Discussion of "Large Shocks in Menu Cost Models"

by Peter Karadi and Adam Reiff

Discussion by Anton Nakov (Banco de España)

September 2013

Overview

- Very nice paper
- Presents new micro evidence on retail price setting in Hungary
- Makes important new points about the behavior of different menu cost models subject to large shocks
- Highly recommended read

Motivation

- Quest for good micro-founded models of nominal rigidity, that
  - Match salient features of price-setting at the micro level, and
  - Produce realistic responses to aggregate shocks
- Contribution to the growing literature on state-dependent pricing
- Different from the literature, the paper focuses on explaining what happens after **large** aggregate shocks

Methodology: setup

- Set up a menu cost model with idiosyncratic shocks, a la Golosov-Lucas (2007)
- Study three versions of the model corresponding to alternative assumptions about the distribution of idiosyncratic shocks:
  - Gaussian (Golosov-Lucas)
  - Poisson (Midrigan)
  - **Mixed Normal** (Karadi-Reiff)

Methodology: evidence and calibration

- The models are calibrated to match several moments from a new data set on store-level prices in Hungary
- Document evidence on the effects of VAT changes of $\pm 5\%$ in 2006

Methodology: testing the three models

- Test the three models by subjecting them to the same VAT shocks
- Focus on the behavior of
  - the adjustment frequency
  - the average absolute size of price changes
  - the inflation pass-through
- Do this separately for positive and negative VAT shocks

Findings: frequency and asymmetry effects

- The VAT shocks in Hungary had large effects on the frequency of price changes and on inflation pass-through
- **Asymmetry**: the effects differed for the VAT increase and decrease
- The Gaussian and Poisson models have difficulty in matching quantitatively these effects: Poisson overstates asymmetry
- The model that matches the evidence best is the intermediate **Mixed Normal model**

Methodology: simulation of the inflation effects of money

- Simulate the effects of large **monetary** shocks
- Explain the differential behavior in terms of different contributions of the intensive margin, extensive margin, and selection effect

Findings: dependence of pass-through on shock size

- Midrigan (2011): for small shocks the Poisson model has a much lower inflation pass-through than the Gaussian model
- But for large shocks: the Poisson model has **higher** pass-through than the Gaussian model !
- Preferred **Mixed Normal model**
  - for small shocks: higher inflation pass-through than the Poisson model (but not as high as the Gaussian model)
  - for large shocks: higher inflation pass-through than the Gaussian model (but not as high as the Poisson model)

Findings: decomposition of the inflation effects

- For small shocks, the differences in pass-through are explained by the **selection effect**: shift in the **mix** of adjusting firms towards firms whose idiosyncratic shocks call for (large) price increases
- For large shocks, the differences are explained by the **extensive margin**: change in the **number** of adjusting firms (more price increases than decreases)
- High trend inflation or more leptokurtic idiosyncratic shocks lead to more asymmetric responses

Comments: main idea

- I welcome the idea to select among state-dependent pricing models based on their predictions for large aggregate shocks
- So far people have looked mainly at the effects of changes in **steady-state inflation** on the **frequency** of price changes
- But many SDP models get this effect right
- This paper looks at the effects of **large shocks in a low inflation environment**, focusing on the asymmetry of responses

Comments: inflation decomposition

- I like that the paper clarifies the distinction between **extensive margin** and **selection effect**
- For small shocks the selection effect dominates: important is **who** adjusts (and who doesn't), and not **how many** firms adjust
- For large shocks the extensive margin dominates: important is **how many** firms cross from inaction to action (and vice-versa)

Comments: relevant model comparisons

- I would dispense with the Calvo model: it doesn't have either a selection effect or an extensive margin
- For small shocks the comparison of SDP with Calvo has been made by GL, Midrigan, etc. And for large shocks Calvo makes no sense
- Better focus on the differences among the three menu cost models

Comments: relevant model comparisons

- Even better: compare the menu cost models with alternative SDP models: e.g. Woodford (2008), Costain-Nakov (JME, 2011)
- These models match better micro evidence such as the size distribution of price changes
- They have a muted selection effect for small shocks
- But they also feature smoother responses of the extensive margin
- Would be interesting to contrast their performance under large shocks

Comments: unobservable idiosyncratic shocks

- The authors calibrate the idiosyncratic shock process based on the mean, the kurtosis, and interquartile range of price changes
- But the mean and kurtosis are very sensitive to outliers
- Others have tried to match the entire **histogram of price changes**, e.g. Costain-Nakov (JMCB, 2011)
- A challenge is that in the data there is a mixture of large and small price changes

Comments: histogram of price changes

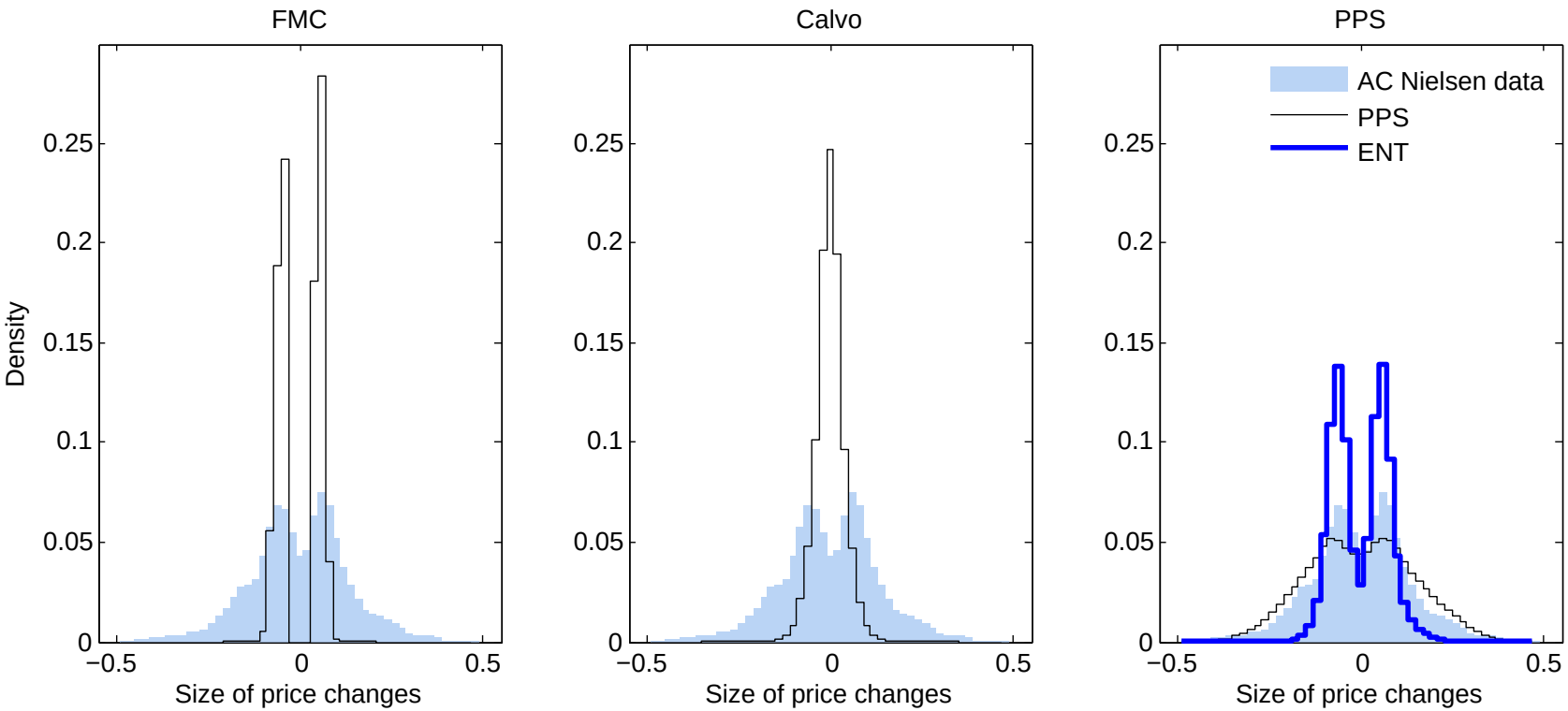

Figure : **Fixed** menu cost models have a hard time

Comments: histogram of price changes

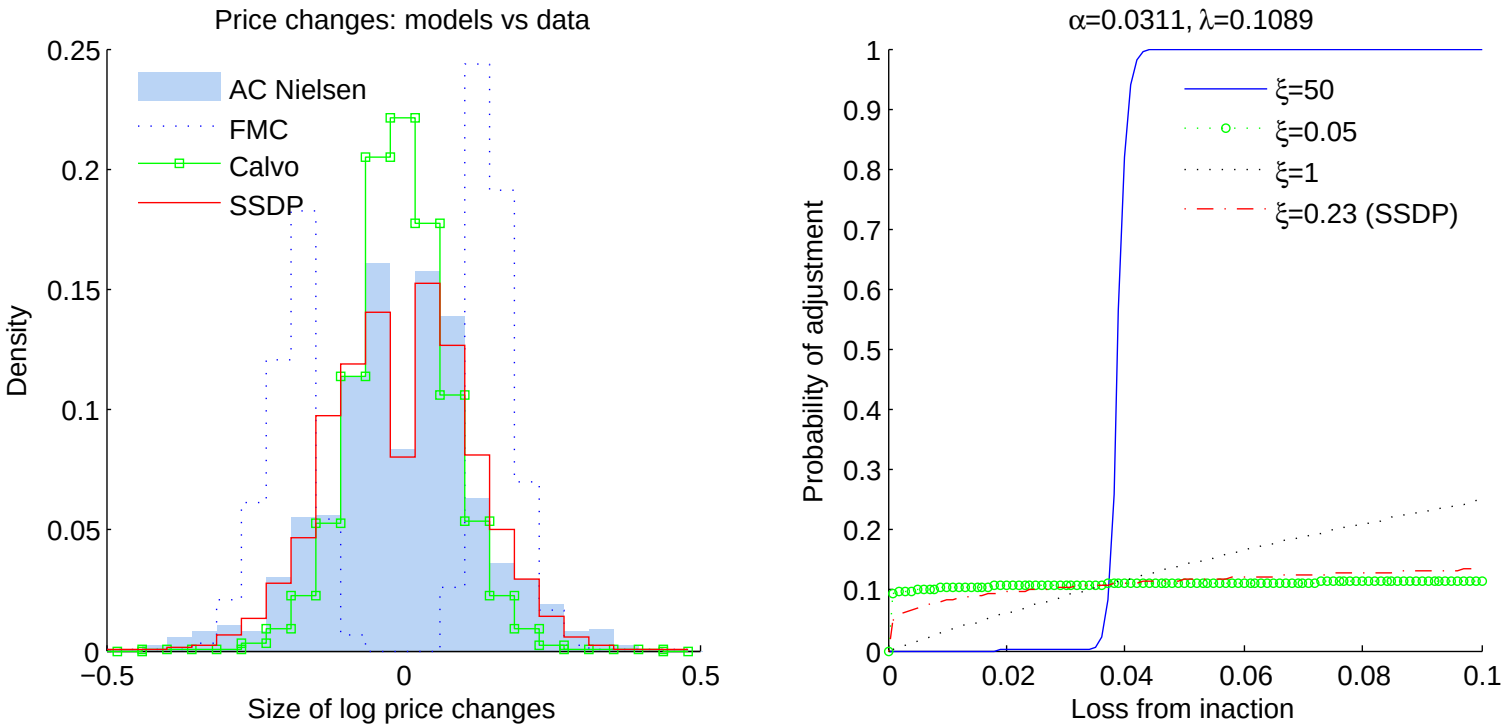

Figure : Costain-Nakov (JME, 2011)

Comments: unobservable idiosyncratic shocks

- Some datasets have information on both prices and costs, e.g. Eichenbaum-Jaimovich-Rebelo (2011)
- If such data is available for Hungary it can be used to estimate more directly the unobservable idiosyncratic shock process

Comments: model simplifying assumptions

- The menu cost is scaled by productivity: reduces the dimensionality of the problem, but how does it affect the results?
- Model initially set up with general (non-linear) labor disutility but later for the solution it is specialized to linear
- Solution assumes perfect foresight with respect to aggregate variables
- Assumptions made such that the nominal interest rate remains constant after the monetary shock
- All these assumptions can be relaxed using Reiter's (2009) solution method

Comments: other puzzling facts

- Both in Eichenbaum-Jaimovich-Rebelo (2011)'s and in Dominick's data (Midrigan, 2011) **prices are more volatile than costs**

Comments: prices are more volatile than costs

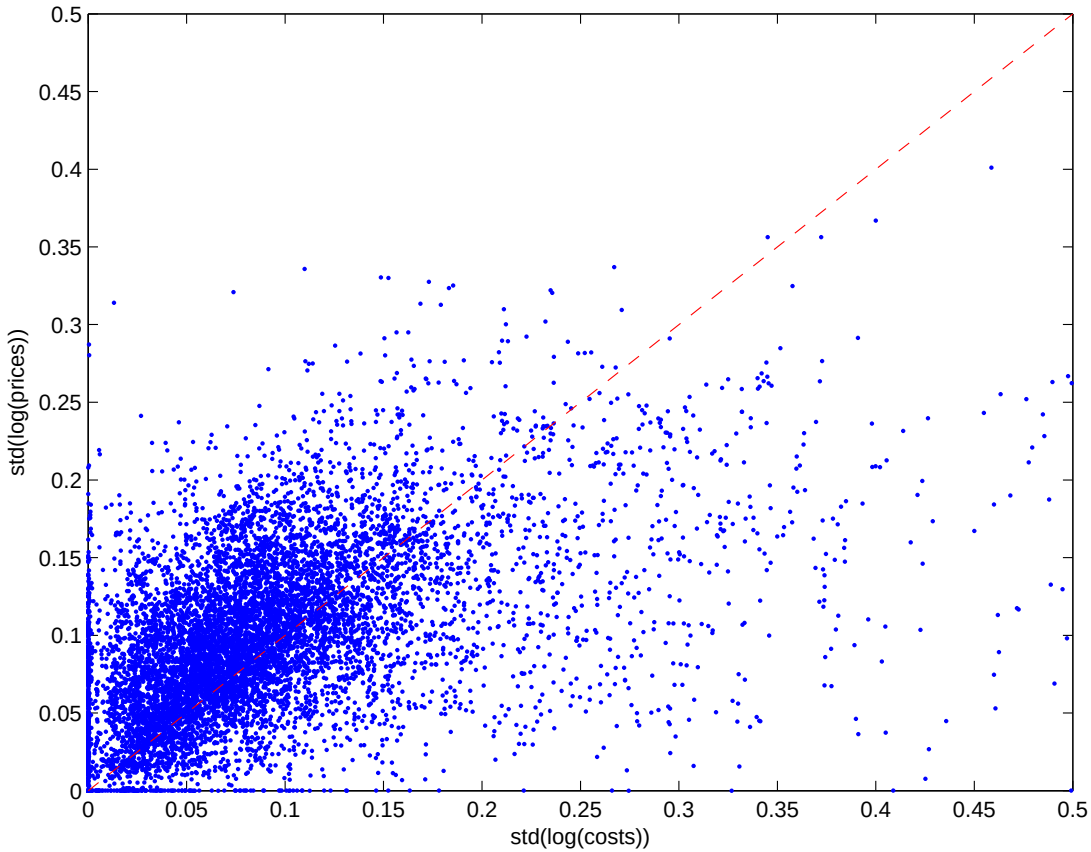

Figure : Price-cost volatility pairs for 9450 products (Dominick's)

Comments: prices are more volatile than costs

- But in the standard menu cost model the opposite is true: firms anticipate mean reversion in costs, hence they price conservatively

Comments: adjustment hazards are downward sloping

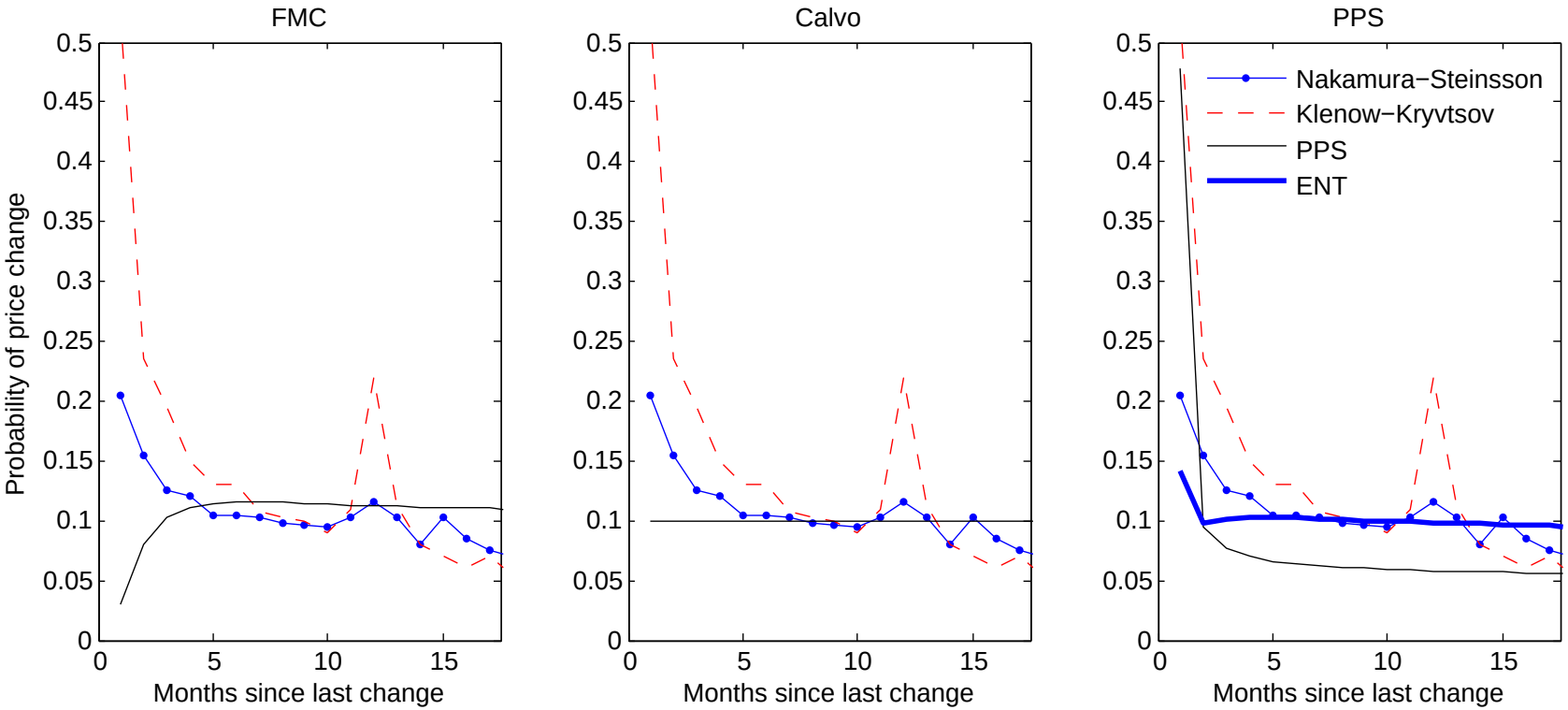

Figure : Upward sloping hazard in menu cost model

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- Costain-Nakov (2013) propose a simple one or two parameter SDP model that can explain these and more puzzling facts
- Based on the idea that avoiding errors in decision-making is costly
- **"Logit price dynamics"**, Banco de España Working Paper 1301
- **"Precautionary price stickiness"**, ECB Working Paper 1375