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TAXES, OUTWARD ORIENTATION, AND GROWTH PERFORMANCE IN KOREA

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ABSTRACT

This paper both discusses and evaluates the role of tax policy in the Korean growth process from the early 1960s to the late 1980s. It begins by reviewing the evolution of Korean policy over this developmental sequence, emphasizing three distinct regime switches, and the tax policies which were part of them. It then presents an analytical framework for quantitative assessment of the contribution of tax policies to this growth through induced intersectoral resource transfers and impacts on effort and labour supply in agriculture and manufacturing sectors. What emerges from the model calculations is that tax policy has played a relatively modest role in Korean growth and that one should look outside of tax policy for the main factors underlying strong Korean growth.

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1. INTRODUCTION

While the literature which tries to explain growth performance in Korea and other Asian NIC's has grown in recent years,[1] little of it has explicitly examined the role of taxes in the growth process. Moreover, literature on Korean tax policy has largely been content to document changes in tax structure as growth has occurred,[2] and make illustrative calculations on such issues as the impact of taxes on the cost of capital, falling well short of evaluating the role of tax policies in the growth process. Capturing all the elements underlying Korean growth performance (high savings rates, human capital accumulation, intersectoral resource shifts) in one single model is both difficult and well beyond current capabilities. Nonetheless, given the current state of literature, we see some modelling evaluation of the contribution of tax policy to growth in Korea as a contribution.

Here, we use an applied general equilibrium model we have used earlier (Trela and Whalley (1989)) to investigate the contribution of outward–oriented policies to Korean growth in the earlier years, through induced intersectoral resource transfers and impacts on effort and labour supply in agriculture and manufacturing sectors. While only focused on one aspect of the Korean growth experience, what seems to emerge from the model calculations is that one should look outside of tax policy for the main factors underlying strong Korean growth. Model calculations portray the tax component of outward oriented policies as accounting for only 6.6 percent of Korean growth between 1962 and 1982, and only 7.4 percent between 1962 and 1972. This conclusion mirrors what we portray as the robustness of Korean growth performance to various policy regime switches, including tax policy. High savings rates (amounting to almost 38 percent of GDP in 1988)[3] and high investment rates have been central to Korean growth performance, as have significant transfers of labour from rural to

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[1]See Chenery et. al. (1986).

[2]See World Bank (1987a), Choi (1988) and Kim (1988).

[3]Park (1989), Table 3.

urban sectors, especially in the early phases of growth. What we suggest therefore is that tax policy in Korea should be seen as being accommodative of high growth in Korea, rather than as one of the key factors driving growth.

In the paper, we also emphasize how, in the extraordinary growth performance which has characterized Korea since the early 1960s, tax policy was used first to facilitate high growth in the initial outward oriented phase (1961–72) through direct and indirect rebate and exemption schemes for exporters, then to facilitate sector specific capital accumulation in a second heavy industry (steel and chemicals) growth phase (1973–79), and subsequently became one of the major elements of a move towards policy neutrality with the growth in revenue importance of the Korean VAT in the third and most recent growth phase (post 1979). Mean growth rates have remained high in each phase, and seemingly resilient to these switches in policy (and hence tax regimes). 1989, however, has seen a sharp fall in the growth rate in Korea, negative export growth, and talk of a new "economic crisis".

2. TAXES, OUTWARD ORIENTATION AND GROWTH IN KOREA – THE RECORD

Existing literature attributes the success of Korea's economic growth in large part to the policy shift in the 1960s from import substitution to export promotion.[4] This is not to say that Korea's growth rates can be explained solely by changes in trade policy. In fact the policy structure in Korea is substantially more complex than this, and there have been three distinct regime switches since the early 1960s. Growth in Korea has also been more volatile than in Taiwan or other Asian NICs, such as Hong Kong, with prolonged periods of extraordinarily rapid growth followed by years in which growth rates have been zero and even negative.

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[4]For some useful interpretive essays and research studies on the proximate causes of success see Brown (1973), Hasan and Rao (1979), Kruger (1979), Kwack (1988), and Scitovsky (1985). Opposite to the conclusions from these studies are the results from Chenery et al. (1986), Table 11–3, which seem to indicate that outward oriented policies have been relatively unimportant to Korean growth.

The mean growth rate in Korea over the period from 1961 to 1986, has been very high – around 8.3 percent—but major policy changes have repeatedly occurred, and come in dramatic fashion usually following perceived crises as in 1973 and 1979. A marked outward orientation characterized policy from 1961 through to 1972, involving duty remissions, tax rebates on exports, registration schemes for importers, and other elements of policy tied to export performance. This was followed by a period between 1973 and 1979, in which development of heavy and chemical industries, including iron and steel, non–ferrous metals, shipbuilding, general machinery, chemicals and electronics was stressed with withdrawal of many earlier export performance policies and tax holidays and other outward oriented incentives used for targetted industries. Since 1980, policies have focussed instead on structural adjustment and trade liberalization, with a pronounced move towards neutrality in policy and removal of most existing incentives.

Growth in Korea has been remarkably resilient to these switches in policy regime and the changes in tax policy which were part of them. Taxes played their role as part of the early outward–oriented strategy through the rebating of cascading sales and excise taxes, and the rebating of a portion of corporate taxes to export industries. However, as protection has come down in the trade liberalization and structural adjustment phase, so duty remissions have become progressively less important. Furthermore, a number of the tax rebate schemes linked to exports have been eliminated over the last ten to fifteen years.[5] In the process, the Korean tax system has matured from a relatively narrowly–based system, focused on traditional excisables, trade and other taxes to a system with a broadly based value–added tax accounting for a major portion of revenues, along with income and corporate taxes with much wider coverage and more sophisticated administration than in most other developing countries.[6]

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[5]See the discussion later in Section 2.

[6]See the discussion in Han (1986).

Growth Performance and Korean Policy Regimes

Korea achieved an 8.3 percent annual rate of real GNP growth between 1961 and 1986. This was among the highest in the world and contrasts with an annual growth rate of approximately 4.0 percent in the preceding 1954–60 period. Over the period, Korea effectively transformed itself from an under–developed predominantly agricultural economy, to a prominent newly industrialized country (NIC).

During the Post–Korean War Reconstruction period, from 1954–60, policy in Korea had been basically inward–looking with import substitution through tariffs and quotas for light manufactured and non–durable consumer goods. The government made some efforts to promote exports,[7] but although exports grew they remained small, ranging from 2.2 percent to 4.1 percent of GNP.

The 1960s saw major changes in policy with moves away from an inward–looking, import substituting towards an outward–oriented development strategy. A comprehensive export–promotion scheme was introduced, involving a range of incentives: preferential credit for exporters; indirect tax exemptions on inputs for export production and export sales; a reduction of corporate and income taxes on export earnings; wastage allowances on imported raw materials for export production; accelerated depreciation allowances for fixed capital directly used in export production; foreign–loan guarantees; and import and export financing assistance. Import controls were liberalized so that entrepreneurs could import machinery and equipment free of tariffs for use in export production. Inflows of foreign loans were encouraged to fill the domestic savings gap, and with the devaluation of the Korean Won in 1964 and interest rate reforms in 1965, interest rates on ordinary loans from banking

[7]These included provisions for converting export earnings into foreign exchange certificates which were traded at a premium in a free market. Moreover, the export–import link system entitled holders of foreign exchange certificates to import certain popular (luxury) items which were not otherwise available. Direct subsidies on exports and preferential interest rates on loans for export activities were used, although not extensively. See Westphal and Kim (1977), pp. 1–2 – 1–3.

institutions were substantially raised. As a result, bank deposits increased rapidly, enlarging the supply of loanable funds to Korean exporters.

The success of Korea's economic growth is often attributed in large part to these outward–oriented policies. As can be seen from Table 1, rapid growth of exports occurred, reflecting major expansion in the production of labour–intensive manufactures (textiles, apparel, plywood and footwear), where exporters were believed at this time to have significant comparative advantage. The annual growth rate of exports in volume terms was about 30 percent between 1961 and 1972, and real GNP grew at an annual rate of 8.2 percent. Manufactures were the dominant force in this export growth; manufactured exports were 18.2 percent of total exports in 1961, but 88.0 percent by 1972 .

The expansion of manufacturing in domestic product (from 8.9 percent in 1961 to 20.0 percent in 1972)[8] also induced a shift in the labour force from agriculture and other primary industries where output per worker was low, to manufacturing and other activities where it was higher. Table 2 indicates that 63.1 percent of the working population was in agriculture in 1963. This proportion steadily declined to 50.6 percent by 1972. The percentage of employment in manufacturing increased from 8.7 percent in 1963 to 14.2 in 1972; total employment increased by about 38 percent between 1963 and 1972. Hence, the expansion of non–agricultural employment was achieved both by sectoral shifts of labour, and an increase in total employment. The share of employment in the social overhead capital and service sectors also increased; from 28.2 percent in 1963 to 35.2 percent in 1972.

In the early 1970s, the government began to change the direction of policy away from general export promotion towards sectoral development, focusing on heavy and chemical industries (HCI). This change in policy reflected several factors. Among them were rising relative labour costs, and concerns over slower growth in traditional labor intensive export industries; rising import barriers in developed countries against labour intensive manufactures;

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[8]This data is from Economic Planning Board (1982), Table 3–15d.

TABLE 1
MAJOR ECONOMIC INDICATORS OF KOREAN GROWTH, 1955–1986
(Unit: US–$ and %)

	Per capita GNP	Growth rate of GNP (1975 Constant Won)	Inflation rate (GNP deflator)	Gross fixed investment to GNP	National saving to GNP	Growth rate of exports	Exports to GNP Ratio	Manufacturi Exports to Total Expo Ratio
1955	65	4.1	62.1	10.2	5.2	22.1	2.9	—
1956	66	–1.4	34.0	10.3	–1.9	–9.0	2.3	—
1957	74	7.6	22.2	10.6	5.5	33.9	2.2	—
1958	80	5.5	–1.3	10.2	4.9	24.6	2.8	—
1959	81	3.8	1.3	11.0	4.2	15.0	3.4	—
1960	79	1.1	11.7	10.8	0.8	20.8	4.1	—
1961	82	5.6	14.0	11.7	2.9	38.7	6.3	18.2
1962	87	2.2	18.4	13.7	3.2	13.0	6.0	27.0
1963	100	9.1	29.3	13.5	8.7	9.0	5.4	51.7
1964	103	9.6	30.0	11.3	8.7	23.5	6.7	51.6
1965	105	5.8	6.2	14.8	7.4	35.9	9.5	62.3
1966	125	12.7	14.5	20.2	11.8	42.4	11.9	62.4
1967	142	6.6	15.6	21.4	11.4	32.7	13.6	70.0
1968	169	11.3	16.1	25.0	15.1	39.5	14.7	77.3
1969	210	13.8	14.8	25.8	18.8	36.1	15.4	79.0
1970	252	7.6	15.6	24.7	16.2	19.6	15.0	83.6
1971	288	9.1	12.9	22.5	14.5	21.1	16.1	86.0
1972	318	5.3	16.3	20.4	15.7	36.0	20.6	87.7
1973	395	14.0	12.1	23.2	21.4	53.0	30.0	88.2
1974	540	8.5	30.4	25.6	19.3	–0.8	28.4	90.2
1975	590	6.8	24.6	25.3	16.8	19.0	28.2	88.3
1976	797	13.4	21.0	24.4	22.2	41.5	32.0	89.8
1977	1008	10.7	15.9	27.3	25.4	23.3	32.7	87.5
1978	1392	11.0	21.6	31.3	27.3	12.5	30.6	89.9
1979	1640	7.0	20.0	33.2	26.5	–1.1	27.7	90.1
1980	1589	–4.8	25.3	32.3	20.8	10.2	34.4	92.3
1981	1719	6.6	15.4	28.7	20.5	15.0	37.8	92.9
1982	1773	5.4	6.7	30.5	20.9	6.5	36.9	93.7
1983	1914	11.9	3.9	31.3	25.3	15.5	37.5	94.4
1984	2044	8.4	3.8	31.3	27.9	10.0	38.7	95.0
1985	2047	5.4	4.1	30.8	28.6	2.1	37.7	95.4
1986	2300	12.3	2.7	31.4	32.6	26.5	42.5	94.6

—: not available
Source: Choi (1988), Table II–I; Economic Planning Board (1976); Economic Planning Board (1988).

TABLE 2
EMPLOYMENT AND LABOUR PRODUCTIVITY IN KOREA BY SECTOR, 1963–86

	Employment				Production Per Worker (1975 Constant Thousand Won)		
	Employed Population (thousand person)	Agriculture, Forestry, and Fishery (%[a])	Mining and Manufacturing (%[a])	Social Overhead Capital and Others (%[a])	Agriculture, Forestry, and Fishery	Mining and Manufacturing	Social Overhead Capital and Others
1963	7662	63.1	8.7	28.2			
1964	7799	61.9	8.8	29.3			
1965	8206	58.6	10.3	31.0			
1966	8423	57.9	10.8	31.3	432	1902	692
1967	8717	55.2	12.8	32.0			
1968	9155	52.4	14.0	33.6			
1969	9414	51.3	14.3	34.4			
1970	9745	50.4	14.3	35.2	541	3110	1041
1971	10066	48.4	14.2	37.4			
1972	10559	50.9	14.2	35.2			
1973	11139	50.0	16.3	33.7			
1974	11586	48.2	17.8	34.0			
1975	11830	45.9	19.1	35.0	658	4589	1851
1976	12556	44.6	21.8	33.5			
1977	12929	41.8	22.4	35.8			
1978	13490	38.4	23.2	38.4			
1979	13664	35.8	23.7	40.5			
1980	13706	34.0	22.6	43.4	731	9190	4667
1981	14048	34.2	21.3	44.5			
1982	14424	32.1	21.9	46.1			
1983	14515	29.7	23.3	47.0			
1984	14417	27.1	24.2	48.7			
1985	14935	24.9	24.5	50.6			
1986	15505	23.6	25.9	50.0			

Note: [a] Percent of total employed population
Sources: Economic Planning Board (1982, 1986, 1988) and Kim (1988).

and concerns to develop domestic production of intermediate inputs, to supply the earlier export industries.[9] This sectoral growth drive was supported by a wide range of measures including import protection for infant industries, industry specific tax preferences and credit rationing. Targeted industries in this sectoral growth drive included steel, metal products, chemicals, shipbuilding, machinery, and auto production.

Under this new policy, light industry saw its share of gross output fall between 1975 and 1980 (Table 3). Heavy industry, on the other hand, saw its share almost double between 1970 and 1975 and rise further by 1980. The share of manufacturing in production increased further from 40.3 percent in 1970 to 51.0 percent in 1980. The HCI promotion also contributed to an upgrading in exports. The share of HCI products in total exports increased from 21.3 percent in 1972 to 38.3 percent by 1980.[10]. The share of agriculture in production continued to decline; from 17.0 percent in 1970 to 8.3 percent in 1980.

Large investments in the targetted HCI industries, however, created several adverse effects during this period, including (allegedly) excessive real wage increases in these industries, insufficient investment in light industries and capital market distortions. The government response was to design a Comprehensive Stabilization Program in mid–1979, which included stringent monetary and fiscal measures, as well as new policy measures to promote greater industrial neutrality. The forces giving rise to this new program were, however, strongly reinforced in 1979–80 by a poor grain harvest, a second oil shock, rising interest rates and domestic political disturbances. These events combined to produce a negative real growth rate of 4.8 percent in 1980, an inflation rate of 25.3 percent (as measured by an increase in the GNP deflator) and a current account deficit at a record level of 9 percent of GNP. The government thus began a new policy effort in 1980, reflecting three goals:

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[9]Kwack (1986), pp. 76–77.

[10]This data is from Choi (1988), p. 11 and Pyo (1989), Table 6.

TABLE 3
INDUSTRIAL COMPOSITION OF KOREAN OUTPUT – SELECTED YEARS
(Percentage shares in total output)

	1970	1975	1980	1983
Agriculture	17.0	12.8	8.3	8.2
Mining	1.1	0.9	0.8	0.7
Manufacturing	40.3	50.4	51.0	50.0
Light industry	28.4	29.5	24.7	22.1
Food, beverages and tobacco	15.9	14.4	10.8	9.6
Textiles and leather	7.1	9.9	8.4	7.0
Lumber and wood products	1.4	1.2	1.0	0.9
Paper printing and publishing	1.4	1.4	1.6	1.8
Nonmetallic metal manufacturing	1.4	1.5	1.9	1.8
Miscellaneous manufacturing	1.2	1.1	1.0	1.0
Heavy and chemical products	11.9	20.9	26.3	27.9
Chemical and chemical products	5.9	10.8	12.6	11.8
Primary metal manufacturing	2.0	3.4	5.1	5.0
Metal products and machinery	4.0	6.7	8.6	11.2
Construction	8.6	6.2	8.0	8.2
Social overhead	6.7	6.7	8.1	8.9
Services	26.3	23.0	23.8	23.9

Source: World Bank (1987b), Tables 1.1 and 1.2.

achieving price stability; renewing rapid economic growth; and achieving an improvement in income distribution. This strategy was reflected in a range of stabilization and adjustment programs, which are documented in Choi (1988) and World Bank (1987a).

Stringent monetary and fiscal policies were implemented first. Once macroeconomic imbalances were largely eliminated the government undertook major trade and financial reforms. Average tariff rates were lowered from 35 percent in 1980 to 23.7 percent in 1983, and then further lowered to 12.7 by 1988. Quotas were sharply reduced, and restrictions on direct foreign investment were substantially relaxed.

Financial liberalization measures included the privatization of commercial banks, lower entry barriers in financial markets, partial deregulations of interest rates offered by financial intermediaries, and abolition of preferential loan policies. A Fair Trade and Anti–Monopoly Law was adopted (1981), designed to prevent anticompetitive practices, and strategic promotion of industries was replaced by more indirect and functional support for industries in order to promote greater industrial neutrality.

This stabilization and adjustment program was remarkably successful. Between 1983 and 1988, the rate of growth of real GNP averaged 10.2 percent, while domestic inflation (GNP deflator) averaged 3.8 percent (compared to 20.8 percent during the period 1973–79). The current account balance continually improved through the 1980s to reach a record surplus of $14.3 billion by 1988.[11]

In 1989, however, the Korean economy produced yet another downturn in growth performance, and there is now growing concern in Korean that the economy is heading into a further crisis.[12] Estimates for 1989 indicate that real GNP growth fell from 12 percent to 6.7 percent, the current account surplus fell from $14.2 billion to $5 billion, the inflation rate rose

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[11]This data is from Pyo (1989), Table 7 and Oum (1989), Table 1.

[12]See Park (1989), p. 2.

to 6 percent, and export volumes declined by 6.5 percent, the first such decline since the early 1960s.[13] These dramatic changes are believed in Korea to be accounted for primarily by a sharp deterioration in Korea's export competitiveness, caused by the appreciation of the won over the past three years, and social and political reforms toward democratization since 1987 which have prompted large wage increases.[14]

B. Korean Tax Policy during the Growth Process

Disentangling the contribution of tax policy to this strong growth is difficult, not only because of the changes in tax policies which have occurred, but because of the many other factors which have influenced Korean growth.

Korea's tax system is composed of both national and local taxes. Since the share of local taxes in total revenues is small,[15] here we only discuss national taxes. The importance of taxes, measured by tax revenues as a proportion of GNP, has risen as growth has occurred in Korea, increasing from 9.1 percent in 1962 to 15.5 percent in 1987 (see Table 4). This growth in taxes has been uneven, covering periods of lower growth when revenue to GDP ratios fell, as in 1963–65, and periods in which substantial tax cuts have been used for incentive purposes, as in 1972–73.

In 1977, a VAT replaced eight indirect taxes, and has since become the single largest source of revenue in Korea, accounting for 25.3 percent of tax revenues in 1987. Since the introduction of the VAT, indirect taxes have increasingly become the most important source of revenue in Korea. The shares of direct and indirect taxes in total national revenues reversed in

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[13]This data is from Park (1989), p. 34 and Oum (1989), Table 1.

[14]See Oum (1989), p. 13.

[15]During the period 1962–87 the local tax share ranged from 8.1 percent to 17.3 percent. See Economic Planning Board (1982, 1988).

TABLE 4
STRUCTURE OF NATIONAL TAXES IN KOREA, 1962–87
As percentage of total national taxes

	Direct Taxes				Indirect Taxes								
	Income tax	Corporation tax	Business tax	Others	VAT	Special Consumption tax	Liquor tax	Commodity tax	Others	Stamp revenue	Custom duties	Defense surtaxes	National Taxes as a percentage of GNP
1962	16.2	7.2	6.9	3.1	—	—	8.9	16.7	13.8	2.3	23.9	—	9.1
1963	19.1	9.6	8.2	2.7	—	—	8.9	12.1	14.5	2.5	20.5	—	7.1
1964	23.0	11.0	8.6	2.8	—	—	7.9	8.8	12.6	2.3	22.0	—	5.9
1965	21.4	10.4	8.0	2.8	—	—	6.9	12.9	12.3	1.4	23.0	—	7.2
1966	23.2	12.4	8.3	3.0	—	—	7.2	11.8	11.2	1.7	20.1	—	9.2
1967	23.9	12.3	8.9	3.3	—	—	6.3	11.9	11.1	1.8	19.7	—	10.9
1968	24.5	12.7	9.0	2.8	—	—	5.7	11.4	12.5	1.3	19.5	—	12.7
1969	26.5	12.6	8.8	2.7	—	—	6.1	11.7	12.6	1.2	17.0	—	13.3
1970	25.2	12.7	9.3	3.5	—	—	6.5	9.5	17.1	4.9	15.2	—	13.1
1971	26.4	13.9	9.3	3.5	—	—	6.8	8.6	17.7	0.6	12.8	—	13.3
1972	24.2	12.6	11.2	3.7	—	—	6.5	8.5	16.8	1.8	13.6	—	11.4
1973	23.7	9.5	11.5	4.8	—	—	6.5	9.6	16.4	1.6	15.8	—	10.8
1974	19.5	13.1	11.5	4.5	—	—	6.3	9.4	18.2	1.6	15.0	—	12.1
1975	15.8	10.4	15.8	4.1	—	—	6.5	9.4	13.7	1.0	14.4	5.0	13.8
1976	16.7	8.9	13.6	3.0	—	—	4.9	8.7	13.0	0.8	14.4	14.0	15.1
1977	14.7	9.8	8.7	0.8	10.1	4.2	5.1	5.0	9.3	0.8	16.1	14.2	14.8
1978	13.9	10.6	—	0.5	24.9	9.7	5.8	0.0	0.7	0.7	19.2	14.0	15.3
1979	14.0	11.2	—	0.4	24.7	11.0	6.0	—	0.8	0.8	16.6	14.4	15.5
1980	12.5	9.2	—	0.6	27.8	11.0	5.6	—	1.0	0.6	14.5	16.2	15.8
1981	13.5	9.0	—	1.0	27.4	10.1	5.7	—	1.1	0.8	13.5	16.6	16.1
1982	13.2	10.2	—	1.2	27.4	8.7	5.2	—	1.4	0.7	13.3	15.4	16.6
1983	12.3	9.4	—	1.0	27.8	8.6	4.8	—	1.4	0.7	15.9	14.2	17.0
1984	12.2	9.2	—	0.8	26.9	8.9	4.9	—	1.6	0.7	15.9	14.7	16.4
1985	13.4	10.2	—	0.6	26.3	8.9	4.5	—	1.6	0.7	14.2	15.1	16.3
1986	14.1	9.4	—	0.6	25.9	8.6	4.4	—	1.7	0.7	15.4	14.6	16.2
1987	13.6	9.3	—	0.5	25.3	8.8	4.5	—	1.7	0.6	17.0	14.4	15.5

—: data not applicable.
Sources: Economic Planning Board (1982, 1988)

importance from 42.3 percent and 26.6 percent, respectively, in 1976 to 23.4 percent and 40.3 percent in 1987.

Tax Incentives

Perhaps the most important aspect of tax policy in Korea relevant to evaluating the contribution of tax policy to strong growth performance has been the use of tax incentives.[16] These have taken different forms in the three periods of growth outlined above.

1961–1972

In the 1960s, the main focus of Korean policy was on export growth, which the government of the day equated with nation building. The government saw tax incentives as a way of promoting growth of foreign exchange earnings, particularly from labour–intensive exports in which Korea was believed to have a comparative advantage. The most prominent measures were those rebating indirect taxes on inputs (whether imported or domestically purchased) into export production and indirect taxes on export sales.[17] These operated alongside tariff exemptions on capital equipment and raw materials imported for export production. Beyond these were direct tax exemptions for exporters. These included a 30 percent corporate tax exemption on income from export business, and a 20 percent exemption on income from tourism and sales of goods and services to U.N. military forces in Korea; although from 1962 on, all income from foreign currency earning activities was given this same treatment, and the exemption rate was raised to 50 percent.

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[16]The discussion that follows draws on Westphal and Kim (1977), Hong (1979), Scitovsky (1985), World Bank (1987a) and Choi (1988).

[17]There is a substantial literature which stresses the neutrality for trade of switches between origin (or production) based indirect taxes with no border tax adjustments, and destination (or consumption) based indirect taxes under which such adjustments occur. (See Johnson and Krauss (1970) and Whalley (1979)). In Korea, however, the tax rebate was also seen as undoing existing export biases in the policy structure as much as it was an explicit export incentive. Thus, one can argue that it had a very favourable influence on exports.

Export incentives also included special depreciation arrangements, first introduced in 1962. Machinery and equipment used in export production and/or sales qualified for an additional allowance equivalent to 30 percent of the normal depreciation allowance. From 1966 on, the scheme changed slightly. The allowance was 30 percent if the export share of total revenues exceeded 50 percent, and 15 percent if the share was less than or equal to 50 percent. In 1971, the formula for the latter case was changed to: 30 percent times twice the share. Machinery and equipment used by small and medium sized firms (SMF's) were also eligible for an additional 30 percent special depreciation allowance from 1968 onwards.

Other features of the tax regime in these years, while not directly tied to trade performance, nonetheless affected economic performance in the trade area. Tax holidays had been provided in Korea from 1949 onwards for selected industries deemed 'important' for national economic development. Over the years, these had included ship building, machinery, basic metal, petrochemicals, and chemical fertilizers. Typically, these were classified into one of two groups, each with a different tax holiday schedule. The first group, which included, oil–refining, steel, ship building, iron and steel, copper, cement, and chemicals; were eligible for a complete tax holiday for five years. For the second group, a three–year corporate tax exemption of 100 percent applied. Over the years minor changes were made to these schedules. In 1968, they were abolished, but the notion of using incentives for selected industries took root in the tax system.

In 1968, a 6 percent investment tax credit was given to qualified firms operating in selected industries. These were: ship building, steel and iron, chemical fertilizer, synthetic fiber, autos, machinery, straw pulp, food processing, petrochemicals, electronic equipment, electrical machinery and equipment, construction, and some mining industries. In 1970, a 6 percent to 10 percent investment tax credit was provided for machinery and equipment investment in iron and steel manufacturing, with the larger firms receiving the higher rate. Tax incentives under a 1972 Presidential Emergency Decree also included a 10 percent

temporary investment tax credit for investment using domestic capital goods manufactured prior to 1975, and a 40 percent to 80 percent special depreciation allowance for fixed assets employed by firms in the selected industries. From 1970 on, the five–year tax holiday with 100 percent exemption was only given to selected petrochemical industries.

The picture in the initial outward oriented phase of Korean growth is therefore of a number of tax measures used to spur development, including tax rebates and exemptions for exports. While not necessarily central, tax policy clearly played a role in outward orientation and growth during this period.

1973–1979

In the early 1970s, the Korean government began to scale down its export promotion schemes, and started giving higher priority to sectoral development, focused primarily on heavy and chemical industries.

Major change occurred with indirect tax rebates on exports in 1977; a destination based VAT replaced eight existing indirect taxes making rebating of indirect taxes both easier and more transparent. The VAT was regarded in Korea as providing a simpler and more effective way to rebate taxes on exports because exports are zero–rated under the VAT.[18] Indirect tax refunds for exports have increased sharply following the introduction of the VAT, in part because the tax rate has increased. For example, the indirect tax refund as a percentage of export increased from 6.0 percent in 1976 to 9.0 percent in 1978 and 10.0 percent in 1982.[19]

There were also changes in direct taxes and their incentive features. In 1973, the 30 percent corporate tax exemption on export earnings was replaced by two tax–free reserve

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[18]One can argue that no export subsidy is involved with VAT rebates on exports, since they compensate for taxes on imports and have no effect on trade flows. However, results from Choi (1984) show that the government had underestimated the border tax adjustment under the previous tax system. In this sense, the adoption of the VAT had a positive effect on trade flows.

[19]Choi (1984), Table 14. It appears that Choi has made an error in reporting his figures, labelling them as percentages rather than ratios.

funds, one to develop new foreign markets and the other to defray export or foreign investment losses. Under the former, licensed exporters could deduct 1 percent of their foreign exchange earnings from taxable income for deposit in a reserve fund. After a grace period of two years, the amount was to be added evenly to taxable income over the succeeding three years. Under the new export and foreign investment loss program, any firm earning foreign exchange could deduct an amount not exceeding the lesser of total sales in foreign exchange or 50 percent of total incomes, and as under the foreign market reserve system add it back into taxable income after a two year grace period.[20]

There were other changes. In 1974, the system of prior tariff exemptions for capital equipment imported for export production was changed to an installment payment system. The tariff exemptions on raw material inputs for export production were dropped in favour of a drawback system in 1975. Under this system, exporters were required to pay tariffs and indirect taxes when importing their inputs, but these were rebated when exports were actually shipped out.

Change also occurred outside the trade based incentives in the tax system. In 1974, a major reform replaced all major tax incentives to key industries with a programme of 'special tax treatment for key industries'. Under this new system, eligible firms in selected industries could get either a tax holiday for five years, with 100 percent tax exemption for the first three years, and 50 percent exemption for the following two years, an 8 percent investment tax credit for machinery and equipment (10 percent for investments using domestic capital goods), or an additional 100 percent special depreciation allowance. Industries selected for this treatment included ship building, naphtha cracking plants, selected machine and electronics manufacturers, iron and steel, fertilizer, copper, lead and zinc smelting, selected mining and

[20]A further tax-free reserve scheme was introduced later (1977) to deal with price fluctuations. Any licensed exporter could deduct additions to a reserve fund from its taxable income within a limit of 5 percent of inventory asset value, as evaluated at the end of the accounting period. This amount was also added to taxable income after a one year grace period.

refining and electric power generation. Firms in iron and steel, petrochemicals, ship building, chemical–fiber, chemical–pulp, marine food–processing, and other food–processing industries not qualifying for the three optional benefits were entitled to a 60 percent special depreciation allowance for machinery and equipment investment. The special depreciation rate for SMF's was also raised from 30 percent to 50 percent by the tax reform of 1977.

Thus in the heavy industry promotion phase of Korean growth, tax incentives towards export were relatively downgraded in preference to industry incentive schemes, whose effect was to concentrate Korean investment over this period on a relatively small number of industries.

1980–1989

In 1980, and in the face of financial losses and structural distortions caused by the HCI drive, Korea began pursuing a policy of structural adjustment and liberalization, which stressed neutrality in policy.

Once again changes in tax policy followed. Substantial modifications were made to the tax system in a 1981 tax reform. Effective 1982, petrochemicals, steel, non–ferrous metal refining, chemical fertilizer and power generation were excluded from the industry beneficiary list. The 60 percent special depreciation system and the tax–holiday option were terminated, and eligibility for the special tax credit was limited to the machinery and electronics industries. Also, the tax credit rate was reduced to 6 percent (10 percent for investment using domestic capital goods), and then it was halved to 3 percent (5 percent for investment using domestic capital goods) in 1983.

A distinctive feature of tax incentives used in recent years is that they are not designed to affect the sectoral structure of the economy; rather to promote greater industrial neutrality by correcting market failures or compensating for them throughout in the economy. As part of its new functional approach, the government has attempted to promote SMF's, in order to

offset the power of conglomerates, and to speed the adoption of new technologies. Up to 15 percent of the book value of the fixed business assets at the end of the previous accounting period can be reserved as a taxable income deduction. If after a four–year grace period, actual investment expenditures exceed the reserved amount, it is added evenly to taxable income over the succeeding three years. If, on the other hand, the reserved amount exceeds actual investment expenditures, the difference is added to taxable income in the fourth year.

Further new incentives include a six–year personal income tax exemption of 100 percent for the first four years and 50 percent for the subsequent two years for owners of newly established SMF's in rural or sea districts running a business in manufacturing, mining, construction, transportation or fishery industries, and of SMF's organized in technology–intensive industries. Furthermore, newly organized SMF's are given a 50 percent deduction from property taxes for five years and a 50 percent reduction in acquisition and registration taxes for two years. Tax incentives for companies investing in newly organized SMF's include tax–free reserves for investment losses; 100 percent exemption from capital gains tax; and a special 10 percent tax rate on dividend income.

C. Incentive Effects of Tax Arrangements for Exports

Establishing exactly what the incentive effects are of these measures, and how they have changed over time is difficult. For the analysis we make here, we draw heavily on a recent study by Kim (1988) which estimates the export subsidy effect of a range of tax and non–tax policies in Korea over the period 1958–83 (see Table 5). We use these estimates in our subsequent model calculations of the effects of Korean tax policies on outward orientation and growth. Kim includes only those policies for which both consistent time series data is available, and which are quantitatively significant. These include direct cash subsidies, exchange rate premia, interest subsidies, indirect tax exemptions, tariff exemptions and direct tax reductions (exclusive of accelerated depreciation provisions and reserve funds both for developing export markets and for covering export losses).

TABLE 5
ESTIMATES OF NET AND GROSS EXPORTS SUBSIDIES PER DOLLAR OF EXPORT FOR KOREA, 1958–1983
(ANNUAL AVERAGES)

Year	official exchange rate (won/$)	Various export subsidies calculated per U.S. dollar of export (won)								Ratio to exchange rate (percent)	
		Direct cash subsidies	Export dollar premium	Direct tax reductions for exporters	Interest rate preference for exporters	Net export subsidies[a]	Indirect tax exemptions for exporters	Tariff Rebates for exporters	Gross export subsidies[a]	Net export subsidies	Gross export subsidies
	(1)	(2)	(3)	(4)	(5)	(6=2+3+4+5)	(7)	(8)	(9=6+7+8)	(10=6/1)	(11=9/1)
1958	50.0	0.0	64.0	–	1.2	65.2	–	–	65.2	130.4	130.4
1959	50.0	0.0	84.7	–	1.3	86.0	–	–	86.0	172.0	172.0
1960	62.5	0.0	83.9	–	1.2	85.1	–	–	85.1	136.2	136.2
1961	127.5	7.5	14.6	–	1.0	23.1	–	–	23.1	18.1	18.1
1962	130.0	10.3	–	0.6	0.9	11.8	5.1	4.7	21.6	9.1	16.6
1963	130.0	4.1	39.8	0.8	2.9	47.6	5.3	6.6	59.5	36.6	48.8
1964	214.3	2.9	39.7	0.7	6.0	49.3	7.6	10.1	67.0	23.0	31.3
1965	265.4	–	–	2.3	7.6	9.9	13.9	15.4	39.2	3.7	14.8
1966	271.3	–	–	2.3	10.3	12.5	17.8	21.3	51.6	4.6	19.0
1967	270.7	–	–	5.2	14.7	20.0	17.8	24.6	62.4	7.4	23.1
1968	276.6	–	–	3.0	15.2	18.2	19.9	39.6	77.7	6.6	28.1
1969	288.2	–	–	3.7	14.7	18.4	27.4	34.3	80.1	6.4	27.8
1970	310.7	–	–	3.5	17.3	20.8	27.0	40.4	38.1	6.7	28.4
1971	347.7	–	–	4.8	18.1	22.8	32.2	48.0	103.0	6.6	29.6
1972	391.8	–	–	1.9	10.5	12.5	26.4	66.3	105.2	3.2	26.9
1973	398.3	–	–	1.4	7.4	8.7	21.0	64.4	94.2	2.2	23.7
1974	407.0	–	–	–	8.6	8.6	22.5	55.1	86.3	2.1	21.2
1975	484.0	–	–	–	12.9	12.9	33.8	34.3	81.0	2.7	16.7
1976	484.0	–	–	–	12.3	12.3	33.6	35.9	81.8	2.5	16.9
1977	484.0	–	–	–	9.4	9.4	53.1	30.6	93.1	1.9	19.2
1978	484.0	–	–	–	11.0	11.0	53.6	30.0	94.6	2.3	19.5
1979	484.0	–	–	–	11.0	11.0	56.6	30.3	97.9	2.3	20.2
1980	618.5	–	–	–	20.6	20.6	74.6	36.4	131.6	3.3	21.3
1981	686.0	–	–	–	15.0	15.0	n.a.	n.a.	n.a.	2.2	n.a.
1982	737.7	–	–	–	3.0	3.0	n.a.	n.a.	n.a.	0.4	n.a.
1983	781.2	–	–	–	0.0	0.0	n.a.	n.a.	n.a.	0.0	n.a.

n.a.: not available

[a]Totals may not add up due to rounding errors.

Source: Kim (1988), Table 3.1

The export subsidy effect of direct tax exemptions is derived as the difference between tax liabilities in the absence of any such exemptions and actual direct tax payments. The incentive effect of different interest rates is determined in any analogous fashion. The interest subsidy is the difference between the interest rate paid at the non–preferential commercial bank lending rate and the interest actually paid. Similar calculations are made for the various other tax and non–tax export incentives.

Several interesting observations flow from table 5. Exchange rate policy, via the foreign exchange premia played an important role in stimulating exports during the late 1950s and early 1960s, before being changed in 1965. Furthermore, the largest export incentives were during the 1960s and early 1970s, especially in the late 1960s, during which time the effects of export promotion schemes notably increased. Beginning in the early 1970s, however, the government tried to reduce the scope of export incentives. Kim's estimates clearly show fluctuations in these subsidies from 29.6 percent in 1972, to a low of 16.7 percent in 1975, and, with subsequent rises, to a high of 21.3 percent in 1980. Gross export subsidies in this data declined from 136.2 percent of the official exchange rate in 1960 to 18.1 percent in 1961 mainly because of the substantial depreciation of the Won and the resulting rapid increase in exports. Net export subsidies per U.S. dollar declined from 23 percent of the official exchange rate in 1964 to about 4 to 7 percent during 1965–67, mainly because of the abolition of the export–import link system.

Table 5 also clearly indicates the growing importance of tax policy as part of outward oriented policies through the 1970's. The direct tax reductions for exporters are consistently small, and disappear by the early 1970's. But indirect tax exemptions for exporters grew from approximately one–third of gross export subsidies in 1965 to approximately one–half by 1980. Adoption of the destination basis VAT system in 1977, under which exports are zero–rated, increased the border tax rebates on exports sharply, and included by Kim (1988) as part of his export subsidy measure.

3. USING A GENERAL EQUILIBRIUM MODEL TO EVALUATE THE TAX CONTRIBUTION TO OUTWARD ORIENTATION AND GROWTH IN THE EARLY GROWTH PHASE IN KOREA

Evaluating the effects of the tax policy component of outward oriented policy on Korean growth over the last three decades in a single consistent model framework is difficult, both because of the regime switches and the changes that have occurred in the economy. Savings rates have risen sharply, substantial human capital accumulation has occurred, resources have transferred from the rural to the urban sector, and other effects. There are, therefore, several different margins on which the incentive effects of the various tax schemes used over the years come into play. Ideally all of these need to be captured in any assessment of the contribution of taxes to growth. These include: effects on export performance, savings, investment, sectoral structure and others.

Our approach, instead, is to use a model we have developed earlier (Trela and Whalley (1989)) to analyze the contribution of intersectoral resource transfers to Korean growth in the early growth phase and to analyze the contribution of tax incentives to outward orientation in policy and the resulting effects on growth performance, especially in the initial growth surges in Korea, putting on one side savings, human capital, and other effects. The model is a two–sector model[21] which captures export promotion effects on manufacturing, induced rural–urban migration effects of policies, and importantly endogenous determination of effort in both manufacturing and non–manufacturing sectors.

Relative to other multisectoral modelling efforts looking at growth in Korea and other Asian NICs (see Chenery et. al. (1986)), this model uses a treatment of average product pricing of labour in agriculture, reflecting traditional family farming arrangements. Effort decisions in all sectors are endogenously determined through utility maximizing behaviour, and average

[21]Our model can be used in higher dimensionality form, but because of the complexity in implementing pairwise migration conditions linking sectors, we limit ourselves here to two sectors.

product pricing of labour in agriculture, in contrast to marginal product pricing in manufacturing sectors, generates lower effort in agriculture than in manufacturing, which is matched by a lower wage rate in agriculture than in manufacturing. Promoting manufacturing through export promotion thus transfers labour from the low effort agricultural sector to the high effort manufacturing sectors thereby fueling growth.

We have used this model here to assess how important tax policies were for Korean growth, especially in the earlier phase (1962–72). As we emphasize above, the second and third phases of this growth experience saw some of the key features of the outward oriented policies of the early growth years sharply curtailed; and in addition many of the features driving high Korean growth are not captured by the model; high savings rates, rapid human capital accumulation, to mention but two.

Our modelling strategy is to construct a base year microconsistent data set to which the model is calibrated. We then compute counterfactuals, in which a new equilibrium for the model is found in which outward oriented policies (including tax elements of outward orientation) are removed. Comparing the two equilibria gives an assessment of the GDP contribution of outward oriented policies during the year. Because of the work involved in constructing base year data sets for each of a series of years, we use two alternative base years, and sequentially introduce the policy variable characteristics of earlier or later years for comparison to the policy neutral equilibrium.

Thus, using what we term the 1962 base year model, we compute a policy neutral equilibrium which we compare sequentially to the 1962 model with 1962 policies, 1963 policies, 1964 policies, and so on. The policy contribution to GDP from each year's policy regime is evaluated, and, in this way, the combined effect over 10 (or 20) years evaluated. We also use a 1982 base year model in which earlier year policies (1981, 1980, ...) can be sequentially introduced in the same way. This procedure allows us to evaluate the contribution to growth of the tax component of outward oriented policies through induced intersectoral

resource transfers. We are also able to evaluate the contribution of outward oriented policies in general, the indirect tax component of policies alone, and the direct tax component of policies alone.

In the model, Korea is treated as a small–open–price–taking economy. The resource endowment of the economy comprises three primary factors: capital, labour and land. Only two of these appear as inputs for any sector. The rural sector uses only land and labour, while the urban sector uses capital and labour. Effort supply of workers is endogenous; rural–urban migration proceeds in response to differences in worker utility across sectors.

Utility is assumed to be a positive function of consumption and a negative function of effort, with individuals trading off differences in effort against differences in income. In the rural sector, employment means family members work not for wages but for an equal share in the output of the family farm. Workers in the rural sector thus receive a return for marginal effort which is less than their marginal value product, because of this sharing rule; they thus tend to supply too little effort. Workers in the urban sector are paid their marginal product, and hence a re–allocation of labour from the rural to the urban sector will typically increase national output, because prospective migrants would put forth greater effort in the urban sector, since they would be receiving their full marginal product. We induce rural–urban migration in the model through policy incentives to promote exports, including tax policies.

(a) Production

The two production sectors which appear in the model are distinguished by the types of goods they produce. The rural sector specializes in the production of a single agricultural good (sector/good 1), while the urban sector produces several manufactured goods (sector/good 2). Output of each good is produced according to a CES production function, i.e.

$$(1) \qquad Q_j = F\,\gamma_j \left[\alpha_j L^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\alpha_j)\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\sigma_j}{\sigma_j - 1}}, \quad j = 1$$

$$(2) \qquad Q_j = \gamma_j \left[\alpha_j K^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\alpha_j)\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\sigma_j}{\sigma_j - 1}}, \quad j = 2$$

where Q_j represents the output of sector j, γ_j is a constant defining units of measurement, α_j is a share parameter, F denotes the number of farms, ε_j^q is the effort of a typical worker in sector j, L denotes for land used per farm in agriculture, K and N_j are capital and labour,[22] and σ_j is the elasticity of substitution between factor inputs.

On the factor side, land and capital are assumed to be sector–specific, while labour is intersectorally mobile, although because of the differential effort decision by sector, wage rates are not equalized across sectors. In equilibrium factors are fully employed, i.e.

$$(3) \qquad \bar{L} = L$$

$$(4) \qquad \bar{K} = K$$

$$(5) \qquad \bar{N} = FN_1 + N_2$$

where $\bar{L}$, $\bar{K}$ and $\bar{N}$ define the economy's fixed factor endowments.

Assuming that urban producers cost minimize, and given that capital supply is fixed, producers in the urban sector choose the labour input that minimizes their costs, i.e.

$$(6) \qquad \min \mathcal{L} = w_j \sum_{q=1}^{N_j} \varepsilon_j^q + \lambda_j \left[Q_j - \gamma_j \left[\alpha_j K^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\alpha_j)\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\sigma_j}{\sigma_j - 1}} \right], \quad j = 2$$

[22] In the agricultural sector, N_j is labour per farm.

where w_j is the price of labour in the urban sector, measured in efficiency units. This leads to the first order condition

$$(7) \quad w_j = \frac{P_j \gamma_j \left[\alpha_j K^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\alpha_j)\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{\sigma_j}{\sigma_j - 1}} \right]^{\frac{1}{\sigma_j - 1}} (1-\alpha_j)}{\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{1}{\sigma_j}}}, \quad j = 2$$

where P_j is the price of good j produced in the urban sector.

The optimal amount of labour in the rural sector is determined using the average product pricing rule for labour,

$$(8) \quad w_j = \frac{P_j \gamma_j \left[\alpha_j K^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\alpha_j)\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{\sigma_j}{\sigma_j - 1}} \right]^{\frac{\sigma_j}{\sigma_j - 1}}}{N_j}, \quad j = 1$$

where w_j is the return to labour in the rural sector.

The return to capital in the urban sector is derived by residual,

$$(9) \quad r = \frac{P_j \gamma_j \left[\alpha_j K^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\alpha_j)\left(\sum_{q=1}^{N_j} \varepsilon_j^q \right)^{\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\sigma_j}{\sigma_j - 1}} - w_j \sum_{q=1}^{N_j} \varepsilon_j^q}{K}, \quad j = 2$$

(b) Consumption

Consumers are differentiated according to their sector of residence, although their utility functions defined over goods and effort (leisure) are the same. We assume an augmented CES form, i.e.

$$(10) \quad U = \left[\sum_{j=1}^{2} \beta_j X_j^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}} - \frac{\varepsilon^z}{z\delta}$$

where X_j defines consumption of good j, β_j is a share parameter, θ is an elasticity parameter, and $z > 1$ and $\delta > 0$ are constants, with z measuring the curvature of the disutility of effort function and δ defined as a units term in this sub–function

Each consumer owns labour and an equal proportion of the economy's capital endowment which, along with transfers, yields consumer incomes. If T^q denotes transfers (recycled tax revenues) received by individual q($\sum_{q=1}^{\bar{N}} T^q = T$), $\bar{K}^q$ denotes capital owned by individual q($\sum_{q=1}^{\bar{N}} \bar{K}^q = \bar{K}$), and X_j^q are purchases of good j by individual q, then individual budget constraints can be written as follows

for workers in the rural sector

$$(12) \quad \sum_{j=1}^{2} P_j X_j^q = w_1 + r\bar{K}^q + T^q$$

and for workers in the urban sector

$$(13) \quad \sum_{j=1}^{2} P_j X_j^q = w_2 \varepsilon_2 + r\bar{k}^q + T^q$$

Maximizing (10) subject to (12) and (13) yields the demand functions

$$(14) \quad X_j^q = \frac{I_j^q \, \beta_j^\theta}{P_j^\theta \left[\sum_{j=1}^{2} P_j^{1-\theta} \beta_j^\theta \right]} \qquad j = 1,2$$

where I represents consumer income.

Substituting (14) into (10) yields the indirect utility function

$$(15) \quad U = I \; C - \frac{\varepsilon^z}{z\delta}$$

$$\text{where } C = \left[\sum_{j=1}^{2} \left[\frac{\beta_j^{\theta}}{P_j^{\theta_j - 1} \left(\sum_{k=1}^{2} P_k^{1-\theta} \beta_k^{\theta} \right)^{\frac{\theta-1}{\theta}}} \right] \right]^{\frac{\theta}{\theta-1}}$$

Substituting (7) and (13) into (15) and optimizing with respect to ε_2 implies the optimal effort of a typical individual in the urban sector

$$(16) \quad \varepsilon_2 = [w_2 C \delta]^{\frac{1}{z-1}}$$

Substituting (8) and (12) into (15) and optimizing with respect to ε_1 implies the optimal effort of a typical individual in the rural sector satisfies

$$(17) \quad \gamma P_1 (1-\alpha_1) \delta C = \frac{\varepsilon_1^{z-1+\frac{1}{\theta}} N_1^{\frac{\theta+1}{\theta}}}{\left[\alpha_j L^{\frac{\theta-1}{\theta}} + (1-\alpha_1) \left(\sum_{q=1}^{N_j} \varepsilon_1^{q} \right)^{\frac{\theta-1}{\theta}} \right]^{\frac{1}{\theta-1}}}$$

(c) Government

Tax, subsidy and transfer interventions of the government are also incorporated in the model. The government collects net revenues from the tax–subsidy system and is assumed to distribute them on an equal per capita basis. In the model we only capture those components of government revenues that are affected by taxing imports and subsidizing exports.

Revenue raised is thus given by

$$(18) \quad R = \sum_{j}^{2} t_j P_j^{w} (X_j - Q_j)$$

where X_j and Q_j are consumption and production respectively, and t_j is the ad valorem tariff rate applied to imports of good j evaluated at world prices. Subsidies paid are thus given by

$$(19) \quad S = \sum_{j=1}^{2} \frac{s_j}{(1-s_j)} P^w_j Q_j$$

where s_j is the subsidy rate applied to production of good j.

In parameterizing the model we use estimates of effective subsidy rates in Korea; rebates of indirect or direct taxes on exports, or import duty remissions on exports are thus not directly modelled, but captured through the parameter values used to represent trade taxes and export subsidies. These are modelled in ad valorem form.

The government net revenue T is therefore given by

$$(20) \quad T = R - S$$

The expenditure side of the government budget consists only of transfers to households; the government makes no real expenditures on goods. The government collects tariff revenues, pays export subsidies and transfers its net revenues to individuals such that in equilibrium its budget is balanced. If transfers are made in lump–sum form and distributed on an equal per capita basis, then transfers received by each individual are

$$(21) \quad T^q = \frac{T}{\bar{N}} \qquad q = 1,...,\bar{N}$$

(d) Foreign Sector

A specification of the external sector (rest of the world (ROW)) completes our model. The ROW produces the same number of goods as the domestic Korean economy, and both imports and exports so as, in equilibrium, to meet Korean desired net trades. Foreign and domestically produced goods are treated in the model as homogeneous commodities; commodities are treated as importables if net imports by Korea are positive, and as exportables if net imports are negative.

The model incorporates an external balance condition which requires that the value of imports equal the value of exports, evaluated at world prices, i.e.

$$(22) \quad \sum_{j=1}^{2} P_j^W (X_j - Q_j) = 0$$

Korea is modelled as a taker of prices on world markets for all tradeables; where P_j^W denote the fixed world prices. The relationship between Korean domestic producer prices and world prices for importables is

$$(23) \quad P_j = P_j^W (1 + t_j) \qquad j = 1$$

and for exportables is

$$(24) \quad P_j = \frac{P_j^W}{(1 - s_j)} \qquad j = 2.$$

(e) Equilibrium

We use an iterative search procedure to solve for the equilibrium combination of rural to urban employment in the model. From this, commodity demand and supplies are determined as well as net trades. Because of the small open economy assumption, equilibrium in the model involves factor market clearing, and government budget balance with trade balance a property of such an equilibrium. We begin with an initial guess of the wage rate in the urban sector and the return to labour in the rural sector. These are then parametrically varied until an equilibrium is found, which is characterized by a set of factor prices such that goods and factor markets clear, external balance conditions holds, and utility across the two sectors is equalized.

4. APPLYING THE GENERAL EQUILIBRIUM MODEL TO ANALYZE THE ROLE OF TAX POLICIES IN KOREA'S OUTWARD ORIENTED GROWTH STRATEGY

We have used the model described above in counterfactual equilibrium analysis to assess the contribution of tax policy to growth in Korea. As indicated above, we calibrate the

model to a base year microconsistent data set incorporating the policies used in that year. The policies at issue include a number of outward oriented growth policies, including tax policies. Because of data difficulties we have built data sets for two years only, 1962 and 1982, representing recent and early years in Korea's growth process. This yields two alternative models, a 1962 and a 1982 base year model.

Using each base year model, we perform a series of counterfactual equilibrium calculations. We first remove the export subsidy component of the outward oriented policy mix used in the base year, yielding what we term an "export policy neutral equilibrium" (i.e. tariffs remain present). This enables us to assess the contribution of policies pursued in the base year to Korean growth. The contribution of policies pursued in other years to growth is evaluated by introducing alternative year policies into the model in place of the base year policies and computing a new equilibrium in the presence of each. Comparison between each of these equilibria and the policy neutral equilibrium then provides the model estimate of the year's policy contribution to growth in the year. The effects of policies over a number of years are evaluated as the sum of the individual year's effects.

We have performed these calculations using both the 1962 and 1982 base year models; different results are obtained in each case, depending upon the choice of base year model. We also perform calculations for different types of policy evaluation; a removal of all export subsidies, only the tax component, and only the direct (or indirect) tax component.

Calibration

Parameter values for the production and demand functions in the model are determined using calibration techniques. Calibration procedures widely used in other applied general equilibrium models are followed (see Mansur and Whalley (1984)). The requirement set for parameter values chosen in this way is that they be capable of replicating the base year microconsistent data set as an equilibrium solution to the model, given extraneous estimates of

elasticities of substitution, policy parameters, endowments, and other features of data.

The first step in calibration is to decompose the base year microconsistent data, constructed in value terms, into separate price and quantity data. For this purpose, a unit's convention is adopted (also see Mansur and Whalley (1984)) which defines physical units for commodities as those amounts which sell for one currency unit ($1.00 U.S.).[23] For factors, base year equilibrium data on the price of capital, labour employment, and rural–urban wage differentials are used to decompose capital and labour payments into separate price and quantity observations.

Share parameters for the demand and production functions can then be determined by calibration, dependant upon the choice of elasticity values for the production and utility functions in the model. In the rural sector, the values of the share parameter α_j are given from the average product pricing rule for labour, and from the first–order condition from producer cost minimization in the urban sector:

These are,

$$(25)\quad \alpha_j = \frac{\left[\frac{w_j N_j}{\gamma_j P_j}\right]^{\frac{\sigma_j - 1}{\sigma_j}} - \left(\sum_{q=1}^{N_j} \varepsilon_j^q\right)^{\frac{\sigma_j - 1}{\sigma_j}}}{L_j^{\frac{\sigma_j - 1}{\sigma_j}} - \left(\sum_{q=1}^{N_j} \varepsilon_j^q\right)^{\frac{\sigma_j - 1}{\sigma_j}}}, \qquad j = 1$$

$$(26)\quad \alpha_j = \frac{1}{1 + \frac{w_j}{r}\left[\frac{\sum_{q=1}^{N_j} \varepsilon_j^q}{K}\right]^{\frac{1}{\sigma_j}}}, \qquad j = 2$$

[23]The 1962 and 1982 benchmark data on production and labour income in Won are converted into US dollars using official exchange rates from Economic Planning Board (1964, 1984). Trade data for both years are reported in U.S. dollars.

γ_1, the units term in the production function, is arbitrarily set equal to 1 allowing equation (25) to be solved for α_1. The value for γ_2 is then derived by residual using equation (9), given the units definition for output.

Demand side parameters are determined in an analogous fashion using calibration techniques, except that first–order conditions for utility maximization are used. Taking the derivative of (10) with respect to X_j yields

$$(27) \quad \frac{\beta_j}{\beta_k} = \frac{P_j}{P_k}\left[\frac{X_j}{X_k}\right]^{\frac{1}{\theta}} \qquad j = 1,2, \quad k = 1,2,$$

Normalizing so that $\sum_{j=1}^{2} \beta_j = 1$, individual β_j values can be obtained. Because ϵ_2 can be arbitrarily set equal to 1.0 in the base case data, the value for δ can be derived from (16). ϵ_1 can then be determined directly from the equal utility condition linking the manufacturing and agricultural sectors.

The microconsistent data sets to which we calibrate our model are built for the two years of 1962 and 1982, each chosen to reflect different stages of Korean growth. One is largely pre–outward orientation, and the other post and for a more recent year. In constructing these data sets, different basic data sources have been used and various incompatibilities between source materials have had to be dealt with. Adjustments have been made to the data both to resolve incompatibilities (differences in definition, and measurement differences) and to ensure that the equilibrium conditions of the model are satisfied in the data.

Data on income of urban wage earners is from the Economic Planning Board (1964, 1984). The urban wage rate (in terms of efficiency units) is calculated by dividing the urban wage bill by the product of the number of employed persons in the urban sector and the effort level of a typical worker in this sector, which is arbitrarily set equal to 1.0 in the base case equilibrium data. Data on urban employment for both years is from the Economic Planning

Board (1964, 1984). The average farm income per worker is estimated using data on urban–rural differences in earnings, taken from Hong (1979). Since the data from Hong are only available up to 1976, we use the 1976 data and assume them to also reflect urban–rural differences in earnings in 1982. The rural wage bill is estimated as the product of average farm income per worker and the number of persons employed in the rural sector. Data on rural employment in each year is from Economic Planning Board (1982, 1986).

The income return to capital in the urban sector is estimated as the residual of the value of production less labour income.[24] To translate this into an observation on the physical quantity of capital used in determining parameters in the model, an estimate of the rate of return on capital in manufacturing is needed. We use estimates on rates of return on capital during 1954–61 and 1972–75 (the latest period available to us) and assume them to be roughly equivalent to the rates in 1962 and 1982.

Data on the value of production and net trade[25] by commodity for each year are from the Economic Planning Board (1964, 1984) except for data on agricultural production, which from our model definition is equal to labour income from employment in the rural sector. For each commodity, the value of consumption is determined as the residual between the value of production and trade. The value of trade evaluated at world prices must, for general equilibrium consistency, satisfy trade balance and a scaling procedure using the import data is used to ensure that condition holds.

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[24]Data availability prevents us making the adjustment for intermediate production to more accurately measure capital income.

[25]Korea was a net importer of manufactures in both 1962 and 1982 and is treated as a net exporter of manufactures in the model. We make the strong assumption that net exports of manufactures in 1982 are given not by net trade in total manufactures but rather in specific aggregate categories (consumption and investment goods) of which Korea was a net exporter in 1982. In 1962, Korea was a net importer in all specific aggregate categories (consumption, investment and raw material goods). We therefore use 1982 export data on the composition of trade in producing our 1962 microconsistent data set.

The model also requires elasticity values for production and demand functions. We use values of 1.5 and −1.5. The unobservable parameter z, which measures the curvature of the utility function, we assume to be 1.5. Because of the potentially crucial nature of these values for model behaviour, we use these values as our central set of values around which sensitivity analyses are performed.

To incorporate outward oriented growth policies into the model, data are also required on tariffs and export subsidies. Since agriculture is the only good which is imported in our model, we need tariff rates only on this product. We use the weighted average tariff rate on primary products (adjusted for rebates) in 1968 (the earliest period available to us) from Westphal and Kim (1977) and assume it to be roughly equivalent to the tariff rate in 1962. For tariff rates in 1982, we use a simple average tariff rate on live animals and vegetable products in 1982 from World Bank (1987a).

Data on subsidy rates are taken from the earlier Table 5, reproduced from Kim (1988). Since 1980 is the most recent year for which detailed information on subsidy rates from Kim is available, we use the 1980 data and assume it to be roughly equivalent to the rates in both 1981 and 1982.

Table 6 reports some summary statistics from the two data sets we have constructed. The rapid expansion in the economy between 1962 and 1982 is evident, as is the change in the industrial composition of employment and output, and the changes in trade importance to the economy. The issue is the significance in outward orientation and specifically tax policies explaining this strong performance.

5. RESULTS

We have used the general equilibrium model described above to assess the contribution of tax policies to Korean growth as part of the outward–oriented growth strategies used in recent decades. The counterfactual policy exercises we have performed involve of a series of counterfactual experiments in which the base year (1962 or 1982) policies are removed, and a

TABLE 6
SUMMARY FEATURES OF 1962 AND 1982 MICROCONSISTENT DATA SETS USED TO EVALUATE INPUTS OF TAX POLICIES IN KOREA'S OUTWARD ORIENTED GROWTH STRATEGY

	1962 Microconsistent Data Set	1982 Microconsistent Data Set
Value of GDP (millions U.S. dollars)	1935.59	92587.56
Ratio of employment in manufacturing to agriculture	1:15	1:2
% of GDP in		
imports[a]	16.0	43.9
exports[a]	6.0	36.9
Manufactured exports as % total exports[b]	27.0	93.7
Average tariff rate on imports (%)	13.4	7.09
Average export subsidy rate (%)	16.6	21.3

Notes: a) The numbers used in the model are smaller due to netting out of two–way trade.
b) These figures are based on actual data. In the model Korea only exports one manufactured good on a net basis.

new equilibrium for the model computed and compared to the benchmark equilibrium. This comparison yields estimates of quantitative changes in all the endogenous model variables under the policy change. Further counterfactual experiments are then performed in which outward–oriented tax policies during each year of the specified time periods (1963–82 or 1963–72) are sequentially introduced. For each of these policy changes, a new counterfactual equilibrium is computed and compared with the same no–policy equilibrium.

The sum of the effects from each of the model experiments across each of the years during the 1962–82 period are reported in Table 7. The average annual increase in GDP over this period attributable to tax policies is small, only 0.54 percent; less than 10 percent of actual average annual Korean growth in real GDP. Similar results occur with each of the other model experiments, which use the 1962 base year model. These results suggest that outward oriented tax policies played only a minor role in Korea's outward oriented developmental process, even in the early phases of Korean growth (1962–72). These policies also clearly had the effect of inducing migration from the rural to the urban sector. The effect of removing 1982 tax policies using the 1982 base year model shows the share of labour in agriculture as increasing to 70.63 percent from its 1982 benchmark level of 67.35 percent, while the share of labour employed in manufacturing falls from 32.67 percent to 29.37 percent. Also these policies caused exports of manufactures to expand by 1.07 percent on an annual basis over the 20 year period.

This relatively small contribution of tax policies to growth can also be decomposed into two separate effects using the same modelling approach; direct tax reductions (mainly corporate tax rebates for exporters) and indirect tax exemptions (rebates of sales and excise taxes on exports). These results are reported in Table 8. Results indicate that indirect tax exemptions have been much the more important of the two tax components in terms of their contribution to Korean growth; direct tax measures have been relatively inconsequential.

Table 8 also reports results for a model experiment in which both tax and non–tax components of outward oriented Korean growth strategies are removed. The quantitative

TABLE 7
GENERAL EQUILIBRIUM ESTIMATES OF EFFECTS OF KOREAN TAX POLICIES 1962–82

Annual Average Growth Rate (%)	Contribution over 20 years of outward oriented tax policies using 1982 base model	Contribution over 20 years of outward oriented tax policies using 1962 base model	Contribution over 10 years of outward oriented tax policies using 1962 base model	Actual average annual growth rate 1962–82	1962–72
GDP	0.54	0.68	0.62	8.21	8.37
Exports of Manufactures using 1982 base model[d]	1.07	n.a.	n.a.	5.98	11.76
Imports of Agriculture using 1982 base model[d]	1.10	n.a.	n.a.	–2.99[a]	2.16[a]

Distribution of Employment (%)	1982 base year model with 1982 policies	1982 base year model with tax policy neutral mix	1962 base year model with 1962 policies	1962 base years model with tax policy neutral mix	Actual Distribution[b] 1962[c]	1972	1982
Agriculture	67.35	70.63	93.73	94.16	63.1	50.6	32.1
Manufacturing	32.67	29.37	6.21	5.84	36.9	49.4	67.9

Notes:

[a] Figures are based on imports of food and live animals.

[b] The distribution is between agriculture and nonagriculture.

[c] Based on the 1963 distribution.

[d] Trade growth using the 1962 base model are unrealistically high because of the small manufactured export base involved, and are not reported.

TABLE 8
ASSESSING THE EFFECTS OF TAX POLICIES ON KOREAN GROWTH USING THE 1982 BASE MODEL

Annual Average Growth Rate (%)	Contribution of indirect tax component of outward oriented Korean growth strategy	Contribution of direct tax component of outward oriented Korean growth strategy	Contribution of combined tax component of outward oriented Korean growth strategy	Contribution of both tax and non-tax components of outward oriented Korean growth strategy	Actual average annual growth rates
GDP	0.51	0.03	0.54	1.40	8.21
Exports of Manufactures[d]	1.01	0.07	1.07	2.64	5.98
Imports of Agriculture[d]	1.04	0.07	1.10	2.66	–2.99[a]

Distribution of Employment (%)	1982 base year model with 1982 policies	1982 base year model without 1982 indirect tax policies	1982 base year model without 1982 direct tax policies	1982 base year model with tax policy neutral mix	1982 base year model with export policy neutral mix	Actual Distribution[b] 1962[c]	1982
Agriculture	67.35	70.63	67.32	70.63	73.27	63.1	50.6
Manufacturing	32.67	29.37	32.68	29.37	26.73	36.9	49.4

Notes:

[a] Figures are based on imports of food and live animals.

[b] The distribution is between agriculture and nonagriculture.

[c] Based on the 1963 distribution.

[d] Trade growth figures using the 1962 base model are unrealistically high because of the small manufactured export base involved, and are not reported.

magnitudes involved emphasize the dominant role that non–tax components (tariff rebates, interest preferences, direct cash subsidies, and export premia) have played in Korea's development process. Overall, however, the results seem to imply that outward oriented policies in Korea have little significance in driving growth.[26]

Table 9 reports on the sensitivity of these results to certain key model parameters. Three sets of parameters are varied: demand and production function elasticities and the utility function curvature parameter affecting effort decisions. Results in Table 9 suggest that model results are sensitive to the values chosen for the substitution elasticities in production, but less to the other model parameters examined. The importance of production side elasticities is that their values affect the slope of the marginal value product of labour schedules in the two sectors, and hence the size of intersectoral resource transfers associated with alternative policies. Even with this sensitivity of results, however, the quantitative magnitudes emerging still indicate that the main factors underlying Korean growth in recent decades lie outside of tax policy.

6. CONCLUSION

This paper both discusses and evaluates the role of tax policy in the Korean growth process from the early 1960's to the late 1980's. As such it seeks to do two things (i) document and describe the evolution of Korean tax policies over this developmental sequence (ii) use a general equilibrium model developed earlier by the authors to provide an initial quantitative assessment of the role that tax policies may have played in this growth.

What emerges from the first section of the paper is a picture of a tax system in Korea which over nearly 30 years has evolved from a system raising small amounts of revenue from

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[26]In a recent study, Chenery et al. (1986) also use a multisectoral general equilibrium model for analyzing the contribution of trade policy to growth in Korea. Results of their model simulations indicate outward oriented policies account for as much as 1 percent of output growth in Korea. Our results indicate a somewhat larger contribution to growth. However, our model only provides a very partial view of the Korean growth process, since savings, investment, human capital formation and many other factors are missing.

TABLE 9
SENSITIVITY ANALYSIS OF ASSESSMENTS OF THE CONTRIBUTION OF TAX POLICIES TO KOREAN GROWTH USING THE 1982 BASE MODEL

Average Annual Growth Rate	Assessment as in Table 1	As in Table 1, but with substitution elasticities in production set equal to 0.75	As in Table 1, but with substitution elasticities in consumption set equal to –0.75	As in Table 1, but with the utility function curvature parameter, z, set equal to 2.50	Actual annual growth rate
GDP	0.54	0.24	0.54	0.54	8.21
Exports of Manufacturers[d]	1.07	1.57	1.06	1.06	5.98
Imports of Agriculture[d]	1.10	1.60	1.10	1.10	-2.99[a]

	1982 base year model with 1982 policies	1982 base year model with tax policy neutral mix	1982 base year model with tax policy neutral mix	1982 base year model with tax policy neutral mix	1982 base year model with tax policy neutral mix	Actual Distribution[b] 1962[c]	1982
Distribution of Employment (%)							
Agriculture	67.35	70.63	69.42	70.63	70.63	63.1	50.6
Manufacturing	32.67	29.37	30.58	29.37	29.37	36.9	49.4

Notes:

[a] Figures are based on imports of food and live animals.

[b] The distribution is between agriculture and nonagriculture.

[c] Based on the 1963 distribution.

[d] Trade growth figures using the 1962 base model are unrealistically high because of the small manufactured export base involved, and are not reported.

a series of narrowly based taxes to a more broadly based mature system raising more revenue and with a heavy reliance on a broadly based VAT. Throughout this period the Korean tax system has also been remarkably adept in responding to the various swings in Korean growth policies. In the outward oriented phase (1961–72) rebates of direct and indirect taxes on exports were used; in the heavy and chemical industry phase (1973–1979) investment tax credits, tax holidays, and other incentives for these industries were used; and in the most recent trade liberalization and structural adjustment phase (1980–1989), neutrality in tax policy has been the approach. The GDP growth rate in each of these phases has been consistently high, implying that the changing tax system in Korea has probably facilitated rather than fueled high growth.

In the second part of the paper, we use a general equilibrium model (Trela and Whalley (1989)) used earlier to investigate the significance of intersectoral resource transfers for Korean growth to assess the contribution of tax policy in Korea. This model only provides a very partial view of the Korean growth process, since savings, investment, human capital formulation and many other key factors are missing. But unlike earlier modelling efforts, this uses a structure in which agriculture is represented by traditional farming patterns with an equal sharing of the proceeds between farm members. As a result, effort levels in agriculture are lower than in manufacturing which has marginal product pricing of labour, with an accompanying differential between the urban wage and (implicit) rural wage. Export promotion policies which stimulate manufacturing move labour from the low efficiency rural sector to the high efficiency urban sector.

Using this model to examine the contribution of tax oriented policies in the earlier years of Korean growth seems to indicate a relatively modest role for taxes, accounting for 6.6 percent of actual Korean growth over the period 1962–82, and a little more over the intensive outward oriented phase of 1962–72. However, around one fifth of export growth can be attributed to these policies.

Bibliography

Balassa, B., E. Voloudakis, P. Kylaktos and S.T. Suh (1986). "Export Incentives and Export Growth in Developing Countries: An Econometric Investigation." World Bank Discussion Paper No. DRD159. Washington, D.C.

Brown, G.T. (1973). *Korean Pricing Policies and Economic Development in the 1960s*. Baltimore: Johns Hopkins University Press.

Chang, Yanshik (1980). *Korea: A Decade of Development*. Seoul: National University Press.

Chenery, Hollis, Sherman Robinson and Moshe Syrquin (1986). *Industrialization and Growth: A Comparative Study*. Oxford: Oxford University Press for the World.

Choi, Kwang (1984). "Value–Added Taxation: Experiences and Lessons of Korea." Korea Development Institute Working Paper No. 84–06. Seoul, Korea.

———— (1988). "Tax Policy and Tax Reforms in Korea." Department of Economics, Hankuk University of Foreign Studies, Seoul, Korea (mimeo).

Economic Planning Board (1964). *Korea Statistical Yearbook: 1964*. Seoul, Korea.

———— (1976). *Major Statistics of Korean Economy: 1976*. Seoul, Korea.

———— (1982). *Major Statistics of Korean Economy: 1982*. Seoul, Korea.

———— (1984). *Korea Statistical Yearbook: 1984*. Seoul, Korea.

———— (1986). *Major Statistics of Korean Economy: 1986*. Seoul, Korea.

———— (1988). *Major Statistics of Korean Economy: 1988*. Seoul, Korea.

Han, Seung–Soo (1986). "Korea's Recent Tax Reform Effort: Personal Observation of Reform Effort in 1984–85." Provisional Papers in Public Economics, No. 85–32. World Bank.

———— (1987). "The Value Added Tax in Korea." World Discussion Paper No. DRD221. Washington, D.C.

Harris, J.R. and M.P. Todaro (1970). "Migration, Unemployment and Development: A Two–Sector Analysis." *American Economic Review* 60 (March): 126–42.

Hasan, Parvez and D.C. Rao (1979). *Korea: Policy Issues for Long–Term Development.* Baltimore: Johns Hopkins University Press for the World Bank.

Hong, Won–tack (1979). *Trade, Distortions and Employment Growth in Korea.* Seoul, Korea: Korea Development Institute.

Hong, Wontack and Lawrence B. Krause, eds. (1981). *Trade and Growth of the Advanced Developing Countries in the Pacific Basin.* Seoul, Korea: Korea Development Institute.

Johnson, H.G. and M. Krauss (1970). "Border Taxes, Border Tax Adjustments, Comparative Advantage and the Balance of Payments." *Canadian Journal of Economics* 3 (November): 595–602.

Kim, Kwang Suk (1988). "The Timing and Sequencing of a Trade Liberalization Policy: The Case of Korea." World Bank (mimeo).

Korea, Ministry of Finance (1986). *Korean Taxation.* Seoul, Korea.

Krueger, A. (1979). *Studies in the Modernization of the Republic of Korea, 1945–75: The Developmental Role of the Foreign Sector and Aid.*

Kwack, Sung Yeung (1986). "The Economic Development of the Republic of Korea: 1965–81." In Lawrence J. Lau (ed.), *Models of Development: A Comparative Study of Economic Growth in South Korea and Taiwan.* California: Institute for Contemporary Studies Press.

Kwack, Taewon (1988). "Public Finance, Trade, and Economic Development: The Role of Fiscal Incentives in Korea's Export – Led Economic Growth." Paper presented at the 44th Congress of the International Institute of Public Finance, Istanbul, August.

Lewis, W.A. (1954). "Economic Development with Unlimited Supplies of Labour." *Manchester School of Economic and Social Studies* 22 (May): 139–91.

Mansur, A. and J. Whalley (1984). "Numerical Specification of Applied General Equilibrium Models: Estimation, Calibration and Data." In H. Scarf and J. Shoven (ed.), *Applied General Equilibrium Analysis.* Cambridge: Cambridge University Press.

Nam, Chong Hyun (1981). "Trade and Industrial Policies, and the Structure of Protection in Korea." In Wontack Hong and Lawrence B. Krause (eds.), *Trade and Growth of the Advanced Developing Countries in the Pacific Basin.* Seoul, Korea: Korea Development Institute.

Nam, Sang–Woo (1989). "Liberalization of the Korean Financial and Capital Markets." Paper presented at the KDI/IIE Policy Conference in Washington, D.C., December.

Oum, Bongsung (1989). "Korea's Exchange Policy in the 1980s: Evaluation and Prospects." Paper presented at the KDI/IIE Policy Conference in Washington, D.C., December 12.

Park, Won–Am (1989). "Korea's Macroeconomics Adjustment and Outlook." Paper presented at the KDI/IIE Policy Conference in Washington, D.C., December 12.

Pyo, Hak K. (1989). "Export–Led Growth, Domestic Distortions, and Trade Liberalization: The Korean Experience During the 1980s." Paper presented at the KDI/IIE Conference in Washington, D.C., December 12.

Scitovsky, Tibor (1985). "Economic Development in Taiwan and South Korea: 1965–81." *Food Research Institute Studies* 14 (3): 215–64.

Trela, I. and J. Whalley (1989). "Trade, Growth and Rural–Urban Migration in Korea: A Framework for the Analysis of Trade Restrictions." Centre for the Study of International Economic Relations, University of Western Ontario, London, Canada (mimeo).

Westphal, L.E. and K.S. Kim (1977). "Industrial Policy and Development in Korea." World Bank Staff Working Paper No. 263. Washington, D.C.

Whalley, J. (1979). "Uniform Domestic Tax Rates, Trade Distortions, and Economic Integration." *Journal of Public Economics* 11 (May): 213–21.

World Bank (1987a). *Korea: Managing the Industrial Transition.* Vol. 1: *The Conduct of Industrial Policy.* Washington, D.C.; reprinted 1988.

———— (1987b). *Korea: Managing the Industrial Transition*, Vol. 2: *Selected Topics and Case Studies.* Washington, D.C.