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GROWTH AND EMPLOYMENT IN MEXICO

- A Quantitative Analysis of Policies -

by

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# GROWTH AND EMPLOYMENT IN MEXICO - A QUANTITATIVE ANALYSIS OF POLICIES*



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## 1. Industrialization and Policy-induced Distortions

Mexico has sustained unusual rates of real income growth (6.4 % of average annual GDP growth between 1950 and 1970) by following an economic policy giving first priority to manufacturing industries.[1] Import substitution has been the dominating trade strategy since the late 1940s with only cautious steps to a more export oriented strategy since the mid-1960s.[2] Mexico has not been spared the wellknown problems of regional and sectoral"imbalances", a skewed personal income distribution and unemployment accompanying the industrialization of other developing countries. Beginning with the presidentship of Díaz Ordaz (1966-70) the "attenuation" of imbalances and inequities is proclaimed as a specific policy goal in plan documents, while employment creation is added to the list in the Echeverría administration.[3]

Although based on another stratum of the Mexican political economy the stepwise execution of a massive land reform has obvious complementary effects to the industrial policy.[4]

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1 L. Müller-Ohlsen, Importsubstitution und Exportdiversifizierung im Industrialisierungsprozeß Mexikos - Strategien, Ergebnisse, Perspektiven. Kieler Studie No. 129, Tübingen 1974.

2 L. Müller-Ohlsen, op.cit.; J.B. Donges and L. Müller-Ohlsen, Außenwirtschaftsstrategien und Industrialisierung in Entwicklungsländern. Kieler Studie No. 157, Tübingen 1978; B. Balassa, Policy Reform in Developing Countries. Pergamon Press, 1977, Chapter 2: Foreign Trade and Industrial Policy in Mexico, pp. 31-49.

3 L. Solís, Planes de desarrollo económico y sociales en México, México, D.F., 1975.

4 B. Fischer, Agrarwirtschaftliche Entwicklung und Agrarpolitik - Mexiko 1960-1975. Kiel Working Papers, No. 88, March 1979.

The agricultural sector absorbs much of the fast growing labor force which cannot be employed in the more capital-intensive industries under socially acceptable conditions.[1] The land reform allows for a minimum wage and a working conditions policy in urban regions without increasing the urban unemployment to a level where it would disrupt the political system. Land reform and minimum wages help to keep political stability despite the social strains created by rapid industrialization as well as population growth.

Trade policies, land reform and minimum wages have gains and costs in terms of real income, employment and equity. The same is true for alternative policies on production, factor inputs and regional distribution. The purpose of this paper is to quantify the welfare effects of the various policies, to identify the trade-offs individual policies have with respect to the different dimensions of welfare (policy goals) and to point out combinations of policies which are more efficient in attaining the goals and in avoiding trade-offs.

The policies pursued up to 1970 induced a set of distortions which may be summarized as follows:

1. Domestic and foreign rates of transformation between tradable goods differ.[2] In 1970 the nominal implicit protection of tradables varies between 17.2 % in manufacturing, 1.1 % in agriculture and -8.7 % in mining.

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[1] In 1970 the agricultural sector absorbs 39.4 % of the labour force although contributing only 11.6 % to the GDP. The main beneficiaries of the land reform, the communal land-owning entities (ejidos), account for 65.2 % of the agricultural labor force.

[2] See A. Waarts, A. Ten Kate, R.B. Wallace, La Protección Nominal en la Economía Mexicana: Su medición para 1970. Investigación Económica, Vol. XXXV (1976), No. 138, pp. 237-303.

Given a general protection for manufacturing further distortions arise from intra-industrial and from intra-agricultural differences in effective rates of protection. Concerning manufacturing differences in nominal implicit rates are more pronounced than required on account of intermediate consumption to equalize effective protection. Inside the agricultural sector cereal producers enjoy a positive protection whilst the producers of other food crops, animal products and agricultural raw materials face a negative protection. Inside manufacturing the domestic production of industrial intermediates, investment goods and consumer durables is effectively more protected than the rest.

2. Social marginal product values of labour differ between regions. Minimum wages are nondistorting insofar as differences between regions and work categories reflect differences in living costs and in the quality of labour. The distorting effect arises from fixing the general wage level above the free market level thus either causing unemployment or depressing the wage level in regions or sectors not adhering to the rules. A strict control of adherence to minimum wage legislation is - if at all - only possible in urban regions with the exception of the self-employed or of firms employing mainly family labour. Since job searchers improve their chance of obtaining a position in the "formal sector", where minimum wages and protection against dismissal apply, search unemployment or search underemployment in the urban "informal" sector occur.[1]

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[1] J.R. Harris and M.P. Todaro, Migration, Unemployment and Development: A Two Sector Analysis. The American Economic Review, Vol. 60, Menasha, Wisc. 1970, pp. 126-142.

3. Social marginal product values of labour differ between sectors in rural regions. Private costs of intersectoral migration arise out of, i.a., individual preferences for types of work and the obsoleteness of sector-specific qualifications on migration. In an industrializing economy these costs lower the opportunity costs of agricultural labour.

   The land reform policy adds to this autonomous distortion by causing private migration costs to the migrant (in terms of land and capital income foregone). Land is redistributed from large private holdings mainly to villages ("ejidos") which in turn distribute easement rights to individual members at no costs to the tiller. The ejidatario is neither allowed to sell nor to lease the land. Should he migrate, he looses all income from the land and from durable investments (irrigation, plantations). The minimum size of individual holdings in ejidos secures a total factor income above the labour income on private farms thus causing a waiting list of applicants for ejido membership. However, the minimum size is too low to allow the marginal value product of labour to be on an equal level with private farms.

4. Social marginal value products of capital differ between sectors. The industrialization policy reduces capital costs particularly to "new" and "necessary" industries by tariff exemptions for imported investment goods, profit tax exemptions, depreciation allowances, preferential access to low interest rate credits, direct investments in state enterprises, the approval of direct foreign investments. The agricultural policy reduces capital costs by public irrigation investments. Since private large farms are concentrated in the semi-arid regions suitable for irrigation, these farms benefit from water services supplied at reduced costs to the consumer more than ejidal and private small farms concentrated in the rain-fed regions.

In addition to the policy-induced distortion, the regional limits to labour mobility in a large and ethnically heterogenous country must be taken into account as an autonomous distortion. Psychic and material costs of migration between north and south seem to be prohibitive.[1] The sustained overproportional economic growth of the north raised northern rural wages on a level more than twice that of the southern rural wages. Since minimum wages are less differentiated, this also implies that rural-urban wage differentials and urban underemployment are more pronounced in the south.[2]

A further autonomous distortion arises between rural and urban areas. The unequal regional distribution of complementary private and public services causes a locational advantage of urban areas particularly for investment in manufacturing. Industrial firms can realize private gains from the local affinity to financing and commercial institutions, which are concentrated in urban centers, and from permanent contacts to central branches of public administration which are necessary to settle the manifold problems in connection with the import of foreign technology, restricted availability of foreign currency, application for preferences, etc. Such externalities distort industrial productivity levels to the disadvantage of rural areas.[3]

In cases of multiple distortions the effects of interventions on policy goals are not determined analytically. Policy proposals made in studies on trade and industrialization, agrarian policy

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[1] This conclusion is based on evidence from the 1970 population census. While there is significant migration between Mexican states with more urban or more rural structures hardly any (net-) migration is observed between the north and the south. For the definitions of north and south see Table 1.

[2] F.W. Young, D.K. Freebairn, R. Snipper, The Strucutal Context of Rural Poverty in Mexico: A Cross-State Comparison. Economic Development and Cultural Change, Vol.27 (1979), pp. 669-686.

[3] M. Bruch, Ländliche Industrialisierung, regionaler technologischer Dualismus und X-Faktoren: Eine Untersuchung am Beispiel der Verarbeitenden Industrie Mexikos. Kiel Working Papers, No. 92, July 1979.

as well as on employment and equity problems face the general reservation that a reduction in one distortion need not be welfare increasing. The reservation can only be met with a quantitative general equilibrium model. Chapter 2 characterizes the application of a Johansen-type model to Mexico, Chapter 3 reports the econometric or numerical specification.[1] The comparative-static results for agricultural and industrial policies are presented and discussed in Chapters 4 and 5, respectively, whereas Chapter 6 draws preliminary conclusions.

## 2. The Structure of the Model

The model has to be disaggregated with respect to products, sectors of production and regions in a way which enables the market distortions and the various economic policies to be analysed.

### Products

Largely diverging rates of effective protection among different product categories require a thorough disaggregation of agricultural, mining and manufacturing outputs (Table 1). Products (1) to (10) are considered as "tradables" while private services (including construction) and public services are treated as "non-tradable" or "local goods". Trade in private services is assumed to consist of distribution services embodied in foreign trade with other goods. The quantity relation between traded goods and distribution services is kept constant. Products (13)-(16) are introduced as separate categories for reasons which will be explained in connection with output supply.

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[1] The system of equations will be documented in the final study of the research project.

Regions

The purpose of the regional breakdown of the model is to account for the above described rural-urban dualism in labour and capital markets. Since according to per capita income and degree of industrialization two major industrial agglomerations are discernible (Distrito Federal and Nuevo Lêon), the Mexico economy is subdivided into two regional entities: the north and the south (see Table 1). Within each region a differentiation between rural and urban areas is introduced at the district (municipio) level. Each municipio, located either in the north-eastern or in the central part of the country (see Table 1), which in 1970 contained a town with at least 50.000 inhabitants, is classified as belonging to the northern or southern urban region, respectively.

Output Supply

Agriculture

The supply of agricultural products (1-4) cannot be described by product-specific production functions because the respective inputs for each output are not known. Instead, separable multi-output production functions with constant returns to scale on both the output and the input side are specified.[1] In these, aggregate output is a function of product quantities, aggregate input is a function of factor quantities and of total factor productivity, and aggregate output equals aggregate input. The output unit is determined by the ratios of producer's prices, the input mix by the ratios of factor prices - unless factors are allocated directly. Labour, irrigated land (including

[1] For details see G. Hasenkamp, Specification and Estimation of Multiple-Output Production Functions. Lecture Notes on Economics and Mathematical Systems, No. 12o, Berlin, Heidelberg, New York 1976.

installations) non-irrigated land and "industrial intermediates for agricultural production" (except animal feed) are considered as substitutable factors. Product-specific intermediates like animal feed, own intermediates and services enter via partial Leontief-functions. Under the separability assumption, product-specific factors like animal stocks and plantations must be treated like product-specific intermediates. The extension of the multi-output function by partial Leontief-functions, in effect, means that the producer's **prices** determining the output mix are product prices net of product-specific taxes and costs of intermediates and factor services.

Differences in topography, climate and quantity of soil require a further disaggregation of rural areas. Each of the two rural regions defined is divided into two agricultural regions (see Table 1). For the purpose of our analysis, agriculture is further broken down institutionally in each of these regions into ejidos, private small farms and private large farms. Altogether, the model contains input and output functions for 12 agricultural subsectors.

Non-agricultural Activities

Output supply of products 5-12 is determined by regional sector-specific production functions. Labour and capital are considered as substitutable factors, fixed coefficients govern the relation between intermediates and output. In manufacturing industries (6-10) production is described by CES-functions whereas Cobb-Douglas functions are applied for mining, extraction of crude oil and private services. Supply of public services equals by definition the public final consumption (i.e. wages and salaries, depreciation and consumption of intermediate inputs); the regional distribution of public services is considered to be determined politically.

Table 1 - Product Classification and Regional Differentiation

A Product Classification

| | |
|---|---|
| 1 | Plant products: cereals |
| 2 | : other food |
| 3 | : raw materials |
| 4 | Animal products |
| 5a | Crude oil and natural gas |
| 5b | Mining and petrochemicals |
| 6 | Processed food, beverages, tobacco |
| 7 | Traditional consumer goods |
| 8 | Industrial intermediates |
| 9 | Chemicals |
| 10 | Investment goods and consumer durables |
| 11 | Private services (incl. energy and construction) |
| 12 | Public services |
| 13 | Tradable capital goods |
| 14 | Industrial intermediates for agriculture |
| 15 | Tourism |
| 16 | Border industry |

B Regional Differentiation

| Regions | Agricultural subregions | Respective Mexican states |
|---|---|---|
| North | North-west | Baja California, Baja California T., Nayarit, Sinaloa, Sonora |
| | North-east | Coahuila, Chihuahua, Durango, Nuevo León, San Luis Potosí, Tamaulipas, Zacatecas |
| South | Central | Aguascalientes, D.F., Guanajuato, Hidalgo, Jalisco, México, Michoacán, Morelos, Puebla, Querétaro, Tlaxcala |
| | South | Campeche, Colima, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, Yucatán |

The Mexican input-output table[1] treats tourism and border industries as sectors without value added (i.e. without factor inputs). "Production" in value terms of these sectors, which is entirely exported, is simply the sum of sectoral outputs consumed by foreign tourists or exported under the "Border Industrialization Programm". The model copies the input-output table with respect to these goods (15, 16). In the same way "tradable capital goods" (13) and "industrial intermediates for agricultural production" (14) are simply the sum of industrial outputs which are either used for investment purposes or as intermediate inputs into agriculture. In each of these four artificial sectors the quantity mix is kept constant.

Product Demand

In the specification of macro-models for open economies, an "intra-trade" problem usually arises; even with a highly disaggregated product classification there are simultaneously imports and exports within individual product groups. Obviously, the assumption of homogeneity between domestically produced and imported goods, which is generally made in trade theory, cannot be maintained. One way of approaching the problem is to distinguish between competitive and non-competitive imports. The latter would be summed up in a separate product group so that in the remaining product groups foreign trade merely consists of net-exports or net-imports of competitive goods. The procedure is, however, characterized by a high degree of arbitrariness, it must neglect parts of the trade flows even if an appropriate product classification is chosen. Such disadvantages are not acceptable for a model designed to analyse trade policies. With the exception of cereals, domestically produced and imported goods are, therefore, regarded as imperfect substitutes.[2] The domestic consumption good is treated as a

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[1] See Chapter 3, pp. 18-19.

[2] Trade in cereals is completely determined by intervention.

CES-aggregate of imports and domestic goods.[1] An elasticity of substitution equal to or smaller than -1 means that the value share of imports in domestic consumption is constant or increases, respectively, when the ratio between import prices and domestic prices declines.

Domestic consumption is comprised of intermediate demands of firms and of the public sector, changes in inventories, capital investment and private final consumption. Given fixed technical coefficients, intermediate demand immediately follows from domestic gross output. Inventories are fixed in a constant ratio to domestic consumption since business cycles are not considered in the model. Total investment equals savings. The distribution of total investment between machinery and construction depends on the sectoral composition of total investment, since the composition of invested capital is allowed to vary among sectors of production. Private final consumption is described by regional consumption functions depending on prices and expenditures.

Market equilibrium of domestically produced tradables (except for cereals) is achieved through exports. The producer's price of these domestically produced goods is determined by the respective world market price, the exchange rate and (net-) export subsidies. Demand for exports is considered infinitely price elastic. Domestic prices of imported goods are determined by their foreign prices, the exchange rate and the implicit rate of protection. Sellers' prices of the (combined) domestic consumption goods, are calculated as weighted averages of both prices.

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[1] For details of this specification in general equilibrium models see J. de Melo, K. Dervis, S. Robinson, Planning Models and Development Policy (forthcoming), Chapter 5: Foreign Trade and Trade Policy; P. Armington, A Theory of Products Distinguished by Place of Production, Staff Papers, Vol. 16 (1969), pp. 159-178.

There can be no national market for local goods. The model contains separate commodity balances for the four regions and, hence, different regional equilibrium prices for private services. This implies different regional prices for constructions.

Factor Inputs

Labour input in the private sector of the economy except for ejidos is governed by the marginal productivity condition. The same condition applies to industrial intermediate inputs in the 12 agricultural subsectors and to capital input in the formal sector of manufacturing and private services. The use of non-irrigated land for agricultural production as well as the labour input in ejidos is determined exogenously by the land reform policy.
Furthermore, public investment in irrigation decides upon the input or irrigated land into agricultural production, private agricultural investment complementary to public investment and additionally irrigated land is taken in equal parts from uncultivated and from non-irrigated, cultivated land. Concerning mining and extraction of crude oil capital input is also considered as exogenously determined since it depends on political decisions about the intensity of exploitation of known deposits and on successful exploration of new deposits.

The Capital Market

Firms belonging to the formal sector of manufacturing and private services have access to a uniform national capital market, which keeps the intersectoral and interregional relations of interest rates - net of taxes and subsidies - constant. Differences in net interest rates reflect - among other things - differences in expected risks. In addition to interest rates, capital costs vary between sectors and regions due to differences in taxes and subsidies, in depreciation rates and in prices for buildings. Supply on the capital market is equal to

the total non-agricultural capital stock less the capital invested in mining and extraction of crude oil. The capital stock is enlarged by net investment which is the balance between private, public and foreign savings on the one hand and investment in agriculture and inventories on the other hand. The savings propensity from wage income (after taxes) is set constant while private savings from capital and profit income is assumed to vary with interest rates. Public savings are a constant share of public consumption and the share of agriculture in total public investment is considered as a political decision. Finally, foreign savings, i.e. the deficit in the trade balance, are treated as an exogenous variable.

The Labour Market

The labour market is more fragmented than the capital market. First of all, migration is allowed between rural and urban areas, but not between the north and the south.[1] Total labour supply in the north as well as in the south does not respond to wage changes (northern supply is, however, diminished by exogenous determined migration to the U.S.). The northern and the southern labour market are each divided into four segments due to the minimum wage legislation and to agrarian reform policies: ejidos, other rural sectors, formal and informal urban sectors. Labour input in ejidos and wage rates in the formal sector of urban areas are determined by the land reform and the minimum wage legislation, respectively. Open unemployment is avoided by the adjustment of the free wage rates. The distribution between "rural" and "urban underemployment" is governed by a Harris-Todaro equilibrium condition according to which urban wage rates expected by migrants have to match expected rural wages. Expected urban wages are defined as averages of minimum and informal wages weighted respectively

[1] See Chapter 1, p. 5.

with the probability of a new migrant obtaining a formal job ("employment probability") or remaining underemployed. Safeguards against dismissal of industrial and service employees limit the employment probability to the ratio between either newly created or - due to natural fluctuation - vacant jobs to the number of underemployed in the urban informal sector. The expected rural wage rate, on the other hand, is equal to the average wage in non-ejido agriculture. In this connection, it is important to note that applicants to ejidos are not required to live in the respective rural area.

The Problem of Specialization

In multi-sectoral general equilibrium models of an open economy, constant or increasing returns to scale and economy-wide markets for all factors induce a specialization of the economy on merely a few industrial manufactures. In addition, a regional disaggregation of the model might give rise to an almost complete regional specialization although this tendency is mitigated by linkages with the local sector and could further be reduced if transportation costs were accounted for. One possible solution of this problem would be to hold sectoral capital stocks constant and to limit the focus of the analysis on short term development.[1] That excludes, however, the testing of some of the more relevant hypotheses and it is questionable whether business cycle fluctuations may be neglected in such a model. Another suggestion to ignore econometric estimates and simply assume decreasing returns to scale in manufacturing is

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[1] L. Taylor, S. Black, Practical General Equilibrium Estimation of Resource Pulls under Trade Liberalization, Journal of International Economics, Vol. 4 (1974), pp. 37-58.

even more unsatisfactory.[1] Production elasticities of labour and capital are then determined by the wage share and as residuals, respectively.

In reality, even, with perfect factor markets and non-intervention of government into the sectoral or regional structure, constant or increasing returns to scale do not lead to a complete sectoral or regional specialization since the intersectoral or interregional migration of entrepreneurial families has private costs in terms of the absoluteness of sector or region-specific knowledge or capabilities and of personal preferences unfulfilled. In the model we take these costs into consideration when specifying the factor demand equations, i.e. we assume subjectively decreasing returns to scale. Unlike the de Melo model, however, the supply equations are specified according to the production function estimates. The model thus softens the sectoral and regional specialization without ignoring the observed supply relationships.

Public Budget

Budgetary implications of policy interventions (taxes and subsidies on income, factor inputs, imports and exports) are captured in the budget equation. Thus, they are interconnected with public consumption and savings. The value added share in public final consumption is held constant.

Price Index and Balance of Payments

The price index of gross domestic product at market prices serves as a numéraire in the model. Implicitly we assume monetary policy to fix the general price level without influencing other variables of the model.

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[1] J. de Melo, A Multi-Sector, Price-Endogenous Trade Model Applied to Colombia. The Johns Hopkins University, Ph.D., 1975.

In 1976 Mexico switched from fixed to flexible exchange rates. Before that date, balance of payments equilibrium was maintained by short-term fluctuations of capital imports and by quantitative restrictions on imports of manufactures. In our model balance of payments equilibrium is achieved by an endogenously determined exchange rate which adjusts imports and exports to an exogenously fixed capital import. Some of the more interesting results of the model on the trade-off between real income and industrialization depend on the balance of payments equation. In the final chapter, however, it is shown that the results will not differ crucially in the case of a fixed exchange rate with fluctuating capital imports. Only in the case of a balance of payments equilibrium kept by trade interventions the results will be basically different.

Welfare Indicators

Real income and industrialization targets are easily operationalized as gross domestic product at market prices and as share of manufacturing industries in gross domestic product at factor costs. These definitions are in general agreement with the goals in Mexican development plans.
Since population is not determined endogenously in the model, it is not necessary to compute national per capita income separately. Concerning the regional imbalances the major goal consists of lowering the income gap between the metropolitan area (the urban south) and the rural regions with particular emphasis on the poor rural south. The "success" of various policies in this respect is indicated by the relation of rural per capita income to per capita income in the urban south ("regional equity").

In describing the global goal of equalizing the Mexican income distribution we refrained from a computation of indices for the size distribution of personal income. This would require a dubious attempt to ascribe the functional incomes in individual sectors and regions to various size-classes of household income.

Furthermore, according to the political economy of the Mexican "institutional revolution" the goal of distributional equity is rather related to the relative income position of major social classes than of individuals. These social classes can be detected in the functionally, sectorally and regionally disaggregated income system of the model. They consist of the "ejidatarios", the working class in general and, as a particularly sensible group, the rural and the urban underemployed, which do not fall under the minimum wage and dismissal regulations.

This catalogue suggests that neither an artifically constructed macro-economic indicator of income distribution nor a separate employment indicator could precisely correspond to the envisaged system of economic goals. Therefore, the following four indicators are chosen to provide evidence on the progress in equity and employment:

- The increase of the ejido contribution to GDP per "ejidatario" in relation to GDP per employee (after direct taxes) ("sectoral equity").
- The increase of the wage share in GDP net of factor incomes in ejidos and in public services ("functional equity").
- The reduction of "rural underemployment", measured as the number of the rural employed (except "ejidatarios") multiplied by the difference between the minimum wage rate and the average rural wage rate.
- The reduction of "urban underemployment", measured as the number of employed in the informal sectors multiplied by the difference between minimum wage rate and the average informal wage rate.

Given the minimum wage rate, underemployment can be reduced in two ways. Either the number of underemployed declines due to migration between economic sectors, when the unregulated wage rates do not fall, or unregulated wage rates increase when the number of underemployed does not grow.

## 3. Numerical Specification of the Model

In specifying the model empirically 1970 was chosen as base year since for this year the most complete set of data is available. Major sources of information are the census of agriculture[1] and of industries,[2] the population census[3] and the national account statistics[4] provided by the Banco de México. The description of the basic relations of the Mexican economy is based on a new input-output table with 54 sectors which has been constructed by the ministry of industry for the year 1975.[5] This matrix is prefered over the 1970 table edited by the Banco de México[6] since the latter is merely an updated version of the 1960 matrix in which changes of intersectoral linkages were not considered. To incorporate the 1975 matrix into our model each row was first deflated by the sectoral 1970-1975 price indices and secondly the matrix was aggregated to the model-classification. The technical coefficients of this aggregated table were then combined with information on sectoral

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1 Secretaría de Agricultura, Ganadería y Ejidal - Dirección General de Estadística, V Censos Agrícola - Ganadería y Ejidal, 1970, Resumen General y los tomos de los estados. México, D.F., 1975.

2 Secretaría de Industria y Comercio - Dirección General de Estadística, IX Censo Industrial 1971: Datos de 1970, México, D.F., 1974.

3 Secretaría de Industria y Comercio - Dirección General de Estadística, IX Censo General de Población, 1970, México, D.F., 1972.

4 Banco de México, Por Cuentas Nacionales y Acervos de ACapital, Consolidadas por Tipo de Actividad Económica, 1950-1967, México, D.F., 1969. - Banco de México - Subdirección de Investigación Económica y Bancaria, Estadísticas de la Oficina de Cuentas de Producción, 1960-1976, México, D.F.,1977.

5 Secretaría de Patrimonio y Fomento Industrial - Dirección General de Política e Inversiones Industriales, La estructura de la oferta y la demanda en México, 1975 - Matrices de Relaciones Intersectoriales, México 1978.

6 Banco de México - Subdirección de Investigación Económica, Estimación del Cuadro Insumo-Producto para 1970 - Utilizando el Metodo RAS (Versión preliminar), México, no date.

gross outputs and other national account data to construct an input-output table for 1970. The final matrix presented in Table A3 is a matrix of total transactions including imported inputs.[1]

Output supply and factor demand in the agricultural sector are derived from multi-output production functions which are specified for three farm categories in each of the four agricultural regions. On the input side, transcendental logarithmic production functions are used to estimate substitution elasticities among the above mentioned agricultural inputs in a cross-section approach. The respective data are taken from the fifth Mexican agricultural census. Since separate estimates for farm categories and regions turned out to be statistically unsatisfactory, regional elasticities of substitution are calculated based on farm data aggregated to the municipio (district) level. This implies identical elasticities among farm categories.
The regression results basically confirm a unitary elasticity among traditional farm inputs and prove that industrial intermediates for agricultural production have also to be treated as a substitutional farm input.[2] For this reason, industrial intermediates are included as an additional factor of production in Cobb-Douglas functions which are used to estimate production elasticities for the different farm categories and regions. These elasticities are presented in Table A4.

Concerning output supply, direct transformation elasticities between the four agricultural product groups had to be estimated on a nation-wide level since more disaggregated time series of producer's prices and marketed quantities are not

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[1] Appropriate trade data are published together with the input-output table.

[2] For details see B. Fischer, Faktorsubstitution in Mexikos Landwirtschaft, Empirische Evidenz und agrarpolitische Implikationen, Kiel Working Papers, No. 85, February 1979.

available. Respective information on the product level which cover the periods 1950-1975 (agricultural products)[1] and 1960-1976 (animal products)[2] was, however, sufficient to compute Fisher price and quantity indices for the four model categories. These data are fitted in a CES-function employing a three stage estimation procedure[3] to derive the elasticities of transformation. As expected, the estimated elasticity are relatively high between "cereals" and "other agricultural food" (-0.486) while it amounts to -0.305 and -0.279 respectively for agricultural food and agricultural industrial commodities on the one hand and agricultural products and animal products on the other hand. It should be stressed that, although these elasticities of transformation are implemented for all subcategories, quantity responses to a price change still differ among farm sizes and regions due to a varying composition of output supply.

The parameters of the linear homogeneous CES-functions which describe industrial output supply [(6)-(10)] were estimated separately for the northern and the southern region, based on information at the municipio -level from the 1970 industrial census. Within each region the urban differentiation was made upon the criterion whether a municipio is located either in the north-eastern (Coahuila, Chihuahua, Durango, Nuevo León, San Luis Potosí, Tamaulipas, Zacatecas) or in the central part (Aguascalientes, D.F., Guanajuato, Hidalgo, Jalisco, México, Michoacán, Morelos, Puebla, Querétaro, Tlaxcala) of the country and whether the municipio contains a town with more than 50.000

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[1] Nacional Financiera, S.A., Statistics on the Mexican Economy. México, D.F., 1977.

[2] Banco de México, S.A., Estadísticas de la Oficina de Cuentas de Producción, 1960-1976, op. cit.

[3] A detailed description of the methods applied is given in B. Fischer, Schätzung direkter Transformationselastizitäten für die mexikanische Landwirtschaft, March 1976 (mimeo, 8 p.).

inhabitants in 1970. Concerning the elasticities of substitution between labour and capital a modified ACMS approach[1] is applied which relates value added per worker to total wages and total labour input. Census wages were adjusted for a hypothetical entrepreneurial income and for incomes of family helpers who are included in the published employment figures.[2] Elasticities of production are computed by the (adjusted) factor shares in value added, which is justified under the postulated assumption of constant return to scale. The respective parameters are shown in Table A5; they confirm a considerable variation of production characteristics among sectors and regions in Mexico which was already demonstrated in a more detailed study of Mexico manufacturing industries.[3]

Private final demand was specified in a "complete" system of all expenditure and price elasticities which fulfills the Engel aggregation as well as the homogeneity and symmetry conditions. Under the separability assumption such a system can be computed according to the Frisch method[4] once the Engel elasticities, the budget shares and a special parameter, the money flexibility are known.[5] Based on information from the latest available (but incomplete) household expenditure survey

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1 For details see M. Bruch, op.cit., pp. 26sqq. (ACMS is used as an abbreviation for Arrow, Chenery, Minhas and Solow).

2 For details see U. Hiemenz, Zur Schätzung von Produktionsfunktionsparametern für die Verarbeitende Industrie Mexikos, December 1978 (mimeo, 7 p.).

3 See M. Bruch, ibid.

4 R. Frisch, A Complete Scheme for Computing All Direct and Cross Price Elasticities of Demand from Budgetary Data. Econometrica, 27 (1959), pp. 177sqq.

5 A discussion of this approach for countries where no or incomplete price statistics are available see H. Reisen, Ein komplettes Nachfragesystem des Nahrungsmittelverbrauchs für Indien, Kenia, Malaysia und Mexiko. Kiel Working Papers, No. 75, August 1978.

for 1970[1] in a first step Engel elasticities were estimated employing cross-section regressions over the Mexican states. For this purpose data were fitted in five functional forms, which are commonly applied in demand analysis, and the parameter of the best functional specification was chosen. The respective elasticity for cereals (1) was calculated as residual from the Engel aggregation.
The survey provides data in a product disaggregation which could be brought in line with the model structure. With respect to regions, however, only a general rural-urban differentiation was feasible to account for structural differences in consumer behaviour.[2] In a second step the value of money flexibility was determined by a method suggested by Lluch, Powell and Williams[3], so that with Frisch's formula all own and cross price elasticities for the non-food items could be computed. Since for foodstuff [(1)-(3), (6)] the separability assumption seemed to be too restrictive cross price elasticities between these products are assumed to be zero. In these cases the homogeneity condition is observed by adjusting the corresponding own price elasticities. The final system of all Engel and Cournot elasticities for the urban and the rural region is shown in Tables A6 and A7.

Finally, the initial (1970) distribution of factor inputs and value added between sectors of production and regions had to be determined. For this purpose information was drawn from the already cited census and national account statistics as well as

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1 Secretaría de Industria y de Comercio - Dirección General de Estadística, Ingresos y Egresos de las Familias en la República Mexicana 1969-70. Tomo III-V, México, D.F., 1971.

2 For further details on quality and scope of data as well as on the method applied see B. Fischer/U. Hiemenz, Schätzung eines "kompletten" Systems der privaten Konsumgüternachfrage für Mexiko, February 1979 (mimeo, 13 p.).

3 C. Lluch, A. Powell, R.A. Williams, Patterns in Household Demand and Saving, A World Bank Research Publication. Washington, D.C., 1977.

from a World Bank country report on Mexico.[1]
Since the different census provide strongly contradictory evidence with respect to employment and since census outputs do not match national account data, we had to resort to approximations. Most difficult was, of course, to obtain the sectoral and regional distribution of capital stock at current prices required by the model, because there are no consistent capital stock data for the Mexican economy since 1967. Therefore, a total capital stock at current prices was estimated for 1970 based on respective capital stock data of the early sixties, investment goods price indices (both provided by national account statistics) and total net investment figures from the World Bank report. This total stock is distributed among sectors and regions in accordance with the pattern emerging from the census. The public capital stock (12) was derived from public investment in 1970 assuming the observed ratio between investment and capital stock of the sixties persisted. The respective value for private services (11) can then be computed as residual.

Sectoral employment is given by the Population Census; the respective regional allocation and the allocation between farm sizes followed again the pattern shown by the agricultural and industrial census. Regional service sector and public employment, however, is directly calculated from the Population Census making some adjustments concerning the rural-urban differentiation. In a similar fashion, we computed the regional value added for each model category. National account statistics supplied the basic data.

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[1] IBRD, The Economy of Mexico - A Basic Report (In Six Volumes), Vol. V: Statistical Appendix, Washington, D.C., 1973.

As a yardstick for the existence of urban informal employment in manufacturing industries we used productivity differences between census data on the one hand and our estimated output and employment figures on the other hand. Such differences are prominent in traditional consumer goods (7) and investment goods industries (10). In these cases, employment and output (as shown in the Industry Census) as well as the respective capital stock are classified as the formal sector. Informal urban employment in private services (11) stems from income statistics contained in the Population Census. All persons in this sector obtaining an income clearly below the official minimum wage are considered to be informally employed.

## 4. Agricultural Policy

The Mexican agricultural policy, in a much simplified manner, may be said to pursue two distinct, and possibly conflicting, lines. The first line would be to maximize the agricultural "contribution" to the general growth and industrialization strategy in the way of

- providing agricultural intermediates at low prices to manufacturing industries thus allowing for high net producers prices in the branches affected (food processing, traditional consumption goods, chemical industries)
- providing unprocessed food at law prices to private consumers thus keeping down the cost of living index of the working population and attenuating the pressure for minimum wage increases which would impair industrial employment
- nevertheless raising agricultural exports to allow for imports of non-competitive raw materials and investment goods.

The conflict between low prices for domestic consumers and high export targets is resolved not by consumption subsidies but by direct interventions on the input side, i.e. by providing irrigation, modern inputs and technological innovations at reduced costs to the producer ("agricultural development policy"). The exception to the first line would be a high price policy for cereals intended to (a) reach self-sufficiency in food and (b) provide a stimulus for farmers to adopt new technologies in cereals production ("Green Revolution") more quickly.

The second line of policy would be to keep political stability among the rural masses in the way of redistributing land from large private holdings to ejidos as well as to settle small farmers on redistributed or newly opened land.

A policy of land reform and settlement can always be resolved with a growth policy by referring to the unknown welfare losses resulting from decisions made under conditions of political instability. Nevertheless, it is of interest to know if, abstracting from the problem of political stability, the redistribution of land affects agricultural value added, social product and industrialization negatively or positively.

Tables 2-4 report the comparative-static solutions for the welfare indicators per unit of price or quantity intervention into agricultural product and input markets and into the allocation of land between ejidos and private large and small holdings. The solutions for strategic variables in the causal chain between intervention and welfare-effects are reported in the extension of the tables and in the Appendix Table A1.

## 4.1 Agricultural Product Markets

In the framework of the standard static two sector model of the open economy reducing the domestic output price ratio between agricultural and industrial goods will increase the industrial share in social product, labour force and capital stock. Despite of the instrumental distortion, industrialization will increase the social product on account of (a) a labour market distortion causing a gap between social marginal products and (b) different sectoral capital intensities causing a reduction in the income share of the factor with a low marginal savings propensity. These effects are not assured when the existence of urban unemployment or informal employment and of non-traded goods are taken into account. The undetermined social product effect has been repeatedly shown in the literature following Harris-Todaro: increasing the urban formal employment opportunities will increase unemployment and underemployment via an overproportional rural-urban migration and may well erode the social product gain of industrialization. The change in the domestic price ratio of traded goods will, in the case of a positive effect on the trade balance, a constant capital inflow and a flexible nominal exchange rate lead to a currency appreciation thus relatively increasing the price of non-traded goods. Even in the case of a fixed nominal exchange rate, which is not considered here, the inflationary pressure would lead to a relative price increase for non-tradables. The domestic price ratio between tradables and non-tradables has the character of a real exchange rate.[1] The industrial share, then, is only assured to grow relative to the agricultural share but not necessarily in absolute terms.

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[1] See M. Bruno, The Two-Sector Open Economy and the Real Exchange Rate. The American Economic Review, Vol. 66 (1976), pp. 566-577.

The product policy may intervene in foreign trade or in domestic production (Table 2). We consider the respective interventions for non-cereals. With regard to cereals, we only consider a change in the guaranteed price as cereals are not exported and import licences are adjusted to allow product market equilibrium at the fixed price.

Policy interventions into the import and the export of non-cereals must be considered separately as imported and domestically produced goods in each of the three product groups (other food crops, raw materials and animal products) are regarded as imperfect substitutes. While an export subsidy, tax reduction or an easing of a quantitative restraint will directly increase the domestic producer's price, an import tariff or quantity restriction will not. The import intervention will only raise the domestic consumption price according to the import share in the composite consumption good. Producer's net price ratios and, thus, factor allocation will only be affected via the intermediate use of the protected good and via a change in the relative price of non-traded goods.

An export intervention, therefore, will have more dramatic as well as other effects than an import intervention. The distinction between an import and an export intervention vanishes in the case of cereals where imported and domestically produced goods are regarded as homogeneous. We take up import intervention - a one percent increase in the import price of all non-cereals by an appropriate quantity restriction - first, then turn to export intervention - one percent increase in the exporter's price by a reduction in the export tax of one absolute percentage point -, go on to a one percent increase in the guaranteed price for cereals and finally consider a production intervention - a one percent production subsidy for non-cereals.

Table 2 - Comparative-Static Model Solutions: Agricultural Trade and Production Policies

| Policy | Welfare Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Real Income | Industri-alization | Underemployment | | Equity | | | | |
| | | | rural | urban | Functional | Regional | | Sectoral | |
| | | | | | Labour Share | Rural North | Rural South | Ejido North | Ejido South |
| (1) Increasing the protection against non-cereal agricultural imports | -0.0336 | 0.0300 | 0.0662 | 0.0388 | 0.0121 | -0.0194 | -0.0238 | 0.0362 | 0.0333 |
| (2) Reducing the tax on non-cereal agricultural exports | -0.1682 | -0.5176 | -0.1148 | -0.8271 | 0.4493 | -0.1148 | -0.8271 | 1.1904 | 1.0409 |
| (3) Increasing the guaranteed prices for cereals | -0.0391 | 0.0233 | 0.1382 | -0.0122 | 0.0063 | 0.0123 | -0.0157 | 0.3077 | 0.4172 |
| (4) Increasing the subsidy for non-cereal agricultural production | -0.1432 | -0.5332 | -0.3515 | -1.1260 | 0.4370 | 0.0295 | -0.1889 | 0.4494 | 0.8777 |

| | Other Dependent Variables | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Employment | | | | | | Wage Rates | | | | Exchange Rate | Total Export | Agricultural Share in GDP | Non-agricultural Capital Stock | Interest Rate |
| | Rural North | Rural South | Formal North | Formal South | Informal North | Informal South | Rural North | Rural South | Informal North | Informal South | | | | | |
| (1) | -0.0027 | -0.0044 | -0.0007 | -0.0004 | 0.0314 | 0.0378 | -0.0216 | -0.0624 | -0.0046 | -0.0056 | 0.0025 | 0.0059 | -0.0623 | 0.0057 | 0.0025 |
| (2) | 0.0090 | 0.0209 | 0.0325 | 0.0285 | -0.2174 | -0.2667 | 0.1706 | 0.2150 | 0.0535 | 0.0597 | 0.0014 | -0.0660 | -0.1834 | -0.0239 | 0.0014 |
| (3) | 0.1340 | 0.1850 | -0.1140 | -0.1040 | -1.0090 | -1.1750 | 0.5960 | 1.5930 | 0.0790 | 0.1150 | -0.1250 | 0.1310 | 2.5710 | -0.0116 | -0.0125 |
| (4) | -0.0004 | 0.0069 | 0.0293 | 0.0316 | -0.1802 | -0.1612 | -0.2355 | 0.1339 | 0.0401 | 0.0434 | 0.0070 | -0.0527 | -0.3142 | -0.0158 | 0.0156 |

Non-cereal Imports

Among non-cereals other food crops are the only product group to have a high import share in domestic consumption. The immediate effects of a rising import price, then, are a substitution of domestically produced for imported food crops in consumption and a depression of net prices in food processing. Both effects result in a sharp decline of (unprocessed and processed) food exports requiring a currency devaluation in order to maintain the balance of payments equilibrium. The rise in all traded goods prices compensates for the negative net price effect in all trading sectors using non-cereals as intermediates. Non-traded good producers, however, experience a negative net price as both the own price declines and the prices of agricultural and industrial intermediates go up. Labour demand in food processing and in services is reduced and not fully compensated for by the increasing demand of other manufacturing sectors. In consequence, total formal sector employment is affected negatively and the labour set free is absorbed by the agricultural and the informal sectors at falling wage rates.

The different welfare effects follow easily. An increase in agricultural employment - given a widening gap between the rural wage rate and the constant formal minimum wage rate - leads to a welfare loss in terms of social product foregone. Increasing the prices of traded goods, however, will increase the GDP share of both agriculture and manufacturing, thus aiding industrialization. The employment effects are negative, since both rural and urban informal employment grow and wage rates fall. The effect on functional equity is positive, with labour's share in total factor income increasing due to the reallocation of labour to the labour-intensive agricultural and informal sectors. Regional equity effects are negative since without an inflow of capital into agriculture increasing rural employment reduces the relative per capita income in

both rural regions. Finally, institutional regulations shelter ejidos against inmigration of labour. Per capita income on ejidos, therefore, is not affected in absolute terms but rises relative to the overall per capita income.

Non-cereal Exports

The reduction of export taxes, by raising net prices to agricultural producers, pushes up the labour demand of agricultural sectors and increases rural wage rates. By raising the domestic consumption prices it lowers the net prices of industrial producers, particularly in food processing and to a smaller extent in traditional consumer goods and chemicals. The dramatic increase in agricultural exports is not fully compensated for by reductions in manufactured exports. The slight revaluation adds to the negative net price effects in manufacturing industries and attenuates the effects in agriculture and services.

With diminishing labour demand at constant minimum wages in the urban regions and increasing labour demand in the agricultural sectors at increasing wage rates, labour is flowing back to the rural regions. With formal employment opportunities worsening and rural wages increasing, urban informal employment looses attraction as well. Finally, urban-to-rural migration and the allocation of labour from manufacturing to agricultural sectors reduces private as well as intermediate consumption demand for local goods in urban regions while increasing it in rural areas. A falling services price in urban areas further reduces urban employment. On the other hand, it prevents a movement of manufacturing industries into rural locations. In combination with a rising rural and a constant urban minimum wage rate, manufacturing industries even move into the urban regions, thus increasing the regional specialization as a result of increasing agricultural prices.

Following this interpretation of the changes in certain strategic variables, the welfare effects of agricultural export subsidies can be understood. The reallocation of labour from high- to low-productivity sectors, i.e. from manufacturing industries to agricultural sectors, reduces total GDP as well as the industrial share in GDP. Furthermore, as agricultural sectors are more labour-intensive, the labour share in national income is increasing thus reducing the availability of capital and adding to the reduction of GDP. With ejido-membership fixed institutionally, the price increase directly carries over to per capita income of ejidatarios. The marked increase in rural wage rates suffices to reduce rural underemployment despite an inflow of migrants into the rural-north and the rural-south. The main employment effect, however, occurs in the urban regions where the outmigration of the informally employed markedly reduces underemployment. The effect on regional equity is negative for the rural-south as the locational specialization of manufacturing industries deprives it of the most capital-intensive sectors. In the rural-north, agriculture is both more land- and capital-intensive. Here, specialization will not fully erode the regional gains resulting from higher agricultural product prices.

Cereals

An increase in the guaranteed price of cereals affects producers as well as consumers. Intuitively, therefore, one would expect welfare effects similar to those of a reduction of export taxes for non-cereals. The results shown in Table 1, however, are strikingly different. Structural differences on the supply and on the demand side of the product markets provide the explanation. Ejidos account for 55 % of total value product in cereals against 35 % in non-cereals. Since

ejidos can only apply additional industrial inputs but not more labour, the price hike leads only to a modest increase in total volume of agricultural production as well as in total agricultural labour demand. On the demand side, the absolute ownprice elasticities of private consumption demand are extremely different (see Tables A6 and A7). Unlike non-cereals, the cereals price change has only negligeable effects on the volume of private consumption. The reduction in cereal imports, then, is not sufficient to compensate for reduced exports of processed food, the balance of payments equilibrium requires a depreciation. With traded goods prices rising the negative impact of rising agricultural prices on manufacturing is compensated and the negative impact on social product is much reduced. Labour set free in the urban services sectors finds rural employment at reduced wage rates only thus increasing rural underemployment. The main trade-off, then, of a cereals price policy is between the per capita income on ejidos and the factor income of the rural labour force outside the ejidos.

Production

Combining the reduction of export taxes and consumption taxes for domestically produced goods amounts to a production subsidy for domestic producers. Unlike the pure export intervention, the production subsidy neither causes a restructuring in manufacturing at the expense of the labour-intensive food processing sector nor a substitution between imported and domestically produced non-cereals. The additional agricultural production, however, promotes agricultural exports without impairing food processing exports, thus requiring a more pronounced revaluation which harms all trading sectors alike but assists services. Total labour demand, then, is increasing more markedly and raises rural as well as informal wage rates more strongly than in the case of export subsidies. With rural demand for services

increasing due to rural inmigration and expansion of agricultural production, the rural-north witnesses a distinct rise in services prices. In the rural-south the effect is compensated for by the outmigration of manufacturing industries in reaction to the rising rural-to-urban formal wage ratio.

## A Comparison of Product Market Policies

A comparison of agricultural trade and production policies under the perspective of contributions to income growth and industrialization manifests a striking difference. In the cases of export and of production intervention the main line of argumentation used in the standard two sector models also holds in the complex quantitative model. Lowering agricultural prices aides in industrialization, reduces the labour share and increases total income. Furthermore, the results show that society not only has to pay a price in terms of functional equity, but also rural and particularly urban underemployment increase, and the per capita income of ejidatarios declines sharply. The only positive effect is in the regional equity of the rural-south as this region attracts manufacturing industries due to falling wage rates.

The effects of lowering prices on the import side or by reducing the guaranteed price level of cereals are more complex as the balance of payments effect turns in favour of non-traded goods. The expansion of services fully erodes the industrialization effect and leaves only a small gain in social product. The two cases show that these unexpected effects can occur for different reasons. In the case of reducing domestic prices by import interventions the domestic producers turn to the export market, in the case of reducing the cereals price an inelastic factor demand of the main supplier as well as an inelastic private consumption demand restrain the import reaction.

## 4.2 Agricultural Input Markets

The sectoral development aspect of agricultural policy is manifested on the input side (Table 3). The supply of irrigation services, of modern inputs, and of research and extension services to develop and to speed up the diffusion of new technologies are the most notable fields of government and, partly, foreign donors activities. Since irrigation services, for reasons noted earlier, have been distributed unevenly between ejidos, small and large private farms, we consider separately the effects of a one percent increase in the public irrigation investment for each type of holding. Public irrigation investments directly reduce public additions to the general capital stock available to manufacturing and services sectors. Data limitations do not allow the separate modelling of the various policies designed to promote the use of modern inputs in agricultural production. These policies - ranging from public investments into distribution channels to input specific credit programs - have the common property of lowering the input price to the agricultural producer. We, therefore, consider the effects of a hypothetical one percent consumption subsidy on the composite good "industrial intermediates for agriculture". The effects of research and extension services are even more difficult to model as information on the relation between additional agricultural production due to technological progress and the costs of generating and disseminating progress is not available. We make use here of a guesstimate that costs amount to about one-third of the agricultural production increase.[1] We consider the effects of a one percent increase in total agricultural productivity accomplished by additional public services financed out of a consumption tax on non-cereals.

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[1] T. Arndt, D. Darymple, V. Ruttan (eds.), Resource Allocation and Productivity, Minneapolis, 1977.

Table 3 - Comparative-Static Model Solutions: Agricultural Development Policies

| Policy | Welfare Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Real Income | Industrialization | Underemployment | | Equity | | | | |
| | | | rural | urban | Functional | Regional | | Sectoral | |
| | | | | | Labour Share | Rural North | Rural South | Ejido North | Ejido South |
| Increasing irrigation investments on | | | | | | | | | |
| (5) ejidos | -0.0051 | -0.0199 | 0.0370 | -0.0009 | -0.0073 | 0.0122 | 0.0174 | 0.0999 | 0.1046 |
| (6) small private farms | -0.0133 | -0.0175 | -0.0128 | -0.0099 | 0.0218 | -0.0064 | -0.0097 | 0.0103 | 0.0099 |
| (7) large private farms | -0.0066 | -0.0525 | 0.0243 | -0.0718 | 0.0196 | 0.0026 | -0.0040 | -0.0012 | 0.0001 |
| (8) Shifting irrigation investments from large private farms to ejidos | -0.0014 | 0.0318 | 0.0131 | 0.0698 | -0.0266 | 0.0096 | 0.0213 | 0.1011 | 0.1045 |
| (9) Increasing the consumption subsidy for industrial intermediates in agricultural production | 0.0317 | -0.1271 | -0.0653 | -0.2134 | 0.0359 | 0.0270 | -0.0309 | 0.1593 | 0.1366 |
| (10) Increasing the total factor productivity in agricultural production | 0.1633 | -0.2163 | -0.4597 | -0.6242 | 0.1889 | 0.2128 | 0.1065 | 0.8481 | 0.7318 |

| | Other Dependent Variables | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Employment | | | | | | Wage Rates | | | | Exchange Rate | Total Export | Agricultural Share in GDP | Non-agricultural Capital Stock | Interest Rate |
| | Rural North | Rural South | Formal North | Formal South | Informal North | Informal South | Rural North | Rural South | Informal North | Informal South | | | | | |
| (5) | 0.0068 | 0.0074 | -0.0182 | -0.0177 | -0.0046 | -0.0015 | -0.0093 | -0.0077 | -0.0031 | -0.0030 | -0.0015 | -0.0081 | 0.0540 | -0.0169 | 0.0121 |
| (6) | 0.0062 | 0.0073 | -0.0149 | -0.0149 | -0.0108 | -0.0099 | 0.0028 | 0.0295 | -0.0007 | -0.0006 | -0.0015 | -0.0108 | 0.0519 | -0.0010 | 0.0089 |
| (7) | 0.0137 | 0.0173 | -0.0223 | -0.0215 | -0.0634 | -0.0702 | 0.0277 | 0.0122 | 0.0058 | 0.0078 | -0.0047 | -0.0157 | 0.1244 | -0.0196 | 0.0004 |
| (8) | -0.0067 | -0.0096 | 0.0038 | 0.0035 | 0.0579 | 0.0677 | -0.0366 | -0.0187 | -0.0088 | -0.0107 | 0.0031 | 0.0074 | 0.0685 | 0.0024 | 0.0117 |
| (9) | 0.0189 | 0.0257 | -0.0060 | -0.0010 | -0.1800 | -0.2080 | 0.1167 | 0.0706 | 0.0214 | 0.0289 | -0.0113 | -0.0016 | 0.3112 | -0.0009 | -0.0113 |
| (10) | 0.0529 | 0.0755 | -0.0082 | 0.0078 | -0.5353 | -0.6206 | 0.4160 | 0.4189 | 0.0256 | 0.0606 | -0.0442 | 0.3515 | 1.2266 | -0.0033 | -0.2342 |

With capital and land inputs determined exogenously, the causal chain of events is basically the same for the various input policies: agricultural production increases, the currency revalues, agricultural production increases, the currency revalues, agricultural labour demand outside ejidos as well as rural services factor demand increase, manufacturing labour demand decreases although manufacturing need not decrease depending on the reaction of public savings to the specific policy. Labour migrates to rural regions where wages may or may not increase according to the relative strength of demand and supply effects. The differences in the welfare effects of various input policies, then, result from different intensities of the conflicting effects. The common negative effect on the GDP share of total manufactures needs to comment as the increasing agricultural share and the currency revaluation work in the same direction.

Irrigation

Consecutive Mexican governments have been investing heavily into irrigation programs. In 1970, roughly one third of the cropland is irrigated. The model results showing a negative social product effect for additional irrigation investments in ejidos, small and large farms alike should, therefore, not come as a surprise. The marginal productivity of investments has been declining as it became increasingly difficult to find new areas suitable for irrigation projects. Irrigation investments for ejidos will definitely increase per capita income on northern and southern ejidos, but will also increase rural underemployment because the reduction in manufacturing labour demand is not met by additional agricultural labour demand. This also prevents an increase in the labour share. The regional equity effect is positive on account of increasing agricultural per capita income. Irrigation investments on small and large private farms do increase agricultural labour demand thus avoiding a deterioration of rural wages and leading to more

positive effects in employment and in functional equity.

Comparing the investment effects for different types of holdings, the solutions show that not much can be gained by shifting irrigation investments from large private holdings to ejidos. The social product effect would be almost nil. There would be a welfare gain in terms of ejido per capita income and regional equity but this would be obtained at a welfare loss in terms of both rural and urban underemployment as well as functional equity.

## Industrial Inputs and Innovations

The use of industrial inputs in agricultural production is sensitive to changes in the own-price of inputs and in total factor productivity. This is shown by the respective model solutions for the quantity of inputs applied in the agricultural sector per unit of price subsidy ($\simeq 1.4$) and per unit of productivity increase ($\simeq 2.1$). The solutions are congruent with the empirical observation of a marked increase in the sectoral gross production share of industrial inputs in the late 1960s when the sector was successfully adopting the new technologies.

Although industrial inputs are a substitutable factor in agricultural production, the factor price subsidy increases labour demand on private farms due to an overwhelming output effect. With only a negligeable effect on formal employment, increasing rural wages attract the urban underemployed into agricultural and rural services employment. The attraction is even stronger in the case of an increase in total factor productivity, because the output effect on labour demand is not weakened by a factor substitution effect. Both input subsidy and the promotion of agricultural productivity, then, are the only interventions so far considered combining positive employment effects in rural and urban regions with a gain in social product.

The positive effects of both measures on sectoral and functional equity need no comment. The positive regional equity effect arising from increasing income in agricultural and rural services sectors is, again, compensated by the out-migration of manufacturing industries from the rural-south due to the relatively increasing rural wage-rental ratio.

## 4.3 Land Reform and Settlement

The ongoing redistribution of land to ejidos and private small holdings is usually given a considerable amount of credit in maintaining the political stability in the face of social strains caused by rapid industrialization and rapid population growth. The contribution of the land reform to agricultural production and to social product, however, is disputed. T. Schultz[1], for example, briskly states: "... they (the ejidos) have not done well. But many farms outside the ejidos have done exceedingly well." F. Dovring[2], on the other hand, claims that ejidos as well as private small farms combine factors more in accordance with the scarcity relations of the country than land and capital-intensive private large farms do. Dovring also attributes positive employment and equity effects to the ejido-system. Both views need not be conflicting as a poor performance in agricultural production may under distortions be compensated by other effects to allow for positive social product, employment and equity effects.

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[1] T. Schultz, Transforming Traditional Agriculture, New Haven and London, 1964, p. 20.

[2] F. Dovring, Land Reform in Mexico. AID Spring Review of Land Reform, 1970, 2nd. ed., Vol. VII, Washington, D.C., 1970, pp. 35sqq.

We consider the effects of a redistribution of non-irrigated cultivable land held by private large farms. Solutions are obtained for three interventions (Table 4): a one percent increase in ejido land at a constant ejido-membership (the case of "closed ejidos"), a one percent increase in ejido land at a constant man-land ratio on ejidos (the case of "new ejidos"), a one percent increase in land on private small holdings with no conditions attached to employment on these holdings (the case of "settlement"). We do not consider the settlement on newly opened land as no information is available on the costs of land reclamation. We also consider a land reform package combining the distribution of land and irrigation investments to ejidos.

## The Case of Closed Ejidos

The redistribution of land to closed ejidos, naturally, raises the per capita income of ejidatarios. It must reduce the total agricultural labour force as the labour set free by large farms cannot enter the ejidos but is absorbed at falling wage rates in the other rural sectors and, to a small extent, in urban informal employment. Since ejidal farms use industrial inputs less intensively than private farms the land redistribution reduces total agricultural consumption of industrial inputs. With labour and industrial intermediate inputs reduced total agricultural value added is affected negatively.

The negative effect on the agricultural contribution to the social product is compensated by positive effects. The redistribution closes the gap between the marginal products of labour in ejidos and in private farming caused by the communal ownership. It further increases the labour supply to non-agricultural sectors where the marginal product of labour is higher, reflecting private costs of intersectoral migration.

Table 4 - Comparative-Static Model Solutions: Land Reform Policies

| Policy | Welfare Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Real Income | Industrialization | Underemployment | | Equity | | | | |
| | | | rural | urban | Functional | Regional | | Sectoral | |
| | | | | | Labour Share | Rural North | Rural South | Ejido North | Ejido South |
| Redistributing non-irrigated land from large private holdings to | | | | | | | | | |
| (11) closed ejidos | 0.0074 | 0.0213 | 0.0727 | 0.0386 | -0.0436 | 0.0056 | 0.0385 | 0.1146 | 0.2396 |
| (12) new ejidos | -0.0550 | 0.0032 | -0.9354 | -0.2804 | 0.0934 | -0.0655 | -0.1214 | -0.0856 | -0.0704 |
| (13) small private farms | -0.0620 | -0.9900 | -1.5900 | -1.1830 | 0.8840 | -0.3270 | -0.2720 | -0.1090 | -0.1180 |
| (14) Land reform package | -0.0462 | 0.0563 | -0.8496 | -0.1720 | 0.0232 | -0.0503 | -0.0616 | 0.1301 | 0.2737 |

| | Other Dependent Variables | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Employment | | | | | | Wage Rates | | | | Exchange Rate | Total Export | Agricultural Share in GDP | Non-agricultural Capital Stock | Interest Rate |
| | Rural North | Rural South | Formal North | Formal South | Informal North | Informal South | Rural North | Rural South | Informal North | Informal South | | | | | |
| (11) | 0.0067 | 0.0021 | -0.0245 | -0.0164 | 0.0192 | 0.0373 | -0.0313 | -0.0242 | -0.0201 | -0.0119 | 0.0100 | -0.4224 | 0.0554 | -0.0091 | -0.0067 |
| (12) | 0.1595 | 0.1866 | -0.2494 | -0.2086 | -0.7793 | -0.8360 | 0.3393 | 0.4991 | -0.0544 | 0.0237 | -0.0199 | 0.1430 | 2.3788 | -0.1005 | -0.0199 |
| (13) | 0.0223 | 0.0169 | -0.0538 | -0.0369 | -0.0382 | -0.0154 | -0.0150 | -0.0450 | -0.0359 | -0.0161 | 0.0090 | -0.0408 | 0.3085 | -0.0128 | -0.0130 |
| (14) | 0.1331 | 0.1801 | -0.1513 | -0.1711 | -0.8616 | -1.0151 | 0.2035 | 0.5999 | 0.0782 | 0.1143 | -0.0681 | 0.2152 | 2.0431 | -0.0768 | 0.0533 |

The other welfare effects of a distribution to closed ejidos follow easily. With labour leaving the agricultural sector, (a) additional industrial employment raises the industrial share, (b) additional employment in less labour-intensive sectors lowers labour's share in total factor income, (c) additional employment in rural industrial and services sectors has positive effects on regional equity for the rural-north and the rural-south, (d) additional rural employment at falling wage rates adds to the rural underemployment problem, (e) additional informal employment adds to the urban underemployment problem.

## The Case of New Ejidos

The distribution of land to new ejidos removes labour from the supply side of the labour market thus increasing the rural wage rates. Private agricultural employment falls more markedly than in the case of closed ejidos and so does the total use of industrial intermediates in agricultural production. The gap between marginal products of labour in ejidos and in private farming widens. Despite an increase in total agricultural employment the land reform, then, has a negative effect on total agricultural value added. In the case of new ejidos the negative effect on social product is augmented by decreasing nonagricultural employment. The reduction in labour supply changes the other welfare solutions as well: the reform reduces rural and urban underemployment and increases functional equity but has negative effects on sectoral and regional equity, while the industrialization effect is negligeable.

## The Case of Settlement

Private small farms use more labour and more industrial intermediates per unit of land than either ejidos or private large farms do. A redistribution of land from private large to private small farms will, therefore, not only increase the total

agricultural input of labour but also of intermediates. Small private farms also use resources more efficiently than ejidos: whereas the average labour productivity is, on the national average, almost equal on both types of holdings the average land productivity on small farms is nearly four times as high as on ejidos. It should not come as a surprise, then, that a distribution of land to small private instead of ejidal holdings increases total agricultural value added. With non-cereal exports increasing and cereal imports decreasing the reform requires a revaluation which in turn increases the factor demand of services sectors. As both agricultural and services labour demand increase, the free wage rates go up markedly.

Industrialization is hurt both by decreasing product prices and by increasing rural wage rates. The negative effect on social product overcompensates the additional agricultural contribution thus causing a welfare loss in terms of social product foregone. The reform has markedly positive effects both on urban and rural employment and on functional equity. Regional equity effects, however, are negative as increasing rural and constant minimum wage rates attract manufacturing industries into urban locations. Per capita income on ejidos, finally, is hurt by decreasing prices for non-cereals.

## Land Reform Package

Before comparing the results of a land reform in favour of ejidos with those of a reform in favour of small farms, it should be noted, that neither the case of new ejidos nor the case of closed ejidos is doing justice to the actual policy followed since 1953. The policy includes an element of decreasing the man-land ratio by increasing the minimum size of farms in new ejidos, it also includes irrigation investments and credit and extension programs. There is, thus, a combination of land reform and of agricultural development policy.

In order to isolate the land reform aspect, we consider the welfare effects of a package combining a land redistribution to new ejidos with a decreasing man-land ratio and with a reallocation of irrigation investments from private large farms to ejidos. The solutions can be derived as the sum of policies 8, 11 and 12.

The combined policy expectedly avoids the negative effect on ejidal per capita income arising in the case of new ejidos. The negative effect on agricultural value added is strengthened by the reallocation of investments, however, the negative social product effect is marginally attenuated by the reduced demand for agricultural labour. The trade-offs between positive employment and functional equity effects and negative industrialization and regional equity effects characteristic for the case of new ejidos also persist in the combined policy.

Comparing the solutions for a land reform package and for settlement the advantages of a policy reversal in favour of small farms become manifest. Despite a dramatic positive effect on agricultural value added the social product effect is near nil as the reversal slows down the industrialization process. The welfare gains to be achieved by the reversal consist of a further reduction of rural and urban underemployment and of increasing functional equity. The additional welfare losses caused by the reversal consist of negative effects on regional and sectoral equity.

## 5. Manufacturing Industries

As pointed out in the introductory chapter enhanced growth of industrial production was the prime objective of successive Mexican Development Plans. In the pursuit of this objective an industrial promotion policy was set up which primarily consisted of protection against foreign competitors, with particular emphasis on import protection for producers of more sophisticated, highly capital intensive manufacturing goods, and of subsidizing investment in manufacturing. To avoid socially and politically undesirable repercussions of the induced industrial absorption of available capital on the standard of living of the working class this policy was backed up by a minimum wage legislation and other interferences into the labour markets which were to improve non-wage income of the labour force. Industrial as well as social policies reinforced rather than leveled the locational disadvantages of rural areas so that both population and economic activities became more and more concentrated in the Metropolitan District of Mexico. This, in turn, induced not only the already discussed attempts to mitigate the pressure on agriculture but in recent years also a government programme for rural industrialization. In sum, the whole package of industrialization policies has distorted the relation of producers net prices (trade distortion), the relation of relative factor prices (factor market distortion) and the regional distribution of economic activities (rural-urban distortion). The impact of these distortions and of hypothetical policies, which could balance the distortions, is discussed in this chapter with respect to the welfare goals of the official Mexican development strategy.

## 5.1 The Trade Distortions

Despite some scattered export promotion measures the Mexican industrialization strategy was governed by import substitution policies throughout the sixties and the early seventies.[1] A comprehensive system of import licensing rather than tariffs protected all branches of manufacturing industry against foreign competition. This protection manifests itself in a substantial difference between domestic and world market prices which introduces a bias of incentives against industrial export production as well as against all non-manufacturing activities into the Mexican economy. Although some protection of manufacturing industry may - according to trade theory - be justified on grounds of dynamic gains from industrialization, the Mexican structure of economic incentives is considered to be distorted by providing too strong incentives to manufacturing production for domestic markets, and, within manufacturing, to the production of investment goods, consumer durables and some industrial intermediates (products 8-10). If this notion is true, welfare gains could be derived from a general reduction of import protection to manufacturing and from equalizing effective rates of protection between industrial activities. First best solutions for equalizing effective rates would either be an appropriate adjustment of the nominal implicit protection or export subsidies to the discriminated activities while production subsidies are considered as a second best solution because of the inherent budgetary repercussions.[2]

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[1] See L. Müller-Ohlsen, op.cit., pp. 17sqq. - B. Balassa, op.cit., pp. 33sqq.

[2] This evaluation is following B. Balassa, op.cit., pp.18-19. Production subsidies are also considered second best because they cause domestic rates of transformation to diverge from domestic rates of substitution. See J.N. Bhagwati, The Generalized Theory of Distortions and Welfare. In: J.N. Bhagwati, R.W. Jones, R.A. Mundell, J. Vanek (eds.), Trade, Balance of Payments and Growth, Amsterdam, London, New York, 1971, pp. 69-90.

The validity of these suggestions for the Mexican economy is demonstrated in Table 5. Solutions for strategic variables are also reported in Table A2.

## Production

The economic logic of industrial import protection rests on two arguments: the existence of a distortion in factor markets which discriminates against manufacturing, e.g. through minimum wages, and the realization of technological externalities (learning by doing and innovations) assuming that the rate of progress can be higher in manufacturing than elsewhere. Under these conditions industrial protection is supposed to increase the productivity of the economy because factors of production are withdrawn primarily from agriculture and allocated in more productive industrial activities. This favourable result is brought about by expanding demand for domestically produced goods and by an increase of domestic producers prices which happens if imported and domestic goods are sufficiently homogeneous (as assumed in our model). Conversely, producers prices of non-protected goods decrease as a result of the appreciation of the currency, which is required to maintain the trade balance, and as a result of higher prices for industrial inputs. Therefore, output of non-protected activities will contract while the protected domestic production can employ more resources and expands.

Our estimates for the Mexican economy, however, only partly confirm the above theoretical notion. In the case of each individual branch of the manufacturing industry, higher protection (i.e. a 1 p.c. increase of import prices) in fact leads to an increased share of total manufacturing in gross domestic output and reduces the respective share of agriculture. The underlying mechanism proves to be basically as described above. GDP, however, is either negatively or not at all affected, showing that highly industrial import protection is

Table 5 - Comparative-Static Model Solutions: Industrial Product Market Policies

| Policy | Welfare Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Real Income | Industri-alization | Underemployment | | Equity | | | | |
| | | | rural | urban | Functional | Regional | | Sectoral | |
| | | | | | Labour Share | Rural North | Rural South | Ejido North | Ejido South |
| Increasing the import protection of | | | | | | | | | |
| ( 1) Processed Food | -0,0007 | 0,0011 | 0,0127 | 0,0034 | -0,0065 | 0,0014 | 0,0033 | -0,0047 | -0,0047 |
| ( 2) Traditional Consumer Goods | -0,0060 | 0,0086 | 0,0137 | 0,0147 | 0,0009 | -0,0090 | -0,0076 | -0,0020 | -0,0010 |
| ( 3) Industrial Intermediates and Chemicals | -0,0257 | 0,0053 | 0,0464 | 0,0401 | -0,0016 | 0,0046 | 0,0216 | -0,0064 | -0,0033 |
| ( 4) Investment Goods and Consumer Durables | -0,0397 | 0,0453 | 0,1173 | 0,0489 | -0,0062 | -0,0207 | -0,0372 | 0,0209 | 0,0244 |
| ( 5) Industrial Manufactures | -0,0721 | 0,0603 | 0,1901 | 0,1071 | -0,0134 | -0,0237 | -0,0199 | 0,0064 | 0,0154 |
| Increasing the export subsidy to | | | | | | | | | |
| ( 6) Processed Food | 0,3364 | -0,5582 | 0,0827 | -0,4400 | -0,5104 | 0,3220 | 0,4454 | -0,7566 | -0,6806 |
| ( 7) Traditional Consumer Goods | 0,0943 | 0,2008 | -0,4873 | 0,4063 | 0,0868 | -0,2604 | -0,1530 | -0,2961 | -0,2728 |
| ( 8) Industrial Intermediates and Chemicals | -0,1288 | -0,0136 | -0,0195 | 0,3876 | 0,0287 | 0,0301 | 0,2340 | -0,1044 | -0,0880 |
| ( 9) Investment Goods and Consumer Durables | -0,0319 | 0,5102 | -0,0003 | 0,4920 | -0,0435 | -0,1554 | -0,3194 | -0,1009 | -0,0710 |
| (10) Industrial Manufactures | 0,2700 | 0,1392 | -0,4244 | 0,8459 | -0,4384 | -0,0635 | 0,2069 | -1,2580 | -1,1124 |
| Increasing the production subsidy to | | | | | | | | | |
| (11) Processed Food | 0,0185 | -0,2660 | -0,00361 | 0,2576 | -0,0655 | 0,1221 | -0,0404 | -0,1665 | -0,1368 |
| (12) Traditional Consumer Goods | 0,0124 | 0,0021 | -0,4452 | 0,2043 | 0,1618 | -0,0524 | 0,0171 | -0,1400 | -0,1320 |
| (13) Industrial Manufactures | -0,0926 | -0,0562 | -0,8742 | 0,3108 | 0,3003 | 0,1592 | 0,0769 | -0,3619 | -0,3118 |

| | Other Dependent Variables | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Employment | | | | | | Wage Rates | | | | Exchange Rate | Total Export | Agricultural Share in GDP | Non-agricultural Capital Stock | Interest Rate |
| | Rural North | Rural South | Formal North | Formal South | Informal North | Informal South | Rural North | Rural South | Informal North | Informal South | | | | | |
| ( 1) | 0,0013 | 0,0019 | -0,0042 | 0,0006 | 0,0023 | 0,0018 | -0,0046 | -0,0080 | -0,0024 | -0,0038 | -0,0047 | -0,1051 | -0,0166 | 0,0005 | 0,0013 |
| ( 2) | 0,0037 | -0,0009 | -0,0118 | -0,0034 | 0,0045 | 0,0186 | -0,0111 | -0,0066 | -0,0034 | 0,0028 | -0,0077 | -0,1531 | -0,0013 | -0,0024 | -0,0028 |
| ( 3) | -0,0100 | 0,0066 | 0,0137 | -0,0210 | 0,0555 | 0,0179 | -0,0291 | -0,0195 | -0,0125 | -0,0356 | -0,0106 | -0,1968 | -0,0288 | -0,0025 | 0,0025 |
| ( 4) | 0,0132 | 0,0053 | -0,0431 | -0,0275 | 0,0187 | 0,0483 | -0,0438 | -0,0560 | -0,0258 | -0,0155 | -0,0123 | -0,3551 | 0 | -0,0252 | -0,0480 |
| ( 5) | 0,0082 | 0,0129 | -0,0454 | -0,0513 | 0,0810 | 0,0866 | -0,0886 | -0,0901 | -0,0441 | -0,0521 | -0,0353 | -0,8101 | -0,0467 | -0,0296 | -0,0470 |
| ( 6) | 0,0523 | 0,1583 | -0,0770 | -0,2283 | -0,2734 | -0,5371 | 0,1375 | -0,1437 | 0,0675 | -0,1185 | -0,4771 | -0,5086 | -1,3522 | 0,1294 | 0,1471 |
| ( 7) | -0,0249 | -0,2025 | 0,0172 | 0,3041 | 0,2019 | 0,6468 | -0,1009 | 0,1034 | 0,1481 | 0,3607 | -0,2174 | -0,1807 | -0,4128 | -0,0046 | -0,0240 |
| ( 8) | -0,1921 | -0,0429 | 0,3877 | 0,0481 | 0,6136 | 0,2133 | -0,1450 | -0,0216 | 0,0206 | -0,2376 | -0,1751 | -0,0174 | -0,1036 | 0,0357 | 0,1354 |
| ( 9) | -0,1460 | -0,2242 | 0,3057 | 0,3799 | 0,4260 | 0,5712 | -0,0742 | -0,2834 | 0,0337 | 0,1222 | -0,1350 | 0,8137 | -0,6858 | 0,0124 | 0,0471 |
| (10) | -0,3107 | -0,3113 | 0,6336 | 0,5038 | 0,9681 | 0,8942 | -0,1826 | -0,3453 | 0,2699 | 0,1268 | -1,0046 | 1,1242 | -2,5544 | 0,1729 | 0,3056 |
| (13) | -0,2882 | -0,3068 | 0,7099 | 0,6723 | 0,4440 | 0,2716 | 0,2027 | 0,0536 | 0,2150 | -0,0460 | -0,3393 | 0,0503 | -0,9088 | 0,0666 | 0,2941 |

counterproductive for the Mexican economy despite the factor market distortion. The major reason for this unexpected finding stems from the existence of a large local service sector which is also discriminated by industrial protection. The withdrawl of resources from services and the subsequent decline of output primarily causes the GDP losses, given the more than 60 p.c. share of this sector in total output. This means that in economies like the Mexican one, which are characterized by a relatively small agricultural and a relatively large service sector, factor market distortions cannot serve as a rationale for protection of manufacturing industries. Factors of production are merely reallocated between economic activities which are subject to similar factor market distortions.

It follows, that any reduction in industrial protection will improve the allocative efficiency in the Mexican economy, if dynamic effects from differential rates of technical progress between sectors can be neglected. Since our model does not provide comparative dynamic solutions we have made some rough estimates assuming a yearly productivity increase in manufacturing and services of 3 p.c. and 1 p.c. respectively. In the framework of our model a 1 p.c. shift between the shares of manufacturing and services would then - ceteris paribus - result in 3 p.c. GDP growth per annum. Our estimates concerning the impact of protection imply a shift of .0441 p.c. between services and manufacturing which means that the substantial productivity differentials have to be maintained for approximately 6 years just to balance the costs of industrial protection.

This example demonstrates - at least for the Mexican economy - the weakness of the arguments on which the case for industrial protection is built. Therefore, net income gains seem to be a rather likely outcome of lower trade barriers. Those gains will particularly be derived from reduced rates of implicit nominal protection to industries 8-10 which indicates that

differences of nominal protection reflect similar differences in effective protection among industries. Less nominal protection to industries 8-10 is obviously a step towards equalizing effective protection which improves industrial resource allocation. The effects, however, remain rather limited in size, primarily because domestically produced and imported goods are not entirely homogeneous and domestic producers prices do not fully adjust to increased import prices.

A much more powerful policy measure in this respect is an export subsidy which directly raises domestic net producers prices in the promoted activities. Concerning growth of GDP the positive signs attributed to export subsidies for food processing (6) and traditional consumer goods (7) as well as the negative impact of such subsidies for the already highly protected branches (8-9) confirm expectations in the sense that the present protective system indeed discriminates against industries 6-7 also in effective terms and that an alleviation of this distortion results in higher output growth. The varying results for the industrialization variable, however, require explanation.

Concerning food processing, the subsidy stimulates output and exports thus giving rise to a revaluation of the Mexican currency in order to maintain the foreign trade balance. This exchange rate adjustment has to be sizeable because total exports increase significantly although the appreciation negatively effects prices of all other traded commodities reducing their net producers prices and outputs as well as exports. The expansion of total exports reflects the relatively large export share which food processing had already achieved in the past. Since this particular sector has strong backward linkages with agriculture and services, domestic demand for these activities also increases. While this effect is not felt in agriculture, because it is more than offset by the exchange rate induced price decrease, the production of private

services, heavily expands both in rural and in urban areas since the price of the local good is increased in real terms in response to the decline in prices of tradables. This contributes to GDP growth and explains, together with the reduction of output in all industrial activities besides food processing, the declining degree of industrialization.

The opposite results were observed in the case of an export subsidy for investment goods industries, which also leads to a drastic increase of total exports. However, given the high import share in this sector, imports also rise since domestically produced investment goods become more expensive, so that the necessary revaluation remains moderate. Thus, net prices of the other industrial activities are only slightly lowered and total industrial value added still expands. This policy measure nevertheless implies economic costs in terms of GDP losses, because the allocation of additional resources in manufacturing (primarily in sector 10) causes a reduction in output and value added in both agriculture and services, which outweighs the industrial contribution to GDP growth.

Concerning industrial intermediates, similar reactions take place. Although total exports decreased in this case, a revaluation of the currency is still required since total imports are lowered by a larger amount in response to slackening domestic demand. The exchange rate adjustment is a little bit larger than in the case of investment goods and, more importantly, the net producers price of investment goods sharply declines due to higher input costs for industrial intermediates. For both reasons, total industrial value added is shrinking and the inefficiency of the policy measure in terms of foregone GDP becomes more obvious.

In fact, export subsidies turn out to promote both income growth and industrialization only when applied to traditional consumer goods. The promotion of this labour-intensive activity only slightly discriminates against other manufacturing

industries. An expansion of output in this sector means - above all - shifting capital from a (at the margin) less productive to a highly productive occupation, so that total industrial value added is not prevented from rising. In urban areas additional demand for services becomes effective which increases prices and output of the local sector. Both effects more than offset the declining agricultural contribution to GDP. This outcome is clearly in line with the notion of comparative advantage: To lower discrimination against those industries which intensively make use of domestic factors of production is beneficial in terms of net income gains for the whole economy.

Summarizing, it is interesting to note that a simultaneous export promotion of the hitherto discriminated branches of manufacturing industry (food processing and traditional consumer goods) lead to a more effective exploitation of available resources but is detrimental to structural change in the economy, since more resources will be employed in non-industrial activities. A further support of the already highly protected branches 8-10, on the other hand, favours industrial expansion at the expense of all other activities. Both findings clearly correspond to the impact of import protection discussed earlier, but the structural implications are different. While import protection induces a shift of resources between services and manufacturing, export subsidies are withdrawing factors of production from agriculture as predicted in the usual two sector models.

In evaluating these solutions, two qualifications have to be kept in mind. First, in a dynamic framework income gains or losses may easily be outweighed by opposite influences due to differentials of productivity growth among sectors. This applies in particular to an export subsidy for food processing which benefits the production of services. A change in the signs of the income variable is, however, less likely

in all other cases since factors of production are primarily reallocated between agricultural and industrial sectors which reveal similar rates of productivity increase. Secondly, one should consider that the solutions were derived for rather highly aggregated subdivisions of manufacturing industry. The product classification conceals that particularly within investment goods industries there are quite a number of activities which have already achieved international competitiveness. It is likely that these activities also suffer from the prevailing protective system through high input costs and therefore should be granted an export subsidy to alleviate this distortion. The subsidy would then induce a shift from import-competing to export-oriented production within the industry thus improving resource allocation despite prevailing import protection. This process of intra-industrial restructuring can, of course, not be described in our model. But the net effect derived in our model for an export subsidy to all manufacturing industries, which shows positive signs for industrial and income growth likewise, would presumably be even stronger, if account could be taken of intra-industrial trade discrimination.

Exactly the opposite, namely negative results were obtained for a production subsidy to all branches of manufacturing industry (13) which turns out to be a redistribution from the public budget to the factors of production at the expense of GDP.

Production and export subsidies influence the economy basically in the same directions but the production subsidy has a much stronger impact for two reasons. First, since the production subsidy in itself does not alter domestic consumer prices, the necessary revaluation of the currency and the respective price decrease of tradables are more pronounced. And secondly, the financial burden on the public budget is larger than in the case of export subsidies. The latter reason explains the controversal effect of both measures on GDP at market prices

and the first is responsible for the declining industrial share. However, a production subsidy also serves its purpose in correcting for the foreign trade distortion when granted to the sectors food processing and traditional consumer goods which are hardly protected. The effects on total output and industrial share resemble those of respective export subsidies but are much smaller in size, which is again explained by the different impact of both measures on the local sector and by the negative budgetary repercussions of a production subsidy. This supports the suggestion that production subsidies are only second best policy measures in the context of a developing country.

In comparing the various model solutions, it might be safe to conclude that, given the existing foreign trade distortions, an industrial export promotion policy based on export subsidies would be the most powerful policy both with respect to a fast growth of total income as well as to a restructuring of the Mexican economy towards manufacturing industry. Such a policy could further be supported by a reduction of import protection for the highly protected activities, while a continuation of the prevailing import substitution policy will induce income losses.

Employment

In Mexican development plans the employment of the labour force is emphasized (almost) as much as output growth. In the light of more than 3 p.c. population growth per annum and a skewed age pyramid - more than 50 p.c. of total population is below 20 years of age - this economic goal deserves special attention indeed. Like those in most developing countries Mexican labour markets are fragmented into rural and urban informal employment with unrestricted wage flexibility and in formal urban employment, which is governed by an administered wage rate fixed above the equilibrium wage (see introductory chapter).

Given this labour market distortion, the employment problem presents itself as a problem of underemployment rather than of open unemployment. Underemployment accrues either from lowly paid rural occupations particularly in agriculture and rural services or from self-employment and casual jobs in the urban informal sector. Therefore, underemployment has two dimensions: the number of underemployed people and the wage rates outside the formal sector. Both aspects are combined in our indicator for rural and urban underemployment.

The current theoretical assumption about the relation between output growth and employment is that labour market distortions might lead to a dichotomy between the two goals. More formal employment does not necessarily mean less underemployment when additional formal employment increases the likelihood of getting a formal occupation thus inducing rural-urban migration into the informal sector. The consequence might merely be a shift from rural to urban underemployment, the welfare implications of which are undetermined. Furthermore, traditional theory is built on a two sector model. Services, however, play a very important role in the Mexican economy as shown earlier. Therefore, the impact of more industrial employment on underemployment will depend on the corresponding development of agriculture and services likewise. If industrial promotion policies simultaneously discriminate against other economic activities, more industrial employment could very well be achieved at the expense of more underemployment.

How such an undesirable result can be brought about, is demonstrated by import protection for manufactured products, which shifts internal price relations to the disadvantage of non-industrial activities. Declining agricultural and urban service factor demand have a twofold effect on labour markets which almost outweigh each other with respect to the ratio of expected wages. On the one hand, total formal employment decreases, thus slowing down rural-urban migration because

the chances to enter into the formal sector are diminished. On the other hand, rural wage rates also have to fall, which in principle accelerates outmigration from rural areas. The net effect is a minor increase in the rural labour force which does not prevent informal urban employment from rising. This also drives informal wages down. In sum, both rural and informal employment increases and the respective wages decline so that there is more underemployment in the economy.

Since the described mechanism also works in the opposite direction, a more liberal trade policy, which reduces import barriers, not only proves to be a first best solution with respect to income growth but also has positive effects on employment promotion. All other policy measures, which could be introduced to alleviate the trade distortions, are rather characterized by a dichotomy between output and employment goals. Export subsidies which strongly enhance output growth and promote industrialization merely induce a shift from rural to urban underemployment.
With the exception of food processing industrial activities are heavily concentrated in urban areas. Increasing industrial output and, in some cases, the ensuing expansion of urban services create significant amounts of new jobs in the formal sector of the economy inducing a voluminous rural-urban migration. Although this migration reduces the rural labour supply, rural wage rates still go down because agricultural labour demand is shrinking on account of the currency appreciation. Nevertheless, outmigration is sufficiently large to ease the problem of rural underemployment. The opposite mechanism works in urban areas. Additional formal employment and higher informal wage rates, which accrue from the policy, induced producer price increases in manufacturing and urban services, tend to diminish underemployment. This effect, however, is spoiled by the large numbers of urban in-migrants.

Almost exactly the opposite reactions are initiated by an export subsidy to processed food, which favours GDP growth

but cuts down industrialization and, thereby, also total formal employment. This latter effect is particularly marked in the urban south where manufacturing industries are concentrated. Since food processing is regionally more equally distributed than other manufacturing activities, industrial and - via linkages - services' demand for labour increases in rural areas while agricultural demand decreases. The final balance of these opposing influences differs between the two rural areas. In the rural north additional employment in food processing and services suffices to occupy a larger rural labour force at a higher average wage rate. In the rural south which suffers from sizeable remigration from the cities, the increased labour force can only be employed at a reduced average wage rate. Thus, total rural underemployment slightly increases while urban underemployment considerably declines because - given the reduction of formal employment - less people are prepared to accept voluntary underemployment as an "entrance fee" to the formal sector.

The service sector also plays a crucial role in explaining the employment effects of a production subsidy to manufacturing since primarily urban services are indirectly favoured by this policy. The ensuing enlargement of formal employment again induces rural-urban migration as in the case of export subsidies. The number of people attracted to the cities more than outweighs the increase of the informal wage rate in the urban north so that total urban underemployment is growing larger. Conversely, the rural labour force is shrinking to an extent that rural wages go up despite the inherent discrimination against agriculture and rural manufacturing. Therefore, production subsidies either to total manufacturing or to single branches issue a very favourable impact on rural underemployment.

The lesson to draw from this analysis is that none of the discussed trade and production policies will simultaneously foster output growth, industrialization and full employment.

The most obvious trade-off appears to be between industrialization and employment since more productive employment in both rural and urban areas is achieved only at the expense of a lower degree of industrialization as in the case of reduced trade protection.

Equity

A similar trade-off characterizes the relationship between industrialization and functional distribution of income measured as labour share in GDP. With two important exceptions, all policies which succeed in restructuring the economy towards manufacturing industries worsen the functional distribution for one of the following two reasons. Either, industrialization goes along with reduced total formal employment as a reaction to declining factor demand in services, i.e. part of the labour force is shifted into less well paid informal occupations (protection). Or, higher formal employment is accompanied by lower rural wages and by rural-urban migration which reduces total informal labour income given the negative wage differential between rural and urban informal employment (export subsidies).

The two exceptions concern the labour-intensive traditional consumer goods industries. In this case an export as well as a production subsidy promotes total manufacturing and improves the functional distribution. The larger labour share is caused by a lower interest rate on capital (export subsidy) and/or by a rather stable or even increased average rural wage rate. This effect is brought about by a balancing between available rural jobs and rural labour force through migration. Both sectoral policy measures also proved to be the only ones without a trade-off between industrial and income growth. But this, of course, does not mean that more functional equity can otherwise only be reached at the expense of lower rates of income growth. Lower import protection likewise improves both welfare indicators.

Concerning the regional distribution of per capita income the model solutions reflect the regional factor market distortion which contributed to a regionally unbalanced distribution of economic activities. Since all industrial activities except food processing are almost entirely concentrated in the urban areas and particularly in the urban south, each sector policy which has a more than negligible impact on industrialization negatively effects rural per capita incomes relative to the urban south. The (relative) income gains from industrialization in the urban south always correspond with income losses in rural areas which result from the above described discrimination against the other economic activities. The resulting income gap is not bridged by migration because, first, for ethnical and social reasons there is no net migration between north and south and, secondly, because rural-urban wage differentials and/or formal employment do not change sufficiently in the south as a reaction to the policy measures.

If one abstracts from the less interesting cases of declining over-all per capita income where merely the rate of the slowdown differs among regions like in (8) and (13), two policies stand out which definitely improve the regional distribution: lower import protection to investment goods and an export subsidy for processed food. These two policies are decisive for the positive regional impact of reduced total industrial protection and of export subsidies to all manufacturing industries respectively. They similarly diminish the degree of industrialization and shift factors of production out of urban areas into rural food processing, services and/or agriculture. The remigration is, however, not strong enough to offset the rural production and income gains which in the case of the export subsidy were quite substantial. In the urban south the export subsidy to food processing has such a disastrous effect on industrial production that per capita income declines in absolute terms while the other policy measure allows a slight increase due to expanding urban services.

Both policies can nevertheless not prevent that total value added in the poorest part of the Mexican economy, the rural south, declines if the liberalized trade regime or export promotion are extended to all manufacturing industries. The observed equalization of the regional distribution in the south is then a case of passive sanitation; rural population is shrinking faster than rural income. Whether such a solution is really desirable seems to be questionable since it means a further concentration of the population in and around the already overcrowded capital of the country.

To summarize, the emerging dichotomy between industrialization and functional as well as regional distribution of income has to be noted when the foreign trade distortion is to be reduced by policy means. Obviously, distributional goals require more specific policy interventions which correct for factor market rather than for foreign trade distortions.

## 5.2 Factor Market Distortions

To secure a certain minimum standard of living for all members of the society and to improve working conditions were major social objectives of the Mexican development strategy. In the pursuit of these objectives a minimum wage legislation was enacted already in 1933 and entrepreneurs are subject to a far-reaching labour legislation which among other things contains rather restrictive dismissal regulations.[1]

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[1] See e.g. W. Bennewitz, Probleme des regionalen Ungleichgewichts in Entwicklungsländern. Dargestellt am Beispiel von Mexiko. Diss., Ludwig-Maximilian-Universität, München 1968, pp. 191sqq.

Such measures protect the employed portions of the labour force and artifically raise total wage costs over the equilibrium level. The resulting labour market distortion supports the substitution of capital for labour. In the parallel attempt to accelerate industrialization this sector was granted a number of privileges (see introductory chapter) which sum up to a subsidy of capital costs thus introducing a capital market distortion into the Mexican economy. The subsequent chapter discusses the welfare implications of policy measures suited to correct the existing distortions. Concerning labour markets a reduction of minimum wages in urban areas is analyzed because it seems justified to assume that this regulation constitutes a more binding constraint to urban entrepreneurial behaviour than to rural. Since such a policy change is extremely unlikely to occur the results are merely presented to demonstrate the social costs associated with minimum wages. A more viable policy could consist of a wage subsidy to manufacturing industry which is considered as an equivalent for all kinds of additional wage costs accruing from social policy. And finally, welfare implications of a less distorted capital market are studied under the assumption of a reduced subsidy to capital inputs. The respective model solutions are presented in Table 6a.

## Production and Employment

The way, in which the welfare indicators react to the mentioned policy changes, confirms once more the old, but nevertheless often neglected theoretical knowledge that the alleviation of one distortion does not necessarily improve economic efficiency if other distortions exist. While total output and employment show the expected positive reaction to lower minimum wages and capital subsidies, a wage subsidy proves to produce output losses and to increase urban underemployment.

Table 6a - Comparative-Static Model Solutions: Industrial Factor Market Policies

| Policy | Welfare Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Real Income | Industri-alization | Underemployment | | Equity | | | | |
| | | | rural | urban | Functional | Regional | | Sectoral | |
| | | | | | Labour Share | Rural North | Rural South | Ejido North | Ejido South |
| Lowering | | | | | | | | | |
| (14) Minimum wage rates | 0,2415 | 0,3903 | -5,4975 | -1,8006 | 0,0789 | 0,3380 | 0,1014 | -0,2631 | -0,2475 |
| (15) Industrial subsidies to capital input | 0,0810 | 0,0376 | -0,1717 | -0,1018 | 0,1234 | 0,0385 | 0,2500 | 0,1493 | 0,1150 |
| (16) Industrial non-wage labour costs | -0,0116 | -0,0186 | -1,0459 | 0,2090 | 0,4237 | 0,1977 | 0,3269 | 0,2126 | 0,1968 |

Table 6b - Comparative-Static Model Solutions: Regional Industrialization Policies

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Promoting rural manufacturing industries by | | | | | | | | | |
| (17) Production subsidies to the rural north | -0,1393 | 0,1321 | 0,4533 | -0,7808 | -0,0492 | 0,2123 | -0,2785 | -0,0420 | 0,0189 |
| (18) Production subsidies to the rural south | -0,2669 | 0,0207 | 0,2527 | 0,1086 | 0,1422 | -0,0949 | 0,6081 | -0,0140 | -0,0645 |
| (19) Subsidies for capital inputs in the rural north | -0,0892 | 0,0641 | 0,3288 | -0,5361 | -0,0490 | 0,2990 | -0,1239 | 0,0237 | 0,0132 |
| (20) Subsidies for capital inputs in the rural south | -0,2134 | 0,1326 | 0,1391 | -0,0293 | 0,0852 | -0,0198 | 0,3173 | 0,0856 | 0,0965 |
| (21) Subsidies for labour inputs in the rural north | -0,0501 | 0,0680 | 0,1245 | -0,2447 | -0,0002 | -0,0867 | -0,1546 | -0,0657 | 0,0057 |
| (22) Subsidies for labour inputs in the rural south | -0,0535 | -0,1119 | 0,1136 | 0,1379 | 0,0570 | -0,0751 | 0,2908 | -0,0996 | -0,1601 |

| | Other Dependent Variables | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Employment | | | | | | Wage Rates | | | | Exchange Rate | Total Export | Agricultural Share in GDP | Non-agricultural Capital Stock | Interest Rate |
| | Rural North | Rural South | Formal North | Formal South | Informal North | Informal South | Rural North | Rural South | Informal North | Informal South | | | | | |
| (14) | -0,7226 | -0,7315 | 2,0709 | 1,9142 | 0,0335 | -0,3961 | 0,4905 | 0,5325 | 0,1793 | 0,1549 | -0,0365 | 0,1885 | -0,6518 | 0,0769 | 0,1070 |
| (15) | 0,0371 | 0,0539 | -0,0765 | -0,0988 | -0,1120 | -0,1125 | 0,0067 | 0,1676 | -0,1227 | -0,0030 | 0,1486 | -0,0437 | 0,3152 | -0,0564 | -0,1925 |
| (16) | -0,2511 | -0,2529 | 0,6334 | 0,5735 | 0,3320 | 0,1591 | 0,2094 | 0,2212 | 0,0923 | 0,0490 | -0,1907 | 0,0066 | -0,5936 | 0,0102 | 0,1016 |
| (17) | 0,1218 | 0,1669 | -0,1718 | -0,1817 | -0,6652 | -0,7640 | 0,3320 | -0,2878 | 0,0689 | 0,0977 | -0,0317 | 0,0909 | -0,2356 | -0,0064 | 0,0543 |
| (18) | 0,1418 | 0,1641 | -0,4070 | -0,4186 | -0,0043 | 0,0526 | -0,2866 | 0,1082 | -0,1733 | -0,1589 | -0,1004 | 0,0158 | -0,0983 | -0,0290 | 0,0895 |
| (19) | 0,0940 | 0,1288 | -0,1505 | -0,1644 | -0,4467 | -0,5086 | 0,2057 | -0,1689 | 0,0892 | 0,0995 | 0,0083 | -0,0077 | -0,0475 | 0,0313 | 0,1262 |
| (20) | 0,0846 | 0,1110 | -0,2351 | -0,2680 | -0,0315 | -0,0150 | -0,1293 | 0,0374 | 0,0290 | 0,0237 | 0,0419 | -0,0249 | 0,0749 | 0,0486 | 0,2442 |
| (21) | 0,0278 | 0,0381 | -0,0213 | -0,0173 | -0,2185 | -0,2554 | 0,1263 | -0,1189 | -0,0203 | -0,0018 | -0,0400 | 0,0986 | -0,1881 | -0,0377 | -0,0719 |
| (22) | 0,0572 | 0,0531 | -0,1719 | -0,1506 | 0,0272 | 0,0676 | -0,1573 | 0,0708 | -0,2023 | -0,1826 | -0,1423 | 0,0407 | -0,1732 | -0,0776 | -0,1547 |

Lower urban minimum wages and wage subsidies to manufacturing induce quite diverging changes in the economy. By the first measure, labour input becomes more profitable in the urban formal sector and factors of production are withdrawn from all rural economic activities. In urban areas manufacturing and services compete for additional labour inputs so that output expansion of the traded goods is less pronounced than in the case of a wage subsidy as reflected in the exchange rate adjustment. The wage subsidy benefits manufacturing activities both in rural and urban areas and discriminates not only against agriculture but also against services. The sizeable expansion of manufacturing output, however, induces a revaluation of the currency which approximately compensates the increase in real terms. Thus, the true winner of the game is the local good due to the additional industrial intermediate demand for services, but the respective value added growth does not prevent slight GDP losses as a consequence of declining agriculture.

These different output changes immediately explain the employment effect. Both policies lead to rural-urban migration, although to a lesser extent in the case of wage subsidies which also promote rural industries. Since rural wages go up and rural employment declines, rural underemployment is reduced. In urban areas, lower minimum wages result in a substantial expansion of formal employment which is able to absorb the inflow of rural labour and even parts of the existing informal labour force. Wage subsidies, on the other hand, directly increase merely manufacturing demand for labour and only via linkages labour inputs of services. Therefore the total effect on formal employment is more moderate compared to the other policy and urban informal employment is enlarged. Hence, in a three sector economy with a labour market distortion a promotion of manufacturing employment alone does not provide an appropriate tool to mitigate the economic costs attached to a minimum wage legislation. To compensate the negative income

and employment effects of this policy countermeasures are required which equally favour all kinds of formal employment, i.e. a wage subsidy at least to manufacturing and services. Respective simulations for such a combined strategy which are not shown in Table 6a, confirm this notion.

To correct distorted factor price relations by an increase in capital costs of manufacturing (i.e. lower capital subsidies) yields similarly favourable income and employment effects, however, for entirely different reasons. Higher capital costs provoke a substitution of labour for industrial capital, lead to a decline of manufacturing output in physical terms - particularly in the capital-intensive lines of production - and to a decline of exports. The subsequent devaluation of the exchange rate increases domestic consumer prices of all traded goods, including the agricultural ones, which on the one hand effects the value share of manufacturing in GDP in a positive sense and on the other hand induces agricultural factor absorption and output to grow. Both agriculture and manufacturing withdraw labour mostly from urban services so that urban service output and also total formal employment are reduced and a remigration to rural areas takes place. There, the additional labour force can be absorbed even at a higher average wage rate and rural as well as urban underemployment is diminished.

As a conclusion it is interesting to note that reduced industrial demand for capital inputs, which augments capital supply to the rest of the economy, strongly favours agricultural employment and growth at the expense of services and not at the expense of manufacturing industries. Increasing industrial capital cost is therefore a policy clearly superior to industrial wage policies in correcting for existing factor market distortions.

Equity

The equity solutions for the minimum wage policy deserve particular attention because they demonstrate the weakness of the arguments put forth to justify this legislation. Lower minimum wages do not only create more employment, as was already shown, but also a higher over-all labour income which is reflected in the higher labour share in the enlarged GDP. This result is achieved in two ways: part of the labour force is shifted from underemployment and low income occupations into better paid jobs, which are primarily supplied by the formal sector of the economy, and another part, the rural labour force, is able to earn higher incomes than under the prevailing regulations. These findings underline once more that minimum wage policies are merely beneficial to that fraction of the labour force which was lucky enough to obtain a job in the formal sector; it does not at all secure a certain minimum standard of living for all members of labour force. On the contrary, a reduction of those administered wages would provide more income to more people and there is not trade-off between growth and equity in this case.

Of course, this as a purely academic statement since nobody will touch minimum wage in reality for obvious political reasons. Therefore, some emphasis has to be placed upon the similarly positive distributional effects of reduced capital subsidies. Such a policy also has no trade-off between growth and the functional distribution and, likewise, improves the regional distribution to the advantage particularly of the poor rural south. The implicite promotion of agriculture which is inherent in this measure, raises rural income in the south to an extent that more people can be employed even at a higher income. Reducing capital subsidies, therefore, also contribute to the much desired decentralization of the Mexican economy while the two labour market policies merely provide cases of passive sanitation: The rural population is better off than otherwise but more people and more economic activities are concentrated in rural areas.

## 5.3 Regional Distortions

A current advice to defeat the increasing regional dualism in most developing countries consists of programs for rural industrialization (besides agricultural promotion policies). Although Mexican governments have placed emphasis on the regional issue little had been done up to 1970 concerning rural manufacturing industries and even after 1970, when some regional tax reliefs and other promotion schemes for rural industrialization were inaugurated, the importance of such measures remained rather limited.[1] This statement has to be qualified with respect to the Border Industrialization Programme which already dates back to 1965. This Programme - initially restricted to the U.S.-Mexican border, but 1971-72 extended to the whole country except for some highly developed areas - consists, in essense, in the establishment of free export processing zones along the border, which attract labour-intensive lines of U.S. manufacturing production. The U.S. firms take advantage of the wage differential and of the U.S. customs regulation (Items 806.30 and 807.00) which allows an almost duty-free re-export of the processed product to the U.S..[2] The Programme was rather successful right from the beginning, but did not get momentum in quantitative terms before the early seventies. In 1970, value-added and employment in border industries only amounted to negligible quantities compared to the whole Mexican manufacturing sector and, more importantly, hardly any information is available concerning the production characteristics of these industries. Therefore, we had to refrain from an analysis of this policy and just took note of border industries in the input-output table which contains the indigeneous industrial contribution to this branch of manufacturing, but does not account for Mexican labour inputs.

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[1] See M. Bruch, Wirtschaftspolitische Maßnahmen in Mexiko zur Beeinflussung der regionalen Struktur der Verarbeitenden Industrie, Kiel, October 1977 (mimeo, 36 p.).

[2] U.S. tariffs are only applied to value added in Mexico.

Two kinds of rural industrialization policies were, however, analysed which in fact were applied in Mexico already in 1970, but became more pronounced only after this year: a general production subsidy to rural manufacturing and a subsidy to capital costs for rural firms. The first measure reflects federal or state tax preferences granted to upgrade rural locations for industrial investment which the second describes the import allowances for capital goods invested in rural areas. Additionally, the welfare effects of reduced rural wage costs in manufacturing were quantified since firms located in rural areas are subject to particular social policy regulations which oblige firms to make provisions for adequate housing of workers and even for educational facilities.[1] The resulting extra labour costs discriminate against the (generally speaking) more labour intensive rural industries and spoil the attractiveness of rural locations for further investment. The most interesting question concerning the above mentioned policies refers to whether an alleviation of regional distortions and a subsequent decentralization of manufacturing would support a more efficient allocation of resources in the economy. The welfare indicators presented in Table 6b show that all rural industrial policies except for the wage policy in the rural north are successful in raising total and per capita income of the specific region at which they are directed. But this success in fact has a negative bearing on all other regions and on the economy as a whole. Factors of production are basically reallocated between agriculture and the urban sector on the one side and rural manufacturing as well as rural services on the other side, total available capital declines since public savings are reduced due to the subsidies paid, and underemployment either increases or is merely shifted from urban to rural areas. Industrial production expands on the whole (with one exception corresponding in size to the regional direction of the policy and the

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[1] See Bennewitz, op. cit., pp. 188sqq.

regional distribution of industrial activities but, since less factors of production become employed in less productive occupations, net income losses cannot be avoided.

The two exceptional solutions observed for the wage policies (21, 22) are an outcome of the respective relative size of rural industries in the north and the south.
Measured in factor input quantities rural industrialization plays a minor role in the north compared to the south. The gains to industrialization derived from wage subsidies in the north are not sufficient to compensate agricultural losses so that per capita income of the promoted area declines. The subsidy to southern rural manufacturing, on the other hand, provokes pronounced reactions of output in physical terms and subsequently of foreign trade, which induces a considerable exchange rate adjustment. The resulting downward movement of domestic prices for tradables offsets the increments to physical manufacturing output (an effect which was already observed earlier) and the industrial share in GDP declines.

These cases, however, do not alter the general conclusion to be drawn from the model solutions. Rural industrialization policies should be characterized as policies for income redistribution among regions which impose social costs on the economy. To avoid these costs such policies have to be part of more comprehensive strategies which provide appropriate incentives for an efficient allocation of resources among sectors and among regions.

## 6. Conclusions

With the model presented in this paper a quantification of the welfare effects of policy interventions in Mexico was possible. The causation of these effects has been discussed in the preceding chapters. In the final chapter we shall identify the more important trade-offs of actual policies and ask for the alternatives. We condense the model results into a summary table showing only gains (+) and losses (-) of selected policies (Table 7).

Mexico has maintained a growth and industrialization policy since the early 1940s without taking direct measures to counteract the resulting employment and equity problems. The problems of social instability facing other developing countries adhering to rapid industrialization were avoided by minimum wage and by land reform legislation directly favouring the two most important collective interest groups, the urban workers and the ejidatarios.
This places two restrictions on an analysis attempting to avoid futile exercises. Firstly, the results derived for minimum wages and land reform can only be taken as expressing the costs and benefits, but not providing a basis for policy recommendations. The two policies must be taken as autonomous. Secondly, employment and equity goals are not on the same level with real income and, possibly, industrialization. It would not be realistic then, to take into consideration employment or equity policies with a (strong) negative effect on real income. This applies to agricultural production subsidies, a cereals price guarantee and to public irrigation investments. These measures are left out of the summary table. A negative real income effect also occurs in the case of all regional policies, nevertheless the table reports the results for regional production subsidies.

Table 7 - Summary Table - Gains (+) and Losses (-) of Selected Policies

| Policy | Welfare Indicators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Real Income | Industrialization | Reduction of Underemployment | | Equity | | | | |
| | | | | | Functional | Regional | | Sectoral | |
| | | | rural | urban | Labour Share | Rural North | Rural South | Ejido North | Ejido South |
| Import Protection | | | | | | | | | |
| Total Manufactures | - | + | - | - | - | - | - | + | + |
| Export Subsidy | | | | | | | | | |
| Non-cereals | - | - | + | + | + | - | - | + | + |
| Traditional Manufactures | + | - | + | + | - | + | + | - | - |
| Modern Manufactures | - | + | + | - | - | - | - | - | - |
| Production Subsidy | | | | | | | | | |
| Traditional Manufactures | + | - | + | - | + | + | - | - | - |
| Modern Manufactures | - | + | + | - | + | + | + | - | - |
| Factor Cost Subsidy | | | | | | | | | |
| Industrial Labour | - | - | + | - | + | + | + | + | + |
| Industrial Capital | - | - | - | - | - | - | - | - | - |
| Agricultural Development | | | | | | | | | |
| Modern Inputs | + | - | + | + | + | + | - | + | + |
| Innovations | + | - | + | + | + | + | + | + | + |
| Regional Industrialization | | | | | | | | | |
| Rural North | - | + | - | + | - | + | - | - | + |
| Rural South | - | + | - | - | + | - | + | - | - |

The hierarchical position of the industrialization goal is less obvious since a trade-off between real income and industrialization is not envisaged in policy making. The results derived for industrial trade and production, for regional as well as for agricultural development policies, however, clearly point to a static conflict between the two goals. The conflict may be resolved dynamically due to differentials in productivity growth between manufacturing industries and services depending on the time horizon, although calculations suggest that this would not occur in the short and medium run. Under considerations of national self-reliance, a case can still be made for taking industrialization as a separate goal. Unlike real income, however, a nonnegative industrialization effect will not be accepted here as a condition for considering an alternative policy.

In the case of industrial trade and production policies the trade-off between real income and industrialization is caused by the movement of the exchange rate in reaction to the policy impact on the trade balance. A flexible exchange rate is only one way of keeping the balance of payments equilibrium, i.e. one may question the relevance of the results on the trade-off. On reflection, however, it becomes obvious, that the trade-off would also occur in the case of a fixed exchange rate with international capital mobility. Keeping the exchange rate constant under conditions of an improving trade balance, production factors will be absorbed by trading sectors, the supply of non-tradables will be reduced and prices of non-tradables will increase. Inflation, therefore, will correct the domestic price ratio between tradables and non-tradables in much the same way as a currency appreciation would in the case of flexible exchange rates. The reverse applies in the case of a worsening trade balance.[1] In the case of a fixed exchange rate without international capital instability the

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[1] For a detailed analysis see M. Bruno, op.cit.

balance of payments equilibrium must be kept via trade interventions. A trade or production policy in favour of one sector then requires an intervention disfavouring another trading sector thus avoiding a reallocation of factors between trading and non-trading sectors. In such a case, the labour distortion argument would always apply and the trade-off between real income and industrialization would not occur for trade and production policies.

The basic package of growth and industrialization policies in the past consisted of protectionist measures for industrial manufactures on the import side, measures to reduce the capital costs for industries, export taxes on agricultural products (except cereals) designed to lower domestic consumption prices and agricultural input policies with the intention of keeping up the agricultural contribution to the trade balance. The results show that agricultural policies on the export as well as on the input side (except irrigation) in 1970 still have positive real income effects. The import protection for the separate branches as well as for the total of manufacturing production, however, has not. Also, a further reduction in capital costs for the separate branches as well as for the total of manufacturing production is shown to be detrimental to real income on account of the induced differentials in marginal capital productivity between manufacturing industries and services.

Industrial import protection and industrial capital cost subsidies both have negative effects on real income, on rural and urban employment, on functional and regional equity, and - in the case of capital cost subsidies for all manufacturing branches - also on sectoral equity and industrialization. The model thus leads to a rather clear negative conclusion with respect to these measures. In the other extreme, agricultural development policies (except irrigation) combine positive real income effects with positive employment and

equity effects. Unless industrialization is established as an overriding goal, the model results lead to a definitely positive conclusion. The result derived for agricultural exports, in contrast, is ambivalent as the positive income and industrialization effect is obtained as welfare costs in terms of rural and urban unemployment as well as functional and sectoral inequity. Similar effects occur in the case of agricultural production taxes.

The question for an alternative to trade and capital cost policies then arises. The model results point to the promotion of exports or of production in food processing and in traditional consumer goods industries ("traditional manufactures") whereas the same measures applied to industrial intermediates, chemicals, investment goods and consumer durables ("modern manufactures") would not help on account of the existing trade distortion between manufacturing industries. The model thus confirms the general recommendation for a policy switch to industrial export diversification. It does, however, restrict the recommendation to those industries which have been discriminated against by the previous import substitution policy.

Furthermore, the results point to production interventions for traditional manufactures as an alternative to export diversification. In practical policy these may be preferred to export interventions as domestic production incentives do not provoke the risk of trade retaliations by other countries. Abstracting from retaliations, however, export promotion proves to be superior to production promotion. The real income effect is stronger on account of the smaller impact on the government budget. While both measures help to alleviate the rural underemployment problem and the regional inequity of the rural north, the export promotion also has positive effects on urban employment and the more pressing regional equity problem for the rural south. The exception is a positive effect of production promotion on functional equity.

Apart from alternatives to the excessive import-substitution and capital cost policies, a reversal of these policies also comes into focus when reviewing the model solutions. Less restrictive trade practices as well as less distorted industrial capital costs can successfully support export diversification not only with respect to income growth but also with respect to employment creation. Both policy changes show no trade-off between the two goals and favour functional and regional equity, too.

Adressing the employment problem specifically, the model results show that actual trade policies as well as industrial capital cost reductions add to rural as well as urban underemployment whereas the agricultural input policies have positive effects in both dimensions of the problem. As stated, the swithh to an export promotion policy for traditional manufactures would be beneficial. The results on industrial labour costs subsidies confirm the expectations based on the reasoning of Harris-Todaro: the intervention would worsen the urban problem while alleviating the rural underemployment. With negative real income effects and an ambivalent impact on employment, labour cost subsidies must be ruled out as a viable policy. Neither can regional industrialization policies be advocated on account of positive employment effects. The rural effect is negative in the north and in the south as the policy attracts more labour into the regions than jobs created. In alleviates the urban employment problem only in the north whereas in the southern urban region the outmigration of industries adds to under-employment. The conclusion on employment arising from the model is that the problem can only be attacked by an agri-cultural development policy concentrating on the distribution of modern inputs and on the diffusion of innovations. The policy can be assisted by an export promotion policy for traditional manufactures, less industrial protection and a reduction of subsidies to industrial capital.

The results with respect to equity are more complex, as the equity goal has been split into five dimensions. We shall not go into the details again. A general conclusion, however, emerges with respect to sectoral policies. While all industrial policies (in trade as well as in production, factor inputs and regional allocation) have costs in terms of worsening inequities in at least two of the dimensions, a policy of increasing total agricultural factor productivity has positive effects in all dimensions and a policy of increasing the use of modern inputs in agricultural sector has positive effects in all but one dimension.

These findings require a slight qualification concerning regional equity. Policies, which improve the standard of living in rural areas, mostly achieve this goal by passive sanitation. Of course, this does not make much sense in a country with an already overpopulated metropolitan area. A reduction of industrial capital subsidies is - aside from lower minimum wages - the only policy without negative effects on rural income which succeeds in decentralising economic activities in the sense that more people can live on higher incomes in rural areas.

In summarizing, the following policy package which avoids trade-offs between the various economic goals emerges from the model solutions:

- Agricultural development policies
- Taxes on non-cereal exports
- Export subsidies for traditional manufactures
- Tariff reductions for manufactured imports
- Reductions of industrial capital subsidies.

It has to be stressed that these policies are selected with respect to goals which were autonomously defined in the framework of the Mexican political economy. No attempt was made in this paper to evaluate the implications of these goals or to establish the congruency between the welfare indicators and the underlying goals. Such analyses are required, however, before suggestions can be made on how to implement the above policy package. An appropriate shaping and timing of the various measures can be crucial in achieving the necessary political support.

Table A1 - Comparative-Static Effects of Agricultural Policies on Selected Dependent Variables

| Policy | Agricultural Sector | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Value Added | Total Labour Force | Total Consumption of Industrial Intermediates | Import Volume of Cereals | Export Volume of | | | Domestic Consumption Prices of | | | |
| | | | | | Other Food | Raw Materials | Animal Products | Other Food | Raw Materials | Animal Products | Industrial Intermediates |
| ( 1) | 0,0248 | 0,0212 | 0,0188 | -0,7440 | -5,2857 | 0,5506 | 0,7972 | 0,2670 | 0,0409 | 0,0479 | 0,0100 |
| ( 2) | 2,2646 | 0,8844 | 2,5018 | -5,9805 | 38,6710 | 15,9847 | 80,0752 | 0,7478 | 0,9522 | 0,9458 | -0,0199 |
| ( 3) | 0,2763 | 0,0600 | 0,2853 | -3,1580 | 2,4883 | 1,7613 | 4,4567 | 0,0090 | 0,0090 | 0,0090 | 0,0090 |
| ( 4) | 2,0624 | 0,7914 | 2,3315 | -2,1123 | 26,9074 | 9,8857 | 52,0966 | -0,1704 | 0,0340 | 0,0276 | -0,0681 |
| ( 5) | 0,0496 | 0,0056 | 0,0435 | -0,3003 | 0,8294 | 0,6738 | 1,0135 | -0,0015 | -0,0015 | -0,0015 | -0,0015 |
| ( 6) | 0,0400 | 0,0333 | 0,0481 | -0,1291 | 0,7967 | 0,2900 | 2,1804 | -0,0015 | -0,0015 | -0,0015 | -0,0015 |
| ( 7) | 0,1198 | 0,0423 | 0,1581 | -0,4218 | 1,9983 | 1,0006 | 4,4409 | -0,0047 | -0,0047 | -0,0047 | -0,0047 |
| ( 8) | -0,0684 | -0,0361 | -0,1122 | 0,1152 | -1,1389 | -0,3118 | -3,3608 | 0,0031 | 0,0031 | 0,0031 | 0,0031 |
| ( 9) | 0,3328 | 0,1051 | 1,3984 | -1,0993 | 4,7638 | 3,0706 | 11,5277 | -0,0113 | -0,0113 | -0,0113 | -1,0113 |
| (10) | 1,3776 | 0,3805 | 1,5430 | -5,5274 | 22,1426 | 12,2256 | 55,4436 | -0,0186 | -0,0697 | -0,0681 | -0,0442 |
| (11) | -0,0567 | -0,0537 | -0,1248 | 0,0714 | -0,9960 | -0,8671 | -2,7273 | 0,0025 | 0,0025 | 0,0025 | 0,0025 |
| (12) | -0,0346 | 0,2355 | -0,1828 | -0,6740 | 0,2456 | 0,6546 | -3,6990 | 0,0014 | 0,0014 | 0,0014 | 0,0014 |
| (13) | 2,5640 | 1,4020 | 2,6280 | -2,9740 | 38,8670 | 7,6330 | 12,6470 | -0,1250 | -0,1250 | -0,1250 | -0,1250 |
| (14) | -0,1597 | 0,1457 | -0,4198 | -0,4874 | -1,8893 | -0,5243 | -9,7871 | 0,0070 | 0,0070 | 0,0070 | 0,0070 |

| Policy | Manufacturing Sectors | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Producer's prices net of indirect taxes and costs of intermediates (excl. services) | | | | | Regional Employment | | | | | | |
| | | | | | | Processed Food | | | | Investment Goods and Consumer Durables | | |
| | Processed Food | Traditional Consumer Goods | Industrial Inter-mediates | Chemicals | Investment Goods and Consumer Durables | Rural North | Rural South | Urban North | Urban South | Rural North | Rural South | Urban North | Urban South |
| ( 1) | -0,0662 | 0,0081 | 0,0097 | 0,0074 | 0,0098 | -0,3014 | -0,2783 | -0,4665 | -0,4093 | 0,1552 | 0,1470 | 0,1342 | 0,1136 |
| ( 2) | -0,4409 | -0,0739 | -0,0273 | -0,0989 | -0,0229 | -4,9880 | -4,4337 | -2,3816 | -2,0468 | -0,7936 | -1,0590 | 0,7371 | 0,6521 |
| ( 3) | 0,1169 | 0,0090 | 0,0090 | 0,0090 | 0,0090 | -0,7959 | -0,5087 | -0,7342 | -0,6439 | 0,1174 | 0,2215 | 0,2341 | 0,1990 |
| ( 4) | -0,0703 | -0,0736 | -0,0689 | -0,0764 | -0,0683 | -3,1774 | -2,9249 | 0,0367 | 0,0748 | -1,5535 | -1,8270 | 1,1071 | -0,0372 |
| ( 5) | -0,0017 | -0,0015 | -0,0015 | -0,0015 | -0,0015 | -0,0439 | -0,0486 | -0,0223 | -0,0202 | -0,0082 | -0,0123 | -0,0177 | -0,0161 |
| ( 6) | -0,0017 | -0,0015 | -0,0015 | -0,0015 | -0,0015 | -0,0313 | -0,1507 | -0,0207 | -0,0182 | -0,0100 | -0,0899 | -0,0162 | -0,0144 |
| ( 7) | -0,0053 | -0,0047 | -0,0047 | -0,0047 | -0,0047 | -0,2534 | -0,1401 | -0,0296 | -0,0259 | -0,1142 | -0,0696 | -0,0258 | -0,0221 |
| ( 8) | 0,0035 | 0,0031 | 0,0031 | 0,0031 | 0,0031 | 0,2057 | 0,0894 | 0,0069 | 0,2349 | 0,1043 | 0,0563 | 0,0077 | -0,0166 |
| ( 9) | -0,0128 | -0,0113 | -0,0113 | -0,0113 | -0,0113 | -0,7267 | -0,3482 | 0,0065 | 0,0054 | -0,3556 | -0,2167 | -0,0046 | -0,0044 |
| (10) | -0,0514 | -0,0428 | -0,0440 | -0,0421 | -0,0441 | -2,2773 | -2,0827 | 0,1545 | 0,1360 | -1,0950 | -1,2718 | -0,2212 | 0,1494 |
| (11) | 0,0029 | 0,0025 | 0,0025 | 0,0025 | 0,0025 | 0,1095 | 0,2077 | 0 | -0,0008 | 0,0573 | 0,1464 | 0,0014 | 0,0008 |
| (12) | 0,0017 | 0,0014 | 0,0014 | 0,0014 | 0,0014 | -0,4063 | -0,4941 | 0,0261 | 0,0299 | 0,2967 | -0,4093 | 0,0226 | 0,0245 |
| (13) | -0,1410 | -0,1250 | -0,1250 | -0,1250 | -0,1250 | -3,1430 | -6,9750 | -0,1240 | -0,0960 | -1,6580 | -4,4460 | 0,1730 | -0,1470 |
| (14) | 0,0081 | 0,0070 | 0,0070 | 0,0070 | 0,0070 | -0,0911 | -0,1970 | 0,0330 | 0,2640 | 0,4583 | -0,2066 | 0,0317 | 0,0087 |

| Policy | Regional Private Services | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Producer's Prices | | | | Volumes | | | | Employment | | | |
| | Rural North | Rural South | Urban North | Urban South | Rural North | Rural South | Urban North | Urban South | Rural North | Rural South | Urban North | Urban South |
| ( 1) | -0,0324 | -0,0331 | -0,0188 | -0,0163 | -0,0181 | -0,0257 | -0,0264 | -0,0227 | -0,0216 | -0,0355 | -0,0441 | -0,0382 |
| ( 2) | 0,0961 | -0,0090 | -0,2261 | -0,2133 | -0,0182 | -0,3218 | -0,1865 | -0,1674 | -0,2429 | -0,7650 | -0,4042 | -0,3744 |
| ( 3) | -0,0270 | -0,0508 | -0,0503 | -0,0456 | -0,0168 | -0,0250 | -0,0650 | -0,0580 | -0,0303 | -0,0339 | -0,1103 | -0,0994 |
| ( 4) | 0,2577 | 0,1955 | -0,0999 | -0,1034 | 0,0444 | -0,1623 | -0,0530 | -0,0583 | -0,1378 | -0,4985 | -0,1468 | -0,1550 |
| ( 5) | 0,0061 | 0,0090 | -0,0045 | -0,0049 | 0,0047 | 0,0078 | -0,0195 | -0,0202 | 0,0201 | 0,0243 | -0,0205 | -0,0216 |
| ( 6) | 0,0008 | 0,0089 | -0,0031 | -0,0035 | -0,0054 | -0,0226 | -0,0139 | -0,0145 | -0,0004 | -0,0372 | -0,0145 | -0,0154 |
| ( 7) | 0,0209 | 0,0134 | -0,0074 | -0,0077 | -0,0017 | 0,0023 | -0,0186 | -0,0190 | -0,0047 | 0,0064 | -0,0226 | -0,0233 |
| ( 8) | -0,0145 | -0,0042 | 0,0028 | 0,0027 | 0,0064 | 0,0055 | -0,0012 | -0,0015 | 0,0247 | 0,0180 | 0,0018 | 0,0014 |
| ( 9) | 0,0605 | 0,0201 | -0,0156 | -0,0140 | 0,0061 | -0,0122 | -0,0004 | 0,0019 | -0,0416 | -0,0516 | -0,0164 | -0,0129 |
| (10) | 0,1894 | 0,1534 | -0,0889 | -0,0828 | 0,0558 | -0,0631 | -0,0396 | -0,0304 | -0,1514 | -0,2894 | -0,1268 | -0,1124 |
| (11) | -0,0070 | -0,0043 | 0,0016 | 0,0013 | 0,0008 | 0,0421 | -0,0061 | -0,0065 | 0,0140 | 0,0909 | -0,0034 | -0,0040 |
| (12) | -0,0111 | -0,0178 | 0,0112 | 0,0109 | -0,1424 | -0,1933 | 0,0462 | 0,0459 | -0,2973 | -0,3901 | 0,0494 | 0,0489 |
| (13) | 0,1110 | 0,4130 | -0,1280 | -0,1150 | -0,1230 | -0,5850 | 0,0670 | 0,0860 | -0,5520 | -1,5750 | -0,0750 | -0,0450 |
| (14) | -0,0326 | -0,0263 | 0,0156 | 0,0149 | -0,1352 | -0,1457 | 0,0389 | 0,0379 | -0,2586 | -0,2812 | 0,0478 | 0,0463 |

Table A2 - Comparative-Static Effects of Industrial Policies on Selected Dependent Variables

| Policy | Manufacturing Sectors | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Consumer Prices | | | | | Producers prices net of indirect taxes and costs of intermediates (excl. services) | | | | |
| | Processed Food | Traditional Consumer Goods | Industrial Inter-mediates | Chemicals | Investment Goods | Processed Food | Traditional Consumer Goods | Industrial Inter-mediates | Chemicals | Investment Goods |
| ( 1) | 0,0336 | -0,0047 | -0,0047 | -0,0047 | -0,0047 | 0,0079 | -0,0048 | -0,0047 | -0,0056 | -0,0047 |
| ( 2) | -0,0077 | 0,0748 | -0,0077 | -0,0077 | -0,0077 | -0,0122 | 0,0218 | -0,0114 | -0,0120 | -0,0107 |
| ( 3) | -0,0106 | -0,0106 | 0,1010 | 0,2119 | -0,0106 | -0,0178 | -0,0349 | 0,1025 | 0,0603 | -0,0591 |
| ( 4) | -0,0123 | -0,0123 | -0,0123 | -0,0123 | 0,2708 | -0,0256 | -0,0207 | -0,0345 | -0,0166 | 0,0770 |
| ( 5) | 0,0030 | 0,0472 | 0,0763 | 0,1872 | 0,2478 | -0,0477 | -0,0386 | 0,0519 | 0,0261 | 0,0025 |
| ( 6) | 0,4947 | -0,4771 | -0,4741 | -0,4771 | -0,4771 | 1,2426 | -0,4818 | -0,4798 | -0,5016 | -0,4771 |
| ( 7) | -0,2174 | 0,7322 | -0,2174 | -0,2174 | -0,2174 | -0,2856 | 1,0256 | -0,2594 | -0,2669 | -0,2527 |
| ( 8) | -0,1751 | -0,1751 | 0,7962 | 0,6383 | -0,1751 | -0,2378 | -0,2707 | 1,2510 | 1,2441 | -0,5165 |
| ( 9) | -0,0741 | -0,1350 | -0,1350 | -0,1350 | 0,6056 | -0,1831 | -0,1570 | -0,1934 | -0,1491 | 1,4751 |
| (10) | -0,0328 | -0,0550 | -0,0333 | -0,1912 | -0,2640 | 0,5361 | 0,1161 | 0,3184 | 0,3265 | 0,2288 |
| (13) | -0,3393 | -0,3393 | -0,3393 | -0,3393 | -0,3393 | -0,3822 | -0,3393 | -0,3393 | -0,3393 | -0,3392 |
| (14) | -0,0365 | -0,0365 | -0,0365 | -0,0365 | -0,0365 | -0,0412 | -0,0365 | -0,0365 | -0,0365 | -0,0365 |
| (15) | 0,1486 | 0,1486 | 0,1486 | 0,1486 | 0,1486 | 0,1674 | 0,1486 | 0,1486 | 0,1486 | 0,1485 |
| (16) | -0,1907 | -0,1907 | -0,1907 | -0,1907 | -0,1907 | -0,2148 | -0,1907 | -0,1907 | -0,1907 | -0,1907 |
| (17) | -0,0317 | -0,0317 | -0,0317 | -0,0317 | -0,0317 | -0,0358 | -0,0317 | -0,0317 | -0,0317 | -0,0316 |
| (18) | -0,1004 | -0,1004 | -0,1004 | -0,1004 | -0,1004 | -0,1131 | -0,1004 | -0,1004 | -0,1004 | -0,1002 |
| (19) | 0,0083 | 0,0083 | 0,0083 | 0,0083 | 0,0083 | 0,0093 | 0,0083 | 0,0083 | 0,0083 | 0,0083 |
| (20) | 0,0419 | 0,0419 | 0,0419 | 0,0419 | 0,0419 | 0,0472 | 0,0419 | 0,0419 | 0,0419 | 0,0420 |
| (21) | -0,0400 | -0,0400 | -0,0400 | -0,0400 | -0,0400 | -0,0451 | -0,0400 | -0,0400 | -0,0400 | -0,0399 |
| (22) | -0,1423 | -0,1423 | -0,1423 | -0,1423 | -0,1423 | -0,1603 | -0,1423 | -0,1423 | -0,1423 | -0,1422 |

| Policy | Manufacturing Sectors | | | | | Regional Private Services | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exports | | | | | Producers Prices | | | | Volumes | | | |
| | Processed Food | Traditional Consumer Goods | Industrial Inter-mediates | Chemicals | Investment Goods | Rural North | Rural South | Urban North | Urban South | Rural North | Rural South | Urban North | Urban South |
| ( 1) | 0 | -0,9236 | -0,4103 | -0,3029 | -0,4695 | -0,0001 | 0,0001 | -0,0014 | -0,0017 | 0,0041 | 0,0075 | -0,0017 | -0,0021 |
| ( 2) | -1,4072 | 0 | -0,6961 | -1,1286 | -1,0410 | -0,0103 | -0,0099 | -0,0075 | -0,0028 | 0,0008 | -0,0028 | -0,0057 | 0,0004 |
| ( 3) | -1,9450 | -8,9575 | 0 | 0 | -6,7182 | -0,0284 | -0,0073 | 0,0076 | -0,0194 | -0,0175 | 0,0014 | 0,0030 | -0,0322 |
| ( 4) | -2,6631 | -1,7520 | -6,4689 | -1,3290 | 0 | -0,0279 | -0,0428 | -0,0253 | -0,0141 | -0,0155 | -0,0245 | -0,0522 | -0,0369 |
| ( 5) | -6,0153 | -11,6331 | -7,5753 | -2,7605 | -8,2287 | -0,0667 | -0,0599 | -0,0266 | -0,0380 | -0,0281 | -0,0184 | -0,0566 | -0,0708 |
| ( 6) | 234,6491 | -146,1814 | -60,9969 | -42,0705 | -57,1187 | 0,4860 | 0,4899 | 0,1297 | 0,0812 | 0,5280 | 0,7920 | 0,1869 | 0,1235 |
| ( 7) | -60,3185 | 281,5519 | -27,4346 | -43,9218 | -38,9060 | -0,1574 | -0,1094 | 0,0310 | 0,1504 | -0,0247 | -0,1484 | 0,1297 | 0,3380 |
| ( 8) | -56,7604 | -110,9446 | 181,3458 | 141,8874 | -67,2898 | -0,2004 | 0,0292 | 0,2586 | -0,0186 | -0,2691 | -0,0790 | 0,1979 | -0,1644 |
| ( 9) | -54,3365 | -57,1983 | -87,3614 | -33,5399 | 204,4810 | -0,1173 | -0,2890 | 0,1495 | 0,2371 | -0,2899 | -0,3228 | -0,0138 | 0,1052 |
| (10) | 63,2337 | -32,7724 | 5,5529 | 22,3552 | 41,1665 | 0,0109 | 0,1207 | 0,5688 | 0,4901 | -0,0547 | 0,2418 | 0,5007 | 0,4023 |
| (13) | -8,5593 | 22,2520 | 2,3485 | 1,5658 | 29,9891 | 0,1831 | 0,0209 | 0,4718 | 0,4264 | -0,1452 | -0,2160 | 0,4150 | 0,3557 |
| (14) | -18,8239 | 28,8587 | 10,4766 | 0,6890 | 30,5159 | -0,0941 | -0,2619 | 0,2486 | 0,2108 | -0,6768 | -0,9323 | 1,1285 | 1,0790 |
| (15) | -4,1031 | 2,8889 | 1,8527 | -5,9230 | -7,0598 | -0,1492 | 0,0972 | -0,2222 | -0,2348 | -0,0413 | 0,1306 | -0,1295 | -0,1460 |
| (16) | -12,6624 | 25,1409 | 4,2012 | -4,3572 | 22,9293 | 0,0339 | 0,1181 | 0,2496 | 0,1916 | -0,1865 | -0,0854 | 0,2855 | 0,2097 |
| (17) | 9,5974 | 3,9324 | 1,0883 | 2,3375 | -7,8515 | 0,6934 | -0,0966 | -0,0753 | -0,0833 | 0,3768 | 0,0876 | -0,1498 | -0,1583 |
| (18) | 3,0924 | 0,2466 | 0,8868 | 1,7394 | -3,5781 | -0,1420 | 0,7154 | -0,2013 | -0,2062 | 0,0136 | 0,5806 | -0,3254 | -0,3320 |
| (19) | 9,0509 | -7,3215 | -1,7215 | -1,3882 | 0,5706 | -0,0872 | 0,0408 | -0,0021 | -0,0148 | 0,6858 | 0,0629 | -0,1498 | -0,1666 |
| (20) | 3,8960 | 0,5274 | -0,1847 | -0,1974 | -5,3204 | 0,0767 | -0,1519 | 0,0194 | -0,0049 | -0,0753 | 0,5944 | -0,2693 | -0,3014 |
| (21) | 0,5465 | 11,2539 | 2,8098 | 3,7257 | -8,4221 | 0,7806 | -0,1374 | -0,0732 | -0,0685 | -0,3090 | 0,0247 | 0,0020 | 0,0083 |
| (22) | -0,8036 | -0,2808 | 1,0715 | 1,9368 | 1,7423 | -0,2187 | 0,8673 | -0,2207 | -0,2013 | 0,0889 | -0,0138 | -0,0561 | -0,0306 |

Table A 3 - Input-Output-Table, Mexiko 1970

(Billions of pesos, at current prices)

| Product Classification | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Tourism | Border industry | $\sum$ | Private Consumption | Gross Fixed Capital Formation | Increase in Stocks | Exports | Imports | Total Gross Production |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Plant products: cereals | 0.54 | | | 3.02 | | 4.08 | | | | | | 0.03 | | | | | 7.67 | 7.97 | | | | -3.12 | 12.52 |
| 2 " " : other food | | 0.81 | | | | 8.72 | | | | | 0.15 | | | | 0.23 | | 9.91 | 12.60 | | | 1.45 | -5.23 | 18.73 |
| 3 " " : raw materials | | | 0.26 | | | 2.34 | 1.39 | 0.11 | 0.89 | | | | | | | | 4.99 | | | 0.39 | 0.78 | -0.15 | 6.01 |
| 4 Animal products | | | | 1.87 | | 4.64 | 0.58 | | 0.14 | 0.07 | 0.09 | | | | | | 7.39 | 17.87 | | 1.72 | 0.85 | -0.87 | 26.96 |
| 5a Crude oil and natural gas | | | | | 5.91 | | | | | | 1.47 | | | | | | 7.38 | | | | 0.09 | | 7.47 |
| 5b Mining and petro-chemicals | | | | | 0.13 | 0.87 | 0.73 | 3.91 | 2.12 | 1.58 | 2.29 | 0.25 | 0.85 | 1.13 | 0.56 | | 14.42 | 11.28 | | 0.13 | 1.96 | -3.97 | 23.82 |
| 6 Processed food, beverages, tobacco | | | | 5.71 | | 11.25 | 0.17 | 0.04 | 0.32 | | 0.55 | 0.07 | 0.04 | | 2.50 | 0.06 | 20.71 | 48.78 | | 0.73 | 2.16 | -1.98 | 70.40 |
| 7 Traditional consumer goods | | | | | 0.88 | 1.37 | 11.83 | 0.64 | 0.66 | 0.83 | 5.25 | 0.82 | 0.18 | 0.67 | 0.60 | 0.67 | 24.40 | 32.45 | | 0.90 | 0.83 | -3.20 | 55.38 |
| 8 Industrial intermediates | | | | | 0.47 | 1.10 | 0.43 | 4.03 | 0.26 | 6.53 | 9.83 | 0.13 | 0.18 | 0.17 | | | 23.13 | | | 1.98 | 1.22 | -0.72 | 25.61 |
| 9 Chemicals | | | | | 0.57 | 0.29 | 3.65 | 1.08 | 5.00 | 1.59 | 1.25 | 1.38 | 0.55 | 3.89 | 0.35 | | 19.60 | 6.98 | | | 0.86 | -5.13 | 22.31 |
| 10 Investment goods and consumer durables | | | | | 1.03 | 0.92 | 1.05 | 1.14 | 0.24 | 11.73 | 8.67 | 1.46 | 13.56 | 1.04 | 0.36 | 3.07 | 44.27 | 13.99 | | | 1.55 | -15.11 | 44.70 |
| 11 Private services (incl. energy and construction) | | 2.05 | | 1.73 | 4.08 | 9.65 | 7.36 | 3.97 | 3.14 | 3.53 | 31.00 | 3.70 | | | 13.58 | 0.08 | 83.87 | 150.32 | 64.85 | 0.85 | 3.64 | -6.95 | 296.58 |
| 12 Public services | | 0.42 | | | | | | | | | 0.37 | -1.23 | | | 0.04 | | | (0.4) | | | | | |
| 13 Tradable capital goods | | | | | | | | | | | | | | | | | | | 15.36 | | | | 15.36 |
| 14 Industrial intermediates for agriculture | | 6.30 | | 0.60 | | | | | | | | | | | | | | | | | | | 6.90 |
| $\sum$ | | 10.38 | | 12.93 | 13.07 | 45.23 | 27.19 | 14.92 | 12.77 | 25.86 | 60.92 | 6.61 | 15.36 | 6.90 | 18.22 | 3.88 | | 302.24 | 80.21 | | 15.39 | -46.43 | |
| Value Added | | 26.88 | | 14.03 | 18.22 | 25.17 | 28.19 | 10.69 | 9.54 | 18.84 | 240.26 | 25.97 | | | | | | | | | | | |
| Imputed Bank Service Charge | | | | | | | | | | | -4.60 | | | | | | | | | | | | |
| Gross Domestic Product | | 26.88 | | 14.03 | 18.22 | 25.17 | 28.19 | 10.69 | 9.54 | 18.84 | 235.66 | 25.97 | | | | | | | | | | | |
| Total Gross Production | 12.52 | 18.73 | 6.01 | 26.96 | 31.29 | 70.40 | 55.38 | 25.61 | 22.31 | 44.70 | 296.58 | 32.58 | | | | | | | | | | | |

Source: Secretaria de Patrimonio y Fomento Industrial - Dirección General de Politica e Inversiones Industriales, La estructura de la oferta y la demanda en México, 1975 - Matrices de Relaciones Intersectoriales, México 1978;

Banco de México, Cuentas Nacionales y Acervos de Capital, Consolidadas y Por Tipo de Actividad Economica, 1950-1967, México, D.F., 1969. - Banco de México - Subdirección de Investigación Economica y Bancaria, Estadisticas de la Oficina de Cuentas de Producción, 1960-1976, México, D.F., 1977;

Secretaria de Industria y Commercio - Dirección General de Estadistica, IX Censo Industrial 1971: Datos de 1970, México, D.F., 1974;

Own computations.

Table A 4 - Elasticities of Production for the Agricultural Subsectors, Mexico 1970; Regression results - linear restricted Cobb-Douglas-Function

| Regions and farm categories | | Elasticities of Production[a] | | | | | Constant | $R^2$ | F-Value |
|---|---|---|---|---|---|---|---|---|---|
| | | unirrigated land | irrigated land | labour | capital | 'modern' intermediates | | | |
| North-west | PF > 5 ha | *** 0,255 (3,407) | *** 0,205 (3,414) | 0,172 | * 0,096 (1,507) | *** 0,269 (5,321) | 1,776 | 0,78 | 40,219 |
| | PF ≤ 5 ha | *** 0,220 (5,814) | *** 0,245 (3,401) | 0,307 | *** 0,125 (2,427) | n.s. 0,101 (1,106) | 1,017 | 0,70 | 26,932 |
| | Ejidos | *** 0,216 (4,342) | ** 0,096 (1,688) | 0,479 | ** 0,074 (1,791) | ** 0,132 (2,155) | 1,129 | 0,49 | 10,946 |
| North-east | PF > 5 ha | ** 0,104 (2,227) | n.s. 0,035 (0,508) | 0,559 | n.s. 0,056 (0,937) | *** 0,246 (4,588) | 1,002 | 0,60 | 17,468 |
| | PF ≤ 5 ha | *** 0,196 (5,459) | *** 0,239 (3,871) | 0,203 | n.s. 0,037 (0,226) | *** 0,323 (5,053) | 1,222 | 0,83 | 58,382 |
| | Ejidos | n.s. 0,036 (0,798) | ** 0,176 (1,843) | 0,591 | n.s. 0,003 (0,054) | *** 0,192 (3,419) | 0,370 | 0,39 | 7,300 |
| Central | PF > 5 ha | *** 0,074 (2,853) | * 0,084 (1,424) | 0,460 | *** 0,122 (3,418) | *** 0,257 (5,113) | 1,051 | 0,59 | 35,582 |
| | PF ≤ 5 ha | ** 0,052 (2,022) | ** 0,184 (2,254) | 0,510 | *** 0,106 (4,196) | *** 0,145 (3,524) | -0,009 | 0,38 | 15,144 |
| | Ejidos | *** 0,100 (4,521) | *** 0,253 (4,400) | 0,376 | *** 0,127 (4,993) | *** 0,142 (3,865) | 0,670 | 0,69 | 53,633 |
| South | PF > 5 ha | n.s. 0,013 (0,507) | *** 0,468 (4,578) | 0,203 | *** 0,081 (2,379) | *** 0,233 (5,729) | 1,059 | 0,48 | 22,538 |
| | PF ≤ 5 ha | *** 0,097 (4,168) | *** 0,630 (8,525) | 0,039 | * 0,041 (1,376) | *** 0,192 (5,286) | 1,573 | 0,56 | 30,690 |
| | Ejidos | n.s. 0,030 (1,243) | *** 0,325 (3,846) | 0,461 | * 0,038 (1,409) | *** 0,144 (4,558) | 0,484 | 0,37 | 13,978 |

[a] t-values are given in parentheses under each regression coefficient

*** = denotes significance at 10 % level
** = " " at 5 % level
* = " " at 1 % level
n.s. = not significant
PF = private farms

Source: Secretaría de Agricultura, Ganadería y Ejidal - Dirección General de Estadística, V Censo Agrícola - Ganadería y Ejidal, 1970, Resumen General y los tomos de los estados. México, D.F., 1975.

B. Fischer, Ergebnisse von Cobb-Douglas Produktionsfunktionsschätzungen für die mexikanische Landwirtschaft, November 1978 (mimeo., 22 p.).

Table A5 - Elasticities of Substitution ($\sigma$) and Labour Shares ($\Phi$) in Value Added in Mexican Manufacturing Industries, 1970

| Product group | Northern Region | | | | Southern Region | | | |
|---|---|---|---|---|---|---|---|---|
| | rural | | urban | | rural | | urban | |
| | $\sigma$ | $\Phi$ | $\sigma$ | $\Phi$ | $\sigma$ | $\Phi$ | $\sigma$ | $\Phi$ |
| 6. Processed food, beverages, tobacco | 1,204 | 0,408 | 1,204 | 0,417 | 1,039 | 0,453 | 1,039 | 0,381 |
| 7. Traditional consumer goods | 0,638 | 0,581 | 0,909 | 0,557 | 0,653 | 0,578 | 0,786 | 0,548 |
| 8. Industrial intermediates | 0,675 | 0,535 | 1,150 | 0,507 | 0,990 | 0,570 | 1,145 | 0,511 |
| 9. Chemicals | 1,158 | 0,293 | 1,158 | 0,368 | 1,103 | 0,387 | 1,103 | 0,387 |
| 10. Investment goods and consumer durables | 0,643 | 0,535 | 1,215 | 0,513 | 0,676 | 0,546 | 1,067 | 0,492 |

Source: Secretaría de Industria y Comercio, Dirección General de Estadística, IX Censo Industrial 1971: Datos de 1970. México, D.F., 1974. - Own Computations.

Table A 6 - A 'Complete' Scheme of Urban Private Demand in Mexico, 1970

| i \ j — Product group | Expenditure elasticities | Budget shares | Own and cross price elasticities | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 4 | 6 | 5 | 7 | 9 | 10 | 11 |
| | | | Plant products: cereals | Plant products: other food | Animal products | Processed food beverages, tobacco | Mining | Traditional consumer goods | Chemicals | Investment goods and consumer durables | Private services |
| 1 Plant products: cereals | 0.0360 | 0* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 Plant products: other food | 0.0491 | 0.61 | 0 | -0.3998 | 0 | 0 | -0.0243 | -0.0658 | -0.0104 | -0.0337 | -0.0760 |
| 4 Animal products | 0.0589 | 1.09 | 0 | 0 | -0.7143 | 0 | -0.0434 | -0.1177 | -0.0186 | -0.0602 | -0.1358 |
| 6 Processed food, beverages, tobacco | 0.2762 | 0.52 | 0 | 0 | 0 | -0.3408 | -0.0207 | -0.0561 | -0.0089 | -0.0287 | -0.0648 |
| 5 Mining | 0.0499 | 0.66 | -0.0240 | -0.0263 | -0.0260 | -0.1532 | -0.2291 | -0.0712 | -0.0113 | -0.0367 | -0.0822 |
| 7 Traditional consumer goods | 0.2037 | 1.53 | -0.0551 | -0.0610 | -0.0600 | -0.3554 | -0.0610 | -0.6356 | -0.0262 | -0.0850 | -0.1907 |
| 9 Chemicals | 0.0393 | 1.84 | -0.0663 | -0.0736 | -0.0722 | -0.4276 | -0.0734 | -0.1990 | -0.5969 | -0.1018 | -0.2292 |
| 10 Investment goods and consumer durables | 0.0970 | 1.40 | -0.0510 | -0.0560 | -0.0550 | -0.3250 | -0.0557 | -0.1511 | -0.0239 | -0.5076 | -0.1747 |
| 11 Private services | 0.1882 | 1.10 | -0.0400 | -0.0440 | -0.0431 | -0.2553 | -0.0440 | -0.1187 | -0.0199 | -0.0608 | -0.4751 |

Note: * Calculated from Engel aggregation.

Source: Secretaría de Industria y de Comercio - Dirección General de Estadística, Ingresos y Egresos de las Familias en la República Mexicana 1969-1970. Tomo III-V, México, D.F., 1971; own computations.

Table A 7 - A 'Complete' Scheme of Rural Private Demand in Mexico, 1970

| Product group (i \ j) | Expenditure elasticities | Budget shares | Own and cross price elasticities | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 Plant products: cereals | 2 Plant products: other foods | 4 Animal products | 6 Processed food beverages, tobacco | 5 Mining | 7 Traditional consumer goods | 9 Chemicals | 10 Investment goods and consumer durables | 11 Private services |
| 1 Plant products: cereals | 0.0579 | 0.17* | -0.1192 | 0 | 0 | 0 | -0.0032 | -0.0199 | -0.0050 | -0.0050 | -0.0177 |
| 2 Plant products: other food | 0.1085 | 0.61 | 0 | -0.4279 | 0 | 0 | -0.0113 | -0.0713 | -0.0179 | -0.0180 | -0.0636 |
| 4 Animal products | 0.1241 | 1.09 | 0 | 0 | -0.7644 | 0 | -0.0203 | -0.1274 | -0.0320 | -0.0322 | -0.1137 |
| 6 Processed food, beverages, tobacco | 0.2636 | 0.48 | 0 | 0 | 0 | -0.4467 | -0.0089 | -0.0561 | -0.0141 | -0.0142 | -0.0500 |
| 5 Mining | 0.0314 | 1.82 | -0.1014 | -0.1705 | -0.1707 | -0.4164 | -0.4410 | -0.2128 | -0.0535 | -0.0537 | -0.1898 |
| 7 Traditional consumer goods | 0.1796 | 1.56 | -0.0869 | -0.1490 | -0.1463 | -0.3569 | -0.0290 | -0.5313 | -0.0459 | -0.0460 | -0.1627 |
| 9 Chemicals | 0.0373 | 0.95 | -0.0529 | -0.0890 | -0.0891 | -0.2174 | -0.0177 | -0.1111 | -0.2404 | -0.0280 | -0.0991 |
| 10 Investment goods and consumer durables | 0.0387 | 1.06 | -0.0590 | -0.0993 | -0.0994 | -0.2425 | -0.0197 | -0.1239 | -0.0312 | -0.2684 | -0.1106 |
| 11 Private services | 0.1580 | 1.52 | -0.0847 | -0.1424 | -0.1426 | -0.3478 | -0.0283 | -0.1777 | -0.0447 | -0.0448 | -0.4986 |

Note: * Calculated from Engel aggregation.

Source: See Table A6.