EMERGENCY RESERVES, PRIVATE STORAGE, OR TRADE? HOW TO PREVENT EXTREME GRAIN PRICES IN A TWO COUNTRY SETTING

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Extended abstract

Introduction

High and volatile food prices are a major concern for governments in developing countries as they have serious impacts on the poor. Therefore, many developing countries actively use trade and storage policies to stabilize local prices and keep them at a low level. When food prices have spiked in the 2007-2008 world food crisis, many countries including Argentina, Ethiopia, and India restricted exports in order to prevent local prices from increasing to global price levels (Headey, 2010). Overall, the 2007-2008 food crisis has put the questions of how to compensate supply shortages again very high on the international agenda. Typical proposals range from maintaining a public reserve, increasing market transparency, boosting production, facilitating trade, subsidizing private storage to shaping demand through policies (e.g. on biofuel quotas and financialization).

Method

This paper presents a theoretical two country model which is used to evaluate a broad set of trade, private storage, and public reserve related policies. Contrary to existing works, this paper analyzes not only the impact on price volatility but also the occurrence and severity of extreme price events which are a very relevant political concern. Furthermore, gains from cooperation between two countries versus losses from non-cooperation are quantified. In the yearly model, private stockholders, producers, and traders are profit maximizing, risk-neutral and have rational expectations. Demand is isoelastic and consumers do not self-insurance, i.e. not save over different time periods. The government in each of the two countries can intervene by shaping trade policies, paying a private storage subsidy or maintaining a public emergency reserve. The reserve is defined by two parameters, its capacity and a trigger price. If prices are below the trigger price, the reserve is filled up to its capacity while stocks are released to prevent any price increase above the trigger price. All actors have full information about the current state and future expectations, act competitively, and anticipate each other's behavior. Based on preferences about costs and risks, the government can define the capacity of the reserve as well as the trigger price, the private storage subsidy, or the trade policies. For all interventions, the fiscal costs are calculated and the effectiveness of the different policies is compared using different measures such as the expected price volatility or the likelihood of extreme prices. The model is solved in MATLAB using the RECS solver (Gouel, 2013) and the CompEcon Toolbox (Fackler & Miranda, 2011).

Results

Unsurprisingly, free trade turned out to be a highly efficient and free of costs way to compensate harvest failures. Limiting trade increases the likelihood of extreme price events as well as the expected price volatility. A private storage subsidy may be an additional tool to stabilize prices but while it is very efficient in reducing the standard deviation of prices, it is likely to fail at compensating extreme events, i.e. massive supply shortages. Such shortages are a result of production, private stocks, and imports combined being significantly below the sum of their expected values.

A public reserve following very simple rules – storing up to some capacity limit if prices are below a trigger price while releasing if they are above – turns out to be a much more efficient way to reduce the highest percentiles of prices and therefore help in extreme events. Such a reserve can be set up

in a way that it hardly affects private storage and only produces minimal fiscal costs. Already for 0.08% of the agricultural GDP, a decent level of insurance against extreme events can be reached. Another consideration for a policy maker is that a private storage subsidy may heavily impact trade while a reserve hardly does. While it could be useful to limit the need for trade if infrastructure is bad, it also implies that in case of large supply shortfalls there may be fewer companies ready to start importing. However, any such measures are much less helpful if the policies of the countries are not aligned. If trade is not limited and only one country has a reserve, the benefits of this reserve will leak into the other country while the costs do not. Both countries would then benefit from the insurance mechanism which is maintained and paid for by one country only. Thus, an international free-rider problem is created. Nevertheless, if for logistical or other reasons the maintenance of a reserve is easier in one country, the other could pay a compensation as both countries are almost equally protected from supply shortages, no matter where the reserve is based. If only one country builds up a reserve and wants to protect itself from paying the costs to stabilize prices in other country, a trade policy based on whether the reserve is touched is a better option than introducing time-independent quotas. The reasons is that limiting the per-period amount of trade seems to have a more devastating impact on the price stability than limiting trade to periods where the reserve remains untouched.

Overall, policy makers looking for stabilization mechanisms may consider either option, a private storage subsidy or an emergency reserve, as well as a combination thereof. Meanwhile, they should clearly opt for free trade as long as their policies are in line with those of their trading partners.

References

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