Journal of International Economics 95 (2015) 16–27

Contents lists available at ScienceDirect

Journal of International Economics

journal homepage: www.elsevier.com/locate/jie

When trade stops: Lessons from the Gaza blockade 2007–2010☆

Haggay Etkes [a], Assaf Zimring [b,*]

[a] Bank of Israel, Research Department, Israel
[b] University of Michigan, Economics Department, 238 Lorch Hall, 611 Tappan st., Ann Arbor, MI 48109, United States

ARTICLE INFO

Article history:
Received 26 February 2014
Received in revised form 23 October 2014
Accepted 25 October 2014
Available online 13 November 2014

Jel classification:
F00
F11
F14
F51

Keywords:
Gains from trade
Economic sanctions
Gaza Strip

ABSTRACT

This paper uses detailed household expenditure and firm production data to study the welfare consequences of the blockade imposed on the Gaza Strip between mid-2007 and mid-2010. Using the West Bank as a counterfactual economy, we find that welfare declined by 14%–27%. Moreover, households with larger pre-blockade expenditure levels experienced larger welfare losses. We show that this large decline in welfare may be due to a combination of resource reallocation and reduced productivity. Workers were reallocated from manufacturing to services, and from industries that use imported inputs intensively, or export. In addition, labor productivity fell by 20% on average.

1. Introduction

While almost all economists agree that international trade is beneficial, measuring just how beneficial it is is difficult. As Irwin (2005) explains: "In theory, the gains from international trade are represented by comparing welfare at the free-trade equilibrium with welfare at the autarky equilibrium. In practice, such a comparison is almost never feasible because the autarky equilibrium is almost never observed." This paper studies the consequences of a rare episode in modern history, in which the Gaza Strip came close to being autarkic as a result of an Israeli and Egyptian blockade that was imposed on it between September 2007 and June 2010.

The first part of the paper studies the welfare implications of the blockade on Gaza. An important advantage of the analysis is the existence of a natural counterfactual economy, the West Bank, which was not blockaded. At the time the blockade began, the West Bank and Gaza had similar economic and political institutions, and, importantly, both before *and after* the blockade on Gaza, the two regions had very similar trends in prices and consumption. Using detailed expenditure data at the household level, we calculate the monetary equivalent of the welfare loss caused by the blockade based on the concept of compensating variation, and using the West Bank as the counterfactual economy for Gaza. That is, the compensating variation we calculate is *not* the sum of money that will make a household in blockaded Gaza as well off as it was before the blockade, but rather the sum that will make it as well off as it would have been had it been located in the open West Bank rather than in the blockaded Gaza during these years. We find that the average welfare loss for a household in Gaza was equal to between 14% and 27% of the value of its pre-blockade expenditure. Moreover, we find that all measures of welfare losses are disproportionally larger for wealthier households.

We contrast these results with the welfare effects predicted by some trade models. Using the formulas in Arkolakis et al. (2012) (henceforth ACR), which give the predicted welfare change as a result of a trade shock for an important class of trade models, and the one suggested by Ossa (2012), we calculate that the predicted welfare loss in Gaza is at most 10.1% according to the ACR formula, but possibly as high as 24.3% according to the Ossa (2012) formula. We discuss some possible reasons for the difference between our results and the results predicted by ACR. Importantly, since the framework used in these models is a static one, while the results we report are based on a relatively short-lived event, we do not see our results as conflicting with those derived in their work. But, we argue, our results can help interpret the ACR formula for gains from trade.

☆ We are indebted to Doireann Fitzgerald, Kalina Manova and Kyle Bagwell for many useful comments on previous drafts. Petra Moser, Ran Abramitsky, Ralph Ossa, Lior Galo, and Pete Klenow, also provided important advice. We thank the Palestinian Central Bureau of Statistics, who granted us access to the data under license no. PLN2012-6-27, and provided useful advice. We are solely responsible for the conclusions and inferences drawn from these data. Assaf Zimring gratefully acknowledges financial support through SIEPR and the B.F. Haley and E.S. Shaw endowment.

* Corresponding author. Tel.: +1 734 764 2367.
E-mail address: assafzim@umich.edu (A. Zimring).

http://dx.doi.org/10.1016/j.jinteco.2014.10.005
0022-1996/

The second part of the paper studies the economic mechanisms that led to this large welfare loss. Using detailed firm-level data, we document two key facts about the adjustment of production in Gaza during the blockade.

First, there was a large reallocation of workers away from manufacturing, where employment fell by 33%, and into services, where employment rose by 24%. A more disaggregated analysis suggests that the loss of access to world markets was the cause for this reallocation: Workers were reallocated away from industries that exported a large share of their output or imported a large share of their inputs.

Second, the average worker's productivity in Gaza, as measured by real value added per worker, declined by 20% during the blockade. This decline differed greatly between the manufacturing and the services sectors: a 36% decline in manufacturing, and only a 0.6% decline in services. Moreover, a more disaggregated analysis of 72 industries reveals that the overall decline was predominantly the result of a decline in productivity within industries, and not of reallocation of workers between industries.

These findings suggest a strong complementarity between imported inputs and labor, especially in the manufacturing sector. In many models of international trade, the important margin of adjustment is between import-competing and exporting industries and firms. In Gaza, however, manufacturing as a whole depended on access to world markets. Lacking this access, both import-competing and exporting industries experienced a large decline in productivity and in employment, and workers were reallocated to the less productive services sector.

Since the blockade was substantially eased after three years, and Gaza had been an open economy for a long time before, our analysis captures the relatively short-run effects of moving from a trading equilibrium to near-autarky. The difference between short-run and long-run effects of trade shocks may be substantial (see for example Trefler, 2004): While Gaza may not have fully adjusted to its new state of near-autarky by 2009, it was still able to use machinery, and possibly some old inventories of raw materials, that were previously imported, and not produced domestically. While the first consideration suggests that the short-run welfare losses we calculate may exceed the long-run welfare costs, the second consideration implies the converse. The question of which effect is likely to be larger is beyond the scope of this paper. At any rate, it is important to study the short-run effects of autarky for a few reasons. First, short-run effects are key to the analysis of trade policy. Economic sanctions, or the threat of using them, are still very much a part of international relations, and the study of the Gaza experience improves our understanding of their possible implications. Extreme changes to trade policy can also lead to a large decline in trade volume, and the study of the short-run effects of the collapse of trade in Gaza can serve as a cautionary tale against the risks of trade wars.

Second, studying the short-run effects of the blockade on Gaza can inform our thinking about the long-run consequences of trade. While Gaza did not yet fully adjust to its new state of near-autarky, the fact that the large adjustments that already took place—the pattern of reallocation of workers, the fall in productivity, the decline in expenditure inequality—are all in line with standard theory is worth noting.

The rest of the paper is organized as follows: Section 2 surveys the relevant literature. Section 3 gives an historical account of the blockade on Gaza. Section 4 describes the welfare calculations we perform based on consumption and price data, and contrasts them with welfare predictions of an important class of trade models. Section 5 documents changes to production in Gaza following the blockade, focusing on the reallocation of workers and changes to their productivity. Section 6 concludes. The data we used is described in the data appendix.

2. Related literature

This paper contributes to four strands of the literature: the study of historical autarky episodes, the study of the effects of economic sanctions, the study of the relationship between international trade and productivity, and the study of gains from trade based on quantitative models.

The most closely related literature is the study of historical episodes of moving between autarky and trade. To our knowledge, only two historical episodes in which autarky equilibrium was observed have been analyzed to date, and both are from the nineteenth century. Bernhofen and Brown (2005) examine Japan's forced opening to trade in the 1850s, and find an upper bound of 8% for gains through the channel of comparative advantage. Irwin (2005) explores the self-imposed "Jeffersonian Embargo" in the U.S. between December 1807 and March 1809, and concludes that losses from the embargo in the U.S. amounted to 5% of 1806 GDP. Since in both cases no data on consumption or production is available, these papers use data on prices and on trade flows to estimate bounds on the gains from trade. The contribution of this paper is threefold. First, our welfare calculations are based on household-level data, and not economy-wide aggregates, so our results do not depend on assuming a representative agent. Moreover, household-level data allow us to study the distribution of the welfare changes. Second, having firm-level data allows us to study the adjustment of the production process to being removed from world markets. And finally, an important advantage of this historical episode is that it provides us with a natural "control group"—the West Bank.

Some natural experiments short of a move between full autarky and free trade have also been used to evaluate gains from trade. Feyrer (2009a) uses the closing of the Suez Canal between 1967 and 1975 as an exogenous (for most countries) shock to trade costs, to explore the relations between trade and income. Feyrer (2009b) uses the advancement in air transportation technology, which had a differential effect on countries with short air routes but long sea routes between them, and countries for which both routes are of similar length. Both papers find a substantial and positive effect of trade on income. However, since they analyze relatively small changes, it is not easy to extrapolate from them to the overall gains from trade.

The literature on quantifying the effects of economic sanctions is not large. This is an unfortunate fact, since, as Davis and Engerman (2003) note, their use has "become a standard and routine policy tool of nations and international organizations …". According to Hufbauer et al. (2007), the use of economic sanctions increased in the post Cold War era from 1.8 new sanctions a year in 1945–69 to 3.8 a year in 1970–89, and to 6.3 new sanctions a year in 1990–2000. Hufbauer et al. (2007) also supply some estimates of the welfare costs of economic sanctions imposed by the US. They base these estimates on assumed elasticities of substitution between the banned US goods and substitutes from other countries. This paper is the first analysis of the welfare cost of sanctions based on detailed microeconomic data and a comparison to a counterfactual economy.

The importance of imported inputs for domestic production has been documented in (Amiti and Konings, 2007) and (Topalova and Khandelwal, 2011), who use establishment-level data and find that trade liberalization in India and Indonesia led to productivity increases in domestic firms both through increased competition and through access to imported inputs. Goldberg et al. (2010) also find that greater access to imported inputs led to an increase in the variety of domestically produced final goods, and Yi (2003) uses the importance of trade in inputs, to argue that vertical specialization can explain the large response of trade volume to relatively small tariff reductions. Our results are consistent with these findings, showing that in the extreme case of an almost complete absence of imported inputs, productivity in the manufacturing sector falls substantially.

Lastly, since quantifying the gains from trade is an important question, while natural experiments are rare, another strand of the literature uses quantitative trade models in order to evaluate these gains without observing autarky. One of the most commonly used frameworks is the one developed in Eaton and Kortum (2002). Based on their model, they calculate the gains from trade, and find remarkably low gains ranging from 0.2% for Japan, to 10.3% for Belgium. Though these gains seem