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Estimating household responses to trade reforms: Net consumers and net producers in rural Mexico

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ABSTRACT

This paper explores an empirical methodology to assess the impacts of trade reforms in agriculture on household behavior in developing countries. I focus on consumption and income responses: when price reforms take place, households modify consumption and production decisions and local labor markets adjust. The paper proposes a joint estimator of demand and wage price elasticities from survey data. The method uses an empirical model of demand to extract price information from unit values, and uses this information to estimate the response of households to price reforms. By correcting unit values for quality effects and measurement error, the method overcomes the problem of the endogeneity of unit values. By endogeneizing household income, the model corrects potential biases in the estimation of own- and cross-price elasticities in consumption. I apply the method to an expenditure and income survey for rural Mexico. It is shown that the corrections suggested in this paper are empirically important. In particular, I show that allowing for consumption and income responses is a key element of an accurate empirical assessment of trade policy.

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1. Introduction

Trade in agricultural products is perhaps one of the most promising instruments for poverty alleviation in developing countries. This is because agriculture is a key productive activity in poor countries and because world markets can provide new opportunities for rural producers. However, international markets for agricultural products have long been distorted by the policies of developed countries. Policies of domestic support, such as subsidies to production or exports, and policies of market access, such as tariffs and non-tariff barriers, are examples. Understanding and measuring the impacts of WTO reforms on poor households in developing countries is therefore critical to the current trade and poverty debate.

When price reforms are implemented, particularly in agriculture, households are affected both as consumers and as income earners. The standard proposition of the literature is that, after an increase in the price of a good, net consumers will be worse off but net producers will be better off (Deaton, 1989). In this static context, the welfare effects of a price change can be assessed by comparing budget shares and income shares. This argument, however, fails to consider dynamic household responses. Consumers may respond by substituting away from the more expensive goods. In rural areas, farmers may increase agricultural production, farm employment and wages, and purchases of inputs and services in local markets. In consequence, the net position of the household becomes endogenous: sufficiently large consumption and income responses may cause an ex-ante net consumer become an ex-post net producer, thus benefiting from the price increase.

The measurement of the total household welfare effect, one that jointly considers first order effects in consumption and production as well as consumption and income responses, is the objective of this paper. I propose a joint estimator of demand price-elasticities and agricultural wage price-elasticities from survey data. The empirical method delivers a set of parameters that can be used to simulate policy outcomes and evaluate trade reforms. While my emphasis in this paper is on trade reforms in agriculture, the model can be used to investigate other pricing policies that affect tradable goods.[1]

The estimation of these parameters requires survey data with sufficient price variation at the household level. This is rarely the case. One possibility is to combine household surveys with official price information. Some studies exploit time and regional variation in official prices (Deaton, 1997; Porto, 2015; Ravallion, 1990; Wolak, 1996); others use community price questionnaires (Edmonds and Pavcnik, 2005, 2006). In this paper, I use unit values, the ratio of reported expenditures and quantities, as measures of prices.

The main advantage of using unit values in household models is the substantial cross-sectional variability. However, when consumers jointly choose quantity and quality, unit values can only be used as proxies for prices because they contain information on both price and quality (Deaton, 1987). This may lead to biases in the estimation of the relevant parameters. Further, endogenous income responses generate additional income effects that can bias the estimates of Marshallian demand elasticities. This is a version of the “profit effect” discussed, for instance, in Singh et al. (1986). Building on the seminal work of Deaton (1987, 1988, 1990), I develop methods to incorporate income responses and to correct the estimates of consumption responses.

The procedure works as follows. By modeling consumer choices of quantity and quality simultaneously, as in Deaton's work, I extract the right price signals from unit values, expenditures, and quality choices. Then, I use this price information to estimate the response of consumption and wage agricultural income. To do this, I develop a thorough econometric model of agricultural prices, quantities consumed, unit values, and household income.

I estimate the own- and cross-price elasticities as well as the wage-price elasticities using survey data for rural Mexico. It is shown that using unit values instead of prices may indeed lead to inconsistent results, and that the corrections suggested in this paper are empirically important. On

[1] Sometimes, modern methods for policy evaluation like natural experiments are not feasible. Trade reforms, which are often accompanied by other simultaneous reforms, are an example. In many instances, in addition, there is an interest, or a need, to explore the effects of a policy that has not yet taken place. WTO reforms are an example. The method proposed here accommodates these cases.