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Towards a consolidated database of distortions agricultural incentives: the Ag-Incentives Consortium

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ABSTRACT

It is important to measure and analyse the impacts of policy design on agricultural markets. Indirect measurement of incidence, e.g. nominal rate of protection (NRP), is one reliable method to do this, as it relies on price gaps between what producers see and what is prevailing in international markets. Ag-Incentives Consortium, a collaboration effort among international organizations that work on measuring distortions to agricultural incentives, is a new initiative that attempts to bring clarification, harmonization, and methodological guidelines to the forefront. This study, based on but not limited to Ag-Incentives, computes NRPs based on a combined input data from all IOs. The results show that high income countries have decreased protection over time, whereas middle income countries have increased it. Low income countries have higher variation in protection, and respond to food price crises of 2008 and 2011 different than high and middle income countries.

Keywords: agricultural incentives, Nominal Rate of Protection, Nominal Rate of Assistance, Producer Support Estimate

PAPER

1. Introduction

In an environment of growing demand and limited natural resources, the importance of correct policy measurement, categorization, and interpretation for the optimal design, monitoring and evaluation of agricultural, environmental, and trade policies cannot be stressed enough. In this context, it is also crucial to identify which parts of agricultural distortions are due to market failure and to distinguish these from the part that is due to effective policy intervention. Agricultural distortions, originating from either policy design or other sources, also create and influence value chains within a country or across countries. With the observed expansion of regional and global value chains, the measurement of distortions along the agricultural value chain is necessary for effective policy design as well.

There are multiple methodologies utilized and different data sets employed in the literature and by international organizations (IOs) to measure distortions to agricultural incentives. In terms of institutional efforts, World Bank started with Nominal Rate of Protection (NRP) database and updated later with Nominal Rate of Assistance (NRA). OECD has continuing efforts with Producer Support Estimate (PSE) database that has been expanded to non-OECD countries. At the same time, new efforts have taken place, such as FAO-MAFAP that focused on Africa and is now expanding to Asia. IDB-Agrimonitor uses OECD methodology and focuses on Latin America and the Caribbean countries.

With different datasets, assumptions, methodologies, and time spans, a consistent long-term measurement across all developed and developing countries has eluded policy makers. This has made it difficult for them to correctly measure, compare, and interpret the impact of their policy designs across commodities, countries, and time spans. To facilitate this, an Agricultural (Ag) Incentives Consortium has been brought into fruition including OECD, FAO-MAFAP, IDB, WB, IFPRI, and CGIAR PIM. The Ag-Incentives Consortium focuses on organizing collaboration among IOs. One pillar of this is generating a common chest of clearly defined and well-documented common indicators, with a focus on prices. Second pillar is about expanding country and product coverage. Third pillar is providing a platform for tackling new issues and improving methodologies.

In this paper, we first present a summary of the efforts in the literature to measure distortions and the relevant methodological discussions. Next, we present a synopsis of the Consortium and its goals, as well as data processing conducted for the databases of members of the Consortium. We, then, present and discuss the NRPs computed based on, but not limited to, the Ag-Incentives Consortium efforts followed by a conclusion.

2. Methodologies in the literature

There is a wide literature as well as multiple IO databases that measure agricultural incentives. Both the literature and the IOs use two main approaches: indirect measurement of incidence and direct measurement of policies.

For indirect measurement of incidence methodology, NRP estimates by Krueger, Schiff and Valdes (1988) were the first major attempt to look at both direct sector specific and indirect economy-wide policies on agricultural incentives in various developing countries. Direct effect was measured by the proportional difference between the Producer Price and border prices adjusting for distribution, storage, transport, and other marketing costs (Reference Price). Therefore, Direct NRP would be

$$NRP_d = ((PP_i / RP_i) - 1)$$

Indirect NRP is measured in two parts, first, through the impact of the unsustainable portion of the current account deficit and of industrial protection policies on the real exchange rate and thus on the price of agricultural commodities relative to non-agricultural non-tradable commodities. Second, through the impact of industrial protection policies on the relative price of agricultural commodities to that of non-agricultural tradable goods.

Anderson et al. (2008) expanded this effort by measuring NRA and outlined the many methodological issues with deriving such numbers. Different components of NRA were identified and defined, such as NRA to farm output conferred by border price support, NRA to output conferred by domestic price supports, NRA to inputs, among others. Furthermore, there is clearer identification of non-distortionary price wedges, which help in location and evaluation of prices being transmitted along the value chain.

For direct measurement of policies, OECD has continuing efforts with PSEs (OECD 2015). For OECD, PSE is more complex and is a part of the Total Support Estimate, which is an indicator of the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of the associated budgetary receipts. Here, the percentage PSE represents policy transfers to agricultural producers, measured at the farm gate and expressed as a share of gross farm receipts.

OECD also calculates the Nominal Protection Coefficient (NPC) that includes budgetary outlays and treats input markets differently. It is the Producer Price relative to the Reference Price, with the unit value of payments based on output also included.

$$NPC = (PP + (\text{payments based on output/production quantity}) / RP)$$

Transfers included in the PSE are composed of market price support, budgetary payments, and the cost of revenue foregone by the government and other economic agents as over time. The PSE has evolved from being just a measure of market price support to including payments based on output as well as well as expanding beyond taking into account just direct payments to multiple sources of payments. The Market Price Support (MPS) for a commodity is estimated either by adding together transfers to producers from consumers and taxpayers or by multiplying the quantity of production by the market price differential (the difference between farm and border price). The MPS component of PSE is similar to NRP in that it also depends on price gaps.

FAO-MAFAP (MAFAP 2016) and IDB-Agrimonitor (2016) use methodologies developed by the World Bank and OECD respectively. Country and commodity coverage show some overlaps with these IOs.

3. Consortium structure and database

The objectives of Ag-Incentives Consortium are to bring together the findings from the organizations active in this field on a continuing basis in order to develop a global view of incentives, and to shine a light on incentives in some of the smaller economies where distortions to agricultural incentives have a particular impact on the poor. Ag-Incentives Consortium achieves these through creation of a community of practices, work on harmonization and consolidation of a database, and providing quality control and scientific rigor.

As seen in Table 1, all IOs publish measurement of distortions with some overlap across geographical and sectoral coverage and time span. The goals of the Consortium, therefore, include maintaining the mandate and the independency of each IO, and creating a collaborative approach for database, with a clear recognition of IPR.

Table 1 - Country and commodity coverage by IOs

International Organization	Economic Clusters Covered	Number of countries	Time Period	Total Commodities	Metrics Reported
OECD	OECD + Emerging	23	1986-2014	58 individual, NONMPS, Total	PSE, MPS, NPC, MPD
World Bank	various	82	1955-2007, updated 2011	72 individual	NRP, NRA
FAO-MAFAP	Selected African	9	2005-2013	27 individual	NRA
IDB-AGRIMONITOR	Latin America and Caribbean	17	2004-2013	37 individual	PSE, MPS

Note: Not all countries report all data for all commodities listed and all years

The initial focus of the Consortium has been on price distortions, with a consolidated indicator based on each IO database. We selected NRP, based on Krueger, Schiff, and Valdes (1988) to be computed and made publicly available. NRP is the ratio between the price gap and the observed reference price measured at the same point in the value chain.

We use the method for Direct NRP from Krueger, Schiff, Valdes (1988) to create a consolidated NRP with the underlying price metadata from IOs. We also compute average NRPs for the agricultural sector or a country, and global NRP for a commodity.

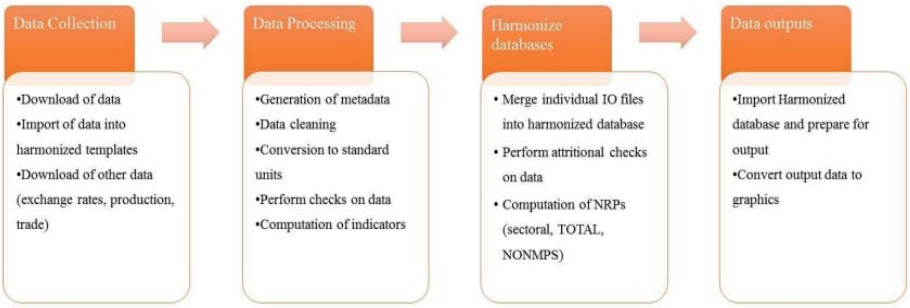
$$NRP_{TOTAL} = ((sum_c(PP_c * Q_c) / sum_c (RP_c * Q_c)) - 1)$$

$$NRP_{SECTOR} = ((sum_i(PP_i * Q_i) / sum_i (RP_i * Q_i)) - 1)$$

We use NRPs to measure distortions based on the law of one price, where the goods must be comparable (in terms of quality, processing level, and location). Reference price is border price evaluated at official nominal exchange rate adjusted for transport, storage, distribution, processing, and quality differences based on input data provided by each IO.

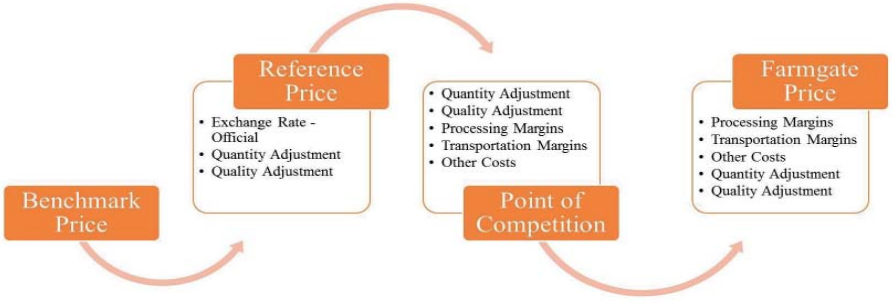
The first step before computing NRPs, is the harmonized metadata template that incorporates input data for all IOs involved and deals with and computes NRPs for commodities and countries as described in Figure 1.

Figure 1 - Harmonized data template process



We construct the harmonized metadata template is constructed to identify the path of price transmission across the Value Chain and measure changes in price along this path while computing reference price at the same point in the value chain. This is described in Figure 2.

Figure 2 - Price Transmission across Value Chain

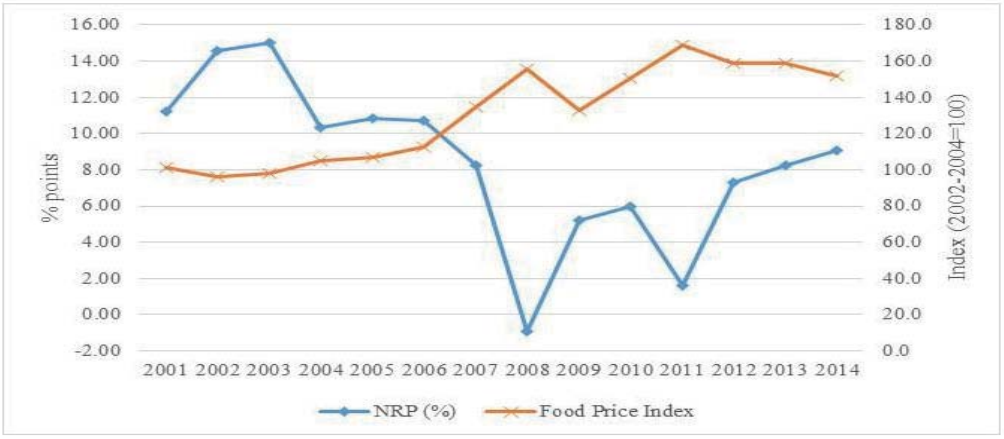


Based on input data from IOs, we computed a continuous series of NRPs. Since there is some overlap across IOs in terms of commodity and country coverage, we use a hierarchy to select the final NRP. When there is an overlap for a period, country or commodity, the first selection for NRP is OECD database, followed by MAFAP-FAO, IDB, and World Bank. This selection process may create an NRP coverage for a country where one commodity NRP is from one data set and another commodity NRP is from another data set. Same issue exists for the time span of a commodity coverage.

4. What do we learn from NRPs?

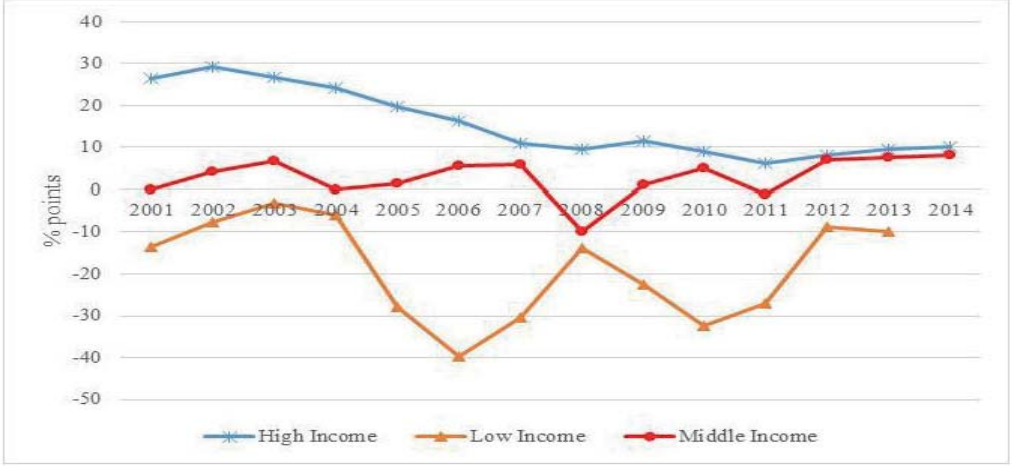
Figure 3 below presents average global NRPs weighted by production quantity as seen in above equations. Figure 3 also includes FAO Food Price Index based on international prices weighted with the average export shares of each of the groups for 2002-2004. As seen below, there is some, but not significant, variation in global NRP for the agricultural sector, although values are positive (except for 2008), showing that overall agricultural policies have protected farmers. As expected, we see that average NRPs and average Food Price Index move in opposite directions. When global food prices are rising, governments are insulating consumers, by reducing or eliminating import duties or adding export taxes that in turn reduce protection afforded to producers. The clearest example is in 2008 and 2011 food price crises, with the drop in global average NRP and the jump in Food Price Index.

Figure 3 - Average NRPs for agricultural sector globally and FAO Food Price Index.



In Figure 4, we present the average NRPs for the agricultural sector categorized by income levels of countries. For the period shown, high income countries have higher protection for their farmers, although the average protection rate has declined in the last decade. Although middle income countries, had lower NRPs on average than high income countries, protection to farmers has been increasing steadily and reaching the level of high income countries by 2012. Low income countries have negative NRPs in the period shown in Figure 3, as the agricultural sector is seen as a source of government revenue (mostly in Africa) and export commodities are taxed. One thing to note is the difference in NRPs for countries during the 2008 food price crisis. High and middle income countries lowered their NRPs in response to 2008 food price crises, with middle income countries' NRP dropping to negative values, choosing to insulate consumers from price increases, rather than protecting producers. However, low income countries have higher NRPs during this period for protection of farmers. This may be attributed to agriculture being a significant source of income for these countries' population, and governments' efforts to keep farm gate prices high.

Figure 4 - Average NRPs for agricultural sector by income category.



In Table 2, we present global NRPs by commodity. We observe the variation to be even higher at individual commodity level, relative to the agricultural sector NRP. Producers in livestock and dairy sectors have much higher protection relative to crop sectors. Cash crops, such as coffee and tea, have negative NRPs, as these are export commodities with exports taxes keeping farm gate prices down. Another example of this is negative palm oil NRP, with demand for palm oil exports increasing.

Table 2 - Global NRPs by Commodity

Commodity	2001	2005	2009	2014
Maize	3.16	7.73	1.59	12.64
Wheat	-0.77	-2.06	6.42	12.93
Soybeans	1.59	-1.30	-3.14	-7.59
Palm Oil	-8.80	-1.56	-0.15	-8.52
Cassava	-3.08	-8.01	10.44	31.74
Coffee	-6.21	-12.48	-12.11	-58.50
Tea	-12.88	-9.76	-12.72	
Milk	34.58	26.96	18.14	7.69
Poultry meat	7.64	8.02	13.69	4.42
Bovine meat	27.31	21.77	16.39	23.66
Pig meat	3.17	15.19	12.57	12.28

3. Conclusions

Ag Incentives Consortium is a broad collaborative effort on part of multiple IOs to create a common set of indicators that measure distortions to agricultural incentives, with a focus on prices. The Consortium also aims to create a community of practices and provide quality control and scientific rigor, not only for the common indicators but also for the individual IO efforts.

The initial output of the Consortium is a global data set of NRPs based on combined IO data. This paper presents NRPs based on, but not limited to, the Ag-Incentives Consortium efforts. The results show that global average NRP moves in opposite direction of Food Price index, indicative that government policies reacted to food price crises of 2008 and 2001. Furthermore, trends of NRPs differ by income category, with high income countries lowering protection of producers, and middle income countries increasing protection. There is significant variation in average agricultural sector NRPs for low-income countries, consisting mostly of Africa.

One aim of this exercise was to provide a unified measurement of distortions by agricultural policies for a wide audience of academics and non-academics. This type of unified approach would help governments design policies and measure them effectively. The global NRPs rely on the same methodology, utilizing each IO database, in a consistent manner. They provide continuous and consistent measurement across a wide sectoral and geographical coverage, allowing stakeholders interpret the implications of agricultural policy design in an effective manner.

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