

Optimal trade and storage policies

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References

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- Gouel (forthcoming) Food Price Volatility and Domestic Stabilization Policies in Developing Countries. In: Chavas, Hummels & Wright (Eds.), *The Economics of Food Price Volatility*. University of Chicago Press.
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Best practices

Last 20 years, standard international recommendations about price stabilization policies:

- Avoid direct market interventions:
 - Rely on world market.
 - Rely on a private marketing system.
- Help people to cope with shocks through safety nets.
- Promotion of market-based risk management instruments.

But market interventions still widespread

- In 2007/08, 68 out of 81 developing countries used trade policy measures (Demeke, Pangrazio and Maetz, 2009).
- Countries that weathered the food crisis best have been highly interventionist countries (e.g., India and China).
- Even countries with large CCT programs adjusted trade policies before scaling up these programs (e.g., Jamaica, Mexico).

Policy situation

Why this situation?

- Safety nets may not be in place, may be imperfect, or may be difficult to adjust within the time-frame of a food crisis.
- Safety nets are targeted, so part of the population will face higher food prices) relying only on safety nets may be politically difficult.
- It may be less fiscally costly to use export restrictions than to scale up safety nets.

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It seems likely that price stabilization policies will be here for a long time.

Policy objective

Welfare maximizing government with objective function:

$$\max_{t=t_0} E_{t_0} \sum_{t=t_0}^{\infty} \beta^{t-t_0} W_t - \lambda (P_t - P)^2 ;$$

where

- W_t is a standard utilitarian social welfare function (sum of surpluses, including the costs of the policies).
- P is a target price level (the steady-state price is a natural choice).
- λ measures the importance assigned to price stabilization in total welfare.

Motivated by the evidence from the AgDistortions database that **countries routinely use trade policies to offset world price deviations from trend** (Anderson & Nelgen, 2012).

Optimal policy approach

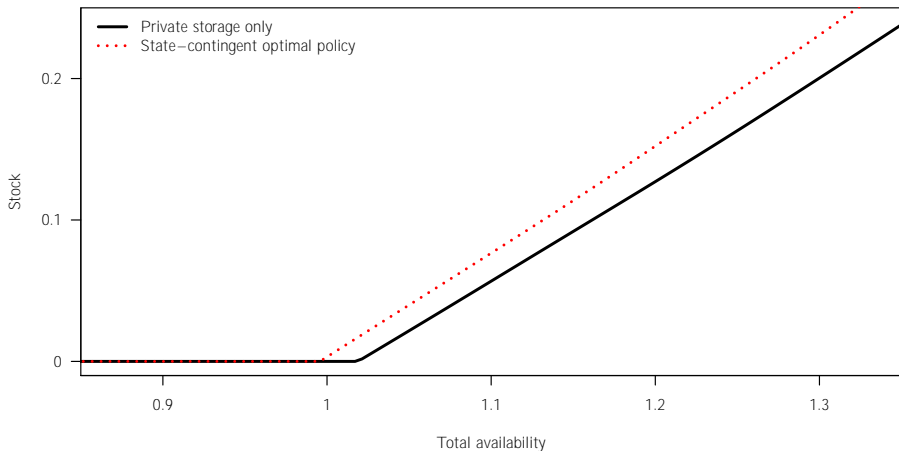
- No closed-form solution for the rational expectations storage model
 - Results are derived from numerical simulations.
 - Models calibrated on values typical of developing countries.
- Results generated in various settings and for various calibrations: closed/open economy, inelastic/elastic supply, small/large country.
- Stochastic problem:
 - Its solution is not an optimal storage or trade level but **policy rules contingent to the state of the system**.
 - The state of the system depends on the model:
 - Availability (= production + beginning private stocks).
 - Beginning public stocks under a price-band program.
 - ...

Competitive storage rule in closed economy

If

Optimal storage

If $\beta > 0$, **competitive storage does not maximize welfare**. The social preference for price stability would dictate a storage level higher than the competitive level.



Consequences of optimal storage in closed economy

- Stocks accumulate
 - At lower levels of availability;
 - With a higher marginal propensity to store.
- Prices are skewed by the additional storage:
 - Additional stock accumulation reduces the occurrence of low prices;
 - Disposal of stocks cannot prevent all price spikes.
- Optimal storage is everywhere higher to competitive storage
 - If the optimal storage level is achieved by public storage) **Complete crowding out** of private storage.
 - The role of public storage is more important than just increasing stock levels beyond competitive levels.
 - Can be achieved by subsidizing private storage) **Make easier the transition to a private marketing system.**

Open economy

Open economy: most relevant situation, but **more complex issue and few general results available**:

- Depends on the trade status of the country.
- Storage rules display more nonlinearity because of the regime change arising from changes in trade direction.
- Performance of a storage policy depends on the trade policy, and conversely.
 - Both types of policies should be endogenous.
- Complementarity/substitution of storage and trade policies.
 - **Complementary** since a trade policy is needed to provide some isolation from world price to have an efficient storage policy.
 - **Substitutable** since when connected to world market, stabilization can be achieved with different combinations of instruments.

Small open economy with occasional self-sufficiency

Gouel & Jean, WBER

In free trade, domestic price would be occasionally between, but not at, border prices

- Complementarity of the policy instruments:
 - Trade policies are ineffective inside border prices;
 - Storage policies are effective only inside border prices;
- But an asymmetry:
 - During price spikes, the connection to the world market is very likely, so domestic stocks will not protect from high prices as they would be exported to the world market
 - Storage can help preventing price spikes in open economy, but only if flanked by trade policies.
 - In open economy, storage stabilizes prices by decreasing the occurrence of low prices, not high prices.
- The larger the trade costs, the more important storage policy
 - With trade costs 2 times higher than storage costs, the trade policy achieves 2/3 of the gains from both policies.

Large open economy

Gouel, Gautam & Martin, case study on India

- The larger the country
 - The more important storage policy;
 - The less important trade policy;
 - For a large country, the world price is a moving target.

Trade-off between trade and storage policies

In these models, the trade-off will depend on

- Trade situation
- Width of border prices.
 - Storage more effective if border prices very different.
- Reaction of trade partners
 - No results when partner countries react (retaliate?) to domestic stabilization policies.
 - If the widespread use of countercyclical trade policies makes them ineffective (Martin & Anderson, 2012), would it imply a larger role for storage?

The performance of optimal simple rules

The good news

Optimal simple rules can achieve most welfare gains achieved by an optimal policy under commitment:

- In closed economy:
 - A constant subsidy to storage achieves 93% of the gains achieved under optimal policy.
- In open economy (calibrated on the India situation):
 - A constant subsidy to storage combined with countercyclical trade policy (border protection reacts isoelastically to world price)
 - 86% of the gains achieved under optimal policy .

) Competitive storers do a good job at stabilizing prices, they just need some incentives to do more.

The performance of optimal simple rules

The not-so-good news

Price bands are the most discussed storage policies, but surely not one of the best.

- Designed optimally

Key policy messages I

- Complete insulation from world price and export bans should be avoided
 - But it can make sense to vary trade policies countercyclically to world price to partially insulate from world price movements.
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Key policy messages II

- Price bands without private storage are unlikely to improve welfare over the competitive benchmark.
 - If a price band is retained, private storers should be welcome to arbitrate the remaining profit opportunities.

Global perspective

Consider that grain markets are characterized by 2 types of shocks: aggregate shocks to global yield and idiosyncratic shocks.

- Absent any policy
 - **storage** would mostly serve at smoothing **aggregate shocks**;
 - **trade** would smooth **idiosyncratic shocks**.
- Domestic price stabilization policies are orthogonal to the free-market behavior:
 - Trade policies prevent international smoothing of idiosyncratic shocks.
 - Domestic storage protected by trade policies will focus on domestic shocks, not aggregate shock to global yield.

Conclusion

If policy makers insist on using price stabilization policies:

- Numeric storage models are analytic tools that allow comparisons among competing policies
- They can be used to design optimal second-best price-stabilization policies.
- When designed optimally **storage and trade policies could increase social welfare with respect to laissez-faire**, but this is a tricky business.
- Optimal simple rules can achieve welfare results almost as good as fully optimal policies
 - They require trust between government and private storers.
 - Optimal price bands do not behave as commonly expected.
- **Ignore retaliations**: likely to affect results.

