EFFECTIVE TAX AND SHADOW PRICE CALCULATIONS FOR TURKEY

A THESIS PRESENTED BY KUZEY YILMAZ
TO THE INSTITUTE OF
ECONOMICS AND SOCIAL SCIENCES
IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ECONOMICS

BİLKENT UNIVERSITY
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JULY, 1997

I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Economics.

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ABSTRACT

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FOR TURKEY

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MASTER OF ECONOMICS
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July,1997

When Turkish government imposes taxes on commodities, particularly import duties and excise taxes, their burden will also fall on inputs. In this thesis, we have two main objectives. First one is to develop a model for Turkish Economy so as to find a set of taxes for Turkey, which we call effective taxes, so that an increase in the effective tax corresponds to an increase in the price of the final good. And then, we will calculate the values of effective taxes for the sectors of Turkish Economy. One also want to know whether a sector of Turkish Economy is socially profitable or not. To answer this question, we have to know shadow prices. My second objective is to calculate social profitability, so that we can classify each sector of Turkish Economy as socially profitable or not, by using Shadow Prices.

Keywords: Effective tax, Accounting Ratio, Standard Conversion Factor, Shadow Price, Shadow Profit, Social profitability

ÖZET

TÜRKİYE İÇİN
ETKİN VERGİ VE GÖLGE FİYAT HESAPLAMALARI

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Tez Yöneticisi : Yrd. Doç. Dr. Osman Zaim
Temmuz,1997

Türk hükümeti mamülleri özellikle ithalat ve satış vergileriyle vergilendirdiği zaman, bunun yükü ham maddelerde de görülecektir. Bu tezde, iki temel amacımız vardır. Birincisi, etkin vergi diye adlandırdıgımız bazı vergileri bulmak amacıyla Türkiye ekonomisi için bir model geliştirmektir. Etkin vergideki artış son ürünün fıyatında artışa sebeb olacaktır. Ve sonra, Türkiye ekonomisindeki sektörler için etkin vergi değerlerini hesaplayacağız. Bazı insanlar Türkiye ekonomisindeki sektörlerin sosyal olarak faydalı olup olmadığını oğrenmek isteyebilirler. Bu soruya cevap verebilmek icin gölge fiyatları bilmek zorundayız. İkinci amacım, Türkiye ekonomisindeki sektörleri faydalı veya faydasız diye sınıflandırabılmek için gölge fiyatları kullanarak sosyal karlılığı hesaplamaktır.

Anahtar kelimeler : Etkin Vergi, Muhasebe Oranı, Standart Çevirim Çarpanı, Gölge Fiyat, Gölge Kar, Sosyal Karlılık

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Contents

1.INTRODUCTION

When Turkish government imposes taxes on commodities, particularly import duties and excise taxes, their burden will also fall on inputs. In this thesis, we have two main objectives. First one is to develop a model for Turkish Economy so as to find a set of taxes t^e for Turkey, which we call effective taxes, so that an increase in the effective tax corresponds to an increase in the price of the final good. In other words, the effective tax t^e is the amount by which government revenue would increase if there were a unit increase in final demand for the good. And then, we will calculate the values of effective taxes for each sector in the input-output table of Turkish Economy.

One also want to know whether a sector in the input-output table of Turkish Economy is socially profitable or not. To answer this question, we have to know shadow prices. My second objective is to calculate social profitability, so that we can classify each sector in the input-output table of Turkish Economy as socially profitable or not, by using Shadow Prices.

A policy-maker in Turkey may want to find a measurement instrument for Turkey, which shows total amount of taxes paid until it reaches consumer, as a percentage of purchaser prices so that he could get an idea about the extent of taxation for each sector in the input-output table of Turkish Economy. This measurement instrument can be effective taxes. Effective taxes would be a

useful summary of statistic for the complicated tax system of Turkish Economy. If this policy-maker were to impose new taxes, or introduce a tax reform for Turkish Economy, effective taxes would be a useful tool for policy-maker. The model, that is used for finding an expression for effective taxes, will be a simple input-output model of open economy, which is based upon the model of Ahmad and Stern (1991).

One may ask the following questions; 'Which sectors in Turkey are socially profitable?, In which sectors, should output be increased or decreased?'. To do this, we have to know shadow prices in Turkey. In principle, shadow prices take into account the full general equilibrium consequences of an extra unit of demand on the system including the effect of changes in government actions. Since shadow prices embody the full effects on social welfare of the extra supply of the good, their calculation requires a general equilibrium model of economy. Since data availability is generally limited, this model should be simple and essentially based on input-output information. We will use the method proposed by Little and Mirrlees (1974), which is based mainly on the information about production to calculate shadow price systems for Turkey. Then, we will use shadow prices to calculate shadow profits, which is defined as shadow value of outputs minus shadow value of inputs (including factors of production). And then, We will try to calculate social profitability, that is the ratio of shadow profit to shadow value of output. Social Profitability is used to determine whether a sector in the input-output table is socially profitable for Turkey or not. So, it will

be useful in the analysis of policy at sectoral level. Shadow prices will also be of value for broad classes of inputs in the analysis of particular investment projects.

The arrangement of thesis will be as follows; In section 2, we will develop a model for Turkish Economy to find an expression for effective taxes and then calculate the value of effective taxes for each sector in the input-output table of Turkish Economy. In section 3, we will give information on shadow prices and show how to calculate them. And then, we will calculate shadow prices and social profitability for Turkish Economy. Finally, we will state our conclusion in section 4.

Literature Review

Ahmad and Stern[1] (1991) presented a set of general principles and methods for the analysis of tax reform in developing countries and examined possible strategies for reform of the tax system in Pakistan. They explored the structure of taxation in Pakistan, reviewed and developed the basic principle of taxation. They also discussed effective taxes and shadow prices in Pakistan. This publication was among important publications in the effective tax literature.

[1] The detailed work in this book was found in the following papers: Ahmad, Barret and Coady (1985) 'Input-output matrices for Pakistan 1980-1'; Ahmad and Stern (1984) 'the theory of tax reform and Indian indirect taxes', Ahmad and Stern (1986) 'Tax reform for Pakistan: Overview and Effective taxes for 1975-76' and Ahmad and Stern (1990) 'Tax reform and shadow prices for Pakistan'.

Metzler (1951), tried to see net effect of taxes in a Leontief's input -output model and showed that the price of taxed goods rises by more than that of untaxed goods. Radhu (1965) tried to see the effect of indirect taxation on prices for Pakistan. Hoffman (1972) tried to see the effect of tax on welfare. Atkinson and Sutherland (1988) use tax-benefit models for optimum taxation.

Newbery (1986), advises that if we could not tax some good even though it must be taxed for optimum taxation, one would want to consider taxing inputs into those goods as a surrogate for taxing final goods. Gersovitz (1987) tried to see the effect of taxes on foreign private investment.

Little and Mirrlees(1974), in their work, advised a method for calculating shadow prices of tradable, non-tradable goods. They used accounting ratios instead of shadow prices and used them to appraise projects.

Ahmad, Coady and Stern (1985), used Little Mirrlees (1974) rule to calculate shadow prices for Pakistan.

Squire and van der Tak (1975), proposed methods to appraise projects. In their work, they mention about investment criteria, distributional weights, the social discount rate, the shadow wage rate, shadow prices for traded and non-traded goods and the standard conversion factor and shadow exchange rate.

Dreze and Stern (1987), has shown how shadow prices can be used to detect welfare improvements arising from a project in an economy with imperfections of various kinds. The analysis provides a framework for the discussion of marginal changes in the government policy in general and shadow prices for investment planning are linked closely to the choice of government policies elsewhere, particularly concerning taxes, trade and the regulation of industry. Dreze and Stern (1990), also tried to find an answer to the question, 'How should public projects and policy reforms be assessed when market prices give misleading signals?'. Revenues and costs at market prices then give distorted measures of social gains and losses and one's appraisal should use social opportunity costs or 'Shadow Prices'. The authors show how shadow prices may be integrated into an analysis of policy reform, demonstrate the critical dependence of these prices on government policy, and analyze their relations with market prices.

In Dixit and Stern (1974), the view of agriculture as facilitating the growth of other sectors was not confined to finance and labour, but included the provision of food to the growing industrial workforce, and the problem of marketed surplus was emphasized. This was among an early analysis of policy models of marketed surplus cooperated with shadow prices.

Heckman (1974) and King (1983) gives an idea about econometric calculation of shadow prices and how those affect welfare of households. Heady

and Mitra (1987) shows how shadow pricing can be employed for optimal taxation. Squire, Little and Durdag (1979) looks at shadow pricing as a macroeconomic policy for Pakistan. Stern (1987) shows how to use shadow prices as a tool for tax reform.

2.EFFECTIVE TAXES

Closed Economy, fixed coefficients; one factor

We begin this section with the simple, static closed-economy Leontieff model, and then turn to open economy.

All purchasers of a good pay a price with tax included. The purchasers' price vector q is defined as the price paid by consumers and is also paid by producers for the purchase of inputs. The producers' price vector p represents the price received by producers for sales. Consider the simple input-output model of production with fixed input-output matrix A, gross output vector Y, and net output vector Z. Then inputs are AY, and

$$Z = Y-AY = (I - A) Y \qquad (1)$$

Competitive price conditions for this model are

$$p' = q' A + v' \qquad (2)$$

where primes denote row vectors and v is the vector of per unit value added by industry. (For the moment , assume it to be fixed- You may think of it as the vector of labor requirements × the wage)

If t denotes the tax vector , then

$$q = p + t \qquad (3)$$

and from equations (2) and (3), we have

$$q' = t' \times (I - A)^{-1} + v' \times (I - A)^{-1} \qquad (4)$$

In this model, the effective tax vector t^e is,

$$t^{e\,\prime} = t' \times (I - A)^{-1} \qquad (5)$$

Open Economy, fixed coefficients; one factor

Let us Introduce exports and imports into our model. Furthermore, let superscripts m and d refer to imported and domestic goods respectively. Unless otherwise stated, all imports are assumed to be complementary; that is, production of good j at unit level requires a_{ij}^{d} of good i produced domestically and

a_{ij}^m of imported good i. In the absence of taxes, the competitive pricing conditions for domestically produced goods becomes

$$q' = q' A^d + v' \qquad (6)$$

where A^d is a matrix of input-output coefficients for domestic flows. The foreign exchange costs ($p_m'A_m$ where p_m stands for import prices) of imported inputs have been included in the vector of value added, v, and there are assumed to be no import quotas for these inputs. If we allow for the imposition of excise taxes on domestic production t^d (per unit), and for the import duties t^m (per unit), the pricing equation becomes

$$q' = t^{d'} \times (I - A^d)^{-1} + t^{m'} \times A^m \times (I - A^d)^{-1} + v' \times (I - A^d)^{-1} \qquad (7)$$

where A^m is the matrix with the ijth element a_{ij}. Thus, the effective taxes $t^{e'}$, are given by

$$t^{e'} = t^{d'} \times (I - A^d)^{-1} + t^{m'} \times A^m \times (I - A^d)^{-1} \qquad (8)$$

In this formulation, the contribution of excise taxes, which fall only on domestic production, to effective taxes is given by $t^{d'} \times (I - A^d)^{-1}$ and that of import duties $t^{m'} \times A^m \times (I - A^d)^{-1}$. Note that in this model the tax effects are additive.

Here, we see domestic and imported inputs as different goods. Hence, we cannot add A^d and A^m to get an aggregate input-output matrix. The effects of sales tax levied on total commodity flows, may also be given by equation (8). There, we can see sales taxes as affecting prices of domestically produced goods in part through domestic inputs. In the discussion of effective taxes, we will ignore the income tax.

Finally, we can take into account the taxation of goods which arises through the capital stocks required in their production. By replacing A^d by ($A^d + r K^d$) and A^m by ($A^m + r K^m$) where K^d is the matrix of stocks of domestic goods required as capital for the production of domestic goods, K^m the matrix of stocks of imported capital goods for domestic production, and r a real rate of interest[2], we can modify formula (8) in a steady state framework. The steady state assumption is necessary since otherwise we would have to consider carefully the time pattern of accumulation, taxes and rates of interest in the determination of prices.

Data

In this study, we needed information on revenue collections for the indirect taxes, and tables of input-output coefficients for absorptions of domestic and

[2] See Ahmad and Stern (1991)

imported goods and services. At the time of my study, the latest available table was for the year 1990.

We assume exports not to enter into the domestic production circuit. Thus export duties do not affect the calculation of effective taxes. However, if world prices are fixed, then export taxes would be shifted backwards onto factors of production. During our reference period, export duties in Turkey were completely lifted .

Data on import and indirect tax collections for the year 1990 have been obtained from the input-output table of the same year. It is a known fact that excise taxes also applied to imported goods. Proportion of imports to total commodities is given by national accounts. This information can be used to find the part of indirect taxes received from imported commodities. Remaining part of total indirect taxes will be total tax collections from domestically produced commodities. Adding the indirect taxes collected from imported commodities to import duties yields tax revenues of imported goods. The nominal tax rates for domestically produced t^d and imported goods t^m will be found as follows: Dividing revenues for each good by flows of the good, we derive the implicit rate of tax, which we call the nominal rate. This way of calculating nominal rates, circumvents the problem of evasion associated with the use of announced statutory changes. Moreover actual collections provide a weighted average of the implicit tax rates for any commodity group.

The input-output matrix used in this fieldwork was obtained from the State Institute of Statistics. It was an 64-sector matrix of domestic and import flows at purchaser prices. We know proportion of imports to total commodity in circulation. Thus, we have estimates for both imported and domestic coefficient matrices, A^m and A^d .

Finally, we need a data set to estimate a capital stock matrix. Investment data was also available in input-output table. Assume that all assets depreciate by a fraction β per year and that a fraction α of the current investment (a matrix) is used for replacement , then $K = (\alpha/\beta) \times I$ and $r \times K = r \times (\alpha/\beta) \times I$. We have to take into account the resources, $\alpha \times I$, used for replacement. We assume that these are not captured in the input-output matrix. Hence we must augment A by $[r \times (\alpha/\beta) + \alpha]$ times the investment matrix. If there were no information on α and β, we would have taken this factor to be unity. One case consistent with this assumption is $r = \beta$ and $\alpha = ½$. By taking the investment for each sector and allocating it across the various investment sectors using the proportions given by the national accounts, we constructed investment matrix. The resulting matrix is divided into assets which are imported and those which have been domestically produced using the proportions of the absorption of imports and domestic goods in 1990. Real interest rate for the year 1990 was negative. (-3.9) It would be insensible to use this value as a real interest rate, since one may expect that using capital should have some cost to the user. One may propose different

methods to obtain real interest rate. One method was to take average of last 20 years real interest rate, which would turn out to be about 3%. Another method was to take the average of last 20 years growth rates, which would turn out to be approximately 4.8%. (note that in growth theory, in long run golden rule holds, which says growth rate = real interest rate). We will experiment with 3%, 4% and 5% values of real interest rate.

The Effective-tax Calculation

We can divide the effective-tax estimates for the year 1990 into the component domestic t^d_e , arising from domestic sources , and imported sources t^m_e , arising from inputs of imported goods into domestic production as shown in equation (8).

$$t^d_e{}' = t^{d'} \times [\, I - A^d \,]^{-1} \qquad (9)$$

$$t^m_e{}' = t^{m'} \times A^m \times [\, I - A^d \,]^{-1} \qquad (10)$$

These are modified as we consider the tax element in price attributable to the taxation of capital assets. So modified components of effective taxes will be as follows;

$$\bar{t}^{d}_{e}{}' = t^{d'} \times [\, I - \bar{A}^{d} \,]^{-1} \qquad (9')$$

$$\bar{t}^{m}_{e}{}' = t^{m'} \times \bar{A}^{m} \times [\, I - \bar{A}^{d} \,]^{-1} \qquad (10')$$

where $\bar{A}^{m}$, $\bar{A}^{d}$ are the matrices of imported good requirements modified by the capital inputs and the capital-augmented domestic good matrix, respectively. We define $\bar{t}^{m}_{e}{}'$ and $\bar{t}^{d}_{e}{}'$ to be the effective taxes on domestic goods arising from import taxation and domestic taxation, respectively, The total effective tax including the effects arising from assets is

$$\bar{t}_{e} = \bar{t}^{d}_{e} + \bar{t}^{m}_{e} \qquad (11)$$

In table I.1, I.2, and I.3, you will see estimates of t^{m}_{e} and $\bar{t}^{m}_{e}$ which arises from the taxation of imported inputs into domestic production for the real interest 3%, 4% and 5%, respectively. All comments are made for the real interest rate 4%. All domestic commodities except public services are affected by the taxation of imported inputs. It is below 3% of purchaser price for most of the commodities. It can be noted that the highest imported sources of effective-taxes, at around 6% of purchaser prices, is observed for Manufacture of Land Transport Vehicles and Equipment, Manufacture of Petroleum and Coal Products, and Manufacture of Plastic Products. When the taxation of the imported capital stock is taken into account, there is change in the imported

source of effective taxes and $\bar{t}^{m}_{e}$ is less than t^{m}_{e} , for most of the commodity groups. The taxation arising through imported goods($\bar{t}^{m}_{e} - t^{m}_{e}$) subtracts less than 1% from purchaser prices of most items. The most affected sectors by taxation of capital stock were Manufacture of Other Transport Equipment (9.3)%, Other Construction (8%) and Building Construction (7.9%). We may move on to next table by saying that the taxation of imported capital goods form a significant contribution to the to the value of $\bar{t}^{m}_{e}$ for all goods except Public Services, which was already untaxed.

We are also interested in the part of taxation arising through domestic intermediate inputs (Table II's) and this is measured by the divergence $\bar{t}^{d}_{diff}$ between the domestic effective tax t^{d}_{e} and nominal tax on domestic production t^{d}

$$\bar{t}^{d}_{diff} = \bar{t}^{d}_{e} - t^{d} \qquad (12)$$

It is, generally, between 0.75 and 24% of purchaser prices for most of commodities, 0 for Public Services. It is above 10 % of purchaser prices for Other Construction (24), Building Construction (21%), Manufacture of Other Transport Equipment (17%), Manufacture of Agricultural Machinery and Equipment (15%), Manufacture of Petroleum and Coal Products (12.8%), Manufacture of Railroad Equipment (12%), Manufacture of Shipbuilding and Repairing(10)

The overall effective tax, from both domestic and imported sources, is shown in Table III's. t^d in the first column stands for nominal tax on domestic production. In columns 2 and 3, the effective taxes with and without the effects of taxation of the capital stock , t_e and $\bar{t}_e$ are shown respectively. All commodity groups except public services are affected by the structure of indirect taxes. In some cases, effective taxes are quite high, as for Other Construction, for which the effective tax as a proportion of purchaser prices is around 35%. High effective taxes may reflect high nominal taxes, and Petroleum Refineries is a case in this point. It is the difference between effective and nominal taxes, $\bar{t}_{diff}$, which reflects taxation arising through other commodities and assets, and which may sometimes be a unintended consequence of a government policy. In case of Other Construction, $\bar{t}_{diff}$ is actually around 35% of purchaser prices. For Building Construction, it is about 31% of purchaser prices. For Railway Transport, it was about 11.5% of purchaser prices. In reality, the only subsidized sector is Railway Transport, for which $\bar{t}_e$ was about -8%. The case of Other Construction is a good example of seeing effect of taxes falling over taxes. In agriculture, Sugar, Manufacture of Petroleum and other Coal products, and Water transport, we observed effective taxes to be positive even though they seem to be subsidized. The inclusion of taxation of capital stock has had a small, insignificant impact on producer prices except for the Public Services. For most of the commodities, $\bar{t}_e - t_e$ is smaller than 1% of purchaser prices

3.SHADOW PRICES

Let us first describe the basic elements of the shadow price system. There are two main elements.

(i) For traded goods, relative shadow prices should be equal to relative world prices.

(ii) for non-traded goods, the shadow price is the marginal cost of production evaluated at shadow prices.

Basically, world prices represents the net benefits on the margin associated with an adjustment to production or consumption of traded good. For example, if a good is traded at fixed prices, the effect of an expansion in the production is not to change prices and the welfare of the households directly, but simply to save imports or increase exports. Therefore, all that matters is the foreign exchange earnings or savings. These foreign exchange earnings may have a different value from that given by the official exchange rate, but relative values of goods are given by their relative world prices.

Another point is the desirability of public sector efficiency. Given that the public sector should be efficient, the marginal rates of transformation between a pair of goods should be the same wherever those goods are transformed one into the other. When economy becomes an open economy, the marginal rates of

transformation in that activity becomes equal to the relative world prices. Therefore, these should be the marginal rates of transformation elsewhere and thus the relative shadow prices to be used for evaluating projects.

We now turn to non-traded goods. The Little-Mirrlees rule is that the shadow price is the marginal cost of production at shadow prices. Let w_j stand for the shadow value of domestic factors used directly in the production of good j and μ_j for the shadow value of the tradable inputs which are direct inputs into good j. Then, for the m non-tradable goods, indexed by j=1,.....,m, we have

$$v_j = \sum v_k a_{kj} + w_j + \mu_j \qquad (13)$$

where v_j is the shadow price of non-tradable good j and a_{kj} is the marginal amount of good k required for the production of a unit of good j. In matrix notation, we have

$$v' = v' \times A + w' + \mu' \qquad (14)$$

and

$$v' = (w' + \mu') \times (I - A)^{-1} \qquad (14')$$

where a prime denotes a row vector and A is the matrix (a_{kj}). Note that theory required us to know the shadow values w of the domestic factors used in the production.

When we employ labour on a project, it is diverted from another activity where it was producing and consuming. We must examine how its withdrawal from other activities will affect output and incomes elsewhere, while considering its opportunity cost. Suppose we employ a labourer at a wage c in a public company and that labourer was earning m (his marginal product) in the previous occupation. Then, the consequence of extra employment is that the labour has an extra income (c-m) and the public sector loses the wage it has paid c. Then, the social cost of employing the labourer , or the shadow wage rate is

$$SWR = c - \lambda \times (c - m) \qquad (15)$$

where λ is the value of the extra income to the labourer as seen by the government.

Consider another aspect of shadow wage which is that the shadow prices for the marginal product (m) elsewhere may not be equal to market prices and the value of c at market prices will not be the same as its value at shadow prices. Hence, we need to convert c and m into shadow prices. To do this, we multiply

each of c and m by a different standard conversion factor or SCF. This converts market prices into shadow prices for a bundle of goods. The make-up of the bundle depends on the problem on the discussion. For m, we would want a bundle relevant to the quantities that worker would have produced if he had been working elsewhere. For c, we need a bundle corresponding to the consumption of the worker. We call the ratio of shadow price to market price, the accounting ratio, and SCF is an appropriate weighted average of accounting ratios. If SCF to be applied to m is 0.75, this says that the shadow prices of goods which would have been produced by the worker elsewhere are 75% of market price, i.e. for traded goods, if these are what would have been produced, the market price is four-thirds of the world price. Then, the reciprocal of the shadow wage rate is like a shadow exchange rate.

Typically, the data for the cost of production will include some element of profit or payment to capital. But, we assume profits to be zero in our fieldwork. Notice that we also have to multiply parts of value added pertaining to capital and land by an appropriate SCF.

Data and some key parameters

Our calculations are based on 64-sector input-output table, the table used for the effective tax calculations. The 64 sectors must be classified into traded and non-traded activities. In the literature, first 49 items in the input-output table

for the Turkish Economy is behaved as tradable and the rest is behaved as non-tradable. For tradable goods, we have to classify them also as exported and imported goods. If the volume of exports (imports) are larger than imports (exports), this commodity group is classified as exported (imported). The non-traded sectors are shown in Table IV.

Once we have obtained information on inputs, outputs and taxes, and classified sectors into tradable and non-tradable sectors, we can find shadow price estimates for Turkey. We consider shadow prices for exportables, importables and non-traded goods in that order. In Table VI, the formulas of shadow prices for non-traded and imported goods is presented. Writing them in matrix form will make life simpler to calculate shadow prices. After writing them in matrix form, you will have two equations and two unknowns. Thus, we will have shadow price estimates for imported and non-traded goods.

We express a shadow price in terms of its accounting ratio (AR) which is the shadow price divided by the market price. For exported goods, this is the ratio of value of exports without taxes to value of exports with export taxes included. So, accounting ratios are 1 for the goods which do not have export taxes. For the year 1990, there were no export taxes or subsidies for exported commodities in Turkey. Thus, accounting ratio is 1 for all exported commodities throughout this fieldwork. The input-output table for the 1990 has data on gross absorptions. In case of imports, subtracting taxes, trade and transport margins

from value of imports, we derive the c.i.f. values. The p_i^{cif} values for importables are shown in Table V.

The calculation of shadow prices requires estimates of the breakdown of the payments to different factor inputs. Such a breakdown can be done by using input-output table. From input-output table, we can find contribution of labour in the value added. The remaining part is due to capital and land. For most of commodity groups, we will assume the share of land to be 0.3. But in some cases, it is different from 0.3. This is done so as to prevent the share of capital from being negative.

To calculate the accounting ratios for non-traded activities, we need those for traded goods and disaggregated value-added terms. For land, we assume throughout an accounting ratio of 0.9. This is somehow a weighted average of accounting ratio for agriculture (exported commodity) and p_i^{cif} value, since one can regard the marginal product of land as being in terms of agricultural goods. For the employment accounting ratio, we experiment with values including 0.9, 0.75 and 0.5. We refer to those ratios as the wage conversation factors (WCF). Lower ARs would correspond to cases where we assume relative abundance of labour.

In a similar manner, an AR for the asset may be generated. We refer to this AR as the asset conversation factor, or ACF. Actual cost of $1 investment is

1+r, r is real interest rate, where nominal cost is 1+n, n is nominal interest rate. So, we can refer to (1+r) / (1+n) as AR for capital. This value is calculated for the year 1990 and referred as AR for capital.

Shadow price estimates for Turkey

The accounting ratios for non-traded goods corresponding to each combination of ARs for labour and assets are presented in Table VIII. Some ARs are, however, greatly affected by the ARs of major inputs. Also notice that activities with high labour coefficients are most sensitive to the wage conversion factor chosen - for example, (63) ' Public Services '. Similarly, one must expect that those which have high capital coefficients are most sensitive to the asset conversion factor chosen.

One minus the accounting ratio for a sector can be interpreted a shadow subsidy on output in that sector, since it measures the extent to which producers are paid more than the shadow price of their product. It provides a direct commentary on the incentives which have been provided. Another commentary on sectoral priorities and incentives is provided by the analysis in terms of social profitability which involves an examination of the social profitability of expanding exports or domestic productions or imports.

Shadow profits or loses are derived by evaluating the inputs and outputs of each sector at shadow prices. We expect non-traded sectors to have a normal profit at shadow prices, because shadow price is the shadow marginal cost which we have assumed equal to shadow average cost. The classification into traded and non-traded is therefore crucial in interpreting results on social profitability. Recall that there are 49 non-traded sectors.

In Table IX, we present the social profitability (shadow profit or loss as a proportion of the shadow value of output). In this table, we present the sensitivity of the social profitability to ARs for labour ranging from 0.9 to 0.5 for given AR=0.62 for the assets.

The list of most socially profitable and non-profitable traded sectors are presented in Table X and XI. Among imported sectors, the most socially profitable sectors are Ginning and Sugar. Canning and Preserving of Fruits and Vegetables are the most socially profitable exported sectors. Petroleum Refineries and Manufacture of Fabricated Metal Products were the most socially non-profitable exported and imported sectors, respectively Expanding Imports (exports) in imported (exported) sectors, is socially profitable for the Turkish Economy.

For non-tradable goods, the policy interest in the calculations for these sectors lies in examining the shadow marginal cost. For example, we could ask

whether there would be any benefit in the relaxation of import restrictions (if this is the reason why it is non-traded) by comparing the shadow price with the import price. If there appear to be particularly beneficial domestic uses of the non-traded output, we could try to calculate a shadow value for these uses (for example, extra electricity supply). If the shadow value of the use exceeds the shadow marginal cost, then one might argue the output should be expanded and directed towards the beneficial use.

One expects that activities whose outputs have relatively low ARs will exhibit negative social profitability. In our case with a conversion factor for labour of 0.9 and for capital of 0.62, our results suggests, this expectation did not turn out to be true. All commodity groups, showing negative social profitability, except Petroleum Refineries have large ARs. One reason for this situation might be that inputs used in the production of those commodities have large AR's. Note that Animal Husbandry and Manufacture of Fabricated Metal Products, showed positive social profitability as we decreased the conversion factor for labour.

4.CONCLUSION

In this fieldwork, we have presented the calculation of two basic policy tools; Effective taxes and Shadow prices.

We have observed that the ' Effective tax ' differs greatly from the nominal tax. This study may be of use to policy-makers in helping them understand the effects of a complex system, especially when some of these may be unintended consequences of a tax policy. Notice that Effective taxes could be used to provide a quantification of the direct and indirect taxation involved in the domestic production of goods for export.

While calculating shadow prices, we had difficulty in data. Overall, under some assumptions we calculated shadow prices for Turkey. And then, we used them to calculate social profitability for each sector in the input-output table. We have used the shadow price calculations to comment on sectoral policy where shadow prices can be employed to characterize socially profitable activities.

5.APPENDIX:

Table 1.1 *Effective taxes on imports into domestic production*

		τ_i	τ_i-bar
1	AGRICULTURE	0.010824747	0.011290678
2	ANIMAL HUSBANDRY	0.009086809	0.009393171
3	FORESTRY	0.004966397	0.005592155
4	FISHERIES	0.012887017	0.013218718
5	COAL MINING	0.01249683	0.012982982
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.007064717	0.008546253
7	IRON ORE MINING	0.026375172	0.027023462
8	NON-FERROUS ORE MINING	0.01901708	0.031545674
9	NON-METALLIC MINERAL MINING	0.006017113	0.015490108
10	STONE QUARRYING	0.014052451	0.014774383
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.013888023	0.014261013
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.01732768	0.01783144
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.023613708	0.024516067
14	GRAIN MILL PRODUCTS	0.01333883	0.014197735
15	SUGAR	0.018277	0.020490322
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.020602219	0.021146399
17	ALCOHOLIC BEVERAGES	0.010857062	0.011070599
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.02176949	0.022740794
19	TOBACCO MANUFACTURES	0.013068932	0.013516686
20	GINNING	0.013736499	0.021819004
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.018198153	0.018966809
22	MANUFACTURE OF WEARING APPAREL	0.015474901	0.016185506
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.017120764	0.017984136
24	MANUFACTURE OF FOOTWEAR	0.024030525	0.025373456
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.011170697	0.011405526
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.010580787	0.012348659
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.04198121	0.042523356
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.038892337	0.039274402
29	MANUFACTURE OF FERTILIZERS	0.054410055	0.055091544
30	MANUFACTURE OF DRUGS AND MEDICINES	0.020833126	0.021058837
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.057740843	0.058236315
32	PETROLEUM REFINERIES	0.008608696	0.010208583
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.059225275	0.062871883
34	MANUFACTURE OF RUBBER PRODUCTS	0.039178693	0.039596829
35	MANUFACTURE OF PLASTIC PRODUCTS	0.059495386	0.059916114
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.028642652	0.029121838
37	MANUFACTURE OF CEMENT	0.015514816	0.015867303
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.020660107	0.021543438
39	MANUFACTURE OF IRON AND STEEL	0.031207506	0.032319154
40	MANUFACTURE OF NON-FERROUS METAL	0.021389829	0.024523935
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.026132259	0.027648066
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.035233998	0.061057398
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.038338511	0.07191981
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.039258979	0.045985579
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.025425308	0.050733769
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.017024615	0.046476556
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.062622027	0.072957344
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.010846417	0.076681693
49	OTHER MANUFACTURING INDUSTRIES	0.022858696	0.026892383

		t^m_e	t^m_e-bar
50	ELECTRICITY	0.010801564	0.011098974
51	GAS MANUFACTURE AND WATERWORKS	0.014976601	0.015295798
52	BUILDING CONSTRUCTION	0.020490602	0.074266988
53	OTHER CONSTRUCTION	0.028670064	0.083827653
54	WHOLESALE AND RETAIL TRADE	0.005288889	0.006025207
55	RESTAURANTS AND HOTELS	0.014320375	0.014666353
56	RAILWAY TRANSPORT	0.033029998	0.035231315
57	OTHER LAND TRANSPORT	0.028000173	0.028787666
58	WATER TRANSPORT	0.023938593	0.024864855
59	AIR TRANSPORT	0.017403639	0.017804971
60	COMMUNICATION	0.020992682	0.021690991
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.004514181	0.004606055
62	PERSONAL AND PROFESSIONAL SERVICES	0.023028422	0.023498841
63	PUBLIC SERVICES	0	0
64	OWNERSHIP OF DWELLINGS	0.004278664	0.004333689

Notes: $r = 3\%$

$$t^m_e{}' = t^{m\prime} \times A^m \times [I - A^d]^{-1}$$

$$\bar{t}^m_e{}' = t^{m\prime} \times \bar{A}^m \times [I - \bar{A}^d]^{-1}$$

Table 1.2 *Effective taxes on imports into domestic production*

		t^m_i	t^m_i-bar
1	AGRICULTURE	0.010824747	0.011502488
2	ANIMAL HUSBANDRY	0.009086809	0.009533043
3	FORESTRY	0.004966397	0.005884309
4	FISHERIES	0.012887017	0.013368621
5	COAL MINING	0.01249683	0.013195524
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.007064717	0.009073435
7	IRON ORE MINING	0.026375172	0.027331721
8	NON-FERROUS ORE MINING	0.01901708	0.037246417
9	NON-METALLIC MINERAL MINING	0.006017113	0.019809968
10	STONE QUARRYING	0.014052451	0.015092841
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.013888023	0.014429024
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.01732768	0.01805988
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.023613708	0.02493291
14	GRAIN MILL PRODUCTS	0.01333883	0.014592142
15	SUGAR	0.018277	0.021480095
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.020602219	0.021393322
17	ALCOHOLIC BEVERAGES	0.010857062	0.011166309
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.02176949	0.02318167
19	TOBACCO MANUFACTURES	0.013068932	0.013713205
20	GINNING	0.013736499	0.025494111
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.018198153	0.019315776
22	MANUFACTURE OF WEARING APPAREL	0.015474901	0.016508009
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.017120764	0.018370981
24	MANUFACTURE OF FOOTWEAR	0.024030525	0.025984957
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.011170697	0.011517483
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.010580787	0.013160248
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.04198121	0.042761463
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.038892337	0.039444073
29	MANUFACTURE OF FERTILIZERS	0.054410055	0.055400948
30	MANUFACTURE OF DRUGS AND MEDICINES	0.020833126	0.02116078
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.057740843	0.058464479
32	PETROLEUM REFINERIES	0.008608696	0.010935735
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.059225275	0.064594263
34	MANUFACTURE OF RUBBER PRODUCTS	0.039178693	0.039786866
35	MANUFACTURE OF PLASTIC PRODUCTS	0.059495386	0.060104849
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.028642652	0.029336366
37	MANUFACTURE OF CEMENT	0.015514816	0.016027159
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.020660107	0.021954866
39	MANUFACTURE OF IRON AND STEEL	0.031207506	0.032810435
40	MANUFACTURE OF NON-FERROUS METAL	0.021389829	0.025874511
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.026132259	0.028328385
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.035233998	0.07246151
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.038338511	0.087301755
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.039258979	0.048963999
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.025425308	0.061962602
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.017024615	0.059955057
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.062622027	0.077519098
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.010846417	0.10427102
49	OTHER MANUFACTURING INDUSTRIES	0.022858696	0.028700787
50	ELECTRICITY	0.010801564	0.011229743
51	GAS MANUFACTURE AND WATERWORKS	0.014976601	0.015438328

		t^m_e	$\bar{t}^m_e$
52	BUILDING CONSTRUCTION	0.020490602	0.099014218
53	OTHER CONSTRUCTION	0.028670064	0.10919846
54	WHOLESALE AND RETAIL TRADE	0.005288889	0.006363071
55	RESTAURANTS AND HOTELS	0.014320375	0.014823824
56	RAILWAY TRANSPORT	0.033029998	0.036231036
57	OTHER LAND TRANSPORT	0.028000173	0.029143266
58	WATER TRANSPORT	0.023938593	0.025277766
59	AIR TRANSPORT	0.017403639	0.017981434
60	COMMUNICATION	0.020992682	0.022001543
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.004514181	0.004647154
62	PERSONAL AND PROFESSIONAL SERVICES	0.023028422	0.023709058
63	PUBLIC SERVICES	0	0
64	OWNERSHIP OF DWELLINGS	0.004278664	0.004358559

Notes: $r = 4\%$

$$t^m{}_e{}' = t^{m\prime} \times A^m \times [I - A^d]^{-1}$$

$$\bar{t}^m{}_e{}' = t^{m\prime} \times \bar{A}^m \times [I - \bar{A}^d]^{-1}$$

Table 1.3 *Effective taxes on imports into domestic production*

		t^m_i	t^m_i-bar
1	AGRICULTURE	0.010824747	0.011755812
2	ANIMAL HUSBANDRY	0.009086809	0.009700653
3	FORESTRY	0.004966397	0.006237865
4	FISHERIES	0.012887017	0.013547428
5	COAL MINING	0.01249683	0.013445164
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.007064717	0.009625111
7	IRON ORE MINING	0.026375172	0.027707698
8	NON-FERROUS ORE MINING	0.01901708	0.044067323
9	NON-METALLIC MINERAL MINING	0.006017113	0.024983754
10	STONE QUARRYING	0.014052451	0.015468473
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.013888023	0.01462913
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.01732768	0.018332787
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.023613708	0.025435025
14	GRAIN MILL PRODUCTS	0.01333883	0.01506598
15	SUGAR	0.018277	0.022655024
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.020602219	0.021688392
17	ALCOHOLIC BEVERAGES	0.010857062	0.011280044
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.02176949	0.02370859
19	TOBACCO MANUFACTURES	0.013068932	0.013944455
20	GINNING	0.013736499	0.029889966
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.018198153	0.019732891
22	MANUFACTURE OF WEARING APPAREL	0.015474901	0.016893431
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.017120764	0.018830606
24	MANUFACTURE OF FOOTWEAR	0.024030525	0.026716852
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.011170697	0.011654188
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.010580787	0.014135171
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.04198121	0.043041739
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.038892337	0.039644836
29	MANUFACTURE OF FERTILIZERS	0.054410055	0.055770779
30	MANUFACTURE OF DRUGS AND MEDICINES	0.020833126	0.021282345
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.057740843	0.058738935
32	PETROLEUM REFINERIES	0.008608696	0.011805324
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.059225275	0.066689048
34	MANUFACTURE OF RUBBER PRODUCTS	0.039178693	0.040014125
35	MANUFACTURE OF PLASTIC PRODUCTS	0.059495386	0.060329213
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.028642652	0.029591157
37	MANUFACTURE OF CEMENT	0.015514816	0.016218139
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.020660107	0.022452248
39	MANUFACTURE OF IRON AND STEEL	0.031207506	0.033390424
40	MANUFACTURE OF NON-FERROUS METAL	0.021389829	0.02744983
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.026132259	0.029137321
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.035233998	0.08592022
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.038338511	0.10576098
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.039258979	0.052483359
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.025425308	0.075243363
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.017024615	0.076123626
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.062622027	0.082901312
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.010846417	0.13600748
49	OTHER MANUFACTURING INDUSTRIES	0.022858696	0.03085
50	ELECTRICITY	0.010801564	0.011383755
51	GAS MANUFACTURE AND WATERWORKS	0.014976601	0.015607407

		t^m_e	$\bar{t}^m_e$-bar
52	BUILDING CONSTRUCTION	0.020490602	0.12877376
53	OTHER CONSTRUCTION	0.028670064	0.13970146
54	WHOLESALE AND RETAIL TRADE	0.005288889	0.006768845
55	RESTAURANTS AND HOTELS	0.014320375	0.01501226
56	RAILWAY TRANSPORT	0.033029998	0.037426164
57	OTHER LAND TRANSPORT	0.028000173	0.029567275
58	WATER TRANSPORT	0.023938593	0.025767206
59	AIR TRANSPORT	0.017403639	0.01818926
60	COMMUNICATION	0.020992682	0.022369247
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.004514181	0.004695949
62	PERSONAL AND PROFESSIONAL SERVICES	0.023028422	0.02395852
63	PUBLIC SERVICES	0	0
64	OWNERSHIP OF DWELLINGS	0.004278664	0.004388224

Notes: r = 5%

$$t^m_e{}' = t^{m\prime} \times A^m \times [I - A^d]^{-1}$$

$$\bar{t}^m_e{}' = t^{m\prime} \times \bar{A}^m \times [I - \bar{A}^d]^{-1}$$

Table II.1. *Domestic effective taxes*

		t^d_i	t^d_i-bar	t^d_{awr}-bar
1	AGRICULTURE	0.006196895	0.007228789	0.018178233
2	ANIMAL HUSBANDRY	0.008892908	0.009582382	0.009168545
3	FORESTRY	0.028459502	0.029985755	0.013744247
4	FISHERIES	0.03063285	0.031351281	0.025912315
5	COAL MINING	0.047580297	0.048502446	0.026999576
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.02864591	0.029254758	0.012472262
7	IRON ORE MINING	0.059036093	0.060719321	0.047955148
8	NON-FERROUS ORE MINING	0.051695321	0.079539042	0.061293427
9	NON-METALLIC MINERAL MINING	0.041542402	0.062768299	0.032614314
10	STONE QUARRYING	0.057760148	0.059181313	0.022672932
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.020200545	0.020998322	0.018730542
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.027672917	0.028778234	0.020828722
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.028923046	0.031042651	0.027056965
14	GRAIN MILL PRODUCTS	0.027785688	0.029760082	0.015718627
15	SUGAR	0.022594325	0.027196727	0.032037599
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.027651199	0.028848006	0.025231233
17	ALCOHOLIC BEVERAGES	0.16605837	0.16650641	0.01644184
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.13135955	0.13349835	0.02857744
19	TOBACCO MANUFACTURES	0.10449472	0.10535801	0.009122284
20	GINNING	0.023367375	0.041282878	0.026425135
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.054912935	0.056606863	0.037760255
22	MANUFACTURE OF WEARING APPAREL	0.045322731	0.046886718	0.03651311
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.032015675	0.033824765	0.020542246
24	MANUFACTURE OF FOOTWEAR	0.038285074	0.041277699	0.030440108
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.021381442	0.021996584	0.021471368
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.035978005	0.040037979	0.019702469
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.04634612	0.047394302	0.038455906
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.094085811	0.094858657	0.035156637
29	MANUFACTURE OF FERTILIZERS	0.049385012	0.050887032	0.042282481
30	MANUFACTURE OF DRUGS AND MEDICINES	0.034344162	0.03483191	0.02508104
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.053806998	0.05495771	0.052080328
32	PETROLEUM REFINERIES	0.2679936	0.27153412	0.00795458
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.10347291	0.11272972	0.116280374
34	MANUFACTURE OF RUBBER PRODUCTS	0.04915062	0.050075833	0.046697458
35	MANUFACTURE OF PLASTIC PRODUCTS	0.050403824	0.051289454	0.032684398
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.046266211	0.04726704	0.0302284
37	MANUFACTURE OF CEMENT	0.044650423	0.045424067	0.032890588
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.05887478	0.061011338	0.039021354
39	MANUFACTURE OF IRON AND STEEL	0.055405462	0.05761046	0.046816172
40	MANUFACTURE OF NON-FERROUS METAL	0.034617763	0.040204137	0.03761711
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.039784013	0.042981049	0.031971873
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.025741746	0.076812538	0.073173814
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.047780798	0.12427212	0.114979751
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.052317895	0.065763948	0.03684696
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.032315592	0.083320041	0.07973947
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.02555462	0.092421174	0.088737248
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.09524263	0.11563668	0.056103598
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.024779012	0.12786329	0.119034714
49	OTHER MANUFACTURING INDUSTRIES	0.083578115	0.092049543	0.02763213
50	ELECTRICITY	0.094934979	0.095512713	0.014846663
51	GAS MANUFACTURE AND WATERWORKS	0.033661584	0.034321479	0.029163039

		t^d_e	t^d_e-bar	t^d_{diff}-bar
52	BUILDING CONSTRUCTION	0.04732319	0.1719134	0.150523581
53	OTHER CONSTRUCTION	0.058346561	0.18591688	0.181593383
54	WHOLESALE AND RETAIL TRADE	0.032045277	0.033733283	0.021519445
55	RESTAURANTS AND HOTELS	0.049923944	0.050693655	0.028953251
56	RAILWAY TRANSPORT	-0.12353147	-0.11867428	0.07674197
57	OTHER LAND TRANSPORT	0.054773333	0.056473732	0.048782513
58	WATER TRANSPORT	0.046991829	0.048894102	0.050555883
59	AIR TRANSPORT	0.043508817	0.044288417	0.038149959
60	COMMUNICATION	0.11134406	0.11276466	0.01575441
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.12681	0.1270013	0.02272772
62	PERSONAL AND PROFESSIONAL SERVICES	0.11757583	0.11855131	0.023720813
63	PUBLIC SERVICES	0	0	0
64	OWNERSHIP OF DWELLINGS	0.081100629	0.081219844	0.007686767

Notes: $r = 3\%$

$t^d_e{}' = t^{d'} \times [I - A^d]^{-1}$

$\bar{t}^d_e{}' = t^{d'} \times [I - \bar{A}^d]^{-1}$

$\bar{t}^d_{diff} = \bar{t}^d_e - t^d$

Table II.2. *Domestic effective taxes*

		t^d_i	t^d_i-bar	t^d_{ex}-bar
1	AGRICULTURE	0.006196895	0.007690858	0.018640302
2	ANIMAL HUSBANDRY	0.008892908	0.009891119	0.009477283
3	FORESTRY	0.028459502	0.030569192	0.014427684
4	FISHERIES	0.03063285	0.031672986	0.02623402
5	COAL MINING	0.047580297	0.048915372	0.027412502
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.02864591	0.029527393	0.012744897
7	IRON ORE MINING	0.059036093	0.061473049	0.048708876
8	NON-FERROUS ORE MINING	0.051695321	0.092007107	0.073761492
9	NON-METALLIC MINERAL MINING	0.041542402	0.072272987	0.042119002
10	STONE QUARRYING	0.057760148	0.059817692	0.023309311
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.020200545	0.021355557	0.019087777
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.027672917	0.029273181	0.021323669
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.028923046	0.031991783	0.028006097
14	GRAIN MILL PRODUCTS	0.027785688	0.030644191	0.016602736
15	SUGAR	0.022594325	0.029257625	0.034098497
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.027651199	0.029383921	0.025767148
17	ALCOHOLIC BEVERAGES	0.16605837	0.16670704	0.01664247
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.13135955	0.13445608	0.02953517
19	TOBACCO MANUFACTURES	0.10449472	0.10574458	0.009508854
20	GINNING	0.023367375	0.049305213	0.03444747
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.054912935	0.057365382	0.038518774
22	MANUFACTURE OF WEARING APPAREL	0.045322731	0.047587051	0.037213443
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.032015675	0.034634853	0.021352334
24	MANUFACTURE OF FOOTWEAR	0.038285074	0.042617758	0.031780167
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.021381442	0.022272036	0.02174682
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.035978005	0.041855984	0.021520474
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.04634612	0.047863665	0.038925269
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.094085811	0.095204727	0.035502707
29	MANUFACTURE OF FERTILIZERS	0.049385012	0.051559617	0.042955066
30	MANUFACTURE OF DRUGS AND MEDICINES	0.034344162	0.035050318	0.025299448
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.053806998	0.055472984	0.052595602
32	PETROLEUM REFINERIES	0.2679936	0.27311952	0.00953998
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.10347291	0.1168748	0.120425454
34	MANUFACTURE OF RUBBER PRODUCTS	0.04915062	0.050490131	0.047111756
35	MANUFACTURE OF PLASTIC PRODUCTS	0.050403824	0.051686028	0.033080972
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.046266211	0.047715199	0.030676559
37	MANUFACTURE OF CEMENT	0.044650423	0.045770495	0.033237016
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.05887478	0.061968061	0.039978077
39	MANUFACTURE OF IRON AND STEEL	0.055405462	0.05859783	0.047803542
40	MANUFACTURE OF NON-FERROUS METAL	0.034617763	0.042705645	0.040118618
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.039784013	0.044412641	0.033403465
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.025741746	0.099681391	0.096042667
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.047780798	0.15852396	0.149231591
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.052317895	0.071784921	0.042867933
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.032315592	0.10615919	0.102578619
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.02555462	0.12236317	0.118679244
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.09524263	0.12476887	0.065235788
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.024779012	0.17402312	0.165194544
49	OTHER MANUFACTURING INDUSTRIES	0.083578115	0.095842942	0.031425529
50	ELECTRICITY	0.094934979	0.095771415	0.015105365
51	GAS MANUFACTURE AND WATERWORKS	0.033661584	0.034616972	0.029458532

		t^d_e	t^d_e-bar	t^d_{err}bar
52	BUILDING CONSTRUCTION	0.04732319	0.22770332	0.206313501
53	OTHER CONSTRUCTION	0.058346561	0.24304125	0.238717753
54	WHOLESALE AND RETAIL TRADE	0.032045277	0.034489151	0.022275313
55	RESTAURANTS AND HOTELS	0.049923944	0.051038322	0.029297918
56	RAILWAY TRANSPORT	-0.12353147	-0.11649929	0.07891696
57	OTHER LAND TRANSPORT	0.054773333	0.05723515	0.049543931
58	WATER TRANSPORT	0.046991829	0.049745916	0.051407697
59	AIR TRANSPORT	0.043508817	0.044637511	0.038499053
60	COMMUNICATION	0.11134406	0.11340078	0.01639053
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.12681	0.12708696	0.02281338
62	PERSONAL AND PROFESSIONAL SERVICES	0.11757583	0.11898811	0.024157613
63	PUBLIC SERVICES	0	0	0
64	OWNERSHIP OF DWELLINGS	0.081100629	0.081273227	0.00774015

Notes: $r = 4\%$

$$t^d_e{}' = t^{d'} \times [I - A^d]^{-1}$$

$$\bar{t}^d_e{}' = t^{d'} \times [I - \bar{A}^d]^{-1}$$

$$\bar{t}^d_{diff} = \bar{t}^d_e - t^d$$

Table II.3. *Domestic effective taxes*

		t^d_i	t^d_i-bar	t^d_{agr}-bar
1	AGRICULTURE	0.006196895	0.008239704	0.019189148
2	ANIMAL HUSBANDRY	0.008892908	0.010257838	0.009844002
3	FORESTRY	0.028459502	0.031480979	0.015239471
4	FISHERIES	0.03063285	0.032055107	0.026616141
5	COAL MINING	0.047580297	0.049405847	0.027902977
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.02864591	0.029851229	0.013068733
7	IRON ORE MINING	0.059036093	0.062368329	0.049604156
8	NON-FERROUS ORE MINING	0.051695321	0.1068167	0.088571085
9	NON-METALLIC MINERAL MINING	0.041542402	0.083562674	0.053408689
10	STONE QUARRYING	0.057760148	0.060573585	0.024065204
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.020200545	0.021779881	0.019512101
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.027672917	0.029861079	0.021911567
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.028923046	0.033119164	0.029133478
14	GRAIN MILL PRODUCTS	0.027785688	0.031694337	0.017652882
15	SUGAR	0.022594325	0.031705563	0.036546435
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.027651199	0.030020482	0.026403709
17	ALCOHOLIC BEVERAGES	0.16605837	0.16694534	0.01688077
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.13135955	0.13559367	0.03067276
19	TOBACCO MANUFACTURES	0.10449472	0.10620375	0.009968024
20	GINNING	0.023367375	0.058834159	0.043976416
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.054912935	0.058266353	0.039419745
22	MANUFACTURE OF WEARING APPAREL	0.045322731	0.048418909	0.038045301
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.032015675	0.035597076	0.022314557
24	MANUFACTURE OF FOOTWEAR	0.038285074	0.044209484	0.033371893
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.021381442	0.022599219	0.022074003
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.035978005	0.044015414	0.023679904
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.04634612	0.048421175	0.039482779
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.094085811	0.095615791	0.035913771
29	MANUFACTURE OF FERTILIZERS	0.049385012	0.052358515	0.043753964
30	MANUFACTURE OF DRUGS AND MEDICINES	0.034344162	0.035309743	0.025558873
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.053806998	0.056085028	0.053207646
32	PETROLEUM REFINERIES	0.2679936	0.27500266	0.01142312
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.10347291	0.12179833	0.125348984
34	MANUFACTURE OF RUBBER PRODUCTS	0.04915062	0.050982236	0.047603861
35	MANUFACTURE OF PLASTIC PRODUCTS	0.050403824	0.052157079	0.033552023
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.046266211	0.048247522	0.031208882
37	MANUFACTURE OF CEMENT	0.044650423	0.046181983	0.033648504
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.05887478	0.063104459	0.041114475
39	MANUFACTURE OF IRON AND STEEL	0.055405462	0.059770631	0.048976343
40	MANUFACTURE OF NON-FERROUS METAL	0.034617763	0.04567694	0.043089913
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.039784013	0.04611309	0.035103914
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.025741746	0.12684506	0.123206336
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.047780798	0.19920837	0.189916001
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.052317895	0.078936644	0.050019656
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.032315592	0.13328757	0.129706999
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.02555462	0.15792833	0.154244404
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.09524263	0.13561611	0.076083028
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.024779012	0.22885186	0.220023284
49	OTHER MANUFACTURING INDUSTRIES	0.083578115	0.10034875	0.035931337
50	ELECTRICITY	0.094934979	0.096078702	0.015412652
51	GAS MANUFACTURE AND WATERWORKS	0.033661584	0.034967959	0.029809519

		t^d_e	t^d_e-bar	$t^d_{e,r}$-bar
52	BUILDING CONSTRUCTION	0.04732319	0.29397069	0.272580871
53	OTHER CONSTRUCTION	0.058346561	0.3108937	0.306570203
54	WHOLESALE AND RETAIL TRADE	0.032045277	0.035386973	0.023173135
55	RESTAURANTS AND HOTELS	0.049923944	0.051447719	0.029707315
56	RAILWAY TRANSPORT	-0.12353147	-0.11391584	0.08150041
57	OTHER LAND TRANSPORT	0.054773333	0.058139563	0.050448344
58	WATER TRANSPORT	0.046991829	0.050757702	0.052419483
59	AIR TRANSPORT	0.043508817	0.045052167	0.038913709
60	COMMUNICATION	0.11134406	0.11415637	0.01714612
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.12681	0.12718871	0.02291513
62	PERSONAL AND PROFESSIONAL SERVICES	0.11757583	0.11950695	0.024676453
63	PUBLIC SERVICES	0	0	0
64	OWNERSHIP OF DWELLINGS	0.081100629	0.081336635	0.007803558

Notes: r = 5%

$t^d_e{}' = t^{d'} \times [I - A^d]^{-1}$

$\bar{t}^d_e{}' = t^{d'} \times [I - \bar{A}^d]^{-1}$

$\bar{t}^d_{diff} = \bar{t}^d_e - t^d$

Table III.1. *Total effective taxes, 1990*

		t^e	t_v	t_v-bar	t_{ww}-bar	t_v-bar - t_v
1	AGRICULTURE	-0.010949444	0.017021542	0.018519467	0.029468911	0.001497825
2	ANIMAL HUSBANDRY	0.000413837	0.017979717	0.018975553	0.018561717	0.000995836
3	FORESTRY	0.016241508	0.033425899	0.03557791	0.019336402	0.002152011
4	FISHERIES	0.005438966	0.043519867	0.044569999	0.039131033	0.001050132
5	COAL MINING	0.02150287	0.060077127	0.061485428	0.039982558	0.001408301
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.016782496	0.035710627	0.037801011	0.021018515	0.002090384
7	IRON ORE MINING	0.012764173	0.085411265	0.087742783	0.07497861	0.002331518
8	NON-FERROUS ORE MINING	0.018245615	0.070712401	0.11108472	0.092839105	0.040372319
9	NON-METALLIC MINERAL MINING	0.030153985	0.047559515	0.078258406	0.048104421	0.030698891
10	STONE QUARRYING	0.036508381	0.071812599	0.073955695	0.037447314	0.002143096
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.00226778	0.034088568	0.035259335	0.032991555	0.001170767
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.007949512	0.045000597	0.046609674	0.038660162	0.001609077
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.003985686	0.052536753	0.055558718	0.051573032	0.003021965
14	GRAIN MILL PRODUCTS	0.014041455	0.041124518	0.043957817	0.029916362	0.002833299
15	SUGAR	-0.004840872	0.040871325	0.04768705	0.052527922	0.006815725
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.003616773	0.048253418	0.049994405	0.046377632	0.001740987
17	ALCOHOLIC BEVERAGES	0.15006457	0.17691544	0.17757701	0.02751244	0.000661570
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.10492091	0.15312904	0.15623914	0.05131823	0.003110100
19	TOBACCO MANUFACTURES	0.096235726	0.11756365	0.1188747	0.022638974	0.001311050
20	GINNING	0.014857743	0.037103874	0.063101882	0.048244139	0.025998008
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.018846608	0.073111088	0.075573672	0.056727064	0.002462584
22	MANUFACTURE OF WEARING APPAREL	0.010373608	0.060797632	0.063072224	0.052698616	0.002274592
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.013282519	0.049136439	0.051808901	0.038526382	0.002672462
24	MANUFACTURE OF FOOTWEAR	0.010837591	0.062315599	0.066651155	0.055813564	0.004335556
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.000525216	0.032552139	0.033402109	0.032876893	0.000849970
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.02033551	0.046558792	0.052386638	0.032051128	0.005827846
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.008938396	0.088327331	0.089917659	0.080979263	0.001590328
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.05970202	0.13297815	0.13413306	0.07443104	0.001154910
29	MANUFACTURE OF FERTILIZERS	0.008604551	0.10379507	0.10597858	0.097374029	0.002183510
30	MANUFACTURE OF DRUGS AND MEDICINES	0.00975087	0.055177287	0.055890747	0.046139877	0.000713460
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.002877382	0.11154784	0.11319403	0.110316648	0.001646190
32	PETROLEUM REFINERIES	0.26357954	0.2766023	0.2817427	0.01816316	0.005140400
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	-0.003550654	0.16269819	0.1756016	0.179152254	0.012903410
34	MANUFACTURE OF RUBBER PRODUCTS	0.003378375	0.088329313	0.089672662	0.086294287	0.001343349
35	MANUFACTURE OF PLASTIC PRODUCTS	0.018605056	0.10989921	0.11120557	0.092600514	0.001306360
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.01703864	0.074908863	0.076388878	0.059350238	0.001480015
37	MANUFACTURE OF CEMENT	0.012533479	0.060165238	0.061291371	0.048757892	0.001126133
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.021989984	0.079534887	0.082554776	0.060564792	0.003019889
39	MANUFACTURE OF IRON AND STEEL	0.010794288	0.086612968	0.089929614	0.079135326	0.003316646
40	MANUFACTURE OF NON-FERROUS METAL	0.002587027	0.056007592	0.064728072	0.062141045	0.008720480
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.011009176	0.065916272	0.070629115	0.059619939	0.004712843
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.003638724	0.060975744	0.13786994	0.134231216	0.076894196
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.009292369	0.086119309	0.19619193	0.186899561	0.110072621
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.028916988	0.091576873	0.11174953	0.082832542	0.020172657
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.003580571	0.0577409	0.13405381	0.130473239	0.076312910
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.003683926	0.042579235	0.13889773	0.135213804	0.096318495
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.059533082	0.15786466	0.18859402	0.129060938	0.030729360
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.008828576	0.035625429	0.20454498	0.195716404	0.168919551
49	OTHER MANUFACTURING INDUSTRIES	0.064417413	0.10643681	0.11894193	0.054524517	0.012505120
50	ELECTRICITY	0.08066605	0.10573654	0.10661169	0.02594564	0.000875150
51	GAS MANUFACTURE AND WATERWORKS	0.00515844	0.048638185	0.049617277	0.044458837	0.000979092

		t^d	t_e	t_e-bar	t_{em}-bar	t_e-bar -t_e
52	BUILDING CONSTRUCTION	0.021389819	0.067813792	0.24618039	0.224790571	0.178366598
53	OTHER CONSTRUCTION	0.004323497	0.087016624	0.26974453	0.265421033	0.182727906
54	WHOLESALE AND RETAIL TRADE	0.012213838	0.037334166	0.039758491	0.027544653	0.002424325
55	RESTAURANTS AND HOTELS	0.021740404	0.064244319	0.065360008	0.043619604	0.001115689
56	RAILWAY TRANSPORT	-0.19541625	-0.090501476	-0.083442966	0.111973284	0.007058510
57	OTHER LAND TRANSPORT	0.007691219	0.082773506	0.085261398	0.077570179	0.002487892
58	WATER TRANSPORT	-0.001661781	0.070930421	0.073758957	0.075420738	0.002828536
59	AIR TRANSPORT	0.006138458	0.060912456	0.062093387	0.055954929	0.001180931
60	COMMUNICATION	0.09701025	0.13233674	0.13445565	0.0374454	0.002118910
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.10427358	0.13132418	0.13160736	0.02733378	0.000283180
62	PERSONAL AND PROFESSIONAL SERVICES	0.094830497	0.14060425	0.14205015	0.047219653	0.001445900
63	PUBLIC SERVICES	0	0	0	0	0.000000000
64	OWNERSHIP OF DWELLINGS	0.073533077	0.085379293	0.085553533	0.012020456	0.000174240

Notes: $r = 3\%$

$t_e' = t^d_e' + t^m_e'$

$\bar{t}_e' = \bar{t}^d_e' + \bar{t}^m_e'$

$\bar{t}^d_{diff} = \bar{t}_e - t^d$

Table III.2. *Total effective taxes, 1990*

		t^e	t_c	t_c-bar	t_{mv}-bar	t_c-bar - t_c
1	AGRICULTURE	-0.010949444	0.017021642	0.019193346	0.03014279	0.002171704
2	ANIMAL HUSBANDRY	0.000413837	0.017979717	0.019424163	0.019010327	0.001444446
3	FORESTRY	0.016241508	0.033425899	0.036553501	0.020311993	0.003127602
4	FISHERIES	0.005438966	0.043519867	0.045041607	0.039602641	0.001521740
5	COAL MINING	0.02150287	0.060077127	0.062110896	0.040608026	0.002033769
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.016782496	0.035710627	0.038600827	0.021818331	0.002890200
7	IRON ORE MINING	0.012764173	0.085411265	0.08880477	0.076040597	0.003393505
8	NON-FERROUS ORE MINING	0.018245615	0.070712401	0.12925352	0.111007905	0.058541119
9	NON-METALLIC MINERAL MINING	0.030153985	0.047559515	0.092082954	0.061928969	0.044523439
10	STONE QUARRYING	0.036508381	0.071812599	0.074910533	0.038402152	0.003097934
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.00226778	0.034088568	0.035784581	0.033516801	0.001696013
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.007949512	0.045000597	0.047333061	0.039383549	0.002332464
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.003985686	0.052536753	0.056924692	0.052939006	0.004387939
14	GRAIN MILL PRODUCTS	0.014041455	0.041124518	0.045236333	0.031194878	0.004111815
15	SUGAR	-0.004840872	0.040871325	0.05073772	0.055578592	0.009866395
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.003616773	0.048253418	0.050777243	0.04716047	0.002523825
17	ALCOHOLIC BEVERAGES	0.15006457	0.17691544	0.17787335	0.02780878	0.000957910
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.10492091	0.15312904	0.15763775	0.05271684	0.004508710
19	TOBACCO MANUFACTURES	0.096235726	0.11756365	0.11945779	0.023222064	0.001894140
20	GINNING	0.014857743	0.037103874	0.074799324	0.059941581	0.037695450
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.018846608	0.073111088	0.076681158	0.05783455	0.003570070
22	MANUFACTURE OF WEARING APPAREL	0.010373608	0.060797632	0.06409506	0.053721452	0.003297428
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.013282519	0.049136439	0.053005833	0.039723314	0.003869394
24	MANUFACTURE OF FOOTWEAR	0.010837591	0.062315599	0.068602716	0.057765125	0.006287117
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.000525216	0.032552139	0.03378952	0.033264304	0.001237381
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.02033551	0.046558792	0.055016232	0.034680722	0.008457440
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.008938396	0.088327331	0.090625128	0.081686732	0.002297797
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.05970202	0.13297815	0.1346488	0.07494678	0.001670650
29	MANUFACTURE OF FERTILIZERS	0.008604551	0.10379507	0.10696056	0.098356009	0.003165490
30	MANUFACTURE OF DRUGS AND MEDICINES	0.00975087	0.055177287	0.056211098	0.046460228	0.001033811
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.002877382	0.11154784	0.11393746	0.111060078	0.002389620
32	PETROLEUM REFINERIES	0.26357954	0.2766023	0.28405525	0.02047571	0.007452950
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	-0.003550654	0.16269819	0.18146906	0.185019714	0.018770870
34	MANUFACTURE OF RUBBER PRODUCTS	0.003378375	0.088329313	0.090276997	0.086898622	0.001947684
35	MANUFACTURE OF PLASTIC PRODUCTS	0.018605056	0.10989921	0.11179088	0.093185824	0.001891670
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.01703864	0.074908863	0.077051564	0.060012924	0.002142701
37	MANUFACTURE OF CEMENT	0.012533479	0.060165238	0.061797655	0.049264176	0.001632417
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.021989984	0.079534887	0.083922927	0.061932943	0.004388040
39	MANUFACTURE OF IRON AND STEEL	0.010794288	0.086612968	0.091408265	0.080613977	0.004795297
40	MANUFACTURE OF NON-FERROUS METAL	0.002587027	0.056007592	0.068580156	0.065993129	0.012572564
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.011009176	0.065916272	0.072741026	0.06173185	0.006824754
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.003638724	0.060975744	0.1721429	0.168504176	0.111167156
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.009292369	0.086119309	0.24582572	0.236533351	0.159706411
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.028916988	0.091576873	0.12074892	0.091831932	0.029172047
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.003580571	0.0577409	0.16812179	0.164541219	0.110380890
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.003683926	0.042579235	0.18231823	0.178634304	0.139738995
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.059533082	0.15786466	0.20228797	0.142754888	0.044423310
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.008828576	0.035625429	0.27829414	0.269465564	0.242668711
49	OTHER MANUFACTURING INDUSTRIES	0.064417413	0.10643681	0.12454373	0.060126317	0.018106920
50	ELECTRICITY	0.08066605	0.10573654	0.10700116	0.02633511	0.001264620
51	GAS MANUFACTURE AND WATERWORKS	0.00515844	0.048638185	0.050055301	0.044896861	0.001417116

		t^d	t_e	t_e-bar	t_{em}-bar	t_e-bar -t_e
52	BUILDING CONSTRUCTION	0.021389819	0.067813792	0.32671753	0.305327711	0.258903738
53	OTHER CONSTRUCTION	0.004323497	0.087016624	0.35223971	0.347916213	0.265223086
54	WHOLESALE AND RETAIL TRADE	0.012213838	0.037334166	0.040852223	0.028638385	0.003518057
55	RESTAURANTS AND HOTELS	0.021740404	0.064244319	0.065862146	0.044121742	0.001617827
56	RAILWAY TRANSPORT	-0.19541625	-0.090501476	-0.080268256	0.115147994	0.010233220
57	OTHER LAND TRANSPORT	0.007691219	0.082773506	0.086378416	0.078687197	0.003604910
58	WATER TRANSPORT	-0.001661781	0.070930421	0.075023682	0.076685463	0.004093261
59	AIR TRANSPORT	0.006138458	0.060912456	0.062618945	0.056480487	0.001706489
60	COMMUNICATION	0.09701025	0.13233674	0.13540232	0.03839207	0.003065580
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.10427358	0.13132418	0.13173412	0.02746054	0.000409940
62	PERSONAL AND PROFESSIONAL SERVICES	0.094830497	0.14060425	0.14269717	0.047866673	0.002092920
63	PUBLIC SERVICES	0	0	0	0	0.000000000
64	OWNERSHIP OF DWELLINGS	0.073533077	0.085379293	0.085631786	0.012098709	0.000252493

Notes: r = 4%

$t_e' = t^d_e' + t^m_e'$

$\bar{t}_e' = \bar{t}^d_e' + \bar{t}^m_e'$

$\bar{t}^d_{diff} = \bar{t}_e - t^d$

Table III.3. *Total effective taxes, 1990*

		t^e	t_v	t_v-bar	t_{wr}-bar	t_v-bar - t_v
1	AGRICULTURE	-0.010949444	0.017021642	0.019995516	0.03094496	0.002973874
2	ANIMAL HUSBANDRY	0.000413837	0.017979717	0.019958491	0.019544655	0.001978774
3	FORESTRY	0.016241508	0.033425899	0.037718844	0.021477336	0.004292945
4	FISHERIES	0.005436966	0.043519867	0.045602535	0.040163569	0.002082668
5	COAL MINING	0.02150287	0.060077127	0.062851011	0.041348141	0.002773884
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.016782496	0.035710627	0.039476339	0.022693843	0.003765712
7	IRON ORE MINING	0.012764173	0.085411265	0.090076026	0.077311853	0.004664761
8	NON-FERROUS ORE MINING	0.018245615	0.070712401	0.15088402	0.132638405	0.080171619
9	NON-METALLIC MINERAL MINING	0.030153985	0.047559515	0.10854643	0.078392445	0.060986915
10	STONE QUARRYING	0.036508381	0.071812599	0.076042058	0.039533677	0.004229459
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.00226778	0.034088568	0.036409011	0.034141231	0.002320443
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.007949512	0.045000597	0.048193867	0.040244355	0.003193270
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.003985686	0.052536753	0.058554189	0.054568503	0.006017436
14	GRAIN MILL PRODUCTS	0.014041455	0.041124518	0.046760317	0.032718862	0.005635799
15	SUGAR	-0.004840872	0.040871325	0.054360587	0.059201459	0.013489262
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.003616773	0.048253418	0.051708874	0.048092101	0.003455456
17	ALCOHOLIC BEVERAGES	0.15006457	0.17691544	0.17822538	0.02816081	0.001309940
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.10492091	0.15312904	0.15930226	0.05438135	0.006173220
19	TOBACCO MANUFACTURES	0.096235726	0.11756365	0.12014821	0.023912484	0.002584560
20	GINNING	0.014857743	0.037103874	0.088724125	0.073866382	0.051620251
21	MANUFACTURE OF TEXTILES (exc. ginning)	0.018846608	0.073111088	0.077999244	0.059152636	0.004888156
22	MANUFACTURE OF WEARING APPAREL	0.010373608	0.060797632	0.06531234	0.054938732	0.004514708
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.013282519	0.049136439	0.054427682	0.041145163	0.005291243
24	MANUFACTURE OF FOOTWEAR	0.010837591	0.062315599	0.070926336	0.060088745	0.008610737
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.000525216	0.032552139	0.034253408	0.033728192	0.001701269
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.02033551	0.046558792	0.058150585	0.037815075	0.011591793
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.008938396	0.088327331	0.091462914	0.082524518	0.003135583
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.05970202	0.13297815	0.13526063	0.07555861	0.002282480
29	MANUFACTURE OF FERTILIZERS	0.008604551	0.10379507	0.10812929	0.099524739	0.004334220
30	MANUFACTURE OF DRUGS AND MEDICINES	0.00975087	0.055177287	0.056592088	0.046841218	0.001414801
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.002877382	0.11154784	0.11482396	0.111946578	0.003276120
32	PETROLEUM REFINERIES	0.26357954	0.2766023	0.28680798	0.02322844	0.010205680
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	-0.003550654	0.16269819	0.18848738	0.192038034	0.025789190
34	MANUFACTURE OF RUBBER PRODUCTS	0.003378375	0.088329313	0.090996361	0.087617986	0.002667048
35	MANUFACTURE OF PLASTIC PRODUCTS	0.018605056	0.10989921	0.11248629	0.093881234	0.002587080
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.01703864	0.074908863	0.077838679	0.060800039	0.002929816
37	MANUFACTURE OF CEMENT	0.012533479	0.060165238	0.062400122	0.049866643	0.002234884
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.021989984	0.079534887	0.085556708	0.063566724	0.006021821
39	MANUFACTURE OF IRON AND STEEL	0.010794288	0.086612968	0.093161054	0.082366766	0.006548086
40	MANUFACTURE OF NON-FERROUS METAL	0.002587027	0.056007592	0.07312677	0.070539743	0.017119178
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.011009176	0.065916272	0.075250411	0.064241235	0.009334139
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.003638724	0.060975744	0.21276528	0.209126556	0.151789536
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.009292369	0.086119309	0.30496935	0.295676981	0.218850041
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.028916988	0.091576873	0.13142	0.102503012	0.039843127
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.003580571	0.0577409	0.20853094	0.204950369	0.150790040
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.003683926	0.042579235	0.23405196	0.230368034	0.191472725
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.059533082	0.15786466	0.21851742	0.158984338	0.060652760
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.008828576	0.035625429	0.36485934	0.356030764	0.329233911
49	OTHER MANUFACTURING INDUSTRIES	0.064417413	0.10643681	0.13119875	0.066781337	0.024761940
50	ELECTRICITY	0.08066605	0.10573654	0.10746246	0.02679641	0.001725920
51	GAS MANUFACTURE AND WATERWORKS	0.00515844	0.048638185	0.050575366	0.045416926	0.001937181

		t^d	t_e	t_e-bar	t_{em}-bar	t_e-bar -t_e
52	BUILDING CONSTRUCTION	0.021389819	0.067813792	0.42274445	0.401354631	0.354930658
53	OTHER CONSTRUCTION	0.004323497	0.087016624	0.45059516	0.446271663	0.363578536
54	WHOLESALE AND RETAIL TRADE	0.012213838	0.037334166	0.042155817	0.029941979	0.004821651
55	RESTAURANTS AND HOTELS	0.021740404	0.064244319	0.066459978	0.044719574	0.002215659
56	RAILWAY TRANSPORT	-0.19541625	-0.090501476	-0.076489672	0.118926578	0.014011804
57	OTHER LAND TRANSPORT	0.007691219	0.082773506	0.087706838	0.080015619	0.004933332
58	WATER TRANSPORT	-0.001661781	0.070930421	0.076524908	0.078186689	0.005594487
59	AIR TRANSPORT	0.006138458	0.060912456	0.063241427	0.057102969	0.002328971
60	COMMUNICATION	0.09701025	0.13233674	0.13652562	0.03951537	0.004188880
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.10427358	0.13132418	0.13188466	0.02761108	0.000560480
62	PERSONAL AND PROFESSIONAL SERVICES	0.094830497	0.14060425	0.14346547	0.048634973	0.002861220
63	PUBLIC SERVICES	0	0	0	0	0.000000000
64	OWNERSHIP OF DWELLINGS	0.073533077	0.085379293	0.085724859	0.012191782	0.000345566

Notes: r = 5%

$t_e' = t^d_e' + t^m_e'$

$\bar{t}_e' = \bar{t}^d_e' + \bar{t}^m_e'$

$\bar{t}^d_{diff} = \bar{t}_e - t^d$

Table IV. *Non-Traded sectors*

50	ELECTRICITY
51	GAS MANUFACTURE AND WATERWORKS
52	BUILDING CONSTRUCTION
53	OTHER CONSTRUCTION
54	WHOLESALE AND RETAIL TRADE
55	RESTAURANTS AND HOTELS
56	RAILWAY TRANSPORT
57	OTHER LAND TRANSPORT
58	WATER TRANSPORT
59	AIR TRANSPORT
60	COMMUNICATION
61	FINANCIAL INSTITUTIONS AND INSURANCE
62	PERSONAL AND PROFESSIONAL SERVICES
63	PUBLIC SERVICES
64	OWNERSHIP OF DWELLINGS

Table V. *Value of imports and c.i.f. values*

		c.i.f. values	value at purchaser price	P_i^{cif}
1	AGRICULTURE	1803781	2120647	0.85058051
2	ANIMAL HUSBANDRY	362781	466448	0.77775229
3	FORESTRY	431230	477906	0.90233226
4	FISHERIES	12031	13881	0.8667243
5	COAL MINING	808029	844073	0.95729753
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	9916285	9933239	0.99829321
7	IRON ORE MINING	182008	191236	0.95174549
8	NON-FERROUS ORE MINING	67038	70963	0.94468949
9	NON-METALLIC MINERAL MINING	51197	78410	0.65293968
10	STONE QUARRYING	152594	157982	0.96589485
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	476375	530087	0.89867324
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	46222	55324	0.83547827
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	722480	814573	0.88694322
14	GRAIN MILL PRODUCTS	166720	212112	0.78599985
15	SUGAR	800558	869893	0.92029479
16	MANUFACTURE OF OTHER FOOD PRODUCTS	638594	781643	0.81698934
17	ALCOHOLIC BEVERAGES	110280	142469	0.77406313
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	30052	35952	0.8358923
19	TOBACCO MANUFACTURES	921663	1890016	0.48764825
20	GINNING	353145	596818	0.59171305
21	MANUFACTURE OF TEXTILES (exc. ginning)	1733049	1816761	0.95392239
22	MANUFACTURE OF WEARING APPAREL	576415	587805	0.98062283
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	483727	501472	0.96461418
24	MANUFACTURE OF FOOTWEAR	40384	65745	0.61425203
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	74120866	74164046	0.99941778
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	39284	55334	0.70994325
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	763400	1021425	0.74738723
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	109424	133526	0.81949583
29	MANUFACTURE OF FERTILIZERS	657720	783704	0.83924543
30	MANUFACTURE OF DRUGS AND MEDICINES	814910	896238	0.90925625
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	6860025	8843616	0.77570363
32	PETROLEUM REFINERIES	1638347	3416879	0.4794864
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	200998	234022	0.85888506
34	MANUFACTURE OF RUBBER PRODUCTS	416909	619826	0.67262264
35	MANUFACTURE OF PLASTIC PRODUCTS	261741	373771	0.70027102
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	163599	247698	0.66047768
37	MANUFACTURE OF CEMENT	118169	128308	0.92097921
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	414893	590201	0.70296899
39	MANUFACTURE OF IRON AND STEEL	4523768	4863680	0.93011218
40	MANUFACTURE OF NON-FERROUS METAL	5312953	5448839	0.97506148
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	1036569	1418949	0.73051886
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	9218375	10622516	0.86781465
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	122852	165633	0.7417121
44	MANUFACTURE OF ELECTRICAL MACHINERY	4374944	5642412	0.7753677
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	507632	574818	0.88311779
46	MANUFACTURE OF RAILROAD EQUIPMENT	28752	33652	0.85439201
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	3446311	5407239	0.63735134
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	844168	876243	0.96339486
49	OTHER MANUFACTURING INDUSTRIES	2017629	2478385	0.81409022
50	ELECTRICITY	12619	13668	0.92325139

		c.i.f. values	value at purchaser price	P_i^{cif}
51	GAS MANUFACTURE AND WATERWORKS	948	948	1
52	BUILDING CONSTRUCTION	0	0	0.97861
53	OTHER CONSTRUCTION	0	0	0.995677
54	WHOLESALE AND RETAIL TRADE	0	0	0.987786
55	RESTAURANTS AND HOTELS	1220198	1220198	1
56	RAILWAY TRANSPORT	31671	31671	1
57	OTHER LAND TRANSPORT	1039202	1039202	1
58	WATER TRANSPORT	610699	610699	1
59	AIR TRANSPORT	445995	445995	1
60	COMMUNICATION	77613	77613	1
61	FINANCIAL INSTITUTIONS AND INSURANCE	5145	5145	1
62	PERSONAL AND PROFESSIONAL SERVICES	656434	656434	1
63	PUBLIC SERVICES	0	0	1
64	OWNERSHIP OF DWELLINGS	0	0	0.926467

Notes: The third column is the second divided by the first and represents p_i^{cif}, the value of a unit of the importable at c.i.f. prices Note that units of goods are chosen so that purchaser prices are unity.

Table VI. *Shadow Prices of non-traded and imported goods*

	Non-traded	Traded	Factors
	$p_1^N = p_1^N a_{11} + ... + p_r^N a_{r1} + ... + p_n^N a_{n1} + p_i^a a_{i1} + ... + p_j^a a_{j1} + ... + p_k^a a_{k1} + p_f a_{f1}$		
Non-traded	$p_r^N = p_1^N a_{1r} + ... + p_r^N a_{rr} + ... + p_n^N a_{nr} + p_i^a a_{ir} + ... + p_j^a a_{jr} + ... + p_k^a a_{kr} + p_f a_{fr}$		
	$p_n^N = p_1^N a_{1n} + ... + p_r^N a_{rn} + ... + p_n^N a_{nn} + p_i^a a_{in} + ... + p_j^a a_{jn} + ... + p_k^a a_{kn} + p_f a_{fn}$		
Imported	$p_i^a =$ ... 0 ... $+ p_r^N a_{ri} +$	...0...	$+ p_i^{cif}$

Notes: p_i^a = Shadow price of imported (i to j) and exported (j+1 to k) goods
p_f = Shadow price of factors
p_i^{cif}= Border price (i.e. c.i.f.) of imported goods.
p_i^N = Shadow price of non-traded goods (i+1, ... ,r, ..., n)
a_{ij} = Input-output coefficients - ith input per unit production of jth good.
p_r^N = Shadow price for trade and transport, a non-traded good.

Table VII. *Breakdown of value added*

		Labour	Capital	Land	Value added
1	AGRICULTURE	0.11044089	0.58955911	0.3	0.75540461
2	ANIMAL HUSBANDRY	0.096536501	0.6034635	0.3	0.49194248
3	FORESTRY	0.21640604	0.48359396	0.3	0.83537993
4	FISHERIES	0.11012256	0.58987744	0.3	0.7920545
5	COAL MINING	0.73125803	0.068741968	0.2	0.69966621
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.051169876	0.64883012	0.3	0.74386372
7	IRON ORE MINING	0.68723423	0.012765767	0.3	0.55533926
8	NON-FERROUS ORE MINING	0.4242117	0.2757883	0.3	0.63824458
9	NON-METALLIC MINERAL MINING	0.22699668	0.47300332	0.3	0.85650395
10	STONE QUARRYING	0.087783414	0.61221659	0.3	0.7676221
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.24286518	0.45713482	0.3	0.20400511
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.24239378	0.45760622	0.3	0.29299684
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.24226237	0.45773763	0.3	0.26698548
14	GRAIN MILL PRODUCTS	0.31977863	0.38022137	0.3	0.13597213
15	SUGAR	0.7879631	0.0120369	0.2	0.13432827
16	MANUFACTURE OF OTHER FOOD PRODUCTS	0.32591938	0.37408062	0.3	0.23797839
17	ALCOHOLIC BEVERAGES	0.12943953	0.57056047	0.3	0.54851203
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.37613863	0.32386137	0.3	0.34402816
19	TOBACCO MANUFACTURES	0.25135873	0.44864127	0.3	0.37960038
20	GINNING	0.10377375	0.59622625	0.3	0.13156111
21	MANUFACTURE OF TEXTILES (exc. Ginning)	0.26078565	0.43921435	0.3	0.33121192
22	MANUFACTURE OF WEARING APPAREL	0.24691498	0.45308502	0.3	0.29248587
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.090099384	0.60990062	0.3	0.36248523
24	MANUFACTURE OF FOOTWEAR	0.34076663	0.35923337	0.3	0.28778647
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	0.12691484	0.57308516	0.3	0.35547013
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.35703965	0.34296035	0.3	0.29926484
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.33184752	0.36815248	0.3	0.33090162
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.36066392	0.33933608	0.3	0.27451014
29	MANUFACTURE OF FERTILIZERS	0.42281757	0.27718243	0.3	0.25405701
30	MANUFACTURE OF DRUGS AND MEDICINES	0.23698562	0.46301438	0.3	0.42084159
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	0.27104183	0.42895817	0.3	0.3566108
32	PETROLEUM REFINERIES	0.042875658	0.65712434	0.3	0.19683886
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.26686319	0.43313681	0.3	0.28403538
34	MANUFACTURE OF RUBBER PRODUCTS	0.38694021	0.31305979	0.3	0.29552115
35	MANUFACTURE OF PLASTIC PRODUCTS	0.29295531	0.40704469	0.3	0.28672197
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.33000279	0.36999721	0.3	0.53024907
37	MANUFACTURE OF CEMENT	0.22618311	0.47381689	0.3	0.51870493
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	0.342169	0.357831	0.3	0.47591771
39	MANUFACTURE OF IRON AND STEEL	0.54124606	0.15875394	0.3	0.19633886
40	MANUFACTURE OF NON-FERROUS METAL	0.27462924	0.42537076	0.3	0.31412246
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	0.26135162	0.43864838	0.3	0.38261245
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.027228374	0.67277163	0.3	0.41119758
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.29247574	0.40752426	0.3	0.3545588
44	MANUFACTURE OF ELECTRICAL MACHINERY	0.31451299	0.38548701	0.3	0.326508
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.6008979	0.099102098	0.3	0.44558155
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.88063348	0.01936652	0.1	0.56568435
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	0.37052888	0.32947112	0.3	0.25434581
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.42867273	0.27132727	0.3	0.58519202
49	OTHER MANUFACTURING INDUSTRIES	0.22094333	0.47905667	0.3	0.20547858
50	ELECTRICITY	0.33041138	0.36958862	0.3	0.61863562
51	GAS MANUFACTURE AND WATERWORKS	0.28826754	0.41173246	0.3	0.66804548

		Labour	Capital	Land	Value added
52	BUILDING CONSTRUCTION	0.499951	0.200049	0.3	0.39556393
53	OTHER CONSTRUCTION	0.71453057	0.085469428	0.2	0.46882877
54	WHOLESALE AND RETAIL TRADE	0.21480794	0.48519206	0.3	0.78091931
55	RESTAURANTS AND HOTELS	0.33459923	0.36540077	0.3	0.44418435
56	RAILWAY TRANSPORT	0.63076945	0.069230554	0.3	0.61960739
57	OTHER LAND TRANSPORT	0.063239721	0.63676028	0.3	0.63146892
58	WATER TRANSPORT	0.26542312	0.43457688	0.3	0.564297
59	AIR TRANSPORT	0.28312124	0.41687876	0.3	0.61546318
60	COMMUNICATION	0.49478002	0.20521998	0.3	0.59832675
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.61495977	0.085040234	0.3	0.68471968
62	PERSONAL AND PROFESSIONAL SERVICES	0.18845585	0.51154415	0.3	0.53833961
63	PUBLIC SERVICES	0.96816941	0.03183059	0	1
64	OWNERSHIP OF DWELLINGS	0.011539655	0.68846035	0.3	0.82412538

Notes: The figures for labour, capital and land are proportions of value added while those for value added are proportions of gross output value.

Table VIII. *Non-traded accounting ratios for various WCF*

	(ACF = 0.62)	WCF		
		0.9	0.75	0.5
50	ELECTRICITY	1.2311557	1.1969449	1.1399269
51	GAS MANUFACTURE AND WATERWORKS	0.61915152	0.58856321	0.53758268
52	BUILDING CONSTRUCTION	3.824152	3.7819759	3.7116824
53	OTHER CONSTRUCTION	8.1759236	8.1093896	7.9984996
54	WHOLESALE AND RETAIL TRADE	1.7614197	1.6911732	1.5740957
55	RESTAURANTS AND HOTELS	1.7550111	1.7231309	1.6699972
56	RAILWAY TRANSPORT	0.87916372	0.81935843	0.71968295
57	OTHER LAND TRANSPORT	2.1436351	2.1262722	2.097334
58	WATER TRANSPORT	1.0669582	1.0392789	0.9931466
59	AIR TRANSPORT	1.437374	1.4056072	1.3526624
60	COMMUNICATION	0.64446443	0.59837855	0.52156877
61	FINANCIAL INSTITUTIONS AND INSURANCE	0.86298007	0.78670325	0.6595752
62	PERSONAL AND PROFESSIONAL SERVICES	1.1076982	1.0833943	1.0428877
63	PUBLIC SERVICES	0.89119698	0.74597156	0.50392921
64	OWNERSHIP OF DWELLINGS	0.72519698	0.72178154	0.71608915

Table IX. *Social profitability for various values of WCF*

	(ACF=0.62)	WCF		
		0.9	0.75	0.5
1	AGRICULTURE	-1.2312465	-1.2022537	-1.1539324
2	ANIMAL HUSBANDRY	-0.004742088	0.006892136	0.026299079
3	FORESTRY	0.26774885	0.29786595	0.34807587
4	FISHERIES	0.32812817	0.34141199	0.36355168
5	COAL MINING	0.23830994	0.31942683	0.4546453
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.44763032	0.45364076	0.46365883
7	IRON ORE MINING	0.47083855	0.53108577	0.63149889
8	NON-FERROUS ORE MINING	0.45938961	0.50030092	0.56848645
9	NON-METALLIC MINERAL MINING	0.33228646	0.36157301	0.41038394
10	STONE QUARRYING	0.39636543	0.40711348	0.4250276
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.66856074	0.6774695	0.69232069
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.70004763	0.71116618	0.7296971
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.39622998	0.40823533	0.42824919
14	GRAIN MILL PRODUCTS	0.7029055	0.71293639	0.72965888
15	SUGAR	0.73678326	0.75558983	0.78696506
16	MANUFACTURE OF OTHER FOOD PRODUCTS	-0.27896516	-0.26378869	-0.23849457
17	ALCOHOLIC BEVERAGES	0.50597031	0.51686364	0.53501919
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.57408127	0.59387562	0.62686619
19	TOBACCO MANUFACTURES	0.23214527	0.26195629	0.31165049
20	GINNING	0.75949961	0.76329293	0.76961555
21	MANUFACTURE OF TEXTILES (exc. ginning)	-0.25423217	-0.2310695	-0.19246506
22	MANUFACTURE OF WEARING APPAREL	0.04865244	0.062720668	0.086167715
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.4389738	0.44452741	0.45378419
24	MANUFACTURE OF FOOTWEAR	0.45858324	0.47377529	0.49909537
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	-0.13006273	-0.11980421	-0.10269971
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.55163538	0.56847916	0.59655213
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.11353474	0.13794314	0.17863648
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.43352837	0.45292373	0.48525616
29	MANUFACTURE OF FERTILIZERS	0.39516428	0.41571898	0.44998679
30	MANUFACTURE OF DRUGS AND MEDICINES	0.25830824	0.27572536	0.30475669
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	-0.078526946	-0.056924771	-0.020891005
32	PETROLEUM REFINERIES	-10.668849	-10.66568	-10.660395
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.63533335	0.64932742	0.67265581
34	MANUFACTURE OF RUBBER PRODUCTS	0.086773549	0.11560261	0.16395271
35	MANUFACTURE OF PLASTIC PRODUCTS	0.41487193	0.43406224	0.46605228
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.39857728	0.42551149	0.47040184
37	MANUFACTURE OF CEMENT	0.22180423	0.24290791	0.27808072
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	-0.10265116	-0.066483218	-0.006156601
39	MANUFACTURE OF IRON AND STEEL	-2.2638074	-2.2452202	-2.214033
40	MANUFACTURE OF NON-FERROUS METAL	-0.071889735	-0.056744502	-0.031499049
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	-0.047344573	-0.023146429	0.017218538
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.21070164	0.21526917	0.22290217
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.29843187	0.32069999	0.35781852
44	MANUFACTURE OF ELECTRICAL MACHINERY	-0.20085203	-0.17853324	-0.14132433
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.49285452	0.53857128	0.61476725
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.37837871	0.4532671	0.57808109
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	-0.04252833	-0.016329132	0.027362283
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.35132521	0.39042099	0.45558111
49	OTHER MANUFACTURING INDUSTRIES	0.070016888	0.079317264	0.094821817

	(ACF=0.62)	WCF		
		0.9	0.75	0.5
50	ELECTRICITY	0	0	0
51	GAS MANUFACTURE AND WATERWORKS	0	0	0
52	BUILDING CONSTRUCTION	0	0	0
53	OTHER CONSTRUCTION	0	0	0
54	WHOLESALE AND RETAIL TRADE	0	0	0
55	RESTAURANTS AND HOTELS	0	0	0
56	RAILWAY TRANSPORT	0	0	0
57	OTHER LAND TRANSPORT	0	0	0
58	WATER TRANSPORT	0	0	0
59	AIR TRANSPORT	0	0	0
60	COMMUNICATION	0	0	0
61	FINANCIAL INSTITUTIONS AND INSURANCE	0	0	0
62	PERSONAL AND PROFESSIONAL SERVICES	0	0	0
63	PUBLIC SERVICES	0	0	0
64	OWNERSHIP OF DWELLINGS	0	0	0

Notes: (i) The social profitability is defined as the difference between the shadow value of outputs and the shadow value of inputs, as a proportion of the shadow value of output.

(ii) Sectors in bold rows are exported sectors.

Table X. *The most socially non-profitable sectors*

	(ACF=0.62)	WCF		
		0.9	0.75	0.5
32	PETROLEUM REFINERIES	-10.668849	-10.66568	-10.660395
39	MANUFACTURE OF IRON AND STEEL	-2.2638074	-2.2452202	-2.214033
1	AGRICULTURE	-1.2312465	-1.2022537	-1.1539324
16	MANUFACTURE OF OTHER FOOD PRODUCTS	-0.27896516	-0.26378869	-0.23849457
21	MANUFACTURE OF TEXTILES (exc. ginning)	-0.25423217	-0.2310695	-0.19246506
44	MANUFACTURE OF ELECTRICAL MACHINERY	-0.20085203	-0.17853324	-0.14132433
25	MANUFACTURE OF WOOD AND WOOD PRODUCTS	-0.13006273	-0.11980421	-0.10269971
38	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS	-0.10265116	-0.066483218	-0.006156601
31	MANUFACTURE OF OTHER CHEMICAL PRODUCTS	-0.078526946	-0.056924771	-0.020891005
40	MANUFACTURE OF NON-FERROUS METAL	-0.071889735	-0.056744502	-0.031499049
41	MANUFACTURE OF FABRICATED METAL PRODUCTS	-0.047344573	-0.023146429	0.017218538
47	MANUFACTURE OF LAND TRANSPORT VEHICLES AND EQUIPMENT	-0.04252833	-0.016329132	0.027362283
2	ANIMAL HUSBANDRY	-0.004742088	0.006892136	0.026299079

Table XI. *The most social profitable sectors*

	(ACF=0.62)	WCF		
		0.9	0.75	0.5
20	GINNING	0.75949961	0.76329293	0.76961555
15	SUGAR	0.73678326	0.75558983	0.78696506
14	GRAIN MILL PRODUCTS	0.7029055	0.71293639	0.72965888
12	CANNING AND PRESERVING OF FRUITS AND VEGETABLES	0.70004763	0.71116618	0.7296971
11	SLAUGHTERING, PREPARING AND PRESERVED MEAT	0.66856074	0.6774695	0.69232069
33	MANUFACTURE OF PETROLEUM AND COAL PRODUCTS	0.63533335	0.64932742	0.67265581
18	SOFT DRINKS AND CARBONATED WATER INDUSTRIES	0.57408127	0.59387562	0.62686619
26	MANUFACTURE OF WOOD FURNITURE AND FIXTURES	0.55163538	0.56847916	0.59655213
45	MANUFACTURE OF SHIPBUILDING AND REPAIRING	0.49285452	0.53857128	0.61476725
7	IRON ORE MINING	0.47083855	0.53108577	0.63149889
17	ALCOHOLIC BEVERAGES	0.50597031	0.51686364	0.53501919
8	NON-FERROUS ORE MINING	0.45938961	0.50030092	0.56848645
24	MANUFACTURE OF FOOTWEAR	0.45858324	0.47377529	0.49909537
6	CRUDE PETROLEUM AND NATURAL GAS PRODUCTION	0.44763032	0.45364076	0.46365883
46	MANUFACTURE OF RAILROAD EQUIPMENT	0.37837871	0.4532671	0.57808109
28	PRINTING, PUBLISHING AND ALLIED INDUSTRIES	0.43352837	0.45292373	0.48525616
23	MANUFACTURE OF LEATHER AND FUR PRODUCTS	0.4389738	0.44452741	0.45378419
35	MANUFACTURE OF PLASTIC PRODUCTS	0.41487193	0.43406224	0.46605228
36	MANUFACTURE OF GLASS AND GLASS PRODUCTS	0.39857728	0.42551149	0.47040184
29	MANUFACTURE OF FERTILIZERS	0.39516428	0.41571898	0.44998679
13	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	0.39622998	0.40823533	0.42824919
10	STONE QUARRYING	0.39636543	0.40711348	0.4250276
48	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	0.35132521	0.39042099	0.45558111
9	NON-METALLIC MINERAL MINING	0.33228646	0.36157301	0.41038394
4	FISHERIES	0.32812817	0.34141199	0.36355168
43	MANUFACTURE OF AGRICULTURAL MACHINERY AND EQUIPMENT	0.29843187	0.32069999	0.35781852
5	COAL MINING	0.23830994	0.31942683	0.4546453
3	FORESTRY	0.26774885	0.29786595	0.34807587
30	MANUFACTURE OF DRUGS AND MEDICINES	0.25830824	0.27572536	0.30475669
19	TOBACCO MANUFACTURES	0.23214527	0.26195629	0.31165049
37	MANUFACTURE OF CEMENT	0.22180423	0.24290791	0.27808072
42	MANUFACTURE OF MACHINERY EXCEPT ELECTRICAL	0.21070164	0.21526917	0.22290217
27	MANUFACTURE OF PAPER AND PAPER PRODUCTS	0.11353474	0.13794314	0.17863648
34	MANUFACTURE OF RUBBER PRODUCTS	0.086773549	0.11560261	0.16395271
49	OTHER MANUFACTURING INDUSTRIES	0.070016888	0.079317264	0.094821817
22	MANUFACTURE OF WEARING APPAREL	0.04865244	0.062720668	0.086167715
2	ANIMAL HUSBANDRY	-0.004742088	0.006892136	0.026299079

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