

Optimal trade and storage policies

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References

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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 \Rightarrow 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.



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

Making sense of price-stabilization policies

- Price-stabilization policies are not first-best policies;
- They have drawbacks (subject to regulatory capture, inefficiencies, ...);
- But policy makers are inclined to use them;
- And if well designed we would expect them to increase domestic welfare.

How to help in the design of price-stabilization policies?

Questions

What are the optimal price stabilization policies?

- What role might trade policy play?
- Are stockholding policies a good answer to food price instability?
- Is there an optimal combination of trade & storage policy?

Delicate situation for an economist:

- trade policies are known to be non-cooperative and to hurt trade partners;
- storage policies have a mixed record.

The approach

Inspiration from modern macroeconomics synthesis, and the optimal design of countercyclical monetary and fiscal policies

- **Benchmark**: a small model with microfoundations and rational expectations able to replicate commodity price dynamics (Cafiero et al., 2011): **the competitive storage model** or storage-trade model.
- Introduce a **motivation for price stabilization** (market imperfection, political economy, reduced-form loss function, ...).
- Find optimal policy rules by **maximizing the social welfare function** subject to the constraints implied by private agents' behavior in this market.
 - Different type of policy rules: commitment/discretion/simple rules.

Policy objective

Welfare maximizing government with objective function:

$$\max E_{t_0} \sum_{t=t_0}^{\infty} \beta^{t-t_0} \left[W_t - \lambda (P_t - P^*)^2 \right],$$

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).
- $\lambda \geq 0$ measures the importance assigned to price stabilization in total welfare.

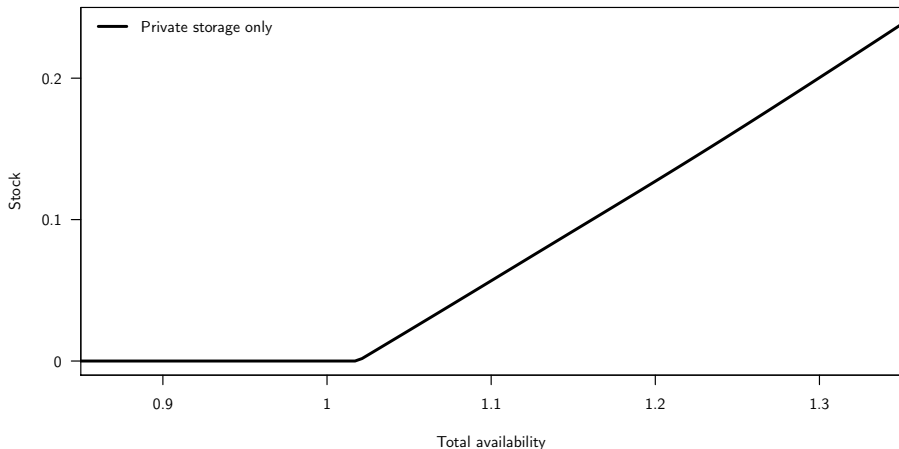
Motivated by the evidence from the AgDistortions database that **countries routinely use trade policies to offset world price deviations from trend** (Anderson & Nelgen, 2012).

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.
 - ...

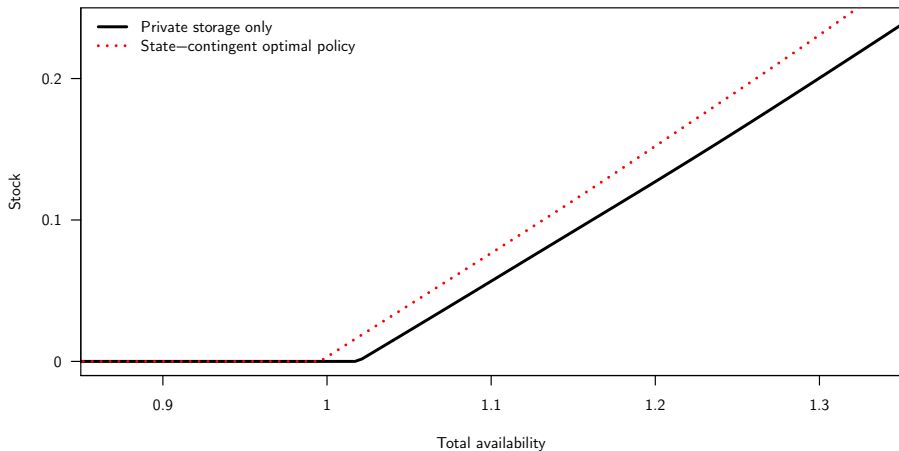
Competitive storage rule in closed economy

If $\lambda = 0$, the optimal storage rule is the competitive storage rule.



Optimal storage

If $\lambda > 0$, **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 \Rightarrow **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 \Rightarrow **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 permanent trade

In the absence of trade costs or with a country consistently importing or exporting

- Domestic price is determined by world price;
- Stabilization can be achieved using trade policy alone;
- Using a storage policy would be redundant and inefficient.

Optimal trade policy

- Trade policies countercyclical to changes in world price;
 - Increase tariff when world price increases
 - Decrease tariff (subsidize imports) when world price decreases.
- Possible bias depending on the difference between the target price and mean world price.

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?

Optimal simple rules

- The policy debate is not about complex state-contingent policies, but about simple rules (e.g., price band, constant subsidy to storage, variable levy)
- Optimal state-contingent policies: useful for characterizing what can be best achieved by stabilization policies, but complex and model-dependent.
- Simple rules = rules of public behavior providing a simple feedback between observable variables and policy instruments.

Advantages of simple rules

- naturally entail commitment;
- allows the delegation of stock management to an independent organization to avoid discretionary public interventions;
- simpler to explain to private agents than state-contingent rules;
- should be more robust to uncertainties.

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:** in closed economy, 82% of the gains achieved by optimal policy.
 - An optimal price band requires a maximum stock level: without one, a price band policy tends to overaccumulate.
 - **Private storers are essential to achieve welfare gains** with a price-band program.
 - They seized all the profit opportunities left by public storage (no profit opportunity left by an optimal storage rule).
- **No results about price bands in open economy**
 - Unlikely to behave well given their nonlinearity.
- Usual problem of price bands: stocks are hold for too long, because nothing is sold between the bounds
 - To overcome this, the optimal price band is a price peg: equal floor and ceiling.

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.
- Storage and trade policies are not easy to coordinate together
 - India used export bans and stockpiled in the middle of the global food crisis, and so lost large export revenues by pressing on brake and gas at the same time.
 - Price-band storage policies in particular are not well suited for an open-economy setting

A subsidy to private storage works well with a trade policy as it relies on the ability of private storers to arbitrate prices intertemporally.

- Private storage is key for price stabilization policies
 - Optimal storage behaves similarly to competitive storage, but prescribing higher stock levels
 - So can be mimicked by a storage subsidy

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.

International cooperation?

- The World Bank and other international organizations should foster international cooperation;
- But a free-trade situation with widespread effective countercyclical safety nets is unlikely in the short-run;
- And it may not satisfy the participation constraints of all countries at all times.
- Even if optimal domestic price stabilization policies are unlikely to be cooperative, they may be a step in the right direction compared to the current situation, because they imply
 - Partial trade insulation,
 - Involvement of private storers,
 - Reliance on rules.
- Effective safety nets are key for a transition toward more cooperation
 - Liberalization not credible if government does not retain some policy options to address hunger in times of high prices.

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.

Thank you for your attention.