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Research Report

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Trade Policy Coordination and Food Price Volatility*

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During food price spikes, food exporting countries frequently use export restrictions to insulate their domestic markets from high prices on the world market. Their use can be so widespread that the high levels reached by international prices could be seen as a consequence of these interventions (Dawe and Slayton, 2011), and the restrictions can be so stringent that they can lead to the near disappearance of the world market as happened to the rice market over nine months in 1973 (Timmer, 2010). Food importing countries also act: they decrease their tariffs to protect their consumers but when world prices are low, the situation is reversed and importers raise their import duties. In summary, in food markets, countries routinely adjust their trade barriers to insulate their domestic markets from international price variability (Anderson and Nelgen, 2012). The lack of commitment to leaving borders open can reduce trust in the world trade system and lead to costly policies.



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.../... Importing countries that expect food exporters to restrict their exports in times of scarcity will move away from the specialization consistent with their comparative advantages in order to ensure greater self-sufficiency, or will carry expensive public stocks. For example, the current large-scale public interventions in the Asian countries, through which many countries attempt to achieve self-sufficiency in major staples, can be explained largely by their experience in the 1972/73 food crisis (Rashid et al., 2008).

► Possible cooperation if governments value food price stability?

In recent research (Gouel, 2014), I addressed the question of how multilateral trade policy coordination is affected if governments value price stability in their domestic markets in addition to the traditional terms-of-trade motive for trade policy. I also addressed the related question of whether this framework implies a difference in the ability to reduce in a cooperative equilibrium import tariffs versus export taxes, given that both should be reduced by the same amounts if governments are concerned only by terms of trade as in Bagwell and Staiger (1990). My paper shows that the price smoothing objective implies that importing and exporting countries have diametrically opposite incentives to deviate from cooperation – this contrasts with trade wars that are motivated by terms of trade which tend to promote symmetrical trade policies. The paper shows also that in food commodity markets where prices tend to follow a positively skewed distribution (Deaton and Laroque, 1992), exporters have a greater incentive than importers to deviate from cooperation which helps to explain why it is more difficult to discipline export taxes than import tariffs within the World Trade Organization (WTO). This is an important policy issue given the recent turmoil in food markets. The widespread use of export re-

strictions in the 2007/08 food prices spike,¹ and the Russian ban on exports in 2010 following a devastating drought, spurred calls for WTO disciplines on export restrictions (FAO et al., 2011, HLPE, 2011). These proposals were received coldly by several food-exporting developing countries (Mitra and Josling, 2009), and were not considered in the agreement reached at the 9th WTO Ministerial Conference held in Bali (WTO, 2013).² So far, according to agricultural draft modalities (WTO, 2008), in the case of another agreement there would not be any significant strengthening of the disciplines on export restrictions. Thus, given the importance of export restrictions for influencing trust in world markets, and food policies in the long run, it is essential to understand what is preventing a trade agreement on this issue.

► Methodology

To improve our understanding, I build a two-country partial equilibrium trade model in which governments adjust their trade policies to stabilize their domestic prices. The resulting model is used to characterize the static Nash equilibria, and the nature of a self-enforcing agreement on time-varying trade policies. The model draws heavily on Bagwell and Staiger's (1990) work to analyze how self-enforcing agreements can discipline countercyclical trade policies. An agreement is self-enforcing when cooperation is sustained by the threat of future punishment if the cooperation is violated, without the need for an external enforcement mechanism. Bagwell and Staiger (1990) show that the threat of a return to a non-cooperative situation is sufficient to obtain tacit cooperation among the countries involved in repeated interactions. However, this cooperation is not necessarily synonymous with

1. In a survey of country responses to the food security crisis, Demeke et al. (2009) show that 25 developing and emerging countries in a panel of 81 restricted or banned exports.
2. This was not a new issue: proposals to regulate export restrictions were rejected by many member countries at the beginning of the Doha Round negotiations (WTO, 2004).

free trade, because when trade shocks are large enough the incentive to deviate from cooperation would become too high in a situation of free trade. Gouel (2014) adapts this model to a setting suitable to analyze trade policies applied to food products. In order to answer the research question, we need to introduce two features absent from Bagwell and Staiger's (1990) model.

Firstly, to investigate the impact of price fluctuations on trade policy coordination, a particular structure must be placed upon the social welfare function. Bagwell and Staiger (1990) focus on trade policies motivated by terms-of-trade gains, and explain changes in trade policies by changes in potential terms-of-trade gains arising from idiosyncratic supply shocks. For food products, terms-of-trade theory may not be sufficient to explain the behavior of trade barriers. Examples of deviations from this theory are the export bans imposed by many countries during the recent food crisis which precluded any gains from trade, and the export subsidies applied by wealthy countries in periods of low prices which deteriorate the terms of trade of the countries using them. In addition, terms-of-trade theory implies that trade policy adjustments are a function of trade volume rather than of the world price because trade volume characterizes the potential gains from manipulating terms of trade. However, Anderson and Nelgen (2012, Table 1) show that protection of food products is negatively correlated with deviations from trend in the international price of the products in question. So to account for the extent of trade policy adjustments in food products, and to characterize the payoff frontier of self-enforcing trade agreements, we need a model where governments are motivated not just by terms-of-trade gains since exploitation of the terms of trade is not sufficient to explain the offsetting of international price variations by trade policies but want also to stabilize domestic prices. To introduce the observed reaction of trade policies to the world price, it is necessary to consider other economic and political-

economy motivations. Countercyclical trade policies can be rationalized as insurance instruments when accounting for market failures in risk management (Gouel and Jean, 2015). Their existence might also be explained by political-economy considerations. For example, the loss-aversion framework of Freund and Özden (2008) is applied by Giordani et al. (2014) to account for price-insulating trade policies. Given the variety of potential motivations for these policies (Anderson et al., 2013), and the focus of the paper on the strategic interactions of countries, I adopt a tractable reduced-form, social welfare function that accounts for the economic and political-economy motivations described above.

Secondly, in contrast to Bagwell and Staiger's model which is concerned only with idiosyncratic risk (i.e., potential trade volume in free trade due to the difference of supply shocks), I introduce aggregate uncertainty (i.e., potential price in free trade due to the sum of supply shocks) which is crucial to add world price volatility to the model. So in the proposed model, price volatility is driven by stochastic supply shocks in both countries. The two risks correspond also to different motivations to use trade policies. If trade policy is motivated by manipulation of the terms of trade, it varies with trade volume. If it is motivated by smoothing prices, it varies with the world price. Introducing aggregate uncertainty allows us to consider also the well-known stylized facts that staple food prices tend to have positively skewed distributions, with more prices below the mean than above it but with occasional spikes. This feature is often explained by the effect of competitive storage but for simplicity, it is represented by negatively skewed supply shocks. If the distribution of free-trade world prices is positively skewed, an importing country in trade war uses its trade policy more frequently than does an exporting country because of the concentration of prices below the mean; however, an exporting country has a greater incentive to deviate from a cooperative trade policy because positive de-

viations from the mean price will be larger than negative ones. So an exporting country is more likely than an importing country to retain in cooperation the right to use its trade policies. This result could explain the difficulty to reach an international agreement which would discipline export restrictions.

These extensions of Bagwell and Staiger's model come at a cost. The reduced-form social welfare function penalizing price volatility combined with aggregate uncertainty implies that in tacit cooperation equilibria, importing and exporting countries have incentives to deviate from cooperation at different periods: exporters will deviate when prices are high and importers when prices are low. This breaks the symmetry of the model, and we lose the ability to characterize the cooperative solution analytically. Therefore, once the equations characterizing the payoff frontier of self-enforcing trade agreements have been defined, I proceed with numerical simulations. These simulations are central to showing that a positively skewed price distribution makes disciplining export taxes more difficult than disciplining import taxes.

► Contributions

This work demonstrates a standard feature of self-enforcing trade agreements: the need for active trade policies in periods of severe shocks to maintain the incentives to cooperate in every state of nature. While repeated interactions allow countries to coordinate over cooperative trade policies, periods of unusually high trade volume, or very low or very high prices, are periods of deviation from free trade. So even in a cooperative agreement, it may not be possible to completely alleviate countercyclical trade policies. These deviations from first best differ from the literature in that, because of the smoothing motivation deviations are asymmetric: exporters deviate when the world price is high, and importers deviate when the world price is low. This implies that even in cooperation, exporters

may be able to shift the burden of adjustment to high prices to importers, and conversely importers may limit the impact of low prices on their economy by using tariffs.

Policy discussions have devoted much attention to export restrictions and their role in recent food price spikes. To prevent future price spikes, many authors advocate the adoption of WTO disciplines on export restrictions which currently are very weakly regulated. However, a few recent papers have pointed out that disciplines on export restrictions, although potentially useful at the global level, are unlikely to be achievable within the WTO framework. For Abbott (2012), this is because policy makers will not agree to renounce their right to stabilize their markets. For Cardwell and Kerr (2014), the dispute settlement system cannot enforce such disciplines because export restrictions are of short duration compared to the time taken to settle disputes, and because complainant countries may not be in a position to retaliate owing to insufficient bilateral trade levels. Gouel (2014) also contributes to the policy discussions on export restrictions. In this paper, there is no formal distinction between export restrictions and tariffs. The former are the policy used by exporters to protect themselves from international scarcity, and the latter are the policy used by importers but both contribute to shifting volatility to partners' markets. However, despite this apparent symmetry between trade policy instruments, export restrictions under repeated interactions may be more difficult to avoid than tariffs because of the asymmetry of the price distribution. Commodity prices are positively skewed and prices are concentrated below the mean, but with occasional spikes. This matters a lot in self-enforcing agreements because it means that the exporter will have a bigger incentive than the importer to deviate from free trade.

► Conclusion

This work shows that export restrictions are more difficult to discipline in trade agreements than tariffs, and the reluctance of food exporting countries to open negotiations on this issue may be a sign of their inability to commit to not using export restrictions given the incentives they are offered during food price spikes. This does not mean that cooperation that would significantly reduce export taxes cannot be sustained. Given that WTO negotiations operate under the principle of a “Single undertaking” – an approach that precludes separate agreements on some of the negotiation items – other areas of negotiations could bring sufficient incentives for the exporters to cooperate. However, that exporting countries have refused to make the topic part of the Doha agenda shows that the stakes related to this issue are very high, and progress on this front is unlikely considering the stalemate at the Doha Round negotiations.

The theory developed in Gouel (2014) opens the possibility of some empirical investigations. For example, this is the case of the value of the parameter characterizing the preference for price stability. It is calibrated in the paper but could also be estimated given that with the slope of the demand function it is a key parameter characterizing the extent of the transmission of world to domestic prices which is a frequent topic of investigations. Another prediction of our theory is that the skewness of the price distribution should be different between exporting and importing country. Exporting countries are able to protect themselves from high world prices which will tend to decrease the skewness of their domestic prices; while the converse applies to importing countries which are able to protect from low prices, increasing the skewness of their domestic prices. This difference in price distribution could be the foundation for empirical tests.

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