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HAZARDS OF POLICY MODELLING: INDIA AND THE WORLD MARKETS FOR GROUNDNUTS AND GROUNDNUT PRODUCTS

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<Hazards groundnuts India>

1. INTRODUCTION

Major advances in modelling techniques and computing power that have occurred over the past 20 years or so now make it relatively easy to quantify the results of policy experiments when large numbers of parameters and variables are involved. The most important and difficult part of this kind of empirical research is the description of a base scenario which is then perturbed by changing one or more policy variables, for example a tax, a subsidy, a tariff, or a non-price constraint of some kind. One of the principal difficulties is deciding on the parameters which are likely to dominate the adjustment of the system and which need to be specified with special care, and on the other hand making judgments on parameters which are likely to be less significant and which can be safely ignored or treated in an aggregate way or as residuals. These difficulties can be especially acute in commodity-specific multicountry trade models, since — despite the increasing availability of national and international databases — it will seldom be possible to accurately describe the policies followed and the adjustment mechanisms in each of a large number of countries, owing to lack of relevant upto-date published information of the required specificity, and limits on the time and resources available to the researchers. In this regard, because substitution and complementarity relationships between commodities on both the supply and demand sides can vary substantially across countries — especially as between developed and low income countries - decisions on whether commodities other than the commodity of initial interest should be modelled explicitly, are especially important.

For these reasons the credibility of these types of policy experiments very much depends on the experience, judgment, good sense and intuition of the researchers in prioritizing countries and parameters in the base scenario from which the policy experiments are launched. When the outcome of a policy experiment is mainly determined by what happens in one or a few segments of the model — e.g. by policy changes in just one or a few countries — it is also prudent to carefully recheck that the base scenario in fact accurately describes the policies and adjustment mechanisms in those countries, and depending on what is discovered, perhaps rerun the model and report the results of alternative policy and parameter specifications. If these precautions are not taken, it is possible that the model simulations will be highly misleading, and more importantly, will have misleading implications for economic policies both in the countries of special interest and at the global level in the relevant markets. This kind of outcome is especially problematic since readers (including journal and book reviewers) will seldom if ever have enough specialized knowledge or time to work back through the model from the policy experiment outcomes, to question the underlying policy and parameter specifications.

These hazards of policy modelling are illustrated by a recent journal article (Beghin, Diop & Matthey, 2006) which identifies India and China as major distorters of world groundnut and groundnut product markets. Essentially the same arguments and model are in three earlier working papers (Beghin, Diop & Matthey, 2003; Diop, Beghin & Sewadeh 2004; Beghin & Matthey, 2003). The authors use a partial equilibrium multi-market model starting from baseline levels of tariffs, trade and prices in 1999/2000, 2000/01 and 2001/02, to simulate the effects of five free trade scenarios. They find that: 'The prohibitive protection in India and distortions in China, exacerbated by their market size ... depress world market prices' and 'impose large welfare losses on themselves' and 'sizeable welfare and agricultural income losses among smaller exporting countries, mainly in Africa' (Beghin, Diop & Matthey, 2006 p.1034). By comparison, according to the model, whether or not the US removes its tariffs or other distortions makes a negligible difference to world trade and

welfare, and so the authors conclude that groundnut product market distortions are now 'essentially a South-South affair' (Beghin, Diop & Matthey, 2006 p.1033). Although the paper argues that the distorting influences of China's policies are important, it states that 'India is the prominent protectionist force in groundnut markets', and this is apparent from summary results of the model simulations (Beghin et al Tables 3, 4 and 5) in which the changes in the direction and scale of India's trade following trade liberalization, are far larger than is the case with any other country.

Given the central and dominant role of Indian protection policies for the model simulations and for the main theme and policy suggestions of this study, it was surely essential to have a careful look at the situation of the industry in India to ensure that the model parameters for India at least approximate reality. Unfortunately a crucial assumption, that the Indian tariffs during the base period were binding and represented the actual excess of domestic prices over border prices, was not checked.¹ As a result neither the model simulation results nor the particular South-South distortion allegedly identified, are credible. In particular, as shown in the next section, during the baseline years Indian tariffs were redundant and estimated implicit protection rates based on price comparisons during the baseline years were negative or about zero. Consequently, tariff removal would have had a zero initial impact on Indian domestic prices. This in turn means that the repercussions for the rest of the world groundnut economy emanating from India which are modelled and discussed in the paper, would not have occurred. Instead, if the model parameters for China and other major producers are reasonably accurate, under free trade worldwide, the most likely model outcome would be very small initial increases in world groundnut product prices that would be moderated by increases in Indian exports.² Therefore, if anything, rather than being a source of major distortions in world groundnut markets, the paper's basic finding should have been that India is an efficient low cost producer of groundnuts and groundnut products, and that it would benefit as an exporter from groundnut trade liberalization in other countries.

Section 2 below provides data on Indian groundnut product production, trade, tariffs and prices which support this general conclusion, and discusses the implications of the data for the Beghin et al policy simulations, considering in turn groundnut oil, groundnut meal and groundnuts. Section 3 then points out that India's agricultural trade policies are nevertheless a problem for other developing countries, and that this is especially the case in edible oil markets as a result of its very high edible oil tariffs, which raise Indian domestic prices of oils

¹ I am grateful to one of the authors of these papers (John Beghin) who at an early stage in my preparation of this paper (in February 2007) kindly sent me detailed responses to a number of questions I had about the model. His responses confirmed that the model assumes that the Indian tariffs were binding. In 2003 he had contacted me about estimates of implicit protection for groundnuts in India, and a discussion of Indian edible oil protection policies in Gulati, Pursell & Mullen (2003). I replied that estimates of negative implicit nominal protection'. I also commented that edible oil production is 'one of the perennial high protection industries' in India. It is possible that these replies may have muted warning bells that should have rung: my apologies to the authors if they did. However I was never contacted — nor to my knowledge were other economists who have worked in this area in India — about the plausibility of the authors' assumption that the Indian tariffs on all three products — food groundnuts, groundnut meal and groundnut oil — were binding. If asked I would have strongly warned about making such drastic assumptions and would have recommended that they do some careful price comparisons. As it turns out, these assumptions were incorrect and undermine the credibility of their findings.

² This appears to be the likely outcome from a reading of the model as presented in the paper. However, the model would require a major revamp to take account of the deficiencies mentioned in this note before a rerun with realistic parameters for India could be trusted. Given the major mistakes in the Indian parameters it would also be essential to check on the realism of the parameters in other countries, especially in China.

other than groundnut oil, considerably above world prices. Hence the Beghin et al paper identifies the wrong problem in the edible oil and oilseed markets: instead it would be more relevant to focus on the interlinked markets for all edible oils and oilseeds together, paying special attention to Indian protection policies for palm oil and soya oil. In conclusion, section 4 summarizes some of the hazards of policy modelling illustrated by the Beghin et al study, and emphasizes the need for conceptual clarity and consistency and above all for careful checking of the base scenario.

2. INDIA'S GROUNDNUT POLICIES AND WORLD MARKETS

In the first two simulations considered in the Beghin et al model, trade in the three products considered — groundnuts, groundnut meal and groundnut oil — is simultaneously liberalized, first world wide and then world-wide without the USA. This results in substantial increases in world prices and large annual net world welfare gains of the order of \$800 million. The welfare gains are concentrated in China (mainly for producers) and India (where consumer gains outweigh producer losses) but there are substantial gains in net exporting countries in Africa, and in Argentina and USA, while net importers including the EU-15 lose out. Large welfare gains³ are also found in two simulations (first including the US and then without the US) in which only groundnut tariffs are removed while groundnut meal and groundnut oil tariffs remain in place. Finally, the authors simulate the effects of a move to free trade in the three products by China and India, with no changes in the base level tariffs and other groundnut product trade policies in the rest of the world. They find that net world welfare increases by more (by approximately \$860 million) than under full world wide groundnut product trade liberalization, and this finding drives the principal theme and conclusion of the study, that China and India are the principal distorters.

Which of these two countries is most to blame is not examined by simulations of liberalization in China and India separately, but a look at the simulated changes in trade reported in the paper suggests that the alleged Indian distortions are the dominant factor. For example, in the simulation in which all countries liberalize trade in all three products, India starts from a situation of zero net trade in groundnut oil during the three baseline years, but following liberalization, crush margins in groundnut processing decline, and on average over these three years, India imports 245,000 tons of groundnut oil annually. This appears to be the dominating force behind a 26% increase in world groundnut oil prices, in addition to which India is the sole outlet for increased groundnut oil exports by China, Nigeria, USA, Senegal, other African countries, and other 'rest of the world' (ROW) net exporters. Similarly, from being a net exporter of groundnut meal India becomes a large net importer. This change is associated with an 18% increase in world groundnut meal prices, and India is again the sole outlet for increases in groundnut meal exports by all baseline net exporting countries. Finally, despite an 8% increase in world groundnut prices, Indian net exports of groundnuts decline by around 84%, and this is relatively and in absolute terms the largest change for an individual country's groundnut trade in the simulation.

The implausibility of these simulation results is apparent from Table 1, which summarizes Indian groundnut product production, trade, tariffs and estimates of implicit protection between 1996/97 and 2004/05, with the three baseline years used in the Beghin et al simulations in italics. The basic error is that the baseline tariffs used in the Beghin et al model simulations (45% for groundnuts and groundnut meal, 85% for groundnut oil) were

³ In this scenario world net welfare increases more than under free trade in all three products. Why this happens is not clear from the paper, but it presumably has to do with general second best considerations, since markets other than these three are not liberalized.

assumed to be binding, whereas the estimated implicit protection rates based on comparisons of Indian domestic prices and world prices, were negative in the case of groundnuts and groundnut meal, and about zero in the case of groundnut oil. This discrepancy undercuts the model results, which appear to be based on the assumption that under free trade domestic prices in India of groundnuts,⁴, groundnut meal and groundnut oil would initially fall by 27%, 31% and 46% respectively.⁵ If following free trade there would be no initial change in Indian prices, there would be no initial direct impact on Indian production, exports or imports, and no repercussions in China and the other countries considered in the model. On the contrary, *on the assumption that there no similar discrepancies between tariffs and measured implicit protection rates in the other countries*, the model suggests that tariff removal in these countries would open up export opportunities for Indian groundnut products, especially food groundnuts and groundnut meal.

This general interpretation of the Indian situation is supported by the data for the years preceding and following the three baseline years considered in the Beghin et al paper. These are briefly summarized below, first considering groundnut oil, then groundnut meal and finally groundnuts. In the process a number of other problems in the Beghin et al paper are noted, including problems with the empirical characterization of the Indian groundnut markets, and more basic conceptual problems.

<u>Groundnut oil.</u> The Table 1 data indicates a number of problems with the Beghin et al model's treatment of groundnut oil. First, during the 9 years 1996/97 to 2004/05 Indian groundnut oil imports were nil or negligible, at most a few hundred tons, and until 2003/04 exports were also negligible. This compared to production which fluctuated from just below a million tons to over two million tons. This was recognized in the Beghin et al model and net trade was appropriately put at zero in each of the baseline years, but despite the absence of trade and in particular the absence of significant imports over tariffs, it was not recognized that in these circumstances tariffs are most likely redundant and indicate little or nothing about the actual differences between domestic and international prices. This is a basic conceptual mistake which also affects the plausibility of the modelling of other countries (and also of groundnut meal and groundnuts) e.g. during the baseline years net South Africa assumes that South Africa's 20% tariff is binding, leading to an initial reduction in domestic groundnut oil prices of 16.7%.⁶

⁴ In the model the initial impact would be on the domestic price of 'food' groundnuts. These are distinguished from 'crush' groundnuts used in oil production, which are treated as non-tradeds with prices determined indirectly though the price of groundnut oil and substitution in production with food groundnuts.

⁵ In discussing and modelling groundnut oil and meal, the paper does not mention international transport costs or port and domestic handling, marketing and transport costs. Domestic 'transaction costs' (presumably including port, handling, transport and marketing costs) are only mentioned in discussing groundnuts. Relative to border prices, all these costs are very important in India for groundnut products, especially groundnuts and groundnut meal. As a result, *if* tariffs were binding, the proportionate effect they have on domestic prices would be considerably less than the tariff rate. These costs also create considerable gaps between domestic import and export parity prices at the wholesale and farm levels. Taking account of these discontinuities, i.e., the gaps between export and import parity prices created by these costs as well as by international freight and insurance, is difficult to handle but essential for realistic modelling. The apparent failure to do so in the Beghin et al model (presumably this is also an important issue in China and the other countries considered) is on its own a serious deficiency which — independently of other problems undermines the credibility of the economic welfare and other outcomes reported.

⁶ A useful rule of thumb in empirical trade studies is that imports should exceed 5% or 10% of domestic production before concluding that tariffs provide a preliminary indication of the actual excess of domestic prices over world prices. Even then, careful checking of prices, qualities, specifications, and import timing is desirable to ensure that the imports are actually competing with domestic production.

Table 1. Indian Groundnuts and Groundnut Products: Production, Trade and Protection Policies												
1996/97 to 2004/05	;											
	Production	Imports	Exports	QRs?	Actual	Tariff used	Estimated					
	000 MT	000 MT	000 MT		tariff %	in Beghin et	implicit					
						al model	protection					
						%	rate %					
Groundnuts												
1996/97	8640	nil	148	Yes	52		-16					
1997/98	7370	0.07	245	Yes	45		-18					
1998/99	8982	0.15	58	Yes	56.6		-1					
1999/2000	5298	0.17	159	No	45.6	45	-5					
2000/01	6410	0.19	137	No	44	45	-15					
2001/02	7027	neg	113	No	44	45	-8					
2002/03	4121	0.18	68	Yes	35.2		7					
2003/04	8182	nil	176	Yes	30.6		-21					
2004/05	7024	neg	177	Yes	30.6		-24					
Average	7006	0.08	142				-11					
Ŭ												
Groundnut meal												
1996/97	2345	nil	324	Yes +SIL	52		-32					
1997/98	2000	nil	211	Yes +SIL	45		-28					
1998/99	2438	0.01	101	Yes +SIL	56.6		-42					
1000/2000	1427	0.01	2	No	45.6	45	-22					
2000/2000	1739	0.02		No	44	45						
2000/01	1907	nil	69	No	15	45	-24					
2001/02	1110	0.1	29	No	15		-25					
2002/03	2221	0.1	1/2	No	15		 					
2003/04	1007	0.57	162	No	15		-25					
2004/03	1907	0.12	117	INU	15		-20					
Average	1900	0.07	117				-23					
Original gut oil						ļ						
Grounanut oli	1097	0.25	0.02	N	25.0							
1996/97	1907	0.35	0.02	No but crude	35.0		0					
1997/98	2000	0.02	0.02	canalizeu	35.0	ļ	-13					
1998/99	2066	0.41	0.01	with SIL	16.5/21.2	05	8					
1999/2000	1209	neg	0.10	NO	16.5/21.2	80	4					
2000/01	1474	0.03	0.02	NO	16.5/40.4	85	5					
2001/02	1616	nıı	0.02	No	75/85	85	0					
2002/03	948	neg	0.13	No	75/85		15					
2003/04	1882	neg	20.71	No	75/85		-16					
2004/05	1616	neg	40.34	No	75/85		-14					
Average	1610	0.09	7				-1					
2004/05 in 1 able 2, which is for "oil year" November 1 2003 to October 31 2004 as reported in Solvent Extractors Association of India website. Groundnut meal production estimated as 1.18 times groundnut oil production. Trade data from India, Ministry of Commerce, Export Import Data Bank website at <dgft.delhi.nic.in>. Information on QRs and tariffs from Goyal, Arun <i>Easy Reference Customs Tariff</i> (various years). During 1996/97-1998/99 deodorized edible groundnut oil was free of QRs. Crude oil imports were canalized by two parastatals, but were on a list of products which could be imported by private traders with the use of Special Import Licenses (SLs) which were issued as an incentive for exporters. During this period groundnut meal imports were restricted, but could also in principle be imported using SILs. According to Persaud and Landes (2006) p.9, after being freed for three years, imports of all oilseeds including groundnuts were effectively once again banned by a plant quarantine order in 2002. Tariffs include protective para-tariffs as well as Customs duties. From 1998/99 there were two tariffs on groundnut oil (indicated by a slash) with a lower tariff for unrefined oil used to produce vanaspati (margerine). Nominal protection estimates are with respect to imports using estimated import reference prices based on world prices and adjustments for freight and insurance, port costs and importer margins. For groundnut oil they use domestic wholesale price and world price data published by the Solvent Extractors' Association of India (SEA) at <www.seaofindia.com>. For groundnut meal average domestic wholesale prices from the SEA website were compared with import reference prices. These estimates started fore annual average export unit values calculated from the Ministry of Commerce Export Import Data Bank, which were adjusted for estimated international freight and insurance, port costs and importer margins, as explained in the text. The oil and meal nominal protection rates compare domestic wholesale pric</www.seaofindia.com></dgft.delhi.nic.in>												
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Secondly, the Indian tariff in 1999/2000 and 2000/01 was much lower (16.5% for oil used for vanaspati (margarine) production) than the 85% tariff used in the model. Therefore, in these two years, even if it had been valid to treat the tariffs as binding, the domestic price adjustment from free trade would have been much smaller than the very large adjustment assumed following the hypothetical abolition of an 85% tariff. Only in 2001/02 did Indian groundnut oil tariffs increase to approximately the level used in the model.⁷

Thirdly, comparisons between actual Indian wholesale domestic groundnut oil prices and estimates of the likely duty free landed price of imported groundnut oil, indicate that on average over the nine years 1996/97 to 2004/05, domestic prices were about equal to import prices, and on average about 3% above import prices during the three baseline years used in the Begin et al model. Since there were no or negligible imports during the period, in estimating these approximate implicit protection rates, actual import prices or unit values could not be used, and so a range of import reference prices was constructed starting from reported average cif prices in Rotterdam and using alternative assumptions on freight rates and importer margins, and adding estimated port costs in Mumbai.⁸ The resulting implicit protection rates reported in Table 1 are the medians of a range of estimated rates, but the maxima of this range (7, 8 and 3% respectively in the model's three baseline years) are far below the 85% rate used in the Beghin et al model.

Fourth, India exported groundnut oil during a period of higher world prices in 2003/04 and 2004/05. According to FAO data, Indian exports during calendar 2004 accounted for 19% of world trade, about equivalent to Argentina's exports and well above the quantities exported by Senegal, Belgium, France, China and other traditional exporters. In India the exports were only 1 to 2% of domestic production, *a priori* too small to have much influence on domestic prices. Nevertheless domestic prices quoted in the Mumbai market during these two years were almost identical to export prices after adjusting for port costs (just 2% above in 2003/04 and the same in 2004/05) and as indicated in Table 1, domestic prices were respectively 16% and 14% below estimated import reference prices.

⁷ As a basis for policy experiments, it is reasonable to use production and trade data from an earlier period if that is the most recent complete and internally consistent data set available. However, this assumes that the policies in place during the baseline period are not drastically different from the policies being tested. Even if the tariffs had been binding, this is emphatically not the case when the policy experiment involves the removal of an 85% tariff, but the actual tariff during two of the baseline years was just 16.5%.

Based on information on freight rates for large scale Indian imports of palm oil and soya oil, alternatively \$30/MT and \$75/MT was added to reported cif Rotterdam prices to get estimated cif prices in Mumbai. Port costs were assumed to be Rs 1000/MT (approximately \$22/MT in 2000/01) and alternative importer margins of 3% and 6% were added. The resulting range of hypothetical import reference prices in Mumbai was then compared with reported annual average wholesale domestic prices in the Mumbai market. Whether the domestic wholesale prices were for crude or refined groundnut oil is not indicated by the source (Solvent Extractor's Association of India website), but comparisons with separately reported domestic wholesale refined groundnut oil prices gave very similar results. A complication in making this comparison is that reported Rotterdam cif prices are calendar year averages, whereas domestic prices are averages for Indian 'oil years' starting on November 1 and finishing on October 31. These again differ from Indian fiscal years (April 1 to March 31) for which the production, trade and tariff data is available. In Table 1 and also in doing the price comparisons these period differences have been treated as follows e.g. Indian fiscal 2003/04 as equivalent to calendar 2003 and to the 'oil year' ending October 31, 2003. For these and many other well know reasons implicit protection estimates based on price comparisons are subject to error, but the consistency of the results over the nine years suggests that the basic finding of low or negative implicit nominal protection is robust.

The picture that emerges from these statistics is that, at least since 1996/97, Indian domestic groundnut oil prices have been very close to world prices in most years, and that during upswings in world prices, if there are favourable domestic supply conditions, increases in domestic prices are likely to lag behind and make exporting worthwhile. This is a radically different picture from that implied by the Beghin et al model, which wrongly assumes that an 85% tariff supports Indian domestic prices at about 85% above import prices. Nevertheless the tariffs (75% or 85% since 2001/02) leaves plenty of scope for prices to rise well above world prices, and it is relevant to ask why this has not happened, especially during and following periodic massive failures (in turn due to poor monsoons) in the groundnut crop which is mainly rainfed e.g. declines in production of around 40% in 1999/2000 and again in 2002/03, leading to similar reductions in groundnut oil and groundnut meal production. The answer appears to be a combination of the following: (a) large Indian imports of palm oil and soya oil over high tariffs which link the Indian domestic prices of these oils to their international prices plus tariffs and import costs; (b) strong preferences of low income Indian consumers for lower priced oils, especially for palm oil, so that the substantial price premium of groundnut oil over palm, soya and other oils that exists in developed countries is far lower in the Indian domestic market; (c) resulting domestic prices for rape/mustard oils, sunflower seed and other oils which are generally lower than tariff inclusive prices, so that the tariffs are prohibitive and there are no or few imports; (d) in the case of groundnut oil, domestic prices which approximate world prices and which move up and down with world prices through the indirect influence of the prices of imported palm and soya oil; (e) high consumer substitution elasticities between oils in India which strongly dampen price responses to shocks affecting the supply of individual oils, for example droughts in the groundnut growing regions. These points are emphasized in section 4, which argues that policy modelling in this area whether at the level of individual countries such as India or world wide — should consider the interlinked markets of all the principal oils and oilseeds together.

<u>Groundnut meal.</u>⁹ Between 1996/97 and 2004/05, Indian imports of groundnut meal were nil or negligible.¹⁰ During 1996/97 to 1998/99 imports were subject to QRs and to high tariffs until 2001/02, but QRs were removed in 1999/2000 and tariffs cut to 15% in 2001/02 and after.¹¹ However, import protection policies do not explain the absence of imports. Instead, this has to do with groundnut meal exports, on average about 6% of Indian production during this period. While these exports were small relative to production, in most years either India or Senegal was the world's largest exporter. According to FAO data, between calendar 1997 and calendar 2004, Indian exports accounted for 32% of total world exports. In the Indian domestic animal feed market groundnut meal competes with other oilseed meals, especially soya meal, a very high proportion of which is exported. These markets are highly competitive and domestic prices of the two principal meals which are exported (groundnut and soya meals) are generally close to export prices. During 1996/97 to 2004/05, average annual domestic wholesale groundnut meal prices quoted in the Mumbai market exceeded fob export unit values by just 3%, and by 12% after deducting port costs from the fob unit values to give an estimate of the net prices exporters were receiving.¹²

⁹ The statistics on 'groundnut meal' also refer to groundnut cake, groundnut pellets and groundnut 'extractions' (the latter is a term frequently used in India to refer to the residue left after the oil is extracted).

 $^{^{10}}$ Very small imports after 2002/03 were duty free from Nepal.

¹¹ The Beghin et al. model which uses 45% tariffs in its three baseline years is correct in the first two of these years, but not in 2001/02 when the actual tariff was 15%. However, all these tariffs were in any case redundant and irrelevant to the actual situation in the groundnut meal markets during the period.

¹² Some groundnut meal exports occurred in every year even though in some years annual average domestic wholesale prices were higher than annual average estimated export reference prices. Part of the explanation may be that groundnut meal export prices were for large scale bulk shipments, whereas reported domestic

By contrast (see the nominal protection rates in Table 1) in every year domestic prices were well below estimated import reference prices, by about 29% on average. This was because of the normal gap between cif and fob prices, and port costs (around \$US10–14/MT) which were added to cif prices to estimate import reference prices, and deducted from fob prices to estimate export reference prices. Relative to world groundnut meal prices, during the period this gap was very large: between \$66–\$81/MT, varying from 43% to 65% of Indian fob export prices.

This illustrates two serious conceptual problems with the Beghin et al model. First, contrary to the standard competitive model, as implemented, the model assumes that domestic prices are raised by tariffs even though a country is exporting and there are no imports¹³. In the Indian case the groundnut meal exports in the model baseline years were low relative to domestic production, but this just indicates that the researchers need to have a careful look at the actual relation between domestic and export prices. Secondly, the model disregards the gap between fob and cif prices at a country's border created by international transport and insurance costs, and also port costs and trader margins that further widen the gap between the prices domestic traders receive when they export and the prices they would have to pay if they were to import. This discontinuity, which is very large in the case of Indian groundnut meal and other low value products, means that over a wide range of domestic prices, the product is essentially a non-traded tradable, and so if a country is observed to be exporting, domestic prices will have to rise well above export prices before importing becomes worthwhile.¹⁴ Both these egregious mistakes contribute to the models' counterintuitive prediction that following trade liberalization, from being a major world exporter of groundnut meals, India becomes by far the largest single importer (Beghin et al Tables 3 and 5). In fact, if world groundnut meal prices were to rise, given the close link between Indian export prices and domestic prices, the crush margins of domestic mills would improve, leading to increased oil and meal production, and increased Indian meal exports.

<u>Groundnuts.</u> Analysis of groundnut markets is complicated by the quality difference between groundnuts which are sold (both with and without their shells) for direct human consumption, and groundnuts which are used in the crushing industry to produce groundnut oil and meal.

wholesale prices are for smaller quantities in bags. Differences in factors such as timing, specification, quality and credit terms also create a great deal of noise in these types of price comparison. However in low production years domestic equilibrium prices are likely to move above export reference prices during some months of the year, even though there may be exports at considerably lower prices during other months. This may have happened in India in 1999/2000, when groundnut and groundnut meal production slumped and exports were minimal (only 2000 tons). On average in that year domestic prices exceeded reported average export fob unit values by 47%, but domestic prices were still 28% below estimated average import reference prices.

¹³ This treatment in the Beghin et al model is inconsistent with its own methodology, which states that (p.1025) 'If a country is a net exporter, and if trade is not restricted by state-trading, the domestic price is just equal to the world price in local currency'. During the baseline years the paper recognizes that state trading in India had been abolished and also that India was a net exporter of groundnut meal. Despite this in implementing the trade liberalization scenarios, the removal of the groundnut meal tariff (assumed to be 45% although actually 15% in 2001/02) reduces domestic prices and contributes to reduced crushing margins (p.1026).

¹⁴ The theoretical outline of the Beghin et al model uses 'price transmission scalars' which can be used to reflect imperfect transmission of changes in the international prices of oil and meal to domestic prices (Equation (9). p. 1024). However, in actually implementing the model, on the grounds that 'transaction costs are much reduced for these products' and that 'cake and oil are usually produced closer to the border and exhibit homogeneous quality' full pass through is assumed and the transmission scalars are put at unity. In principle these scalars could be used to allow for international and domestic transport, handling and marketing costs, but this would have to be done separately for imports, and separately for exports. A single coefficient cannot be used to represent the very large gap between the import and export parity prices that are relevant for traders and producers of these products.

The former (called food groundnuts in the Beghin et al paper) typically sell for about twice the price of the latter ('crush groundnuts'). From about 1990 there has been negligible international trade in crush groundnuts, as countries such as Senegal invested in crushing facilities and replaced exports of nuts with exports of oil and meal. Since then nearly all the international trade has been in higher quality food groundnuts, which typically sell at prices not far below the international prices of groundnut oil.

In India there are no separate production or price statistics which distinguish the two types of groundnut, but it is generally considered that approximately 85–95% of production is used in the crushing industry,¹⁵ and that the reported average domestic prices represent the prices paid by the oil mills for crush groundnuts. All or nearly all India's directly exported groundnuts (both unshelled and shelled) are 'Hand Picked Select' (HPS) food groundnuts. There is no information on the prices at which food groundnuts similar to these sell domestically, but since 1986/87 there have been no restrictions on exports and it is plausible that domestic prices are closely linked to export prices.¹⁶

During the nine years 1996/97 to 2004/05, Indian groundnut imports were zero or negligible, but in every year there were substantial exports, on average 142,000 tons annually (Table 1). As was the case with groundnut meal, these exports were very small in relation to total groundnut production (around 2%), but they would have constituted a considerably larger but unknown share of total food groundnut production — for example about a fifth assuming food groundnut production was say 10% of total groundnut production. India is also normally one of the larger groundnut exporters, according to FAO statistics accounting for about 14% of total world exports between 1997 and 2004. In the Beghin et al model, domestic groundnut prices are a production-weighted average of tradable food groundnut prices, and the prices of non-traded crush groundnuts, which are determined indirectly through substitution in production at the farm with food groundnuts, and by demand from oil mills, which in turn is affected by the protection to groundnut processing from edible oil and groundnut meal tariffs. In the authors' trade liberalization scenario for all products including groundnuts (the FMTL& US scenario) the average Indian farm price for groundnuts falls by 25%, despite a 10% increase in the world price (Beghin et al. p. 1026). This change implies a 32% average initial drop, consisting of an initial decline in food groundnut prices of approximately 27%,¹⁷ following the abolition of the 45% tariff, and a similar decline in crush groundnut prices which are linked to food groundnut prices by a 'stylized facts' equation.¹⁸

¹⁵ According to USDA as reported in the Beghin et al paper (Table 1) food groundnuts were 7.4% of total Indian groundnut production between 1996 and 2001.

¹⁶ Export controls were removed in 1986/87 (Gulati et al , 1990, p.107) and there are no export taxes or subsidies. Most exports are subject to rigorous rules required by importing countries and enforced both by them and the Indian government, to ensure that the exported groundnuts are not contaminated by aflotoxin (a toxic fungus which is difficult to control under Indian conditions). Insofar as these controls are more rigorous than domestic aflotoxin controls, it is possible that domestic prices are lower than export prices.

¹⁷ For food groundnuts, the Beghin et al model uses an equation (p.1023) for the relation between world prices (defined as US shelled food groundnuts at Rotterdam) which takes account of quality differentials, a weight loss ratio from shelling, and 'transaction cost' parameters which presumably include domestic port and other costs, but (strangely) not international freight and insurance. In this case, however, since the base for the tariff does not include the post import transaction costs, the proportionate increase in domestic prices is less than the tariff rate. Assuming transaction costs of \$65/MT in India (the authors mention a range from \$35–\$65/MT is used depending on the country) and a quality adjustment factor of 0.5 (the authors mention that they use a range from 0.4 to 0.6 for developing countries) the 45% tariff would increase domestic prices by about 37%, and *pari-passu* its hypothetical removal would reduce prices by about 27%.

¹⁸ Beghin et al p.1025. The equation is Pcg=Pfg(0.42+0.05(CGS/GS)), where Pcg is the price of crush groundnuts, Pfg is the price of food groundnuts, CGS is the supply of crush groundnuts, and GS is the total supply of groundnuts. When the food groundnut price goes down, farmers produce relatively more crush

Very similar price reductions in India occur in the simulation in which China and India liberalize, but not the rest of the world (CIFTL scenario, Table 5). Finally, drastic reductions in Indian groundnut prices also occur in a 'groundnuts only' simulation (GMTL& US scenario, Beghin et al Table 4) in which all countries liberalize their groundnut trade, but leave their tariffs and other trade policies affecting groundnut oil and groundnut meal unchanged. In this experiment, Indian food groundnut prices once again initially decline by approximately 27% following the abolition of the 45% tariff, leading to a slightly smaller percentage reduction in crush groundnut prices. The reduced food groundnut price reduces the supply and increases domestic demand. There is increased crush groundnut demand from the processing industry since crush margins have increased, because there is no change in edible oil and groundnut meal protection, and the price of the principal input (crush groundnuts) has fallen. To meet the increased domestic demand, food groundnuts are no longer exported, and very large quantities are imported (about half a million tons annually), and this is the principal reason for an increase of approximately 8% in world food groundnut prices. However, production of the non-traded crush groundnuts increases even though the price has fallen, and as a result of this increased crushing activity, starting from zero trade, India begins to export groundnut oil, and increases its exports of groundnut meal.

This story line is conceptually flawed and internally inconsistent, and is also not credible in the light of available data on the Indian groundnut sector.

First, according to the model description (p.1023), if a country is a net exporter of food groundnuts, the in-shell farm price is the world price minus transport costs from the producing areas to the country's border, with adjustments for quality differentials and imperfect pass-through, and a shelling ratio. However, as is the case with groundnut meal, the application of the model is inconsistent with the methodology, since even though India is recognized as a net exporter of food groundnuts, domestic prices of food groundnuts are determined by the estimated price of imports including the Indian tariff. This means that in the baseline years, food groundnuts are supposedly being exported in substantial quantities at prices that are about 23% lower than prevailing domestic prices. For this to occur there would have to be either an export subsidy or some kind of direct government intervention involving cross subsidization of exports. However, during this period and for many years previous years, there were no direct export subsidies in the groundnut sector, and as the Beghin et al paper itself points out (p.1019) earlier Indian interventions which included state trading in the groundnut sector had been removed well before the baseline years.

Secondly, the baseline assumption that domestic groundnut prices were raised above world prices by a 45% tariff,¹⁹ is inconsistent with previous published empirical research that was available to the authors.²⁰ According to this, implicit nominal protection for Indian groundnut production with respect to imports was negative in every year from 1992/93 up to 2001/02. Recent updates and revisions of these estimates find that negative implicit protection continued up to 2004/05. During the nine years 1996/97 to 2004/05 (see Table 1) on average domestic prices were estimated to be 11% below import reference prices, and to be about 9% lower during the three baseline years used in the Beghin et al model. Although

groundnuts, increasing the ratio CGS/GS and reducing the gap between the food groundnut price and the crush groundnut price. Hence the proportionate reduction in the crush groundnut price is somewhat less than the proportionate reduction in the food groundnut price which sets it off.

¹⁹ In the case of groundnuts, the 45% tariff used in the Beghin et al simulations is about the same as the actual tariff during the three years.

²⁰ For example Gulati et al (2003), Fig A.7. Earlier estimates are in Gulati and Kelley (1999); World Bank (1999); and Gulati et al (1990)

these estimates are approximations only,²¹ they are consistent with the direct price comparisons for meal and oil already discussed, which indicate that Indian domestic groundnut meal prices have tracked export prices and have been well below estimated import prices, while domestic groundnut oil prices have also approximated border prices.

Thirdly, under the model's 'groundnut only' liberalization scenario, India becomes a groundnut oil exporter and groundnut meal exports increase, even though the crushing industry remains protected with domestic oil and meal prices far above world prices (Beghin et al, Table 4). As with groundnuts, these dual price scenarios could conceivably exist if there were large export subsidies, or in the presence of private or government created monopoly power in groundnut crushing. However, in fact there were no export subsidies for oil or meal during the period, large numbers of highly competitive oil mills,²² and no restrictions on exports. Therefore, the post-liberalization equilibrium for India in this scenario is inconsistent with both the paper's own methodology and with the actual situation during the baseline years.

Finally, in outlining its methodology, the Beghin et al paper recognizes domestic transport and other transaction costs between the border and domestic markets, and also appropriately has separate equations for the link between world food groundnut prices (Pgw) and domestic food groundnut prices (Pfg), depending on whether groundnuts are an exportable or an importable (p. 1023).²³ However, the methodology does not mention international transport costs and the resulting gap between fob and cif prices at the border, which for groundnuts is substantial. Including these considerably widens the discontinuity in the range of domestic prices over which Indian food groundnuts would not be traded internationally.²⁴ More seriously, however, it is not clear whether (or if so how) the two separate equations for exportable and importable food groundnuts are implemented in the various liberalization scenarios, especially in the 'groundnuts only' liberalization scenario in which from exporting over 100, 000 tons annually, India imports around half a million tons.

To sum up this section, as with groundnut oil and groundnut meal, the Beghin et al model's treatment of groundnuts in India is misleading and inconsistent with the extensive price and other data that is available. In particular, in their 'groundnuts only' trade

²¹ These estimates compare domestic crush groundnut prices in three Indian states (Andhra Pradesh, Gujarat and Tamil Nadu) with estimated import prices after allowing for freight, insurance, port costs and marketing margins. Until 1990 actual import prices of African origin groundnuts (cif Rotterdam) were used. From about 1990 this trade disappeared as countries such as Senegal began to crush nearly all their harvests and export oil and meal instead of crush groundnuts. Since then the only consistent series of world prices that is available is for much more expensive 'US runner' food groundnuts. After 1990 the nominal protection estimates use a notional international price for crush groundnuts using coefficients from a regression of crush groundnut prices on groundnut meal prices and groundnut oil prices (all cif Rotterdam).

²² As discussed in World Bank (1999) and elsewhere, SSI (Small Scale Industry) restrictions applied to oil mills have very likely kept oilseed processing costs higher than they would otherwise be, but the resulting proliferation of large numbers of small oil mills is incompatible with the creation of privately organized market power.

²³ In preparing this paper Indian domestic groundnut prices predicted by the equations given in the methodology section of the Beghin et al. paper were compared with actual prices. There were very large differences even assuming (contrary to the paper) that the Indian tariffs were not binding. These inaccurate predictions appear to be mainly because of inadequate allowance for transport and other transaction costs, and an arbitrary range for a 'price transmission/quality adjustment scalar'. Although time consuming, validation of such parameters to ensure at least rough approximation to reality is critical in policy modelling.

²⁴ According to rough estimates done for this paper the average total gap in India during 1999/2000 to 2001/02 was about \$US 178/MT, equivalent to 39% of average fob export unit values for food groundnuts (around \$US 510/MT during these three years)

liberalization scenarios, the predicted large production and trade adjustments in India would not occur, nor would the predicted 8% increase in world groundnut prices. Instead provided the model's characterizations of the situations in other countries (especially China) are not similarly flawed — following tariff reductions in other countries, India would benefit from marginally higher world food-groundnut prices and export more, while very minor (almost negligible) adjustments would occur in its crushing industry.

3. GROUNDNUTS AND OTHER OILSEEDS

It was argued above that to understand the groundnut and groundnut product markets — especially in India — it is necessary to include the other principal oilseed products with which groundnut products compete. Table 2 summarizes some India data and implicit protection estimates during 2001/02 and 2004/05 for the five principal Indian oils — groundnut, soya, rape/mustard, sunflower and palm, and the four corresponding oilseeds.²⁵ These years were chosen to compare the situation during a period of low world oil and oilseed prices (2001/02) and a period of higher world prices (2004/05). The five oils usually account for about 70% of total Indian edible oil production (in 2004/05 approximately 7 million MT).²⁶ It can be seen that around 40% of the market is supplied by imports — nearly all palm oil and soya oil — so groundnut oil is just 15% of domestic edible oil production, and about 8% of total domestic edible oil availability.

Because there are large imports of palm oil and soya oil over India's tariffs, domestic prices of these two products are determined by import prices plus the tariffs and port, domestic transport and marketing costs and margins. Implicit protection rates of these two products (estimated by comparing average reported wholesale domestic prices with average cif prices plus the domestic transaction costs) are generally somewhat lower than the tariffs. Thus in both years the unrefined palm oil tariff was 75%, and the implicit nominal protection rate was 62% in 2001/02 and 63% in 2004/05. For soya oil, the tariff was 45% and the estimated implicit protection rates in the two years were 33% and 49% respectively.²⁷ Imports of rape/mustard oil and sunflower seed oil are subject to TRQs: when world prices were relatively high in 2004/05, implicit protection of both was lower than the in-quota tariffs and far below the out-of-quota rates. However, implicit protection of both was in the vicinity of the TRQ rates when world prices were relatively low in 2001/02. By contrast implicit protection of groundnut oil was about zero in 2001/02 and minus 14% in 2004/05 (when groundnut oil was exported). Hence the groundnut oil tariff and the out-of-quota tariffs for rape/mustard and sunflower seed oil were prohibitive and (except for small quantities of imported sunflower seed oils at the lower in-quota tariff during 2004/05) domestic prices were being set by substitution with imported palm and soya oil and domestic supply and demand.

²⁵ Palm seeds are crushed directly after harvesting: in India there is no separate data on palm seed production.
²⁶ Just about every other vegetable oil is produced in India., including rice bran oil, safflower (kardi seed) oil,

cotton seed oil, coconut oil, mahuwa oil, and tobacco seed oil

²⁷ Even if tariffs are binding, empirical estimates of implicit protection rates using price comparisons will not be the same as the tariffs. If the implicit protection estimate is the excess of the domestic price over an import reference price including port costs and importer margins, it will in general be lower than the tariff since tariffs are applied to the Customs dutiable values, in India cif prices plus 1%. This is further complicated when the import and domestic prices are annual averages, as was the case in these comparisons. This means that estimated implicit protection rates can exceed the tariff if, for example, most of the domestic price observations included in the average domestic price occur during a period of high world and domestic prices, whereas most of the imports occur during a period of low world prices.

		Table 2									
India's principal oils and oilseeds: production, trade, tariffs and implicit protection ra											
· ·	Groundnut	Soya	Rape/	Sunflower	Palm	Total/avg					
OILS			mustard		<u> </u>						
Production and trade		Ĩ			l						
Oil production 2004/05 '000 MT	1080	870	2280	630	40	4900					
Oil imports 2004/05 '000 MT	0	1633	0	65	3542	5240					
Oil exports 2004/05	40	8	2	0	0	50					
Total domestic availability '000 MT	1040	2495	2278	695	3582	10090					
Imports/domestic availability %	0.0	65.5	0.0	9.3	98.9	51.9					
Exports/production %	3.7	0.9	0.1	0.0	0.0	1.0					
Tariffs and implicit protection rates											
Tariffs 2004/05 %	75	45	45/75 TRQ	50/75 TRQ	75/TV	68					
Implicit protection rate 2004/05 %	-14	49	33	33	63	19					
Tariffs 2001/02 %	75	45	45/75 TRQ	50/75 TRQ	75/TV	68					
Implicit protection rate 2001/02 %	0	33	50	61	62	34					
International & domestic prices 2004/05											
World price cif Mumbai \$US/MT	1214	558	645	659	501						
Domestic price Mumbai \$US/MT	1108	916	938	963	902						
World price/world price of palm oil	2.42	1.11	1.29	1.32	1.00						
Domestic price/domestic price of palm oil	1.23	1.02	1.04	1.07	1.00						
OILSEEDS											
Implicit protection rates %		1			 						
2004/05	-24	-34	54	-2	1 1						
2001/02	-8	-29	9	-13	1]						
Average 1996/97-2004/05	-11	-28	30	-12	, 						
Netes: Broduction and price data from Solvent Extractor		India (SEA) M	chaita at <uu< td=""><td>cooofindia.com</td><td>E Adata is</td><td>for F</td></uu<>	cooofindia.com	E Adata is	for F					
November to October "oil years" i.e. 2004 is November	2003 to October	2004 .This ha	is been treated	as the Indian fis	cal vear 2004/	05. Trade					
data from DGFT Export Import data bank. According to t	hese statistics th	e exports of s	oya oil and rap	e-mustard oil we	re generally ir	very small					
quantities at export unit values much above prevailing we	orld prices, sugge	esting that the	y were speciali	zed types of oil v	vith specialize	d uses.					
Tariffs are from Goyal, Arun (various years) The tariffs are those in force during fiscal years 2004/05 and 2001/02. The 75% tariffs are											
that palm oil tariffs are applied to pre-set "tariff values" instead of the normal Customs assessable values (cif price plus 1%) TRO=Tariff Rate											
Quota. The lower in-quota TRQ rates are respectively for 150,000 MT of refined rape/mustard oil and for 150,000 MT of crude sunflower or											
safflower oil. The average is of the five out-of-quota tariffs. The implicit nominal protection rates are with respect to imports and are either based											
on actual import prices or estimated import prices. For palm oil and soya oil they are calculated by comparing annual average wholesale											
prices excluding domestic sales taxes and other domestic taxes, with the actual wholesale prices of imported oils after removing tariffs and domestic taxes. The price of the actual wholesale prices of imported oils after removing tariffs and action taxes are taken at the actual taxes and the actual taxes are taken at taxes at the actual taxes are taken at taxes at taxes are taken at taxes at taxes are taken at taxes at taxes at taxes are taken at taxes at ta											
small guantities, were calculated by comparing average wholesale domestic prices with estimated import reference prices. The import reference											
prices are estimated from international prices by adding	estimated freight	and insuranc	e, port charges	, and importer m	argins. The in	mplicit					
protection rates for palm oil and soya oil are expected to be lower than tariffs since port and other importer charges and margins.are not											
Included in the base on which the tariffs are imposed. However this is not necessarily always the case (e.g. for soya oil in 2004/05) since timing											
[2003] and Mullen et al (2005). There is no data on paim fruit processor trade.											
						-					
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A consequence of these tariff policies and Indian consumer preferences is that relative domestic prices are highly distorted, in that they vary only slightly compared with a much wider range of international prices (Table 2). For example, in 2004/05 palm oil was selling domestically for only \$206/MT (about 18%) below the domestic price of groundnut oil, whereas in world markets (where groundnut oil is a 'luxury' oil preferred by higher income buyers) the price of palm oil (cif India) was \$713 (59%) below the price of groundnut oil. India's very high edible oil tariffs are usually justified as a way of protecting oilseed farmers and reducing national dependence on imported edible oils. To make sure this indirect source of protection for farmers is not undermined by imports of oilseeds, farmers have been and remain directly protected by a combination of QRs and high tariffs. The QR status and tariffs have been about the same for all the principal oilseeds as shown for groundnuts (Table 1). Until 1999/2000 this policy was implemented by high tariffs and a *de facto* import ban through the use of parastatal import monopolies. From 1999/2000 to 2001/02 imports were freed from QRs but subject to 44% or 45% tariffs. Tariffs were reduced in 2002/03 and again

in 2003/04 to approximately 31%, but according to USDA since 2002 imports have once again been effectively banned by a new SPS regulation.

The indirect and direct protection of oilseed production through these formal barriers to import competition has had a very uneven incidence and effect on actual oilseed production and prices. The principal beneficiaries appear to have been farmers producing rape/mustard seeds. The domestic prices of these have consistently exceeded estimated import reference prices, by about 30% on average over the nine years 1996/97–2004/05. Palm oil and indirectly palm plantations have also been very heavily protected for an extended period, but in 2004/05 palm oil production was only 40,000 MT, just half of one percent of total domestic edible oil production. However in most recent years implicit protection rates of groundnuts, soya beans and sunflower seeds have been negative; on average between 1996/97 and 2004/05 minus 11%, minus 28% and minus 12% (Fig 2). Accordingly, if the price comparisons are reliable, for these three oilseeds the tariffs and QRs protecting farmers against import competition are redundant, and could be removed with little or no impact on domestic production.

Because about 40% of Indian edible oil consumption is imported palm and soya oil, the government's protection policies tax consumers at higher rates than they protect edible oil producers. In 2001 the tariffs raised the average consumer price of the five oils at wholesale level by 39%, and in 2004 by 27%. This compared with weighted average protection rates for the producers of 23% and 13%. The tax on consumers is highly regressive, since especially price sensitive low income groups are reported to be the principal buyers of palm oil, for which the estimated implicit protection rate in 2001/02 was 62% and in 2004/05 64%. The lowest protection rates (negative in 2004) are for groundnut oil, which is a more expensive 'luxury' oil preferred by higher income households. Until 2001 the taxation of low income consumers was offset to some extent by the sale of edible oils at subsidized prices as part of India's Public Distribution System (PDS). But this created rampant diversion and corruption to benefit from the wedge between the PDS price and open market prices, and edible oils were removed from the system in 2001.

Cutting the Indian palm oil tariff would have very substantial consumer welfare benefits, especially for low and very low income families, both directly and indirectly through the resulting downward pressure on the prices of other edible oils, except groundnut oil, the price of which in most years is either at or not far above a floor provided by export parity prices. But unless there were substantial improvements in storage, transport and processing efficiency, a higher market share of imported palm oil and a lower general level of domestic oil prices, would squeeze domestic processors of rape/mustard, sunflower seeds and soya beans. This would adversely affect the rural sector through a combination of lower prices and reduced demand for these oilseeds.²⁸ In India, this conflict between consumer and producer interests has so far been dominated by producer interests, and the poverty dimension of present policies has received little attention in policy debates.²⁹

²⁸ For about the past 10 years domestic soya bean and sunflower seed prices have generally been below import reference prices but above estimated export reference prices. Therefore they have behaved as non-tradables, with prices fluctuating with domestic supply and demand conditions.

²⁹ Persaud and Landes (2006) propose that allowing duty free imports of oilseeds would be a partial way out of this dilemma. According to them domestic oilseed prices would fall and increase the ability of the processing mills to compete with imported palm oil. However, the implicit protection estimates in their paper and the estimates summarized in Table 2 of this paper, indicate that domestic groundnut, sunflower seed and soya bean prices were already well below import parity prices, so removing the oilseed import ban and oilseed tariffs would make no difference to their domestic prices. The prices of rape/mustard seeds would however decline, as Persaud and Landes suggest.

Because of India's size — both as a producer and importer — in world edible oil markets, its policies can have major repercussions in other countries. However, the Beghin et al study of groundnut products focuses on the one oilseed group in which India's trade policies are least distorting, and which on their own have practically no adverse economic welfare consequences either in India or in the rest of the world. By contrast, India's high protection policies for palm oil directly impact other developing country exporters — especially Malaysia and Indonesia — while its high soya oil tariffs adversely affect both developed countries (notably the US) and developing countries (notably Brazil). The resulting indirect protection in India of other edible oils also has world-wide repercussions on trade and welfare. This broad topic would be a highly relevant for policy oriented research, but in undertaking it all the principle edible oils and oilseeds would need to considered together.³⁰

4. CONCLUSIONS: HAZARDS OF POLICY MODELLING

If well done, policy modelling can make important contributions to better understanding of how government policies affect complex commodity and other markets, by providing estimates — not precise but indicative of orders of magnitude — of the relative quantitative significance for the various market participants of alternative policies. But unless the modelling is careful and rigorous, both conceptually and empirically, the models can give highly misleading results and lead to quite erroneous policy conclusions. If this happens, a serious problem is that the assumptions and empirical parameters that are responsible for these results are often not easily discovered by other researchers unless they have specialized knowledge, and even then after considerable effort. This in turn contributes to scepticism of modelling in general, which may undermine the credibility of modelling exercises which are careful and accurate.

Unfortunately, the model of world groundnut markets discussed in this paper is deficient owing to mistakes in its treatment of India's role. The deficiencies are both conceptual and empirical, and include (1) the assumptions that domestic prices are determined by tariffs even though imports are zero or negligible; (2) the assumption in the policy experiments that domestic prices can exceed export prices even though domestic markets are competitive, exports are substantial and there are no export subsidies; (3) the absence of any treatment of the large gaps between export and import parity prices, which makes groundnut products (especially food groundnuts and groundnut meal) non-tradable over a wide range of domestic and international prices; (4) the failure to adequately investigate the realism of the protection parameters used in describing India in the base scenario, even though these parameters are by far the main determinants of the results of the policy experiments, both for India itself and for world groundnut markets.

These deficiencies in the treatment of Indian groundnut markets and policies do not inspire confidence in the characterization of the policies and parameters of the groundnut markets in China and the other countries included in the study. The model also illustrates the desirability of spending some time and resources in advance to minimize the possibility that the problem studied turns out to be a non-problem or of minor policy interest, and that a related alternative study — for example in this case of policy distortions in all oilseed and oilseed products considered together — would not be more relevant and useful.

³⁰ Recent studies which have analysed the principal oilseeds and oilseed products as a group (but in India only) are Srinivasan (2005) and Persaud & Landes (2006).

The temptation to take the easy option and to use tariffs to represent nominal protection, has also been a problem for other models which have included the Indian agricultural sector. Extensive empirical research involving detailed price comparisons has established that despite QRs and very high tariffs, there is pervasive and substantial tariff redundancy during most years for most Indian agricultural crops, with low or negative implicit protection rates and domestic prices often situated in between import and export parity prices, so that over a considerable range of domestic and world prices these crops should be treated as non-tradeds.³¹ Despite this, modelling exercises, including those using GTAP,³² have used tariff based parameters in running policy experiments, with the result that the welfare and other outcomes of these experiments have been highly inaccurate, certainly for India but most probably also for global agriculture, because of the size of Indian production.³³ Similar problems undoubtedly exist with the GTAP data bases of other countries, especially countries in which there are long distances and poor transport links between ports and farming areas. A new multi-country World Bank study³⁴ which covers 75 countries including India and China, aims to provide more accurate agricultural protection estimates using price comparisons where appropriate. Provided it is regularly updated, this new data base should improve the reliability of future GTAP policy experiments. It should also provide an improved starting point for more disaggregated studies, but will by no means reduce the need for conceptual clarity and attention to detail that will always be needed to avoid the kinds of modelling hazards discussed in this paper.

³¹ For example Gulati & Kelley (1999), World Bank (2004) Vol III, Mullen, Orden and Gulati (2005), Pursell, Gulati and Gupta (2006)

³² Global Trade Analysis Project. See <u>www.gtap.agecon.purdue.edu</u>.

³³ For example, a recent modelling paper which uses the GTAP version 6.2 data base (Chadha, Pratap & Tandon (2007)) gives highly implausible results for India and possibly for the rest of the world because the Indian GTAP agricultural protection rates used in the policy experiments appear to be based on Indian tariffs, even though there is an extensive literature documenting substantial tariff redundancy for agricultural products, and wide export-import parity price ranges over which these products are non-tradeds.

³⁴ A description of this research project is at <u>www.worldbank.org/agdistortions</u>.

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