Asymmetries in Price Developments: Some Micro Data Evidence

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May 9, 2007

The paper intends to explore asymmetries in the price development as a response to value-added tax (VAT) changes using a micro-level CPI data set of Hungary. VAT changes[1] provide a valuable source of information, as these kind of exogenous cost push shocks influence a large number of firms simultaneously and in an easily measurable way. What makes the Hungarian data especially interesting is the natural experiment provided by two major VAT increases and a major VAT decrease within 2 years time.

The fiscal authorities increased the medium VAT tax rate of 12% by 3%-points in January 2004, and again by 5% points in September 2006[2], and decreased the 25% highest tax rate by 5% point in January 2006.

The observed reactions to these sizable VAT changes can not be well explained by the standard Calvo model assuming exogenous probability of price changes and small shocks, but seem to be in line with the predictions of menu cost models. The data implies that the average frequency of price adjustment of affected products has increased from around 20% to almost 60% in case of the VAT increase and to over 35% in case of the VAT decrease. Furthermore, the average size of price changes has decreased from the average of 13% to below 10% in case of the VAT increase and from the average of 12% to below 8% in case of the price decrease. These latter facts suggest that the VAT changes induced firms with prices not that far from their optimal price – which normally would not have triggered a price change – to adjust their prices potentially as a result of the increased loss they could expect as more firms adjusted their prices.

Preliminary panel analysis of the data (Gabriel-Reiff, 2007), furthermore, shows a highly asymmetric inflation effect of the VAT changes. The 3% point increase of the 12% VAT tax rate in January 2004 had a 2.24% overall inflation effect, even though the full pass-through would imply a 2.68% effect[3], while the

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[1] in Hungary most sectors quote gross prices

[2] We expect data covering period after May 2006 during the summer, opening way to check whether the second, even larger VAT increase had any noticably different, potentially non-linear effect on the price changes.

[3] 1.15/1.12-1=0.0268

5% point decrease of the 25% VAT tax rate in January 2006 had a -0.94% effect, even though the full pass-through would imply a -4% effect.

There are various potential reasons for the observed asymmetry in the price development. Exogenous reasons can come from the different sectoral composition of the two VAT changes, from the asymmetry in the size of VAT changes, or from the potential asymmetry in the menu costs (because of sales), while more endogenous reasons could be the positive (and different) inflation levels at the time of VAT changes (Ball and Mankiw, 1994), and the asymmetric strategic incentives of the firms to keep their prices close to other firms prices (Devereux and Siu, 2007).

The paper plans to use Simulated Method of Moments to estimate a sectoral menu cost model based on the model of Klenow-Willis, 2006 in order to quantify the effects of the various sources of asymmetry. To numerically solve the model, the paper will use value function iteration with shocks to aggregate variables as in Krusell and Smith, 1998, or use third order approximations of the first order conditions and particle filtering as suggested by Arouba, Villaverde and Rubio-Ramirez, 2006.

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