Discussion of

“Commodity Price Movements in a General Equilibrium Model of Storage”

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main contribution of the paper

- introducing the storage model in a General Equilibrium setting is a great idea:
  - the storage model provides a consistent framework for analyzing the impact of demand and supply shocks on the price of storable commodities;
  - the GE setting imposes consistency between intertemporal (consumption/saving and the storage decision) and intratemporal allocation decisions.

main contribution of the paper

- the model provides a high return:
  - insight in the typical commodity price behaviour: non-linear relation with D-S shocks, high/low volatility and autocorrelation depending on stock level, spot-forward price behaviour and relation with price volatility;
  - structural model for analysing commodity-related policy issues in GE context;
  - model for monetary policy?

  => relating commodity demand-supply-price to the business cycle would be very useful for inflation forecasting, for the interpretation of the stance of the cycle and for deciding on the desired policy response

main contribution of the paper

- the model structure is simple but contains the necessary building blocks for a consistent analysis of storage in a GE setting:

- households consume final goods and commodities, and supply labour:
  - labour supply remains fixed in calibrated version
  - no capital accumulation

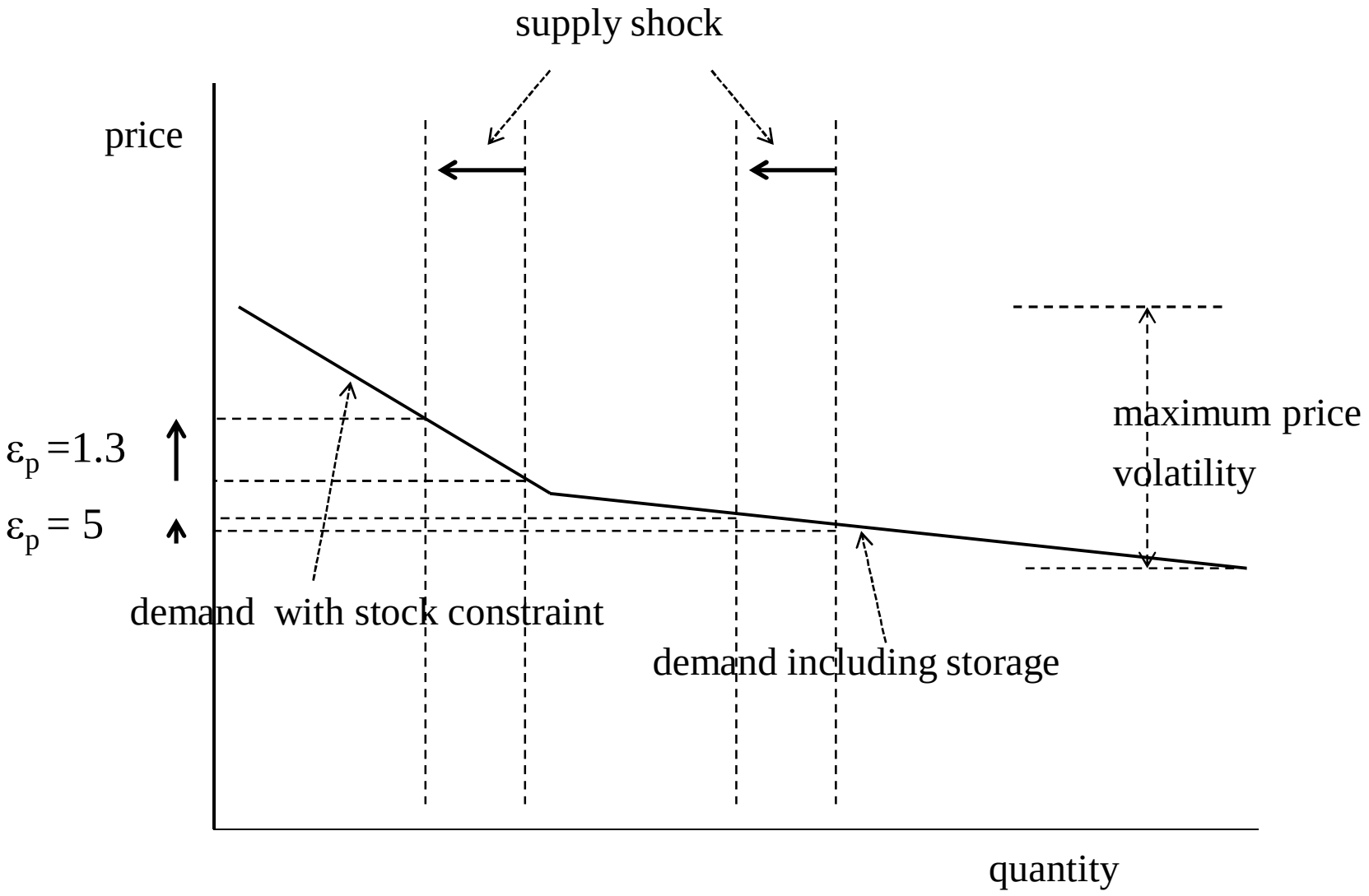
  => storage of commodities is only way to smooth consumption over time
- final good producers use labour, commodities and (fixed) capital
- commodity production is predetermined with planned production potentially responding to expected prices
- competitive risk-neutral and rational speculators choose optimal storage level in order to equalize the cost of storage (spot price + storage cost) to discounted expected price under the non-negativity constraint for inventory

questions about calibration choices

- log utility function in final consumption and commodities implies a unit relative price elasticity for the final demand for commodities
- CD production function in the final good production sector implies unit price elasticity for intermediate demand for commodities

=> imply high demand elasticity for commodities even during periods when stocks are low

=> impossible to generate high price volatility



questions about calibration choices

- highly elastic demand

  => impossible to generate high price volatility

  => consider alternative preferences and CES-production function

- exogenous supply: price elasticity of supply is assumed to be zero

  => no feedback from supply to announced policy changes

- limitations for policy analysis of biofuel subsidy ?

implications for policy analysis of biofuel subsidy

- subsidy has strong effect on demand for corn/biofuel as intermediate inputs in production (highly price elastic demand), but these resources are flexibly provided by the equally elastic final demand for food
  => large shifts in sectoral usage of corn without big price effects

- lower price elasticity in both final and intermediate demand would reduce shifts in volumes but probably not in prices, but what if final demand is much less elastic than demand for intermediate inputs ?

- impact of this policy change will also affect supply:
  => how price elastic ?
  => depending on whether policy change is expected or not ?

- introduction of subsidy that increases demand temporary above supply might reduce stocks and increase the probability of stockouts and high price increases

further empirical validation is desirable

- sensitivity of the results to the calibration should be further illustrated

- calibration could exploit results from empirical partial-equilibrium storage literature (Deaton Laroque 1995-96, Cafiero et al 2010-11, etc)

  => successful in reproducing stylized facts on commodity price volatility and autocorrelation, and on spot and forward price relation

  => too much focused on price data only, not exploiting information from demand, supply and inventory

  => using annual data, focused on impact of crops on price volatility

further (ambitious) model extentions are also desirable

- a realistic high frequency model, that wants to investigate also the asset price implications of the storage model in GE, should relax the assumptions on risk neutral agents and rational expectations

  - producers that are not risk-neutral or that face bankruptcy costs, have an interest to hedge their positions by forward short positions
  - investors (speculators) have massively increased their long forward positions and provide insurance

  => allows for higher inventories and increases spot prices, but reduces volatility in the long run, unless financial shocks force market participants to revise their positions

further (ambitious) model extentions are also desirable

- increased financial trade in commodity related products since 2003, together with volatile commodity prices, puzzling price-inventory and spot-forward behaviour and high correlation between commodity prices and equity markets, suggest increased role of capital markets for commodity prices

- a model that wants to explain the role of capital investments in forward markets, hedging activity, forward prices for real storage decisions and spot prices must be based on:
  - heterogeneous agents (producers, hedgers, various investors) that are risk averse and have limited capital available (Gorton et al 2006, Acharya 2010, Tang and Xiong 2009, Hamilton 2011, Singleton 2011, Xiong 2012);
  - important role for imperfect information and heterogeneous beliefs with role for learning dynamics (Singleton 2011, Adam Marcet 2011, Evans et al 2011)