\lambda_{P,t}$ corresponds to the Lagrange multiplier attached to the budget constraint of patient households, k_t to the stock of capital, $q_{k,t}$ to its relative price, $r_{k,t}$ to its rental rate, and δ_k to its depreciation rate. The adjustment costs to capital are governed by κ_{ik}. The intruder variable is $\mathbf{q_{h,t+1}}$, which corresponds to the relative price of housing. The relative price of capital $q_{k,t+1}$ should show up instead. It is a small coding error, but it has important consequences on the transitional paths of aggregate variables and the multipliers. However, it does not affect the terminal steady state values. We correct their error and re-simulate the four experiments. As can be seen in the first two columns of Table 1, the resulting multipliers are reduced to almost half the original values.

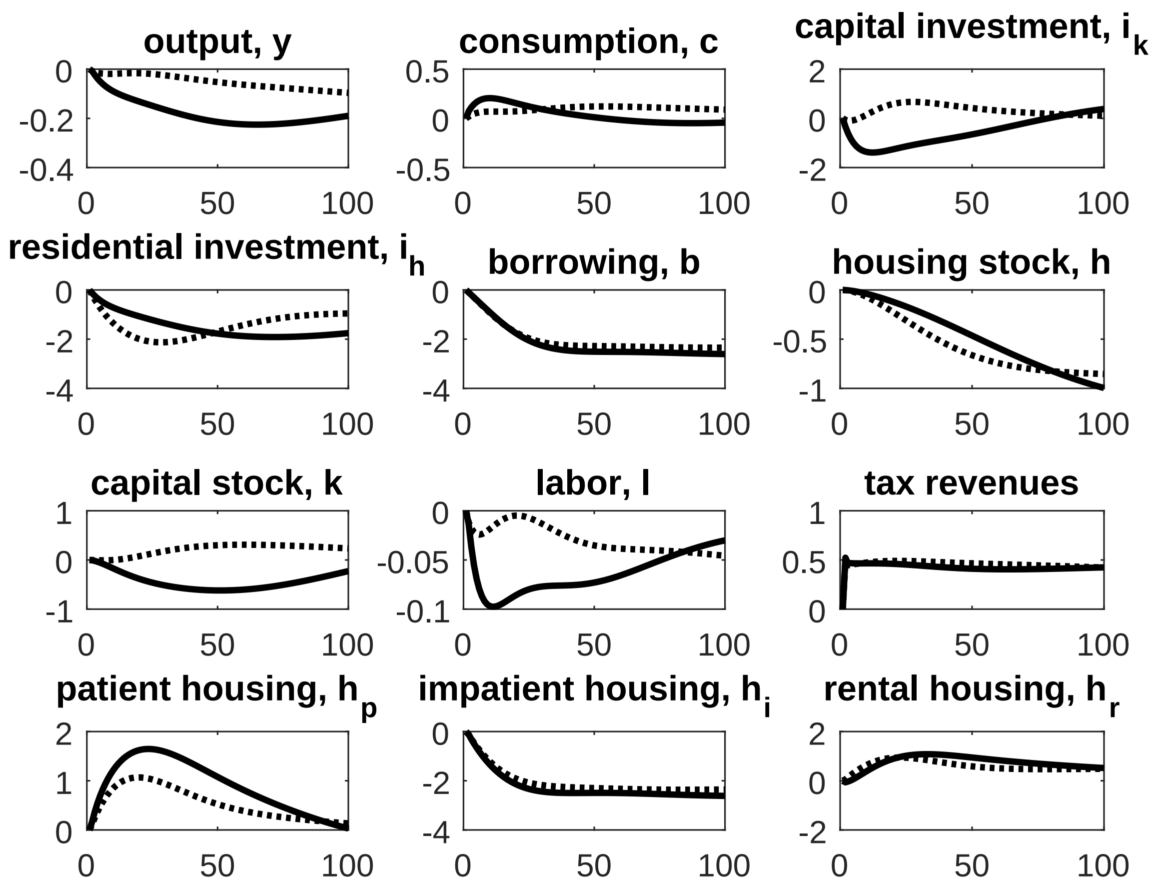

Figure 1: Transitional paths in response to reduction in **mortgage interest deduction**. The solid lines correspond to AZ's simulation and the dashed lines to the re-simulation of their model.

To gather some intuition on the differences between these results, in Figure 1 we compare the transitional paths obtained by AZ and those from our re-simulation, following a permanent change in the mortgage interest deduction. The comparisons of the transitional paths of the three remaining experiments are presented in Figures 2 to 4, which are located in the Appendix. Correcting for AZ's coding error has important consequences for the dynamics of capital accumulation. Since households substitute away from housing and demand more non-housing goods, capital investment increases. As a consequence, the marginal product of labor also increases, thereby dampening the effects on the equilibrium values of labor. In the short-run, output still decreases, but much less than what is presented by AZ.

In the last two columns of Table 1, we present short-run multipliers, which we define as equations (1) and (2) evaluated at a horizon of $T = 20$ quarters. We consider that this is the midpoint of business cycle frequency. We find very small effects on output from implementing changes in housing tax policies, as the multipliers range from -0.14 to -0.02. It appears that the differences in the long-run multipliers between AZ and our re-simulation are mainly driven by diverging responses in the short-run.

Table 2 presents the effects on welfare of the permanent changes in the housing tax code for the three types of households. Columns 1 to 3 pertain to the results of AZ, while columns 4 to 6 to the results following our re-simulation of the same experiments. Once we correct for the coding error, the welfare effects do not change much. The only significant change is the effect of property tax increase on patient households. Specifically, we find that these households are now negatively affected by this policy change.

TABLE 2: Welfare effects of housing tax policies

	AZ			Re-simulation		
	Savers	Borrowers	Renters	Savers	Borrowers	Renters
Reduction of mortgage interest deductions	0.22%	−0.59%	0.33%	0.11%	−0.74%	0.31%
Instituting partial taxation of imputed rents	−0.17%	−0.3%	0.33%	−0.16%	−0.28%	0.3%
Property tax increase	0.11%	−0.22%	0.01%	−0.1%	−0.2%	0.01%
Reduction of depreciation allowance	0.13%	0.08%	−1.16%	0.12%	0.07%	−1.05%

In conclusion, it is important for policy makers to know that the effects of housing tax policies on economic activity that aim to raise tax revenues are actually quite moderate. The short-run multipliers are even close to zero.

References

Alpanda, S. and Zubairy, S.: 2016, Housing and tax policy, *Journal of Money, Credit and Banking* **48**(2-3), 485–512.

Iacoviello, M.: 2005, House prices, borrowing constraints, and monetary policy in the business cycle, *The American Economic Review* **95**(3), 739–764.

A Additional Figures

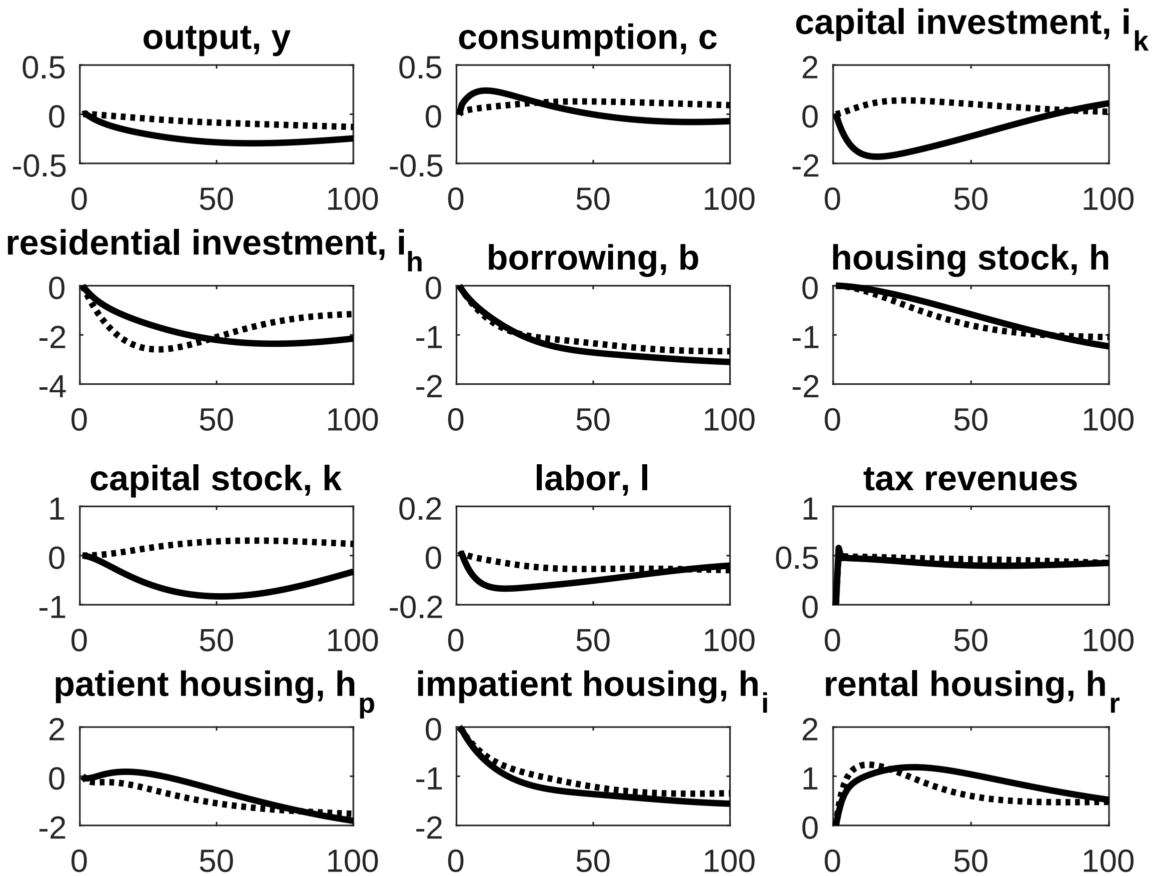

Figure 2: Transitional paths in response to instituting **partial taxation of imputed rents**. The solid lines correspond to AZ's simulation and the dashed lines to the re-simulation of their model.

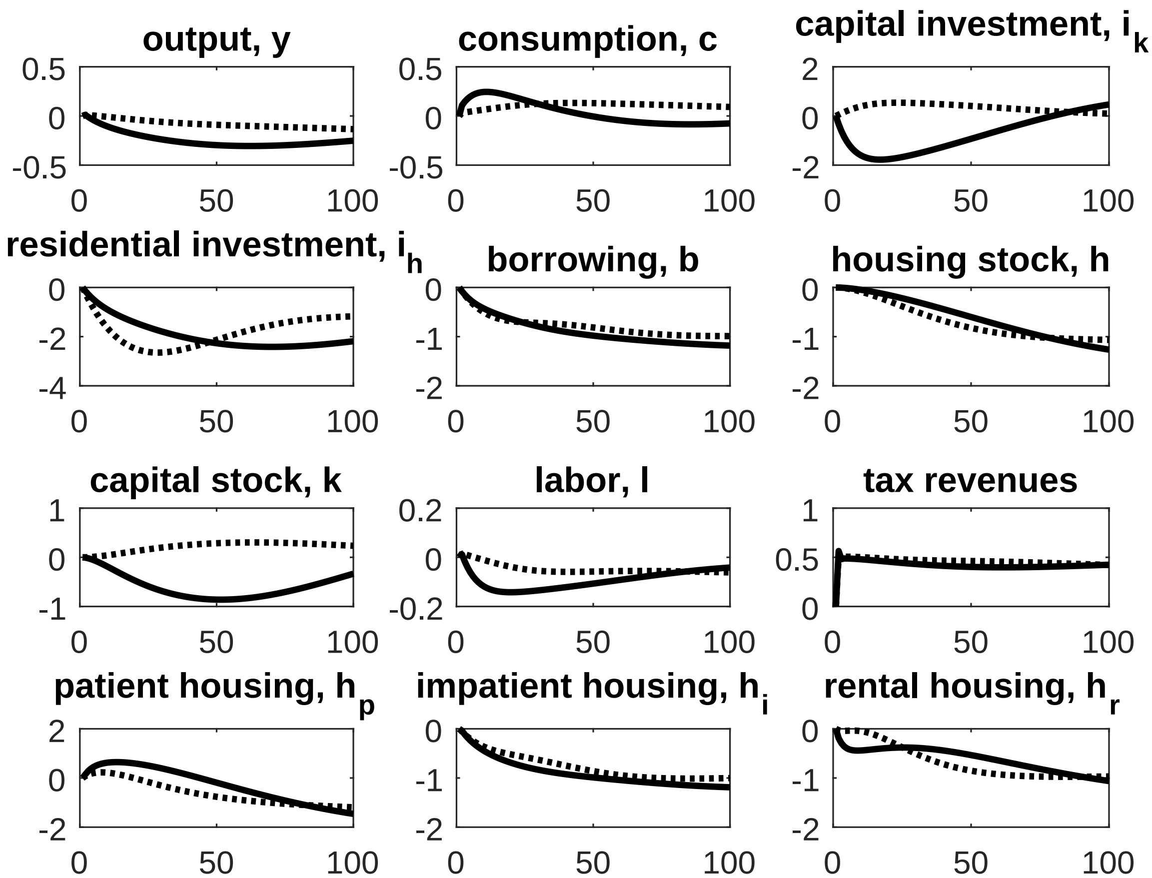

Figure 3: Transitional paths in response to an increase in **property taxes**. The solid lines correspond to AZ's simulation and the dashed lines to the re-simulation of their model.

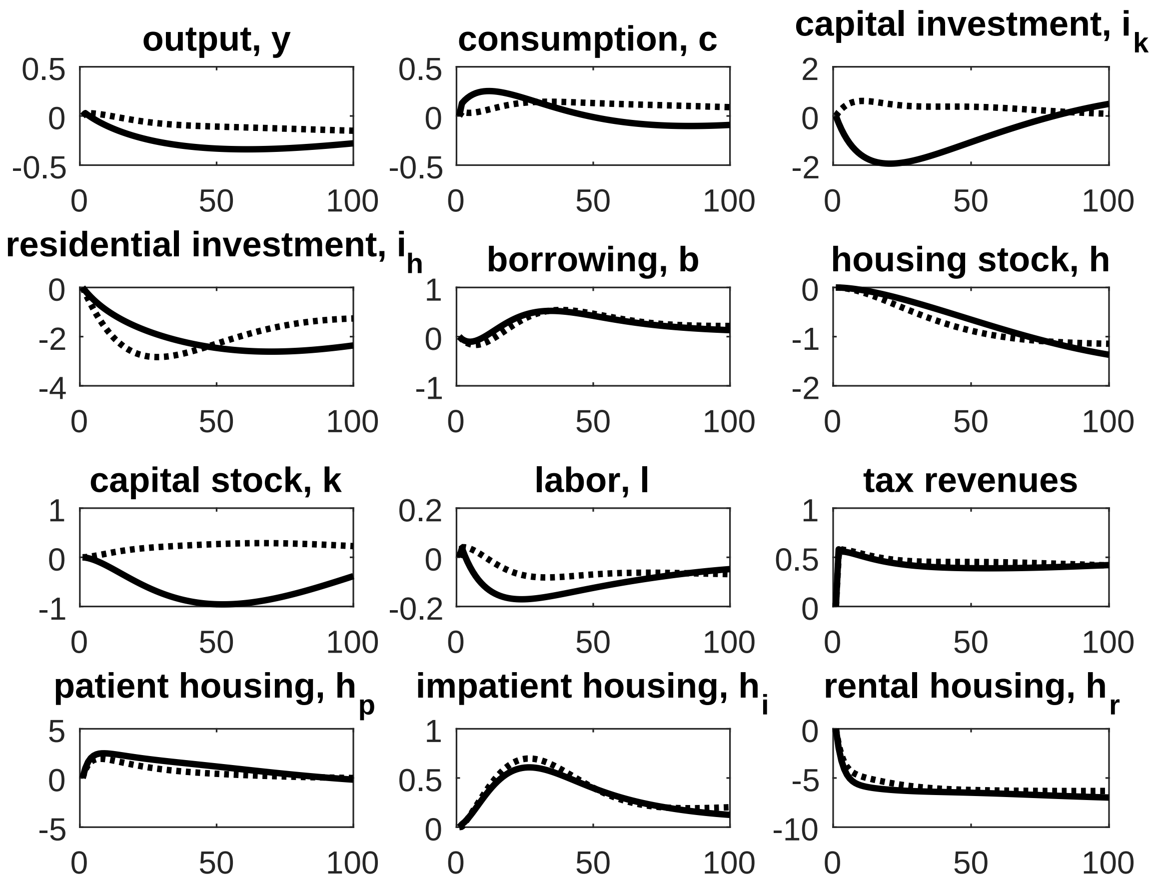

Figure 4: Transitional paths in response to a reduction of **depreciation allowance**. The solid lines correspond to AZ's simulation and the dashed lines to the re-simulation of their model.