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PROTECTION AS A TAX ON CONSUMERS: WHO BEARS THE BURDEN?

by

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ABSTRACT

Protection implicitly taxes consumers by raising prices, in a manner akin to a consumption tax. This paper presents an analysis of the distribution of the burden of this 'protection tax' across different types of households. The households are differentiated on the basis of (a) principal source of income, (b) nature of housing occupancy (c) age of household head, (d) number of adults and (e) number of children. The analysis depends on simulations using an extended version of the ORANI model of the Australian economy. That is, the 'standard' version of the ORANI model has been augmented with data from the 1981-82 Income and Housing Survey and from the 1984 Household Expenditure Survey.

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Protection as a Tax on Consumers: Who Bears the Burden?

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I INTRODUCTION

Tariffs and quantitative restrictions have an implicit tax effect on consumers through their effects on prices of imports and domestically produced goods. The imposition of a tariff usually raises the price of an imported product, providing domestic producers of substitute products with the scope to sell their outputs at a higher price than would prevail without the tariff. Quantitative restrictions on imports generally have a similar effect on prices because the artificial scarcity of imports subject to a restriction usually leads to an increase in their prices, enabling domestic producers to raise the price of competing products accordingly.

As far as consumers of the protected products are concerned, the higher prices they face might equally have been caused by a tax on the consumption of these products. Accordingly, a tax which would cause the same price increase as a tariff or quota, is called its consumer tax equivalent. This paper provides empirical estimates of

* I am indebted to Tony Lawson, Alan Powell and Peter Wilcoxen for helpful comments on an earlier draft of this paper. This paper is an output from a project which aims to provide a detailed elaboration of income distributional issues within a computable general equilibrium framework. This project is being carried out collaboratively by Tony Meagher (at the Institute of Applied Economic and Social Research, University of Melbourne) and the author.

this implicit 'protection tax' and of its incidence upon different types of household consumers. It differs from previous studies which provide such estimates (see Industries Assistance Commission, (1980, 1988)) in that it relaxes a number of simplifying assumptions that had been made in these studies. Specifically, the earlier studies assume that:

(A.1) the landed price of imports increases by the full amount of the tariff and that domestic producers take full advantage of tariffs, so that the price of comparable goods increases to the same extent;

(A.2) prices to consumers are changed by the same proportion. (The only variation from this was in the treatment of excisable goods, such as beer and tobacco, where specific rate consumption taxes apply); and

(A.3) protection only affects the prices of imported commodities and their domestic equivalents -- all other factors, such as changes in patterns of production and consumption, factor usage, factor returns, exchange rates etc., are assumed to remain unchanged. That is, the previous effects of the 'protection tax' have been estimated in a partial equilibrium framework.

In this paper, we relax all three of these assumptions. In other words, the effects of a protection tax are estimated in a 'general equilibrium' framework. The analysis is based on simulations using an extended version of the ORANI model of the Australian economy, augmented with data from the 1981-82 Income and

Housing Survey (IHS) and from the 1984 Household Expenditure Survey (HES).

The rest of the paper is organized as follows. The methodology is discussed in Section II. Section III contains an analysis of the results. Finally, Section IV provides a brief conclusion.

II METHODOLOGY

II.1 *The Tariff Cuts*

We want to estimate the magnitude by which protection raises the prices of consumption commodities. To do this, we simulate the effects of removing all existing tariffs and quota restrictions on all manufactured commodities in Australia, and examine the extent to which prices fall in response to this reform. In other words, we simulate the effects of a 100 per cent cut in the ad valorem rates of protection on manufactured commodities shown in Table 1 (see Section III.1 below). These rates are estimates supplied by the Industries Assistance Commission of the extent to which tariff and quota protection raised the domestic prices of imported goods in December 1987.

II.2 *The Assumed Economic Environment*

In the following sections, we report results for two simulations. Three aspects of the economic environment should be borne in mind when assessing these results.[1] The first concerns the

[1] A complete list of the variables selected as exogenous is given in Table A1 of the Appendix in Higgs (1988).

level and composition of real domestic absorption. It is assumed that real private absorption and both its components (i.e., private consumption and private investment) vary in direct proportion to real private sector disposable incomes. Further, real public investment varies directly with real private investment, i.e., the shares of the public and private sectors in aggregate investment remain unchanged. We also assume that real current government expenditures on goods and services are exogenously determined. Finally, apart from tariff rates, all real rates of direct and indirect taxation are assumed to be constant.

The second aspect of the economic environment concerns the operation of primary factor markets. In the labour market, we take real wage rates as exogenously determined and assume that, in each occupation, labour is in excess supply at the going wage rate. This treatment is in accord with the centralized nature of the wage fixation process and the high levels of unemployment (in most occupations) that have characterized the Australian labour market in recent years. It implies that any induced changes in the demand for labour appear as changes in employment. Since the tariff cut affects the consumer price index (CPI), a pivotal variable for real wage determination, a scenario must be specified to describe the response of the nominal wage rate. In the spirit of sensitivity analysis, we present results for two scenarios, one representing "real wage maintenance" (i.e., no change in the CPI-deflated real wage rate) and the other representing "full wage discounting" (i.e., no change in the nominal wage rate).

In other factor markets, it is assumed that industry-specific physical capital and (where appropriate) land in use do not respond to the policy changes simulated, so that rental rates adjust to ensure that these factors remain fully employed. In this sense, our simulations should be considered to be short-run.[2]

The third central aspect of the economic environment concerns our choice of the numeraire. In both simulations, the nominal exchange rate is exogenous and all price changes are measured relative to it.

II.3 *The Model*

Figure 1 contains an overview of our methodology. It reveals the five steps involved in generating the results reported in this paper. These steps are as follows:

Step I:

First, we solve[3] the ORANI-NAGA model of the Australian economy to obtain the effects of tariff reform on a number of macro and structural variables of the economy, including employment changes by occupation and changes in various factor and commodity prices. The ORANI multisectoral model of the Australian economy is

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2 The duration of the ORANI short-run has been estimated to be about two years (Cooper, McLaren and Powell (1985)).

3 The equations of the ORANI model are solved using the GEMPACK general purpose software system for CGE models (Pearson (1988), and Codsi and Pearson (1988)). The process of solving the linear equations used the Harwell sparse matrix code (Duff (1977)). NAGA is solved using the procedure documented in Agrawal and Meagher (1987).

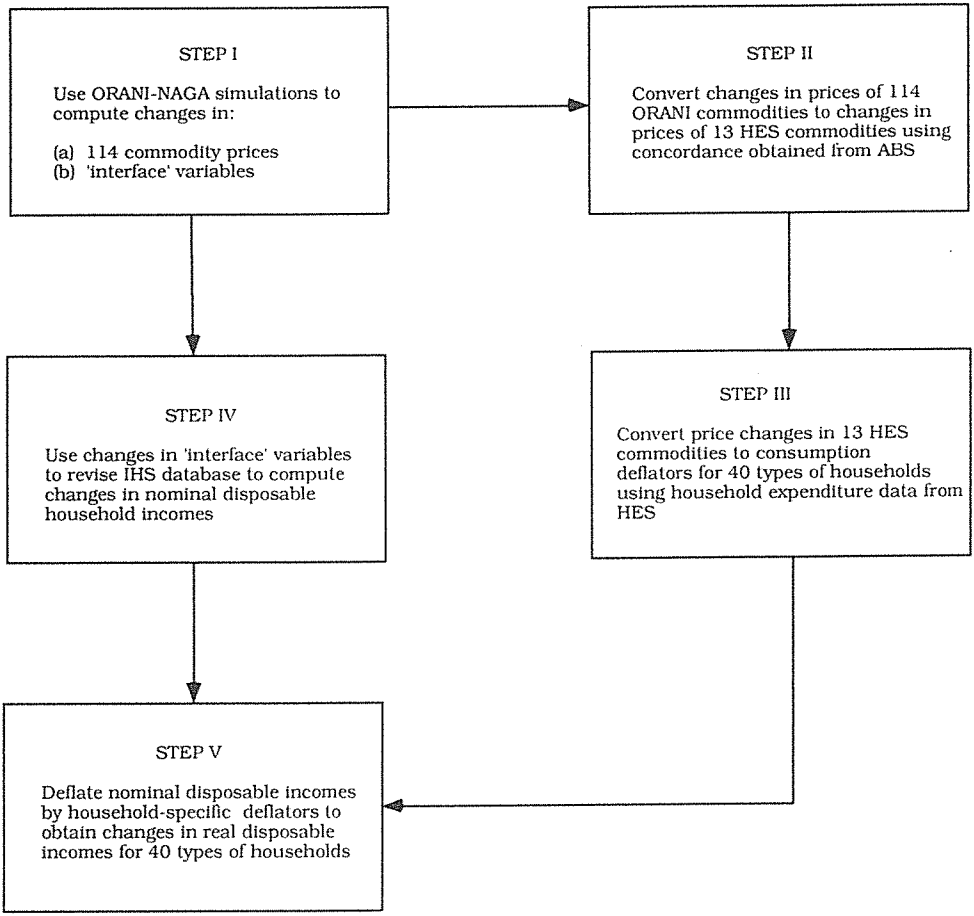

FIGURE 1: OVERVIEW OF METHODOLOGY

well known, having been applied by many users to a wide range of policy issues.[4] The standard version of the model is comprehensively documented in Dixon *et al.* (1982). In recent applications it has often been augmented with a system of equations designed to improve its description of the national and government accounts. This extension, referred to as the NAGA module, is specified in Meagher and Parmenter (1985, 1987). The NAGA database used in our simulations is set out in Agrawal and Meagher (1988a), while a record of the relevant ORANI database can be found in Blampied (1985).

Step II

From the ORANI-NAGA simulations we obtain projected changes in the prices facing consumers for each of the 114 commodities identified in ORANI. We convert these price changes to projected changes in the prices of consumption commodities identified in the the 1984 HES.

The HES database contains consumption information at two levels of detail: at a fairly disaggregated level of over 400 commodities and at a more aggregated one of 13 broad expenditure groups. We calculate the projected price changes at the 13 commodity level (listed in Table 3 below). For this purpose, a concordance was obtained from the Australian Bureau of Statistics between the Input-Output Commodity Classification (IOCC) underlying ORANI and the detailed (419) commodity classification underlying the HES. This

[4] For a recent review of the experience, see Powell and Lawson (1989).

concordance was used to construct a 13 x 114 matrix that gives the shares of each of the 114 ORANI commodities in the aggregate expenditure on each of the 13 HES commodities. This matrix provides the weights for converting the projected changes in the prices of the 114 ORANI commodities into changes in the prices of the 13 HES commodities, and is contained in Appendix 1.

Step III:

We want to obtain a measure of the effect of tariff reform on the price of the typical consumption bundle of each type of household. To do this, we convert the projected price changes in the 13 HES commodities into 40 household-specific consumption deflators. For each type of household, the value of this deflator is obtained by taking a weighted sum of the 13 price indices calculated at Step II, where the weights used are the shares of the respective commodities in the household's expenditure bundle.

For this purpose, we first obtained household budget shares for these 13 commodities from the 1984 HES. The budget shares for our 40 types of households are contained in Appendix 2.[5] For housing, these figures represent the share of current housing costs in total expenditures. In addition, owner-occupiers also spend their imputed rental incomes on housing. Since we make an adjustment to take account of imputed rentals on the income side (see Step IV below), we need to make a similar adjustment on the expenditure side. Hence, to the current housing costs (paid out of cash incomes)

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5 These shares were calculated using data for only those individuals in our sample for whom the value of the budget share for each of the 13 commodities lay between zero and one. This was done to avoid problems in the data arising from the lack of an adequate distinction between households' expenditures on durables and their savings.

we add the amount spent in the form of imputed rental incomes and calculate the new share of housing. We also rescale the shares for all the other commodities so that they are now shares out of 'gross' (i.e., cash plus imputed) incomes rather than out of just cash incomes. The new budget shares thus obtained are reported in Appendix 3. It is these shares that are used as weights in converting the projected changes in the prices of the 13 HES commodities into our 40 household-specific consumption deflators.

Step IV:

In order to calculate post-shock nominal disposable incomes for the 40 types of households, we utilize values for the 'interface' variables computed at Step I to revise unit record data from the 1981-82 IHS database. In our calculations of these incomes, we use an updated[6] and modified[7] version of this database. The pre-shock records were derived from the 1981-82 data by updating weights and incomes to conform to historical values for 1984-85. The modifications to the IHS database involved (amongst other things) imputing incomes from sources that were identified in the *Australian National Accounts* but not in the IHS. There were two main sources of such incomes: imputed rental incomes from owner-occupied housing and imputed interest income from life insurance and superannuation funds. We allocated these incomes amongst the various individuals in our database as described in Agrawal (1987a).

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6 The procedure adopted to update the 1981-82 IHS database to 1984-85 is described fully in Agrawal and Meagher (1988b).

7 The modifications were undertaken to make the IHS database conceptually consistent with the national accounts data underlying ORANI. They are described in Agrawal (1987a).

Briefly, to all persons in the IHS database who own their homes outright, we imputed an income equal to the market rental value of their dwelling. The imputed interest income on life insurance and superannuation funds was distributed amongst the individuals in the IHS sample in proportion to the sum of their weekly contributions to life insurance and superannuation.

The procedure for obtaining post-shock (or revised) incomes from the pre-shock (or original) incomes for the simulations undertaken in this paper is described in detail in an earlier study (see Agrawal (1989)). Here, we merely recapitulate the main steps involved.

First, we revise each individual's pre-tax income from every source according to projected changes in various factor and commodity prices. This gives us each individual's post-shock pre-tax nominal income. Second, we apply the provisions of the 1984-85 personal income tax system to each individual income recipient to calculate his/her post-shock disposable nominal income.[8] The final step in our calculations is to revise the population weight attached to each individual in the unit record IHS database according to his/her labour force category and occupation. These changes are made to reflect the projected changes in employment (by 61 occupations), and in unemployment and labour force participation.

Each individual in the IHS database has been assigned to one of 40 types of households that have been differentiated on the basis of characteristics (such as household size and composition) that are

[8] The details of these tax calculations are described in Agrawal (1987b).

likely to influence their expenditure patterns. Individual results are aggregated to obtain the levels of pre- and post-shock nominal disposable incomes for each type of household. Because household type is defined partly by income source, and because this in turn can be affected by the employment status of the head, the household type to which some individuals belong is affected by the tariff removal. To take account of these changes, we adjust the household weight attached to each household head in our sample as described in Agrawal (1989).

Step V:

At the final step, we use the household-specific CPIs calculated at Step III to deflate the post-shock nominal disposable household incomes calculated at Step IV. This gives us the real post-shock disposable income for each of the 40 types of households. A comparison of the level of the pre- and post-shock real disposable income for a particular type of household then enables us to evaluate the effect of tariff reform on that type of household.

III Results

III.1 *Relaxing Assumption A.1*

In this section we examine the effects of relaxing the first of the three assumptions made in the IAC's earlier studies (1980, 1988) of the effects of tariffs as a consumption tax. In other words, we relax the assumption that the prices of imported and comparable domestic

commodities change by the full amount of the tariffs. Instead, we let the model determine these changes as follows.

In ORANI, the basic values for domestic goods are defined as the prices received by producers, i.e., basic values exclude sales taxes and margin costs (such as transportation, wholesale and retail). For imports, basic values are the prices received by the importers; sales taxes and margin costs associated with deliveries from the ports to domestic users are excluded, but import duties are included. In percentage change form, we can write down a simplified version of the ORANI equations for these two sets of prices as follows:

$$(1) \qquad p_{bvd,i} = p_{Ii}\, S_{Ii} + p_{Li}\, S_{Li} + p_{Ki}\, S_{Ki} + p_{Ti}\, S_{Ti} + p_{Oi}\, S_{Oi} , \qquad i = 1, \ldots, 114$$

and

$$(2.1) \qquad p_{bvm,i} = (p_{mi} + \phi)\, S_{mi} + v_i\, S_{vi} , \qquad i = 1, \ldots, 114$$

where in (2.1)

$$(2.2) \qquad v_i = (t_i + p_{mi} + \phi) , \qquad i = 1, \ldots, 114.$$

For equation (1), we define percentage changes in the various prices as:

$p_{bvd,i} \equiv$ basic value price of domestic good i,

p_{Ii} ≡ price of an 'effective' unit of intermediate inputs (aggregated over various industries and the two sources of supply (domestic and imported)) used in the production of good i,

p_{Li} ≡ price of an 'effective' unit of labour input (aggregated over various skill types) used in the production of good i,

p_{Ki} ≡ rental price of capital used in the production of good i,

p_{Ti} ≡ rental price of agricultural land (where relevant) used in the production of good i,

p_{Oi} ≡ price of miscellaneous inputs used in the production of good i,

and the various shares as:

S_{Ii} ≡ share of intermediate inputs costs in the total cost of producing good i,

S_{Li} ≡ share of labour costs in the total cost of producing good i,

S_{Ki} ≡ share of capital costs in the total cost of producing good i,

S_{Ti} ≡ share of land costs in the total cost of producing good i,

S_{Oi} ≡ share of miscellaneous production costs in the total cost of producing good i.

Equation (1) then states that the percentage change in the basic value price of domestic good i is a weighted average of the percentage changes in the prices of its various inputs, where the weights are the base-period cost shares of each input.

For equations (2.1) and (2.2) we define:

$p_{bvm,i}$ ≡ basic value price of imported good i,

p_{mi} ≡ foreign currency c.i.f. price of imported good i,

ϕ ≡ nominal exchange rate ($A per unit of foreign currency),

v_i ≡ tariff in $A per unit import of good i,

t_i ≡ ad valorem tariff rate on imported good i,

and the shares as:

S_{mi} ≡ share of the foreign currency price in $A of the basic value price of imported good i,

S_{vi} ≡ share of the tariff in the basic value price of imported good i.

Equation (2.1) states that the percentage change in the basic value price of imported good i is a weighted average of the percentage change in its foreign currency c.i.f. price in $A and the percentage change in the tariff levied on it, where the weights are

the respective base period shares of the two components in the basic value price of imported good i.

Equation (2.2) reflects our modelling of the tariff. The ORANI model allows flexible handling of tariffs, so that users can model tariffs in a variety of ways. In our simulations, we have modelled the tariff on imported good i (V_i) as an ad valorem tariff on the c.i.f. import price of good i at the rate (T_i). Hence, equation (2.2) states that the percentage change in the tariff on imported good i is the sum of the percentage changes in its ad valorem tariff rate, in its foreign currency c.i.f. price, and in the nominal exchange rate.

Equations (1), (2.1) and (2.2) reveal that in ORANI, the factors determining changes in the (basic value) prices of domestic commodities are quite different from those influencing changes in the prices of comparable imported commodities. Thus, unlike in the IAC's earlier studies (1980, 1988) that assume that tariffs will affect the prices of domestic commodities by the same extent as those of imported commodities, we find that this is not the case for the ORANI projections reported in Table 1.

Column 1 of Table 1 contains estimates of the nominal levels of protection provided to various (manufacturing) industries as at 31 December 1987. Column 2 contains the values for the projected changes in the basic values of imported commodities in both simulations. Columns 3 and 4 contain projections for changes in the basic values of domestic commodities for Simulations I and II, respectively.

TABLE 1

Projected Changes in the Basic Prices of Domestic and Imported Commodities[a]

ORANI Commodity No.	Name	Nominal Rates of Protection at 31 December 1987[b] (per cent)	Basic Prices of Imported Commodities	Basic Prices of Domestic Commodities	
			Both Simulations	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
1	Wool	-	0.00	-2.29	-0.58
2	Sheep	-	0.00	1.44	0.99
3	Wheat	-	0.00	0.91	0.18
4	Barley	-	0.00	0.89	0.20
5	Other grains	-	0.00	0.91	0.16
6	Meat cattle	-	0.00	5.52	1.07
7	Milk cattle and pigs	-	0.00	-3.17	-0.43
8	Other farming (sugar, fruit and nut)	-	0.00	-0.59	0.20
9	Other farming (veg, cotton, seeds, tobacco)	-	0.00	-4.15	-0.73
10	Poultry	-	0.00	-2.10	-0.24
11	Agricultural services	-	0.00	-4.20	-0.25
12	Forestry and logging	-	0.00	-5.77	-1.65
13	Fishing and hunting	-	0.00	-4.48	-1.25
14	Ferrous metal ores	-	0.00	0.18	-0.02
15	Non-ferrous metal ores	-	0.00	-0.09	-0.03
16	Black coal	-	0.00	0.87	0.28
17	Oil, gas and brown coal	-	0.00	0.03	-0.05
18	Other minerals	-	0.00	-4.25	-1.87
19	Services to mining	-	0.00	-4.69	-0.77
20	Meat products	0.61	-0.61	-1.39	-0.29
21	Milk products	22.11	-18.11	-4.33	-1.00
22	Fruit and vegetable products	8.58	-7.90	-4.39	-0.98
23	Margarine, oils and fats n.e.c.	7.00	-6.54	-4.44	-2.28
24	Flour mill and cereal food products	8.43	-7.77	-3.93	-1.39
25	Bread, cakes and biscuits	0.48	-0.48	-4.67	-1.05
26	Confectionery and cocoa products	16.10	-13.87	-4.73	-1.65
27	Other food products	7.19	-6.71	-1.51	-0.32
28	Soft drinks, cordials and syrups	10.60	-9.59	-4.84	-1.57
29	Beer and malt	28.59	-22.23	-4.51	-1.12
30	Other alcoholic beverages	19.00	-15.97	-5.55	-2.77

... continued

Table 1 continued

ORANI Commodity		Nominal Rates of Protection at 31 December 1987[b] (per cent)	Basic Prices of Imported Commodities	Basic Prices of Domestic Commodities	
No.	Name		Both Simulations	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
31	Tobacco products	7.00	-6.54	-4.55	-1.36
32	Cotton ginning, wool scouring, etc.	8.72	-7.99	-3.30	-0.80
33	Man-made fibres, yarns, etc.	34.05	-25.40	-11.40	-8.65
34	Cotton yarns, broadwoven fabrics, etc.	29.44	-22.74	-10.01	-7.00
35	Worsted and woollen yarns, etc.	12.70	-11.27	-5.18	-1.92
36	Textile finishing	39.70	-28.42	-11.88	-9.66
37	Textile floor coverings, felt, etc.	35.86	-26.39	-8.57	-5.69
38	Other textile products	22.45	-18.33	-8.87	-5.93
39	Knitting mills	67.31	-40.23	-10.33	-6.92
40	Clothing	68.15	-40.53	-10.14	-6.60
41	Footwear	57.50	-36.51	-8.31	-4.73
42	Sawmill products	5.14	-4.89	-5.10	-1.60
43	Veneers and manufactured wood boards	15.40	-13.34	-5.68	-2.16
44	Joinery and wood products n.e.c.	12.60	-11.19	-5.52	-1.88
45	Furniture and mattresses	22.48	-18.35	-6.22	-2.66
46	Pulp, paper and paperboard	9.80	-8.93	-5.78	-2.68
47	Bags, fibreboard containers	20.73	-17.17	-5.92	-2.85
48	Paper products n.e.c.	21.50	-17.69	-5.99	-3.03
49	Newspapers and books	0.46	-0.46	-5.50	-2.04
50	Commercial printing	19.25	-16.14	-5.74	-2.16
51	Chemical fertilisers	1.02	-1.01	-3.10	-1.41
52	Other basic chemicals	12.72	-11.29	-7.50	-5.58
53	Paints and varnishes	13.80	-12.13	-6.60	-3.64
54	Pharmaceutical products, etc.	5.49	-5.20	-5.49	-2.30
55	Soap and detergents	5.90	-5.57	-5.51	-2.52
56	Cosmetics and toilet preparations	18.10	-15.33	-6.38	-3.00
57	Other chemical products	11.47	-10.27	-6.24	-3.34
58	Petroleum and coal products	0.14	-0.14	-1.88	-0.80
59	Glass and glass products	6.10	-5.75	-5.76	-2.75
60	Clay products and refractories	3.82	-3.68	-4.91	-1.58

... *continued*

Table 1 continued

ORANI Commodity		Nominal Rates of Protection at 31 December 1987[b] (per cent)	Basic Prices of Imported Commodities	Basic Prices of Domestic Commodities	
No.	Name		Both Simulations	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
61	Cement	1.00	-0.99	-3.91	-0.92
62	Ready mixed concrete	0.00	0.00	-4.52	-1.37
63	Concrete products	1.28	-1.26	-4.21	-0.84
64	Other non-metallic mineral products	9.56	-8.73	-4.75	-1.52
65	Basic iron and steel	9.22	-8.45	-4.79	-1.74
66	Basic non-ferrous metals and products	4.22	-4.05	-1.00	-0.38
67	Structural metal products	13.24	-11.69	-5.07	-1.71
68	Sheet metal products	16.02	-13.81	-5.16	-1.69
69	Other metal products	18.44	-15.57	-6.00	-2.60
70	Motor vehicles and parts, etc.	28.73	-22.32	-9.43	-6.50
71	Ships and boats	14.92	-12.98	-6.10	-1.97
72	Railway rolling stock and locomotives	17.50	-14.89	-5.49	-1.19
73	Aircraft	1.80	-1.76	-4.37	-0.74
74	Photographic and scientific equipment	7.94	-7.36	-5.60	-2.25
75	Electronic equipment	19.87	-16.58	-7.26	-3.96
76	Household appliances and water heaters	23.90	-19.29	-6.86	-3.59
77	Other electrical equipment	21.02	-17.37	-5.78	-2.51
78	Agricultural machinery	7.64	-7.10	-3.83	-1.36
79	Construction machinery, etc.	22.01	-18.04	-6.34	-2.74
80	Other machinery and equipment	14.42	-12.60	-5.80	-2.09
81	Leather products	9.88	-8.99	-6.20	-3.31
82	Rubber products	21.86	-17.94	-7.40	-4.42
83	Plastic and related products	19.89	-16.59	-7.44	-4.60
84	Signs, writing and marking equipment	14.13	-12.38	-6.22	-2.64
85	Other manufacturing	21.95	-18.00	-6.01	-2.94
86	Electricity	-	0.00	-3.35	-1.51
87	Gas	-	0.00	-4.04	-1.77
88	Water; sewerage and drains	-	0.00	-4.28	-1.49
89	Residential building	-	0.00	-4.97	-1.45
90	Other construction	-	0.00	-5.41	-1.46

... continued

Table 1 continued

ORANI Commodity		Nominal Rates of Protection at 31 December 1987[b] (per cent)	Basic Prices of Imported Commodities	Basic Prices of Domestic Commodities	
No.	Name		Both Simulations	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
91	Wholesale trade	-	0.00	-4.91	-0.93
92	Retail trade	-	0.00	-4.96	-0.73
93	Mechanical repairs	-	0.00	-6.07	-2.36
94	Other repairs	-	0.00	-5.92	-2.43
95	Road transport	-	0.00	-5.60	-1.68
96	Rail and other transport	-	0.00	-5.39	-0.96
97	Water transport	-	0.00	-4.10	-0.78
98	Air transport	-	0.00	-4.13	-1.02
99	Communication	-	0.00	-4.50	-1.25
100	Banking	-	0.00	-4.76	-0.91
101	Non-banking finance	-	0.00	-3.62	-2.49
102	Investment and services	-	0.00	-4.12	-2.40
103	Insurance and services	-	0.00	-4.78	-0.85
104	Other business services	-	0.00	-4.76	-1.21
105	Ownership of dwellings	-	0.00	-2.73	-2.67
106	Public administration	-	0.00	-5.07	-0.65
107	Defence	-	0.00	-5.48	-1.60
108	Health	-	0.00	-5.29	-0.80
109	Education, libraries	-	0.00	-5.27	-0.40
110	Welfare and religion	-	0.00	-5.29	-0.72
111	Entertainment, leisure	-	0.00	-5.30	-1.62
112	Restaurants, hotels	-	0.00	-5.01	-1.03
113	Personal services	-	0.00	-4.68	-1.18
114	Non-competing imports	-	0.00	-5.26	0.00

(a) Simulation results are expressed as percentage changes.
(b) Source: Dee (1988).

In Table 1, the estimates for the projected changes in the basic value prices of domestic goods differ significantly from the estimates for the projected changes in the basic value prices of imported goods. While the changes in the prices of imported commodities are determined entirely by the size of the initial tariff imposed on that commodity[9] , the changes in the prices of domestic commodities are influenced mainly by domestic cost conditions. The reason why the prices of domestic commodities in ORANI are determined by supply-side (cost) considerations is because on the demand side, it is assumed in ORANI that such commodities are only imperfect substitutes for their imported counterparts. Hence, the 'law of one price' for similar domestic and imported goods does not prevail. In the IAC's earlier studies, it is assumed instead that domestically-produced commodities are perfect substitutes for imported commodities and hence, prices of the former are fully determined by prices of the latter.

In Simulation I, the nominal wage rate, which is assumed to be fully indexed to the CPI, falls by 5.3 per cent. This fall in labour costs is reflected in the 5.1 per cent decrease in the GDP factor cost deflator in this simulation. This decline in production costs is the main factor underlying the reported values of the projected changes in the basic value prices of domestic commodities in Simulation I. In Simulation II, we have assumed that the nominal wage rate does not respond to the tariff reform. Hence, costs now fall by less than half

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[9] It is easy to calculate from equations (2.1) and (2.2) above that under the conditions of our simulations, the number in Column 2, $p_{bvm,i}$, equals $-100 \times \left(\frac{T_i}{1+T_i} \right)$, where T_i is the ad valorem tariff rate (per cent) on imported good i reported in Column 1.

as much as they did in Simulation I; the GDP factor cost deflator now decreases by only 2.1 per cent. Again, this decline in production costs is the primary influence on the estimated changes in the basic value prices of domestic commodities in Simulation II.

III.2 *Relaxing Assumption A.2*

In this section we examine the effects of relaxing the second of the three major assumptions made in the earlier studies. In other words, we no longer assume that tariffs change the price paid by consumers by the same proportion as they change basic prices. Instead, for each commodity, we first convert the projected changes in its basic value price into projected changes in its purchasers' price for consumers. This is done separately for each domestic and imported commodity. We then weight these two sets of purchasers' prices for each commodity by the appropriate share of the domestic and imported counterparts in the total consumption of that commodity to obtain the general price of each commodity (no longer distinguished by source) consumed by households.

The purchasers' price for a commodity is the sum of its basic value and the costs of the relevant taxes and margins. In percentage change form, we can write down a simplified version of the ORANI equations for these prices as:

$$(3) \qquad p_{ppd,i} = p_{bvd,i}\ S_{bvd,i} + g_{di}\ S_{gdi} + p_{tdi}\ S_{tdi}\ . \qquad i = 1, \ldots, 114$$

and

$$(4) \quad p_{ppm,i} = p_{bvm,i}\, S_{bvm,i} + g_{mi}\, S_{gmi} + p_{tmi}\, S_{tmi}, \qquad i = 1, \ldots, 114$$

where in equation (3)

$p_{ppd,i}$ ≡ purchasers' price of domestic good i,

$p_{bvd,i}$ ≡ basic value price of domestic good i,

g_{di} ≡ sales tax levied on the sale of domestic good i to households,

p_{tdi} ≡ total cost of margins (aggregated over different types) used to transfer good i from producers to households,

$S_{bvd,i}$ ≡ share of the basic value in the purchasers' price of domestic good i,

S_{gdi} ≡ share of the sales tax in the purchasers' price of domestic good i,

and finally,

S_{tdi} ≡ share of the margin costs in the purchasers' price of good i.

The variables in equation (4) are similarly defined for imported commodities.

The general price of each commodity to households is the weighted sum of the purchasers' prices of the domestic and

imported commodities. In percentage change form, we can write it as:

$$(5) \quad p_{hi} = p_{ppd,i}\ S_{di} + p_{ppm,i}\ S_{mi}, \qquad i = 1, \ldots, 114$$

where the new terms in equation (5) are defined as:

p_{hi} ≡ general price of commodity i to households,

S_{di} ≡ share of domestic good i in the total consumption spending on good i,

S_{mi} ≡ share of imported good i in the total consumption spending on good i.

Table 2 contains estimates of the projected changes in the general price of each consumption good to households. In this table, we have listed prices for only those ORANI commodities that are directly purchased by households. As stated above, these prices are a weighted sum of the changes in the purchasers' prices of the domestic and imported commodities, where the weights are the shares of the respective commodities in total consumption. The import share for each commodity is given in Column 1 of Table 2.

Our analysis indicates that in both simulations, the general price of every consumption commodity falls. The commodities that experience larger than average price decreases have two characteristics:

TABLE 2

Projected Changes in the General Prices of 71 ORANI Consumption Commodities[a]

ORANI Commodity No.	Name	Import Share in Consumption	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
8	Other farming (sugar, fruit and nut)	0.08	-2.13	-0.20
9	Other farming (veg, cotton, seeds, tobacco)	0.05	-4.36	-0.78
10	Poultry	0.00	-2.80	-0.42
12	Forestry and logging	0.00	-5.41	-1.25
13	Fishing and hunting	0.24	-3.92	-0.92
16	Black coal	0.00	-1.13	-0.11
20	Meat products	0.00	-2.51	-0.46
21	Milk products	0.02	-4.70	-1.19
22	Fruit and vegetable products	0.13	-4.92	-1.58
23	Margarine, oils and fats n.e.c.	0.07	-4.69	-2.17
24	Flour mill and cereal food products	0.02	-4.29	-1.31
25	Bread, cakes and biscuits	0.02	-4.72	-0.96
26	Confectionery and cocoa products	0.13	-5.50	-2.23
27	Other food products	0.18	-3.16	-1.31
28	Soft drinks, cordials and syrups	0.01	-4.94	-1.46
29	Beer and malt	0.00	-5.01	-1.67
30	Other alcoholic beverages	0.21	-6.13	-3.23
31	Tobacco products	0.07	-5.05	-2.02
34	Cotton yarns, broadwoven fabrics, etc.	0.36	-10.56	-7.71
35	Worsted and woollen yarns, etc.	0.17	-5.71	-2.46
37	Textile floor coverings, felt, etc.	0.28	-10.49	-7.69
38	Other textile products	0.21	-8.69	-5.73
39	Knitting mills	0.20	-11.24	-7.88
40	Clothing	0.21	-11.38	-7.94
41	Footwear	0.31	-11.20	-7.91
45	Furniture and mattresses	0.09	-6.36	-2.77
48	Paper products n.e.c.	0.14	-6.26	-3.00
49	Newspapers and books	0.36	-4.39	-1.12
50	Commercial printing	0.05	-5.60	-2.00
51	Chemical fertilisers	0.08	-3.80	-1.17
52	Other basic chemicals	0.32	-7.33	-5.15
54	Pharmaceutical products, etc.	0.16	-5.11	-1.46
55	Soaps and detergents	0.06	-5.33	-2.10
56	Cosmetics and toilet preparations	0.09	-5.88	-2.35
57	Other chemical products	0.11	-5.85	-2.73
58	Petroleum and coal products	0.08	-3.65	-1.32
59	Glass and glass products	0.55	-5.35	-2.58
60	Clay products and refractories	0.73	-4.57	-1.86
68	Sheet metal products	0.14	-5.79	-2.34
69	Other metal products	0.36	-6.84	-3.73

... *continued*

Table 2 continued

ORANI Commodity No.	Name	Import Share in Consumption	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
70	Motor vehicles and parts, etc.	0.28	-9.60	-6.86
71	Ships and boats	0.13	-6.17	-2.65
73	Aircraft	0.50	-3.06	-1.25
74	Photographic and scientific equipment	0.53	-5.88	-3.35
75	Electronic equipment	0.49	-8.62	-6.02
76	Household appliances and water heaters	0.32	-8.93	-6.13
77	Other electrical equipment	0.18	-6.62	-3.35
82	Rubber products	0.13	-7.53	-4.52
83	Plastic and related products	0.26	-7.66	-4.73
85	Other manufacturing	0.48	-8.42	-5.73
86	Electricity	0.00	-3.37	-1.52
87	Gas	0.00	-4.07	-1.78
92	Retail trade	0.00	-4.96	-0.73
93	Mechanical repairs	0.00	-6.07	-2.36
94	Other repairs	0.00	-5.92	-2.43
95	Road transport	0.00	-5.59	-1.66
96	Rail and other transport	0.00	-5.39	-0.95
97	Water transport	0.58	-1.72	-0.33
98	Air transport	0.36	-2.63	-0.65
99	Communication	0.03	-4.35	-1.21
100	Banking	0.00	-4.78	-0.98
103	Insurance and services	0.00	-4.80	-0.91
104	Other business services	0.02	-4.67	-1.19
105	Ownership of dwellings[b]	0.00	-1.49	-3.37
106	Public administration	0.00	-5.07	-0.65
108	Health	0.00	-5.29	-0.80
109	Education, libraries	0.00	-5.27	-0.40
110	Welfare and religion	0.00	-5.27	-0.72
111	Entertainment, leisure	0.01	-5.23	-1.82
112	Restaurants, hotels	0.02	-4.93	-1.02
113	Personal services	0.00	-4.68	-1.17

(a) I am grateful to George Codsi for his help in computing these price series. Simulation results are expressed as percentage changes.

(b) The ownership of dwellings industry is a dummy industry that represents the utilization of the housing stock of the economy. The relevant price of housing for consumers is the rental price of housing which, in our model, is the rental rate of the capital stock in this industry. Hence, it is these rental rates that are reported here.

(1) they have high initial tariffs, and

(2) they have large import shares.

These features are common to commodities such as textile, clothing and footwear (commodities 34-41) and motor vehicles and parts (commodity 70), all of which experience relatively large falls in prices in both simulations. The price changes of most other commodities by-and-large reflect the general deflationary effects of tariff reform, as explained above.

Since we calculate household budget shares for only 13 aggregate commodities, the next step of our calculations involves converting the 71 price changes listed in Table 2 to price changes in these 13 commodities. This is done by using the conversion matrix provided in Appendix 1. The results are listed in Table 3.

Table 3 indicates that the response of the labour market to the tariff reform is a key determinant of the effect of the reform on the prices of various consumption commodities. For all commodities except housing, prices fall by more in Simulation I than in Simulation II, because production costs fall by more in the first simulation than in the second. *Current housing costs*, i.e., the rentals on housing, however, fall by more in Simulation II. This is because the real rentals on housing tend to vary directly with real private consumption, which increases substantially in Simulation I (by 1.2 per cent), but decreases slightly in Simulation II (by 0.1 per cent). As a result, real housing rents (i.e., rents relative to the CPI) rise in Simulation I and fall in Simulation II.

TABLE 3

Projected Changes in the Prices of 13 HES Commodities [a]

	HES Commodity	Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
1	Current housing costs	-1.49	-3.37
2	Fuel and power	-3.51	-1.54
3	Food and non-alcoholic beverages	-3.81	-0.99
4	Alcoholic beverages	-5.71	-2.65
5	Tobacco	-5.05	-2.02
6	Clothing and footwear	-10.89	-7.54
7	Household furnishings and equipment	-7.90	-4.84
8	Household services and operations [b]	-5.17	-1.96
9	Medical care and health expenses	-5.05	-1.03
10	Transport	-6.01	-3.85
11	Recreation	-5.51	-2.53
12	Personal care	-5.55	-2.07
13	Miscellaneous commodities and services	-5.14	-1.51
	Aggregate	-4.94	-2.85

(a) Simulation results are expressed as percentage changes.

(b) This group consists of items such as postal charges, telephone and telegram charges, child care services, and other household hire and maintenance expenses.

In both simulations, the price of *Clothing and footwear* falls the most. This is not surprising given that almost 80 per cent of this HES commodity consists of three ORANI commodities (Knitting mills, Clothing, and Footwear) that all experience relatively large declines in their prices (see Table 2). Similarly, the price of *Household furnishings and equipment* also experiences above average decreases in both simulations because it can be mapped (via Appendix 1) to the prices of ORANI commodities that undergo large price declines. This commodity consists of items such as bed linen, curtains, towels, etc., so that about 20 per cent of it consists of the output of the heavily-sheltered textile industry. Another 25 per cent of it consists of household appliances, which are also initially heavily protected. Thus, such consumption commodities, which experience above average price decreases in Table 3, can be mapped to ORANI commodities in Table 2 that are initially heavily protected and also have large import shares, so that the removal of tariffs has a large influence on their consumer prices. In contrast, commodities that experience below average price decreases in Table 3 (such as *Food and non-alcoholic beverages*, or *Fuel and power*) have the opposite characteristics.

The most recent IAC study (1988) on protection tax estimated this tax to have been equivalent to 6.2 per cent of household expenditure in 1987. We find that in Simulation I, our average estimate of 4.9 is roughly about this magnitude. However, if we relax the assumption that real wages remain constant under tariff reform, we find that our estimate of the average protection tax falls considerably, to only about 2.9 per cent. Hence, the estimate of this

tax depends crucially on the labour market assumptions of the analysis.

Next we examine how changes in the prices of various consumption commodities affect different types of households. For example, since the price of *Clothing and footwear* undergoes the largest price decrease in both simulations, it is to be expected that households that allocate a relatively larger share of their budget to *Clothing and footwear* will be better off than other households, as a result of this factor. To evaluate the full effects of tariff reform on the household, however, we need to examine its effect on the entire consumption bundle of the household.

Table 4 contains the projected changes in the prices of the typical consumption bundles of 40 types of households. These households have been differentiated on the basis of the following characteristics:

(1) principal source of income,
(2) nature of housing occupancy,
(3) age of household head,
(4) number of adults,[10] and
(5) number of children.

[10] Adults are defined as persons aged 15 years or more.

TABLE 4

Projected Changes in the Prices of the Typical Consumption Bundles of 40 Types of Households*

Household Characteristics						Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
Principal source of income	Nature of housing occupancy	Age of household head	Number of adults	Number of children	No.		
Earned income	Owning home	Under 65 I	1	0	1	-4.56	-2.74
			2	0	2	-4.99	-2.86
				1	3	-4.96	-2.76
				2	4	-4.86	-2.73
				3+	5	-4.98	-2.79
			3	0	6	-5.12	-2.96
				1+	7	-4.92	-2.88
			4	0	8	-5.07	-2.88
				1+	9	-5.07	-2.88
			5+	0	10	-5.21	-3.03
				1+	11	-5.09	-2.84
		65+ II			12	-4.75	-2.83
	Buying/renting home	Under 65 III	1	0	13	-4.71	-2.92
			2	0	14	-5.09	-2.97
				1	15	-4.87	-2.83
				2	16	-4.88	-2.82
				3+	17	-5.03	-2.81
			3	0	18	-5.14	-2.86
				1+	19	-5.11	-2.82
			4	0	20	-5.49	-3.04
				1+	21	-5.21	-2.74
			5+	0	22	-5.61	-3.13
				1+	23	-5.27	-2.81
		65+ IV			24	-5.02	-2.68
	Single parents	V			25	-4.95	-3.01

... continued

Table 4 continued

Household Characteristics						Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
Principal source of income	Nature of housing occupancy	Age of household head	Number of adults	Number of children	No.		
Unearned income	Owning home	Under 65 VI	1	0	26	-4.28	-2.75
			2	0	27	-4.76	-2.80
				1+	28	-4.86	-2.66
			3+	0	29	-4.95	-2.76
				1+	30	-4.80	-2.72
		65+ VII	1		31	-3.98	-2.61
			2+		32	-4.60	-2.72
	Buying/renting home	Under 65 VIII	1	0	33	-4.51	-2.68
			2	0	34	-4.60	-2.55
				1+	35	-4.60	-2.71
			3+	0	36	-5.17	-2.83
				1+	37	-4.79	-2.67
		65+ IX	1		38	-4.66	-2.61
			2+		39	-4.97	-2.72
	Single parents	X			40	-4.51	-2.83
Aggregate						-4.94	-2.85

* Simulation results are expressed as percentage changes.

Table 4 indicates that in both simulations, tariffs act as a consumption tax on all 40 types of all households identified in our study. As we have seen earlier from Table 3, the average incidence of this tax varies between the two simulations, and is substantially higher in Simulation I (4.9 per cent) than in Simulation II (2.9 per cent). In addition, Table 4 reveals that within each simulation, there are significant differences in the incidence of this tax across different types of households. In Simulation I, the rate of taxation varies from a high of 5.6 per cent (which is 14 per cent above the average) for households belonging to category 22 (consisting of earning, home buying/renting, younger households with five or more adults and no children) to a low of 4.0 per cent (which is 19 per cent below the average) for households belonging to category 31 (consisting of non-earning, home-owning, older, single-person households). In Simulation II, we find that the types of households subject to the highest rate of taxation are again those belonging to category 22; such households are taxed at the rate of 3.1 per cent, which is 10 per cent above the average. The households subject to the lowest rate of taxation, however, are of a different type in the two simulations. In Simulation II, it is households belonging to category 34 (consisting of non-earning, home buying/renting, younger households with two adults and no children) that are subject to the lowest tax rate of 2.6 per cent, which is 11 per cent below the average.

Within each simulation, the differences in the effects of tariff reform across various types of households arise due to differences in the expenditure patterns of these households. For instance, households that allocate a higher proportion of their budget to highly taxed commodities such as *Clothing and footwear* will be subject to

higher than average rates of taxation. In contrast, households that allocate a higher proportion of their budget to lightly taxed commodities such as *Food and non-alcoholic beverages* will be subject to below average rates of taxation. In fact, it is easy to explain the bulk of the variation in the incidence of the protection tax across different types of households in terms of the variations in their budget shares across just a few select commodities whose prices deviate the most from the average.

In Simulation I, *Current housing costs* and *Fuel and power* are subject to significantly below average rates of taxation while *Clothing and footwear* and *Household furnishings and equipment* are subject to well above the average rates of taxation. However, of these four commodities, the average budget share for *Fuel and power* is quite small (3 per cent) and shows the least variation across households. Hence, in trying to explain some of the salient results for Simulation I in Table 4, it is useful to concentrate on the budget shares for the other three commodities.

Earlier we had noted that under the conditions of Simulation I, households belonging to category 22 are currently paying the highest tariff taxes and therefore stand to gain the most from tariff removal. In other words, tariffs currently raise the price of the consumption bundle of such households by more than the prices of the consumption bundles of any other types of households. There are two reasons why such households (i.e., earning, home buying/renting, younger households with five or more adults and no children) are being taxed the most by tariffs. Firstly, relative to other commodities, tariffs tax *Housing* the least and these households

spend below average proportions on *Housing*. Thus, instead of allocating 17 per cent of their budget on *Housing*, as did the 'typical' household in Australia, households in category 22 instead allocated only 9 per cent of their budget (see Appendix 3). This is the lowest share allocated to *Housing* by any type of household, and only one other type of household (belonging to category 20) has a similarly low share. Other types of households that have relatively low *Housing* shares are of types 21 and 23 (10 per cent each). These four types of households (categories 20-23) have some important characteristics in common: they are relatively large households that do not own their homes outright. Earlier empirical studies have often revealed that such households tend to economize on housing. The data from the HES support this observation.

The second reason why those belonging to household type 22 are subject to the highest incidence of the tariffs tax under the conditions of Simulation I relates to their expenditures on *Clothing and footwear*. Relative to other commodities, tariffs tax *Clothing and footwear* the most and those belonging to household type 22 spend above average proportions on this commodity. As compared with an average budget share of 6 per cent, these households have shares of 11 per cent for *Clothing and footwear*. This is the highest share allocated to this commodity by any type of household, and it is not matched by the share of any other type of household. However, there are several other types of households (belonging to categories 9, 11, 20 and 39) that have smaller, but still above average shares (of 9 per cent each) for *Clothing and footwear*. At least three of these categories consist of relatively large households, similar in nature to household type 22. Hence, it seems to be a characteristic of large

families that they spend above average proportions of income on *Clothing and footwear.*

The last commodity whose price change we consider to explain Simulation I results is *Household furnishings and equipment,* which is also taxed at rates that are significantly above average. However, the taxation of this commodity does not contribute towards making households of type 22 the most heavily taxed households. This is because such households have slightly below average shares for this heavily taxed commodity. Compared with an average share of 6 per cent, households of type 22 allocate only 5 per cent of their budget on *Household furnishings and equipment.* Hence, this offsets to some extent the unfavourable effects on such households of allocating above average shares to *Clothing and footwear,* and below average shares to *Housing.*

We now turn to explaining results for those households that are being relatively lightly taxed by tariffs under the conditions of Simulation I. We had noted earlier that households belonging to category 31 (consisting of non-earning, home-owning, older, single-person households) have the lowest rate of taxation (of 4.0 per cent) in Simulation I. This is because these types of households have the opposite patterns in terms of their expenditures on *Housing* (the most lightly taxed commodity) and on *Clothing and footwear* (the most heavily taxed commodity) as compared with the expenditure patterns of households belonging to category 22. Our data reveal that of all households, those belonging to category 31 have the highest budget shares for *Housing* (33 per cent) and the lowest for *Clothing and footwear* (3 per cent). In addition, they also have the lowest

shares (of 3 per cent) for *Household furnishings and equipment*, another heavily taxed commodity. These factors help explain why households belonging to category 31 get relatively lightly taxed under the conditions of Simulation I.

The reason why households of type 31 have the kinds of expenditure patterns observed above relates to their source of income. The principal source of household income for these types of households is unearned income. Hence, they would typically be receiving low amounts of cash income. However, they own their homes outright and would therefore be receiving relatively large amounts of imputed rental income. In fact, our database reveals that such households receive almost a quarter of their gross (i.e., cash plus imputed) incomes in the form of imputed rental incomes. These incomes have to be spent on *Housing*; therefore, such households have relatively large shares of *Housing* in their budgets. Shares for *Clothing and footwear* (and for other commodities) that have to be purchased out of cash income (which is low), necessarily get squeezed for such households.

To sum up, under the conditions of Simulation I, households such as those belonging to category 22 are being subject to the highest tariffs tax because they allocate relatively low proportions of their budget to lightly taxed commodities such as *Housing* and relatively high proportions of their budget to heavily taxed commodities such as *Clothing and footwear*. In contrast, households such as those belonging to category 31 are being subject to the lowest tariffs tax because they have quite the opposite kinds of expenditure patterns: they allocate relatively high proportions of their budget to

lightly taxed commodities and low proportions to the highly taxed ones.

We now turn to explaining some of the salient results for Simulation II. We had noted earlier that the incidence of the tariffs tax is much more uniform across different types of households under the conditions of the second simulation than it is under the conditions of the first. This is because in the second simulation, the prices of commodities that account for a relatively large share of the household budget, such as *Housing*, do not deviate as much from the price of the average consumption bundle as they did in Simulation I. However, there is still some variation in the incidence of the tariffs tax across households, and as before it can be explained in terms of the differences in the budget shares of households for a few relatively heavily and relatively lightly taxed commodities.

In Simulation II, *Food and non-alcoholic beverages* and *Medical care and health expenses* are subject to lower than average rates of taxation while *Clothing and footwear* and *Household furnishings and equipment* are again the most heavily taxed commodities. Of these four commodities, the average budget share for *Medical care and health expenses* is quite small (4 per cent) and shows the least variation across households. Hence, in trying to explain some of the outstanding results for Simulation II in Table 4, we concentrate on the budget shares for the other three commodities.

We have noted that under both simulations, households belonging to category 22 are subject to the highest incidence of the

tariffs tax. An important reason for this is that they allocate almost twice as high a share (11 per cent) of their budget to *Clothing and footwear* (the most highly taxed commodity) as does the 'average' household (6 per cent). In addition, we find that they allocate only 18 per cent of their budget to *Food and beverages*, a lightly taxed commodity under both simulations. The 'average' household, in comparison, allocates 20 per cent to this commodity.

We now turn to those households that are being lightly taxed under the conditions of Simulation II. Our analysis indicates that under such conditions, households belonging to category 34 (consisting of non-earning, home buying/renting, younger households with two adults and no children) suffer the least from the imposition of the tariffs tax. This is because such households have the opposite patterns in terms of their expenditures on *Clothing and footwear* (the most highly taxed commodity) and *Food and beverages* (the most lightly taxed commodity) as compared with the expenditure patterns of households belonging to category 22. In other words, they allocate below average shares to *Clothing and footwear* (4 per cent) and well above average shares to *Food and beverages* (25 per cent). In addition, they also allocate below average shares to *Household furnishings* ... (4 per cent), which is another highly taxed commodity. As a result, they are not as adversely affected by tariffs as other types of households are.

To sum up this sub-section, our analysis indicates that tariffs impose a considerable burden on consumers. Depending upon their effect of the real wage rate, tariffs are equivalent to a 2.9 - 4.9 per cent consumption tax on households. Furthermore, this tax is not

uniformly distributed across different types of household consumers. This is because households tend to differ in the allocation of their budgets across different commodities. Since some commodities (such as *Clothing and footwear*) are taxed at higher rates than others (such as *Food and beverages*), some households (i.e., those who allocate higher proportions of their budgets to highly taxed commodities and lower proportions of their budgets to lightly taxed commodities) get taxed at higher rates than others.

So far we have assumed that the pre-tax nominal incomes of individuals remain unchanged due to the tariff reform. In the next sub-section we examine the effects of relaxing this assumption.

III.3 *Relaxing Assumption A.3*

In this section we undertake a general equilibrium analysis of the effects of tariff reform. In other words, we relax the assumption that protection only affects the prices of imported and domestic commodities and leaves all other factors (such as patterns of production and consumption, factor usage, factor returns, etc.) unchanged. In particular, we are interested in examining the effects of tariffs on the incomes of various types of households. In a situation where a household's income is not assumed to be held constant, it is no longer sufficient to measure the burden of tariffs by simply measuring the change in the price of the household's consumption bundle. Instead, we need to look at the combined effects of tariffs on both the income and the expenditure side and the protection tax can be thought of either as an income tax or a consumption tax. Its value can then be measured by the effect it has on the household's real

disposable income, since we are assuming that household consumption moves in line with real household disposable income.

Table 5 contains results for the projected effects of tariff reform on the nominal disposable incomes of the 40 types of households identified in our study. Columns 1 and 2 contain the estimated changes in these incomes for Simulations I and II, respectively.

The effect of tariff reform on the distribution of nominal incomes has been discussed in Agrawal (1989) and will not be repeated. Here we merely note that in both simulations, all types of households experience a decline in their nominal incomes. This is because the removal of tariffs leads to a decline in costs and prices and hence to a decline in nominal incomes from most sources in both simulations. The only nominal incomes to increase in both simulations are those accruing to agricultural land and agricultural capital; nominal income from wages remains constant (by assumption) in Simulation II; all other nominal incomes register a decline in both simulations. The significant decline in nominal wages (by 5.3 per cent) in Simulation I is largely responsible for the fact that average nominal household incomes decline by over three times as much in Simulation I (by 4.7 per cent) as compared with their decline in Simulation II (by 1.6 per cent).

Table 6 contains our general equilibrium (GE) estimates of protection as a consumption (or income) tax on consumers. Columns 1 and 2 contain the estimated changes in real disposable incomes for Simulations I and II, respectively. These values have been calculated

TABLE 5

Projected Changes in the Nominal Disposable Incomes of 40 Types of Households

Household Characteristics						Average Disposable Household Income in 1984-85 (dollars)	Simulation I* (Fixed real wage rate)	Simulation II* (Fixed nominal wage rate)
Principal source of income	Nature of housing occupancy	Age of household head	Number of adults	Number of children	No.			
Earned income	Owning home	Under 65 I	1	0	1	22,908	-3.95	-1.46
			2	0	2	31,066	-4.20	-1.37
				1	3	30,737	-4.18	-1.15
				2	4	32,870	-4.25	-1.35
				3+	5	31,150	-3.64	-1.63
			3	0	6	32,592	-4.21	-1.26
				1+	7	30,981	-4.03	-1.64
			4	0	8	31,156	-4.06	-1.92
				1+	9	30,912	-4.10	-1.73
			5+	0	10	35,700	-4.84	-1.60
				1+	11	35,124	-4.40	-1.92
		65+ II			12	24,375	-3.78	-2.11
	Buying/renting home	Under 65 III	1	0	13	19,103	-5.09	-0.84
			2	0	14	33,681	-5.00	-0.83
				1	15	28,650	-4.88	-0.91
				2	16	28,117	-5.04	-0.88
				3+	17	28,550	-4.88	-0.90
			3	0	18	50,058	-4.90	-1.03
				1+	19	39,163	-4.96	-1.16
			4	0	20	60,360	-5.19	-0.83
				1+	21	39,251	-5.30	-0.70
			5+	0	22	60,809	-5.15	-0.15
				1+	23	50,491	-5.36	-0.77
		65+ IV			24	51,743	-4.76	-1.81
	Single parents	V			25	20,158	-4.85	-1.24

... continued

Table 5 continued

Household Characteristics						Average Disposable Household Income in 1984-85 (dollars)	Simulation I* (Fixed real wage rate)	Simulation II* (Fixed nominal wage rate)
Principal source of income	Nature of housing occupancy	Age of household head	Number of adults	Number of children	No.			
Unearned income	Owning home	Under 65 VI	1	0	26	16,381	-4.12	-3.29
			2	0	27	25,911	-4.19	-2.94
				1+	28	34,813	-3.92	-3.23
			3+	0	29	31,503	-3.83	-3.21
				1+	30	29,965	-3.29	-3.20
		65+ VII	1		31	15,405	-4.17	-2.80
			2+		32	25,450	-4.40	-2.76
	Buying/renting home	Under 65 VIII	1	0	33	11,204	-4.33	-3.23
			2	0	34	22,892	-4.33	-3.40
				1+	35	20,438	-4.65	-3.03
			3+	0	36	43,670	-3.84	-4.28
				1+	37	28,512	-4.91	-2.31
		65+ IX	1		38	10,843	-5.17	-2.63
			2+		39	26,469	-5.19	-2.03
	Single parents	X			40	13,358	-5.04	-2.72
Aggregate						29,182	-4.66	-1.60

* Simulation results are expressed as percentage changes.

by deflating the projected changes in nominal incomes (reported in Table 5) by the corresponding household-specific deflators (reported in Table 4).

The estimates in Table 6 represent the amounts by which real income and consumption would be higher for the 40 types of households in the absence of protection in Australia. It is immediately clear that for both simulations, these estimates are significantly smaller than the corresponding partial equilibrium (PE) estimates contained in Table 4. The difference between the GE and PE estimates are especially noticeable for Simulation I: instead of an average estimated protection tax rate of 4.9 per cent, we now estimate this rate to be only 0.3 per cent. For Simulation II, our estimate of the average protection tax rate falls from 2.9 per cent to 1.3 per cent.

Table 6 also indicates that allowing nominal household incomes to change in response to tariff reform not only alters our estimates of the magnitude of the average protection tax rate, but also of the incidence of this tax across different types of households. The PE estimates presented in Table 4 indicated that all types of households were subjected to the tariff taxes in both simulations. In other words, we found that all types of households would be better off if tariffs were removed. This is no longer our conclusion based on the results in Table 6. Instead we find that the disposable income of some types of households would rise as a result of tariff removal, while for other types it would fall. In other words, tariffs act as a consumption tax for some types of consumers and a consumption subsidy for others. However, the households whose consumption is

TABLE 6

Projected Changes in the Real Disposable Incomes of 40 Types of Households*

Household Characteristics						Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
Principal source of income	Nature of housing occupancy	Age of household head	Number of adults	Number of children	No.		
Earned income	Owning home	Under 65 I	1	0	1	0.61	1.28
			2	0	2	0.79	1.49
				1	3	0.78	1.61
				2	4	0.61	1.38
				3+	5	1.34	1.16
			3	0	6	0.91	1.69
				1+	7	0.89	1.25
			4	0	8	1.01	0.96
				1+	9	0.97	1.15
			5+	0	10	0.38	1.43
				1+	11	0.69	0.93
		65+ II			12	0.97	0.72
	Buying/renting home	Under 65 III	1	0	13	-0.38	2.08
			2	0	14	0.10	2.14
				1	15	-0.01	1.92
				2	16	-0.16	1.94
				3+	17	0.14	1.91
			3	0	18	0.24	1.83
				1+	19	0.15	1.65
			4	0	20	0.29	2.21
				1+	21	-0.09	2.04
			5+	0	22	0.46	2.98
				1+	23	-0.09	2.04
		65+ IV			24	0.26	0.87
	Single parents	V			25	0.10	1.78

... continued

Table 6 continued

Household Characteristics						Simulation I (Fixed real wage rate)	Simulation II (Fixed nominal wage rate)
Principal source of income	Nature of housing occupancy	Age of household head	Number of adults	Number of children	No.		
Unearned income	Owning home	Under 65 VI	1	0	26	0.16	-0.54
			2	0	27	0.58	-0.14
				1+	28	0.94	-0.57
			3+	0	29	1.11	-0.45
				1+	30	1.51	-0.48
		65+ VII	1		31	-0.19	-0.19
			2+		32	0.20	-0.03
	Buying/renting home	Under 65 VIII	1	0	33	0.18	-0.55
			2	0	34	0.27	-0.85
				1+	35	-0.06	-0.32
			3+	0	36	1.33	-1.45
				1+	37	-0.12	0.36
		65+ IX	1		38	-0.51	-0.02
			2+		39	-0.22	0.68
	Single parents	X			40	-0.53	0.10
Aggregate						0.28	1.25

* Simulation results are expressed as percentage changes.

being subsidized by tariffs are in the minority in both simulations. That is, in both simulations, the majority of all consumers would be made better off by the removal of tariffs.

The range of variation in the degree of taxation across different types of households is quite large in both simulations. In Simulation I, it ranges from a tax of 1.5 per cent on households of type 30 to a subsidy of 0.5 per cent for those of type 40. Similarly, in Simulation II, the incidence of tariffs ranges from a tax of 3.0 per cent on households of type 22 to a subsidy of 1.5 per cent for those of type 32. The differences in the sources of income and in the expenditure patterns of different types of households are responsible for the differences in the incidence of the protection tax across them.

To sum up, we find that our general equilibrium estimates of the protection tax are considerably smaller than our partial equilibrium estimates. Depending upon their effect on the real wage rate, we estimate that tariffs are equivalent to a 0.3 - 1.3 per cent tax on household consumption. These estimates are significantly smaller than our previous estimates of 2.9 - 4.9 per cent, which were obtained under the assumption that tariffs only affected the prices of commodities consumed by households, but not their incomes.

IV CONCLUSION

This paper provides the first general equilibrium estimates of protection as a tax on consumers. It shows that these estimates are significantly smaller than those derived in a partial equilibrium framework, in which it is assumed that tariffs only affect the prices of the goods purchased by households, not their incomes. If we relax this assumption, i.e., if we allow household incomes to be affected by tariffs, we find that nominal household incomes are likely to fall due to tariff reform. This is because tariff reform lowers costs, creates a deflationary situation, and leads to lower nominal factor returns. As a result, on average, the gain from the fall in the price of the household consumption bundle is largely offset by the loss from the fall in household income. Thus, we find that the average consumption cost of tariffs is relatively minor, and ranges from 0.3 per cent to 1.3 per cent of aggregate real household consumption. However, the reader should be reminded that the ORANI model typically estimates small GDP gains from removing protection. Therefore, it is not at all surprising that the consumption cost of tariffs is estimated to be small. It should be pointed out, however, that there are several reasons (discussed by Dixon (1978), for example) why the standard ORANI model understates the gains from trade liberalization. For the same reasons, the model also understates the consumption costs of tariffs.

The paper also provides estimates of the incidence of the protection tax across 40 types of households distinguished according to various socio-economic characteristics. We find, again, that the nature of our partial and general equilibrium estimates differ

considerably. According to our partial equilibrium analysis, all types of households stand to gain substantial improvements in their welfare as a result of tariff removal. This is because the removal of tariffs leads to large declines in the prices of the typical consumption bundles of all types of households. However, according to our general equilibrium analysis, which also takes into account the effects of tariffs on household incomes, we find that the distributional effects are no longer so uniform. In fact, if all tariffs were removed, some types of households would experience increases in their incomes, while other types would experience declines. However, the majority of consumers would belong to the former category and would therefore be made better off by the tariff removal.

APPENDIX 1

A Mapping Between the 114 ORANI Commodities and the 13 HES Commodities

ORANI COMMODITY	HES COMMODITY												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	--	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--	--	--	--	--
8	--	--	0.0654	--	--	--	--	--	--	--	--	--	--
9	--	--	0.0685	--	--	--	--	0.0541	--	--	0.0075	--	--
10	--	--	0.0170	--	--	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--	--	--	--	--	--
12	--	0.0102	--	--	--	--	--	--	--	--	--	--	--
13	--	--	0.0127	--	--	--	--	--	--	--	--	--	--
14	--	--	--	--	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	--	--	--	--	--
16	--	0.0028	--	--	--	--	--	--	--	--	--	--	--
17	--	--	--	--	--	--	--	--	--	--	--	--	--
18	--	--	--	--	--	--	--	--	--	--	--	--	--
19	--	--	--	--	--	--	--	--	--	--	--	--	--
20	--	--	0.2538	--	--	--	--	--	--	--	--	--	--
21	--	--	0.1441	--	--	--	--	--	--	--	--	--	--
22	--	--	0.0765	--	--	--	--	--	--	--	--	--	--
23	--	--	0.0215	--	--	--	--	--	--	--	--	--	--
24	--	--	0.0303	--	--	--	--	--	--	--	--	--	--
25	--	--	0.1162	--	--	--	--	--	--	--	--	--	--
26	--	--	0.0373	--	--	--	--	--	--	--	--	--	--
27	--	--	0.1011	--	--	--	--	--	--	--	0.0436	--	0.0013
28	--	--	0.0557	--	--	--	--	--	--	--	--	--	--
29	--	--	--	0.3737	--	--	--	--	--	--	--	--	--
30	--	--	--	0.6263	--	--	--	--	--	--	--	--	--

...continued

APPENDIX 1 Continued

ORANI COMMODITY	HES COMMODITY												
	1	2	3	4	5	6	7	8	9	10	11	12	13
31	--	--	--	--	1.0000	--	--	--	--	--	--	--	--
32	--	--	--	--	--	--	--	--	--	--	--	--	--
33	--	--	--	--	--	--	--	--	--	--	--	--	--
34	--	--	--	--	--	0.0336	0.0886	--	--	--	--	--	--
35	--	--	--	--	--	0.0203	0.0062	--	--	--	--	--	--
36	--	--	--	--	--	--	--	--	--	--	--	--	--
37	--	--	--	--	--	--	0.1011	--	--	--	--	--	--
38	--	--	--	--	--	0.0199	--	--	0.0100	--	--	--	--
39	--	--	--	--	--	0.1131	--	--	--	--	--	--	--
40	--	--	--	--	--	0.6053	--	--	--	--	--	--	--
41	--	--	--	--	--	0.1725	--	--	--	--	--	--	--
42	--	--	--	--	--	--	--	--	--	--	--	--	--
43	--	--	--	--	--	--	--	--	--	--	--	--	--
44	--	--	--	--	--	--	--	--	--	--	--	--	--
45	--	--	--	--	--	--	0.2657	--	--	--	--	--	--
46	--	--	--	--	--	--	--	--	--	--	--	--	--
47	--	--	--	--	--	--	--	--	--	--	--	--	--
48	--	--	--	--	--	--	--	0.0729	--	--	--	--	--
49	--	--	--	--	--	--	--	--	--	--	0.0995	--	0.0034
50	--	--	--	--	--	--	--	--	--	--	--	--	0.0674
51	--	--	--	--	--	--	--	0.0330	--	--	--	--	--
52	--	--	--	--	--	--	--	0.0114	--	--	--	--	--
53	--	--	--	--	--	--	--	--	--	--	--	--	--
54	--	--	--	--	--	--	--	--	0.1868	--	0.0093	--	--
55	--	--	--	--	--	--	--	0.1242	--	--	--	--	--
56	--	--	--	--	--	--	--	--	--	--	--	0.5220	--
57	--	--	--	--	--	--	--	0.0052	--	--	--	--	--
58	--	0.0697	--	--	--	--	--	--	--	0.2999	0.0243	--	--
59	--	--	--	--	--	--	0.0125	--	--	--	--	--	--
60	--	--	--	--	--	--	0.0460	--	--	--	--	--	--

...continued

APPENDIX 1 Continued

ORANI COMMODITY	HES COMMODITY												
	1	2	3	4	5	6	7	8	9	10	11	12	13
61	--	--	--	--	--	--	--	--	--	--	--	--	--
62	--	--	--	--	--	--	--	--	--	--	--	--	--
63	--	--	--	--	--	--	--	--	--	--	--	--	--
64	--	--	--	--	--	--	--	--	--	--	--	--	--
65	--	--	--	--	--	--	--	--	--	--	--	--	--
66	--	--	--	--	--	--	--	--	--	--	--	--	--
67	--	--	--	--	--	--	--	--	--	--	--	--	--
68	--	--	--	--	--	--	0.0112	--	--	--	--	--	--
69	--	--	--	--	--	--	0.1330	0.0073	--	--	--	--	--
70	--	--	--	--	--	--	--	--	--	0.3756	--	--	--
71	--	--	--	--	--	--	--	--	--	--	0.0120	--	--
72	--	--	--	--	--	--	--	--	--	--	--	--	--
73	--	--	--	--	--	--	--	--	--	--	--	--	--
74	--	--	--	--	--	--	--	--	0.0021	--	0.0346	--	0.0152
75	--	--	--	--	--	--	--	--	--	--	0.1570	--	--
76	--	--	--	--	--	--	0.2560	--	--	--	--	0.0578	--
77	--	--	--	--	--	--	--	0.0101	--	0.0035	--	--	--
78	--	--	--	--	--	--	--	--	--	--	--	--	--
79	--	--	--	--	--	--	--	--	--	--	--	--	--
80	--	--	--	--	--	--	--	--	--	--	--	--	--
81	--	--	--	--	--	--	--	--	--	--	--	--	--
82	--	--	--	--	--	--	0.0037	--	--	0.0189	--	--	--
83	--	--	--	--	--	--	0.0082	--	--	--	--	--	--
84	--	--	--	--	--	--	--	--	--	--	--	--	--
85	--	--	--	--	--	--	0.0605	0.0903	--	--	0.1031	--	0.0850
86	--	0.7682	--	--	--	--	--	--	--	--	--	--	--
87	--	0.1491	--	--	--	--	--	--	--	--	--	--	--
88	--	--	--	--	--	--	--	--	--	--	--	--	--
89	--	--	--	--	--	--	--	--	--	--	--	--	--
90	--	--	--	--	--	--	--	--	--	--	--	--	--

...continued

APPENDIX 1 Continued

ORANI COMMODITY	HES COMMODITY												
	1	2	3	4	5	6	7	8	9	10	11	12	13
91	--	--	--	--	--	--	--	--	--	--	--	--	--
92	--	--	--	--	--	0.0021	--	0.0088	--	--	0.0241	--	--
93	--	--	--	--	--	--	--	--	--	0.0969	--	--	--
94	--	--	--	--	--	0.0100	--	0.0468	--	--	0.0114	--	0.0106
95	--	--	--	--	--	--	--	--	--	0.0412	0.0088	--	--
96	--	--	--	--	--	--	--	--	--	0.0140	0.0041	--	--
97	--	--	--	--	--	--	--	--	--	0.0005	--	--	--
98	--	--	--	--	--	--	--	--	--	0.0051	0.1430	--	--
99	--	--	--	--	--	--	--	0.4301	--	--	--	--	--
100	--	--	--	--	--	--	--	--	--	--	--	--	0.3428
101	--	--	--	--	--	--	--	--	--	--	--	--	--
102	--	--	--	--	--	--	--	--	--	--	--	--	--
103	--	--	--	--	--	--	--	0.0001	0.4956	0.1384	0.0024	--	0.0046
104	--	--	--	--	--	--	--	0.0085	--	--	--	--	0.0439
105	1.0000	--	--	--	--	--	--	--	--	--	--	--	0.0591
106	--	--	--	--	--	--	--	--	--	--	--	--	0.0546
107	--	--	--	--	--	--	--	--	--	--	--	--	--
108	--	--	--	--	--	--	--	--	0.3055	--	0.0089	--	--
109	--	--	--	--	--	--	--	0.0217	--	0.0023	0.0163	--	0.1486
110	--	--	--	--	--	--	--	--	--	0.0037	0.0105	--	0.1636
111	--	--	--	--	--	--	0.0073	--	--	--	0.1962	--	--
112	--	--	--	--	--	--	--	--	--	--	0.0744	--	--
113	--	--	--	--	--	0.0232	--	0.0755	--	--	0.0089	0.4202	--
114	--	--	--	--	--	--	--	--	--	--	--	--	--
All	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

APPENDIX 2

Original Household Budget Shares for 13 Commodities for 40 Types of Households*

HLDTYPE	HOUSING	FUEL	FOOD	ALCOHOL	TOBACCO	CLOTHING	FURNISHINGS	SERVICES	MEDICAL	TRANSPORT	RECREATION	P-CARE	MISC
1	.08	.04	.20	.05	.02	.03	.07	.05	.05	.17	.14	.02	.07
2	.05	.03	.21	.04	.02	.08	.08	.05	.06	.15	.14	.02	.06
3	.05	.04	.24	.03	.02	.08	.07	.06	.05	.16	.09	.02	.08
4	.07	.04	.25	.03	.01	.07	.06	.05	.05	.16	.13	.02	.07
5	.05	.03	.26	.02	.00	.08	.07	.05	.06	.17	.10	.02	.08
6	.04	.03	.21	.05	.02	.08	.08	.04	.04	.20	.13	.02	.05
7	.06	.03	.23	.02	.01	.09	.06	.05	.05	.14	.17	.02	.07
8	.04	.02	.24	.04	.01	.09	.07	.04	.04	.16	.16	.02	.08
9	.03	.04	.23	.03	.01	.10	.03	.04	.05	.20	.13	.02	.09
10	.04	.03	.21	.03	.02	.08	.09	.03	.05	.26	.10	.03	.06
11	.05	.03	.23	.03	.01	.10	.04	.03	.05	.16	.15	.03	.10
12	.05	.04	.21	.04	.01	.07	.05	.05	.06	.19	.15	.02	.06
13	.23	.02	.15	.04	.02	.05	.07	.03	.03	.15	.12	.02	.07
14	.17	.02	.16	.04	.01	.06	.09	.04	.03	.15	.13	.02	.07
15	.18	.03	.18	.03	.02	.05	.07	.06	.04	.16	.10	.02	.07
16	.18	.03	.20	.03	.02	.06	.07	.05	.04	.14	.11	.02	.06
17	.15	.03	.22	.03	.01	.07	.07	.05	.04	.14	.10	.02	.07
18	.13	.02	.18	.05	.02	.07	.05	.03	.04	.17	.13	.02	.08
19	.13	.03	.23	.03	.02	.08	.06	.04	.04	.16	.11	.02	.07
20	.09	.02	.19	.04	.01	.09	.07	.03	.03	.19	.13	.02	.07
21	.10	.03	.23	.04	.02	.08	.05	.03	.04	.15	.11	.02	.10
22	.09	.02	.18	.04	.02	.11	.05	.03	.04	.22	.10	.02	.09
23	.10	.02	.20	.05	.01	.07	.06	.03	.05	.17	.14	.02	.08
24	.11	.03	.20	.02	.01	.05	.03	.04	.04	.17	.23	.01	.05
25	.20	.04	.18	.01	.02	.10	.09	.08	.04	.09	.07	.02	.06
26	.09	.05	.26	.02	.02	.06	.05	.07	.04	.11	.17	.02	.04
27	.07	.04	.24	.04	.02	.06	.08	.06	.05	.15	.13	.02	.05
28	.06	.05	.25	.02	.02	.05	.14	.05	.06	.09	.07	.02	.12
29	.04	.03	.24	.06	.03	.07	.06	.04	.03	.15	.12	.03	.08
30	.04	.04	.28	.03	.03	.06	.07	.04	.04	.19	.10	.01	.08

...continued

APPENDIX 2 Continued

HLDTYPE	HOUSING	FUEL	FOOD	ALCOHOL	TOBACCO	CLOTHING	FURNISHINGS	SERVICES	MEDICAL	TRANSPORT	RECREATION	P-CARE	MISC
31	.12	.06	.25	.02	.01	.03	.04	.09	.06	.11	.11	.03	.06
32	.08	.04	.26	.03	.01	.06	.06	.06	.06	.14	.12	.03	.05
33	.23	.04	.24	.03	.03	.07	.03	.07	.03	.08	.11	.03	.03
34	.18	.04	.25	.03	.03	.04	.04	.05	.04	.11	.12	.02	.05
35	.21	.04	.23	.02	.03	.05	.07	.05	.02	.12	.08	.02	.06
36	.12	.03	.25	.05	.03	.08	.06	.04	.02	.14	.11	.02	.06
37	.15	.04	.26	.02	.03	.05	.04	.05	.01	.17	.08	.02	.07
38	.19	.05	.25	.02	.02	.08	.03	.09	.04	.04	.12	.03	.03
39	.14	.04	.25	.02	.02	.06	.09	.05	.04	.10	.12	.02	.04
40	.23	.05	.23	.01	.02	.07	.06	.06	.01	.10	.08	.02	.06
ALL	.13	.03	.21	.03	.02	.07	.07	.04	.04	.15	.12	.02	.07

* Note that each row in the table sums to one.

APPENDIX 3

Revised Household Budget Shares for 13 Commodities for 40 Types of Households*

HLDTYPE	HOUSING	FUEL	FOOD	ALCOHOL	TOBACCO	CLOTHING	FURNISHINGS	SERVICES	MEDICAL	TRANSPORT	RECREATION	P-CARE	MISC
1	.23	.03	.17	.04	.02	.03	.06	.05	.04	.15	.12	.01	.06
2	.17	.03	.18	.04	.01	.07	.07	.05	.05	.13	.13	.02	.05
3	.15	.04	.22	.03	.01	.07	.06	.05	.05	.14	.08	.02	.08
4	.16	.03	.22	.03	.01	.06	.05	.04	.05	.15	.12	.02	.06
5	.16	.03	.23	.02	.00	.07	.07	.05	.05	.15	.09	.02	.07
6	.15	.03	.19	.05	.02	.07	.07	.03	.04	.18	.12	.02	.05
7	.19	.03	.20	.02	.01	.08	.05	.04	.04	.12	.15	.02	.06
8	.15	.02	.21	.03	.01	.08	.06	.03	.03	.14	.14	.02	.07
9	.15	.03	.21	.02	.01	.09	.03	.04	.04	.18	.11	.02	.07
10	.14	.02	.19	.02	.01	.07	.08	.03	.04	.23	.09	.02	.05
11	.15	.03	.20	.03	.01	.09	.04	.03	.04	.14	.13	.03	.09
12	.20	.03	.18	.04	.01	.06	.04	.04	.05	.16	.13	.02	.05
13	.23	.02	.15	.04	.02	.05	.07	.03	.03	.15	.12	.02	.07
14	.17	.02	.16	.04	.01	.06	.09	.04	.03	.15	.13	.02	.07
15	.18	.03	.18	.03	.02	.05	.07	.06	.04	.16	.10	.02	.07
16	.18	.03	.20	.03	.02	.06	.07	.05	.04	.14	.11	.02	.06
17	.15	.03	.22	.03	.01	.07	.07	.05	.04	.14	.10	.02	.07
18	.13	.02	.18	.05	.02	.07	.05	.03	.04	.17	.13	.02	.08
19	.13	.03	.23	.03	.02	.08	.06	.04	.04	.16	.11	.02	.07
20	.09	.02	.19	.04	.01	.09	.07	.03	.03	.19	.13	.02	.07
21	.10	.03	.23	.04	.02	.08	.05	.03	.04	.15	.11	.02	.10
22	.09	.02	.18	.04	.02	.11	.05	.03	.04	.22	.10	.02	.09
23	.10	.02	.20	.05	.01	.07	.06	.03	.05	.17	.14	.02	.08
24	.11	.03	.20	.02	.01	.05	.03	.04	.04	.17	.23	.01	.05
25	.22	.04	.18	.01	.02	.09	.09	.08	.04	.09	.07	.02	.05
26	.29	.04	.20	.01	.01	.05	.04	.06	.03	.09	.13	.02	.03
27	.20	.04	.21	.03	.02	.06	.07	.05	.04	.12	.11	.02	.04
28	.16	.05	.22	.02	.02	.04	.12	.05	.05	.08	.07	.02	.11
29	.15	.03	.22	.05	.03	.06	.05	.04	.03	.13	.11	.03	.07
30	.17	.03	.25	.03	.02	.05	.06	.04	.03	.17	.08	.01	.07

...continued

APPENDIX 3 Continued

HLDTYPE	HOUSING	FUEL	FOOD	ALCOHOL	TOBACCO	CLOTHING	FURNISHINGS	SERVICES	MEDICAL	TRANSPORT	RECREATION	P-CARE	MISC
31	.33	.04	.19	.02	.01	.03	.03	.07	.04	.09	.08	.02	.05
32	.22	.04	.22	.03	.01	.05	.05	.05	.05	.12	.10	.02	.04
33	.23	.04	.24	.03	.03	.07	.03	.07	.03	.08	.11	.03	.03
34	.18	.04	.25	.03	.03	.04	.04	.05	.04	.11	.12	.02	.05
35	.21	.04	.23	.02	.03	.05	.07	.05	.02	.12	.08	.02	.06
36	.12	.03	.25	.05	.03	.08	.06	.04	.02	.14	.11	.02	.06
37	.15	.04	.26	.02	.03	.05	.04	.05	.01	.17	.08	.02	.07
38	.19	.05	.25	.02	.02	.08	.03	.09	.04	.04	.12	.03	.03
39	.14	.04	.25	.02	.02	.06	.09	.05	.04	.10	.12	.02	.04
40	.26	.05	.22	.01	.02	.07	.06	.06	.01	.09	.08	.02	.05
ALL	.17	.03	.20	.03	.02	.06	.06	.04	.04	.15	.12	.02	.06

* Note that each row in the table sums to one.

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