Imperial Policy or World Price Shocks?
Explaining Interwar Korean Consumption Trend*

March 1998

Myung Soo Cha

Department of Economics
Yeungnam University
Kyungsan, Kyungbuk,
712-749,
South Korea

e-mail: mscha@ynucc.yeungnam.ac.kr
phone: +82-53-813-5686
fax: +82-53-812-5321

published in the
Journal of Economic History
Vol. 58, No. 3 (Sept. 1998)
pp. 731-754

* I am indebted to Kenneth H. Kang, who collaborated with me at initial stages of this project. An earlier version of this paper was used as a chapter of his PhD thesis submitted to Harvard University. I am also grateful to Jeffrey G. Williamson, Dwight H. Perkins, Peter Timmer, Carter Eckert, John Latham, Sooyoul Huh, David Fieldhouse, Mitsuhiko Kimura and the participants of the Harvard Economic History Seminar and Workshop, Economic Development Seminar, Korean Economic History Society Seminar and Cliometrics Conference preceding the 48th Association for Asian Studies Meeting in 1996 for their helpful comments and advice. All remaining errors are mine.

Abstract

This paper investigates why per capita food availability tended to decline in interwar Korea, a small open economy ruled by Japan, hence exposed to both world price and imperial policy shocks. Counterfactual experiments using a dynamic computable general equilibrium model of interwar Korea indicate that the downward consumption trend was primarily caused by population explosion initiated by a health campaign, and aggravated by the interwar agricultural depression. Although the colonial government stimulated capital accumulation by raising taxes and public investment and promoted a "Green Revolution" and an industrialization drive, these efforts proved less than adequate to overcome the population pressure. Similar developmental policies were successful enough in Taiwan to offset not only the population explosion, but also the agricultural depression. In Asian rice producing regions outside the Japanese Empire, suboptimal levels of government intervention caused severer declines in living standards than in Korea.

Introduction

While the Korean economy was initiated into growth and structural change under the Japanese rule (1910-1945)[1], Koreans tend to view the colonial era as being a dark period in their history. Much of this has to do with the fact that living standards seemed to have deteriorated: in particular, per capita food consumption declined during this time. The decline in consumption levels is remarkable given that the transfer of an advanced farming technology from Japan boosted agricultural productivity substantially in the colony. While agricultural output (mainly rice) did increase, exports outpaced imports and production, and per capita consumption levels fell--a phenomenon known as "starvation exports."

Although starvation exports have traditionally been cited as evidence of Japanese "exploitation" of Korea, the colony never generated either a budget or a current account surplus, prima facie evidence of colonial "drain".[2] Also the economic impact of colonialism upon the periphery is generally considered to have been superficial, given its short duration and the then prevailing laissez-faire belief on the role of governments.[3] Moreover, Korea was not alone in suffering worsening living standards during the interwar period, when massive disequilibrating shocks predominated. This paper asks whether the declining food consumption trend has to do with Japan's imperial economic intervention or shocks emanating from outside the Empire. I begin by briefly examining major trends in colonial Korea to identify possible factors driving starvation exports. Then a dynamic computable general equilibrium model of the interwar Korean economy is set up to assess the impact of diverse shocks via counterfactual experiments. Results from

---

1 Suh, *Growth and Structural Changes*, chapters III and IV. Jones, "The Economic Development of Colonial Korea."

2 Charlesworth, *British Rule and the Indian Economy 1800-1914*, p. 52; Maddison, "Dutch Income in and from Indonesia 1700-1938," pp. 646-647.

3 Fieldhouse, *Colonialism*, chapter II.

the experiments are reported, which prompts a comparison with the interwar experiences of other primary producing areas. The final section summarizes and concludes.

Trends and Shocks in Interwar Korea

In annexing Korea, Japan had a mixed bag of economic objectives which included securing a cheap supply of foodstuffs and industrial raw materials, establishing a viable marketplace for Japanese manufactured goods, and easing the pressure of Japan's surplus rural population.[4] While the development of agriculture was one of the early goals of colonial policy, it was not until the well known Rice Riots of 1918 that Japan began to look seriously to her colonies as food suppliers. The Japanese government responded to this crisis with a series of Rice Production Development Programs (*Sanmai Zoshoku Keikaku*) beginning in 1920. These plans aimed at the expansion of rice production by introducing improved seed types, increasing fertilizer input, and securing a stable water supply.[5] As a result, from 1920 to 1935, Korean agricultural output grew 1.6% per year. In particular, rice production, the dominant crop making up over half of the real value of total output, grew rapidly at 2.1% per year. Agricultural growth accelerated, especially after the mid-1920s, with the annual trend growth rate rising from 0.5% between 1920-25 to 0.9% between 1925-30 and then to 3.4% in the period 1930-35.[6]

---

4 Gragert, "Land Ownership Change," pp.128-135.

5 Ban, et al., *Rural Development*, pp.163-164.

6 Growth rates and shares are Yamada's calculation using 5-year moving averages. Yamada, "Taiwan, chosen no nogyo seisan", pp.36-38, 42. Throughout this paper, we do not consider agricultural statistics before 1918, when with the completion of the Cadastral Survey reliable aggregate data became available. Yamada, "Taiwan, chosen no nogyo seisan", p. 39 and Hayami and Ruttan, "Korean Rice," p.573, footnote 7.

Agricultural exports (mostly rice exports to Japan) increased far more rapidly than production over the period, 6.4% p.a. from 1918 to 1938. Since agricultural imports (consisting mostly of small grains like barley and millet, considered traditionally as inferior foodstuff items to rice in Asia) were far exceeded by, but expanding about as rapidly as exports, Korea's net agricultural exports increased at roughly the same high rate as gross agricultural exports. The faster growth in net agricultural exports implied a declining domestic availability of agricultural products; as population was growing, per capita agricultural consumption fell as a matter of trend during the colonial period (Figure 1).[7] Although the falling trend in per capita agricultural consumption was reversed in the early 1930s, per capita food consumption in 1938 was well below the 1918 level. Critics of the Japanese imperialism used the term "starvation exports" to express the dismal conditions imposed upon Koreans.[8]

Why did Korean agricultural development lead to a rapid expansion of agricultural exports at the expense of domestic consumption? The search for a plausible answer to this question should start by recognizing the fact that Japanese colonialism did not rely chiefly upon forced extraction of resources to generate export surpluses, but on the working of the market and on the commercial interests of farmers

---

[7] Per capita consumption here is "apparent" consumption which is defined as agricultural net production in year t-1 minus net agricultural exports in year t. Apparent consumption does not account for changes in inventory or improvements in storage capability. Kimura finds that changes in rice inventories after 1930 were small compared to total production, and there is no evidence that storage capacity improved a great deal. Kimura, "Standards of Living," pp.637-641.

[8] Other pieces of evidence exist to support this pessimistic view and to indicate that the declining per capita availability of agricultural products in interwar Korea does not constitute a case of "Food puzzle", as described by Clark, et al., "British Food Puzzle." The evidence includes a falling trend in male real wages in the primary sector and an increase in the portion of the Korean population receiving government emergency aid. Odaka, "Nihon tochi ka," p. 152; Cha, "Segye nong'op konghwang," pp. 80,81.

and landlords to bring these surpluses to Japan. If the development of a market economy was retarded in dynastic Korea due to monetary instability and lack of adequate transportation and communication, the colonial government facilitated trade by currency reforms, expansion of railroad, telegraph and telephone lines, and harbor improvement. These developments also aided better integration not only with the Japanese but also with the world market. The transition to an open economy was further stimulated by the incorporation into the yen area and low and declining levels of import duties.[9] As a result, Korean rice prices, the most important price in interwar Korea, fluctuated showing a close parallelism with those in other Monsoon Asian rice markets: Korean and Japanese rice prices moved in nearly perfect unison, and correlation between Korean and non-imperial rice prices, although weaker, remained positive and highly significant. Comovement of prices, however, was a common phenomenon during the interwar period, which could be observed, say, between Korean rice and US brick prices. This suggests that the price correlation reflects not only market integration but also the influence of aggregate shocks transmitted internationally via income flows (such as the Great Depression).[10] Whether due to Korea being a small player in an integrated world market or the synchronization of interwar business cycles, it appears indisputable that Korean prices were to a significant degree set exogenously.

Korea's susceptibility to world price shocks was clearly revealed in a sharp fall in rice prices from 1925-1931, when most other primary prices suffered an equally drastic slide. The worsening terms of trade during the interwar agricultural depression dealt a severe blow to primary producers like Korea. If the land tenancy ratio (the share of land cultivated under sharecropping contract out of total acreage) tended to rise in Korea during the colonial period, the land redistribution occurred mostly during the years

[9] Jones, "The Economic Development of Colonial Korea," pp. 64.

[10] Brandt, "Interwar Japanese Agriculture," pp.274-278 and Latham and Neal, "The International Market," p.266. The correlation coefficient between annual changes in Korean rice and US brick prices was 0.69 between 1920-36.

of world agricultural depression, as in Japan and the US. Similarly, the rise in the portion of the Korean population receiving government emergency aid was concentrated in the agricultural depression years.[11]

Using a partial equilibrium analysis of the Japanese rice economy, Hayami and Ruttan showed that the increased rice imports from colonies had sizable depressing effects on rice prices in Japan[12], which caused Japanese farmers to protest against the Program, leading to its de facto suspension in 1931 (and de jure suspension in 1934). This suggests that the fall in agricultural price was not an event driven entirely by exogenous shocks, but also influenced by an increased rice supply under the Rice Program. The Rice Program is also likely to have accentuated the impact of the agricultural depression on the land tenancy ratio by encouraging (and sometimes forcing) peasants to build dams, reservoirs and waterways by taking loans. The falling agricultural prices sharply increased the real value and service costs of their debts, which compelled many farmers to sell their land and become tenant farmers.[13]

In addition to the world agricultural depression and the Rice Production Development Program, two important imperial policy shocks could be singled out as possible causes of the declining food consumption trend: a health campaign and an increasingly heavy tax burden.

---

[11] Cha, "Segye nong'op konghwang," p. 73-75, 78-81. Gragert's study on the change in land distribution in five Korean villages from 1900-1935 shows that most of the ownership change occurred during the Great Depression. Gragert, "Land Ownership Change in Korea," chapters 5 and 6. For evidence on the impact of the agricultural depression on tenancy in Japan and the US, see Ouchi, "Agricultural Depression," p.604 and Alston, "Farm Foreclosures in the US during the Interwar Period".

[12] Hayami and Ruttan, "Korean Rice," p.584; Jones, "The Economic Development," p. 46.

[13] In Taiwan, where the bulk of irrigation projects were financed by the colonial government and as a result peasants were not as heavily indebted as in Korea, the land tenancy ratio did not rise during the agricultural depression. See the section below, where a comparison is made between interwar Korea and Taiwan. See also Jones, "The Economic Development," pp. 41, 42.

It was not until Korea's annexation in 1910 that an institutionally organized health care and medical system was introduced in Korea. Regulations on vaccinations and quarantine procedures were implemented. Public hospitals and medical colleges were set up to train the proper personnel. The government also improved the sanitary conditions in large cities by building waterworks and sewer systems. As a result, mortality rates continued to decline, with birth rates remaining stable. As a result the Korean population expanded at an increasingly faster rate, exerting ever stronger Malthusian pressure on resources. Population growth from 1920-38 recorded an unprecedentedly high rate of 1.47%.[14]

During the interwar period, when the Korean population expanded by around 30%, central and provincial government tax revenue more than tripled. This was made possible not so much by per capita income growth as by imposing increasingly onerous tax burdens on Koreans. While income tax rates (particularly non-agricultural income tax rates) registered some gains, the tax increases mainly took the

---

[14] Suh, *Growth and Structural Changes*, p. 87, Kimura, "Standards of Living," pp. 647, 648. Population growth rates were calculated using three year averages of numbers available from Mizoguchi and Umemura, *Kyu Nihon Shokuminchi Keizai Tokei*. Mortality rates fell for all age groups and for both sexes, and the drop was greatest for the young and the old. The rapid population growth also had a significant impact upon the age structure making it more "youthful" and thus lowering nutritional requirements. See Kwon et al., *The Population of Korea*, pp. 7,12,23. This implies that with more children in the population, fewer calories were required per person. By applying Mueller's consumption rate schedule which relates the consumption of young and old to that for an adult male between the age of 15 and 54 to the census population figures by age and sex, we can come up with a new "consumption population" series in adult male units. Although when we correct for the lower nutritional requirement for children (the more youthful age structure does have the effect of lowering the impact of rising population growth rates on per capita consumption trends), the downward trend still remains. Mueller, "The Economic Value of Children," p.127.

form of introducing new indirect taxes and raising existing indirect tax rates: average indirect tax rate is estimated to have increased from 3.6% in 1920 to 7.2% in 1936. The tax increases were implemented to expand public investment, rather than consumption; from 1920-36, when combined consumption by central and provincial governments rose around 50%, public savings saw an almost fourfold increase.[15] And maintaining the low tax rates in 1919, the colonial government could have comfortably paid for the rising consumption during the following two decades. As a result of the "forced saving", public investment came to account for well over 60% of interwar Korean gross domestic fixed capital formation. The expanding public investment was not financed entirely by the tax raises, but had also to be paid for by transfer from Japan, i.e. unilateral payment by the Japanese government and debts floated in the Japanese capital market.

A Dynamic Computable General Equilibrium Model of the Interwar Korean Economy

One way to separate and compare the impact of these different shocks on the consumption trend is to construct a computable general equilibrium (CGE) model of colonial Korea and run counterfactual experiments. This section presents a summary of the important features of a CGE model of the interwar Korean economy.[16] There are two sectors in this model--agriculture and non-agriculture which includes forestry, fishery, mining, manufacturing, construction and services; we do not have a separate service sector because of the unavailability of reliable data. The production functions are Cobb-Douglas by nature and identify three factor inputs of production: capital, labor, and agricultural land. Factor supply is fixed outside the model. The time path of aggregate labor supply is determined by exogenous population growth

[15] Calculated using three year averages of numbers available from various pages of Kim, *Ilcheha Choson Chaejongsa Non'go.*

[16] A model appendix describing the structure of the dynamic CGE in detail is available on request.

and participation ratio. Capital stock growth is driven by an accumulation equation, where annual gross investment volume and a constant depreciation ratio are given exogenously. Since investment is exogenous, savings are determined endogenously. This "investment-driven" model closure rule "is justified by an active participation of the state in the investment program", "a common feature in many developing countries."[17] Colonial Korea was no exception. First, more than 60% of interwar Korean domestic capital formation was accounted for by public investment, which was mainly for providing social infrastructure, i.e. railroads and better harbors and roads.[18] Second, the colonial government controlled private savings decisions in various and important ways. For instance, "implicit coercion by the Government" was instrumental in carrying out irrigation projects, undoubtedly the most important part of agricultural capital formation in colonial Korea.[19] Also "the Government-General floated compulsory savings bonds within Korea as a way of helping Japanese companies finance some of the gigantic investment projects (hydroelectric power and fertilizer plants) in northern Korea."[20]

Given capital mobility between Korea and Japan, exogenously determined interest rate and endogenous investment may be suggested as an alternative specification, which was rejected because the inflows of Japanese savings were heavily influenced by policies motivated by political considerations, such

---

[17] Sadoulet and de Janvry, *Quantitative Development Policy Analysis*, p.355.

[18] According to Peattie, "The Japanese Colonial Empire," p. 254, "The transformation of the agrarian economies of Taiwan and Korea was wrought not so much by private venture capital as by energetic, enterprising colonial bureaucracies whose policies were designed to serve the needs of the central government in Tokyo and to create conditions in the colonies that would lead to economic growth and the eventual participation of private capital."

[19] Lee, *Land Utilization and Rural Economy in Korea* , p.127.

[20] Kohli, "Where Do High Growth Political Economies Come From?" p. 1281.

as the Rice Program in the 1920s and the industrialization drive in the 1930s.[21] Similarly, notwithstanding migration on a substantial scale from Korea to Japan, labor markets in the two regions appeared to remain largely segmented, with real wages displaying neither comovement nor convergence, probably due to various legal barriers to migration.

While land is restricted to the agricultural sector, the intersectoral allocation of capital and labor and their respective returns are all endogenously determined. There are four agents in the model: landlords, farmers, urban workers, and industrial capitalists. Landlord and urban capitalist populations are fixed outside the model; the remaining working population is distributed endogenously across the two sectors to equilibrate labor markets. Landlord incomes consist solely of the rental income from their own land[22]; farmers receive the rest of the value added agricultural output, i.e. value added agricultural output from their own land, labor, and capital. Urban capitalists and workers receive rental income from capital and return on labor, respectively.

On the expenditure side, a special feature of the model is the Almost Ideal Demand System (AIDS) of Deaton and Muellbauer[23], which allows us to specify, outside the model, the income and price demand elasticities of different goods by household--an important element for studying the distributional impact of a shock.

On the trade side, dollar prices of exports and imports are set exogenously, except for the export price of agricultural products. The agricultural export price is both endogenously determined by domestic

---

[21] See below, pp. 18, 19.

[22] To be more precise, total landlords' income equals agricultural value added production times the land tenancy ratio, then multiplied by the land share parameter in the agricultural Cobb-Douglas production function. This simplified formula ignores the possibility that rents were rising over the colonial period and that productivity differed between owned and rented land.

[23] Deaton and Muellbauer, "An Almost Ideal Demand System".

production costs and affected by exogenous changes in world agricultural prices. To capture the impact of the growth of foreign (mainly Japanese) income upon Korean exports, time trends are included in export functions. Since import duties were low and declining, tariffs are not modeled.

Table 1 List of Exogenous Variables

A. External Prices
- world price of agricultural goods
- non-agricultural export price
- agricultural and non-agricultural import prices

B. Population
- total population
- landlord household population
- urban capitalist household population

C. Capital, Land and Productivity
- capital stock and gross investment
- foreign private capital inflows
- cultivated area
- land tenancy ratio
- agricultural and non-agricultural total factor productivity

D. Public Finance
- income tax rates
- indirect tax rate
- government consumption
- public transfer from Japan

Table 1 lists and classifies the exogenous variables in the model, which determine the values of endogenous variables, including sectoral output, the volume of trade, and household incomes and consumption. The model is calibrated to the base years of 1924-26, relying on data from official statistics published by the Japanese colonial government and from a database on the Japanese colonies compiled by Mizoguchi and others (see Data Appendix).

The Results from Counterfactual Experiments

This dynamic CGE model tracks closely actual changes in key endogenous variables, including both agricultural and non-agricultural output, trade, and per capita availability of agricultural goods. Figure 1 compares actual and simulated values of per capital availability of agricultural goods only.[24] In order to isolate and measure the influence of a particular shock on per capita food availability from 1919-38, I use the model to run counterfactual experiments, where some exogenous variables are held constant at their values in 1919 and all the other exogenous variables are allowed to change following their actual time paths. Then the counterfactual per capita food availability generated by these experiments is compared with the simulated per capita food availability, which obtains when all the exogenous variables change.

A. Population Growth vs. Capital Accumulation and Technological Progress

Were capital accumulation and productivity advance sufficiently fast in interwar Korea to offset diminishing returns due to population explosion? To answer this question, I run a counterfactual experiment holding external prices (control variables in Panel A of Table 1) fixed at their initial values and letting other control variables to change. Public finance variables (in Panel D, Table 1) are also changed because they affect the rate of capital accumulation in an important way via public investment. In Figure 2 are compared five year moving average of per capita food consumption produced by this experiment (solid line) with five year moving average of simulated per capita food consumption (dotted line). Counterfactual consumption falls more rapidly than simulated consumption until 1927, when its downward trend is reversed so that the counterfactual exceeds simulated consumption level at the end of the period; the rising trend in counterfactual consumption levelled off from the early 1930s, however, and as a result the level of counterfactual consumption at the end of the period is well below that at the beginning.

[24] Figures showing the tracking performance of the CGE model is included in the model appendix availble on request.

Although capital accumulation and technological progress began to outstrip diminishing returns from population growth after around 1927, over the entire period they were by no means sufficiently rapid to deal with the population pressure.

The early 1920s was a period, when population explosion was under way as a consequence of the Japanese health campaign, while a "Green Revolution" was not yet forthcoming. Although the colonial government tried to spread the use of high-yield rice varieties, two other essential elements of the Green Revolution -- an adequate irrigation system and inexpensive fertilizer -- were missing, and as a result total factor productivity grew slowly during the first phase of the Rice Production Development Program, i.e. from 1920-25 (0.9% p.a.).[25]

Although population growth accelerated after this initial period reflecting declining mortality rate due to the continued health campaign, the mounting pressure on resources began to be successfully countered with the inauguration of the second phase of the Rice Program from 1925. Recognizing that the lackluster performance of the agricultural sector in the first phase was due to inadequate irrigation, the colonial government took various measures to expand investments in waterways, dams, and reservoirs.[26] Also the establishment of chemical fertilizer plants facilitated the introduction of new seed varieties. As a consequence the growth rate of total factor productivity rose to 2.4% per year in 1925-31. One of the results from the counterfactual experiments is that the Green Revolution did turn the terms of trade against agriculture by expanding supply and thus lowering agricultural export prices, as the Japanese landlords complained during the agricultural depression. The increase in the counterfactual per capital food

---

[25] Jones, Economic Development," pp. 33-34. Hayami and Ruttan, *Agricultural Development*, pp.290, 291. Ho, Colonialism and Development," p.362.

[26] See Lee, *Land Utilization*, chapters 3 and 6.

consumption in Figure 2 shows that this adverse price effect on income was more than made up for by the increased volume of output.[27]

With oversupply, rather than shortage, of rice in the Empire becoming a growing concern during the agricultural depression, the Rice Program was suspended and replaced by an industrialization policy in the early 1930s, which attracted capital and manufacturing technology from Japan (see subsection D below). The improvement in counterfactual per capita food consumption slowed down to a snail's pace in the 1930s for two reasons. First, agricultural total factor productivity growth decelerated after the suspension of the Rice Program (2.4% in 1925-31 vs. 1.8% in 1931-36 p.a.) at the same time when population growth accelerated due to continued decline in death rates. Second, more important, in the 1930s productivity progressed more rapidly in non-agriculture (the more capital-intensive sector) than in agriculture (the less capital intensive sector) (4.1% vs. 1.8% p.a. in 1931-36). Such unbalanced productivity advance causes structural change from labor to capital intensive industry, which takes up most of the rise in the aggregate capital intensity due to capital accumulation. As a result, during the transition sectoral capital intensities, the aggregate labor demand and real wages stagnate.[28]

B. World Price Shocks

Figure 2 can also be used to evaluate the impact of external prices on per capital food consumption. The faster decline in the counterfactual food consumption in the early 1920s implies that the

[27] This result is based upon a low price elasticity value (0.8) in agricultural export supply function, which generates an upper bound measure of the fall in agricultural export prices due to expanded supply.

[28] Once the structural change is completed, real wages begin to rise pari passu with capital accumulation and productivity advance. For a rigorous exposition, see Ciccone, "Falling Real Wages during an Industrial Revolution."

shifts in world prices in this period involved an improvement in the terms of trade. The rise in the counterfactual and the fall in the simulated food consumption from the late 1920s to the early 1930s demonstrate the adverse impact on the welfare of the Korean population of the falling agricultural prices during the worldwide agricultural depression. Finally, although agricultural prices on the world market recovered from the early 1930s, comparably sluggish paces of improvement in simulated and counterfactual consumption show that the rising agricultural prices did not entail a significant gain in the terms of trade for the Korean economy, which was being industrialized.

In Figure 2 is also shown by a dashed line the counterfactual trend in per capital availability of agricultural goods, which would have prevailed had the land tenancy ratio, as well as the world prices, maintained its 1919 level. As discussed above, the rising inequality in land distribution from the mid-1920s was primarily a consequence of the world agricultural depression; at the same time the land distribution is likely to have become unequal to a smaller extent had farmers not been encouraged (or forced) to contract debts to finance irrigation investment under the Rice Production Development Program. In this sense, the solid and dashed lines in Figure 2 could be considered as boundary measures of the impact of the agricultural depression. The land transfer to landlords depressed farmers' real incomes by reducing their share of agricultural income, whereas the landlords' share increased and their income rose as a result of the land transfer. In other words the land transfer had the effect of cushioning the negative impact of the price collapse on landlord incomes while at the same time worsening it for farmers.[29] The share of agriculture being lower in well-to-do landlords' consumption expenditure than in poor peasants', the rising

[29] Gragert's study of the land records for five Korean villages from 1900 to 1935, found that during the depression, landlords and lending corporations, mainly Japanese, significantly increased their landholdings at the expense of smaller Korean landowners. Well-to-do Korean landlords also increased their landholdings during the depression through the same means. Gragert, "Land Ownership Changes," pp. 302-15.

inequality in land distribution lowers the overall level of per capita agricultural consumption, as can be seen in the solid line drawn below the dashed line. The two lines are not far apart from each other, indicating that although the land transfer did change the pattern of household incomes and consumption, the size of this effect was small.

Over the entire period, the net impact of the swing in external prices was negative: had the world prices remained at their levels in 1919, living standards would have declined more slowly (0.32% vs. 0.38% p.a.). Although world price shocks did contribute to the starvation exports, their impact was modest in comparison with population pressure: around four fifths of 2.48 yen decline in simulated per capita food consumption from 1921-36 was due to diminishing returns not countered by capital accumulation and productivity advance, and the remaining one fifth was accounted for by the adverse turn in the terms of trade.

C. Fiscal Policy

Did the introduction of new taxes and increase in existing tax rates depress consumption in colonial Korea? This question would be a trivial one, to be answered in the affirmative, had the expanding tax receipts been used to finance public consumption, where the share of non-agricultural goods could reasonably be assumed to be higher than in private consumption. As in Meiji Japan, the tax raises were implemented not to finance public consumption, but to set up government enterprises and to build railways, roads, harbors, dams, waterways. Increased public investment financed by higher taxes has the effect of reducing incomes and consumption today, but raising output and consumption tomorrow by accelerating capital accumulation. Whether rising tax rates and public investment improve living standards or not depends upon which of these two effects proves to be dominant.

An upper bound measure of the impact of this "forced saving" can be obtained by a counterfactual experiment, where tax rates are fixed at their (low) 1919 levels and exogenous annual gross investment is

reduced by the difference between actual and (smaller) counterfactual tax revenue, calculated using the 1919 tax rates. Figure 3 shows that the counterfactual exceeds simulated per capita availability of agricultural goods until 1928: up to 1928 the positive effect of the low tax rates on disposable incomes and consumption outweighed their negative impact of slower capital accumulation and growth. From 1929 counterfactual consumption is exceeded by simulated consumption, indicating that capital augmenting effect of higher tax rates prevailed over their instantaneous consumption reducing effect. The reason for this reversal is because in the 1930s industry, a capital intensive sector relatively to agriculture, began to play an increasingly important role in the economy (see the following subsection D).

This counterfactual food consumption trend is extreme, because the hypothetical increase of disposable incomes in the absence of tax raises is unlikely to have been translated entirely into consumption expansion; rather a part of the increased income would have been saved. A more realistic counterfactual per capita food availability would therefore run between the solid and dotted lines shown in Figure 3. Whatever the degree may have been to which the foregone public savings were replaced by an increase in private savings, the conclusion remains that without the tax raises per capita food consumption would have fallen somewhat more rapidly in interwar Korea.[30]

Finally, Figure 4 shows the impact of the public transfer from Japan which paid for a significant portion of the pubic investment. Without the transfer payment, annual public investment would have been reduced by the amount of the transfer payment. As a consequence, capital accumulation would have been slowed down, leading not only to lower levels of output and consumption, but also slightly more rapid decline in living standards.

---

[30] If, as seemed likely to be the case, the colonial public enterprises were set up to provide public goods or in those sectors displaying economies of scale in production, the true extent of improvement in living standards due to tax raises would be significantly larger than can be inferred from Figure 3. Aschauer, "Is Public Expenditure Productive?", p. 180.

D. Causes of the Reversal in the early 1930s

Although the amount of food available for an average Korean on the eve of WWII was smaller than that by the end of WWI, the interwar food consumption trend included two segments, a longer period of decline up to the early 1930s, followed by a shorter period of incomplete recovery (Figure 1). What caused the reversal?

From the early 1930s several events occurred to halt the declining food consumption trend, which included continued advance in agricultural productivity, and stabilization of the land tenancy ratio, and possibly the recovery of agricultural prices in the world market following the agricultural depression. It was also in the 1930s that industrialization took off in Korea. If in the 1910s and 1920s the colonial government was reluctant to encourage manufacturing enterprises, which might compete with Japanese industries, Korea's industrialization began to accelerate from the early 1930s in the wake of both Japan's recovery from the Great Depression and growing militarism.[31]

Japan abandoned the gold standard in December 1931 causing the yen to depreciate by roughly 40%, which stimulated export demand for Japanese goods. Also being off gold and unfettered by external constraints enabled Japan to adopt expansionary fiscal and monetary policies, initiating investment booms

[31] The Corporation Law in the 1910s hindered industrial growth by requiring that new enterprises obtain a charter from the colonial government. Also an absence of protective tariffs may have impeded the emergence of infant industries. Under such circumstances, the secondary sector's share in net domestic product stagnated around 8% until the early 1930s. As a result of the industrialization the ratio rose to 18% by 1938. Calculated from Mizoguchi and Umemura, *Kyu Nihon Shokuminchi Keizai Tokei*, pp.238-239.

in Japan. [32] Japan's recovery seemed to affect Korea both directly and indirectly: the surge in investment activity spilled over into Korea, while the recovery in Japan had the effect of increasing Japan's demand for raw material imports from Korea.

Japan's invasion of Manchuria in 1931 forced a reexamination of Korea's strategic role in Japan's overall policy for Asia. Since Korea was ideally located to launch an invasion into China, the colonial government hoped to transform Korea into a military supply base by encouraging large Japanese industrial groups to set up heavy industry in Korea through various subsidies and tax breaks.[33]

Which of these shocks was the most important factor to reverse the falling trend in living standards in the early 1930s? In Figure 5 are shown different hypothetical per capita food consumption paths which would have prevailed had each of these events in turn been absent.[34] First, had Japan stayed on the gold standard, the terms of trade would have improved, and as a result per capital food availability would have been higher and risen with greater speed from 1932. Second, shifts in external prices after 1931 did not have a significant influence upon living standards; if any, the impact of the price shocks turned slightly negative in the mid-1930s. Although agricultural prices rose more rapidly than non-agricultural prices on the world market, such price shifts did not imply an improvement, but a deterioration in the terms of trade in the mid-1930s, when manufacturing acquired a fairly important position in the Korean economy. Third, had there been no advance in agricultural total factor productivity after 1931, the declining food consumption trend could not have been reversed. Finally, but for the industrialization drive,

---

[32] For the background of Japanese recovery see Nanto and Takagi, "Korekiyo Takahashi and Japanese Recovery," pp.371-373 and Yasuba, "The Japanese Economy and Economic Policy in the 1930s", pp.145-147.

[33] Suh, *Growth and Structural Changes*, pp.12,13.

[34] Note that in Figure 5 simulated and counterfactual consumptions begin to diverge not after 1932, but after 1929, because these are five year moving averages.

the downward trend in per capita food consumption would have not only continued, but also accelerated.[35] In short, it was the industrialization that played a key role in reversing the falling trend in Korean living standards in the early 1930s.

E. Summary

Falling food consumption trend in interwar Korea was set in motion as a Malthusian phenomenon. During the first phase of the Rice Production Development Program (1920-1925) the terms of trade improved, capital accumulation was in progress, total acreage was being expanded, and advanced farming techniques were disseminated. Without an adequate irrigation system and fertilizer input, these changes were not sufficient to deal with diminishing returns from population explosion triggered by the Japanese health campaign. Although under the second phase of the Rice Program starting in 1925 both the expansion of irrigation and increased use of chemical fertilizer began to generate sufficient productivity effects to offset population pressure, living standards continued to worsen until the early 1930s under the influence of the worldwide agricultural depression. The agricultural depression lowered living standards not only by deteriorating the terms of trade, but also by redistributing land away from farmers and towards landlords. The declining food consumption trend was halted in the early 1930s due to both continued (albeit slower) progress in agricultural technology and an industrialization drive. The recovery in the 1930s was slow and incomplete, largely because the latter held back the increase in sectoral capital intensities and real wages. As a result per capita food availability on the eve of W.W.II remained below that at the end of W.W.I. The overall downward drift in food consumption was predominantly a Malthusian

[35] The no industrialization drive counterfactual is represented by zero private foreign capital inflow, correspondingly lower domestic capital formation, and fixed non-agricultural total factor productivity at its 1931 level.

phenomenon. Although the colonial government made extensive efforts to encourage capital accumulation and productivity advance, these were prevailed over by accelerating population growth triggered by the health campaign. The net effect of population growth on the one hand and capital accumulation and technological progress was negative, accounting for around four fifths of the fall in per capita food consumption. Interwar Korea experienced a net deterioration in the terms of trade, which was responsible for the remaining one fifth of the decline in food consumption.

A Comparison with Other Interwar Primary Producers

Other major rice producing regions in Asia appeared to suffer a more painful decline in per capita food consumption during the interwar period than Korea. Per capita food availability (calculated at 1924/6 prices) fell from 45.5 yen in 1919/21 to 45 yen in 1936/38 (a 1% fall) in Korea. In British India, per capita availability of food grains rose from 0.2 ton in 1891 to 0.22 ton in 1921, only to be reduced to 0.16 ton in 1941 (a 27% fall). A similar trend is found in the per capita rice retained in Thailand, which increased from 1.8 piculs in the late 1900s to a peak of 2.8 piculs in the early 1920s, and fell back to 1.7 piculs in the late 1930s (a 39% fall). Also daily caloric intake in colonial Java registered a greater decline than in Korea, from 1850 calories in 1921 to 1750 calories in 1938 (a 5% fall), which was nevertheless not so bad as in either India or Thailand.[36] Outside Asia, a falling interwar food consumption trend is not readily found. While quantitative information is apparently lacking for colonial Africa, Wrigley's verdict is that "a general improvement in the standard of living ... can be noticed in the more favored territories from the

36 Heston, "National Income," p. 413; Ingram, *Economic Change in Thailand*, p.53; Geertz, *Agricultural Involution*, p.96. The per capita rice supply tended to decline from 1880 to the early 1940s, whereas the per capita cassava supply rose from 1880-1920, and stagnated in the following two decades in Java. See van der Eng, *Agricultural Growth in Indonesia*, p.169, Figure 4.1.

beginning of the period[1905-1940] and in nearly all of them by its half-way mark ... the main improvement is likely to have been in diet... people on the whole were eating a little better."[37] In the late 1920s and the late 1930s, the amount of wheat flour consumed by an Argentine barely changed, and per capita consumption of mutton and pork rose by more than 40%, whereas beef consumption fell 5%.[38] The per capita availability of wheat in Australia seemed to be rising slowly in the interwar period.[39]

These contrasting interwar experiences are not readily explained by differing courses of movement in the terms of trade: neither Asian rice producers nor primary producers outside Asia witnessed significant net improvement or deterioration in the terms of trade during the interwar years.[40] Consumption trends in the periphery, instead, seemed to depend chiefly upon the race between population growth on the one hand and acreage expansion and productivity advances on the other.

Contacts with the industrialized West from the early nineteenth century on, whether via colonialism or a trade relationship, brought modern medical knowledge and improved transportation and communication to undeveloped areas, which helped to eliminate two major checks on population growth, disease and famine. The Indonesian population growth rate, which remained well below 1% p.a. until the mid-nineteenth century, rose to 1.2% between 1840 and 1870, 1.4% from 1870-1939, and 2.1% from 1950-1973. If Africa suffered a demographic decline during the first two decades following the European

---

[37] Wrigley, "Aspects of Economic History," pp.137, 138.

[38] Calculated from Diaz-Alejandro, *Essays on the Economic History of the Argentine Republic*, pp. 421, 498. The consumption trend is consistent with rising Argentine real wages during the interwar period, shown on p. 42.

[39] Mitchell, *International Historical Statistics: Americas and Australasia*, pp. 53, 264, 362.

[40] Thorp, *Latin America in the 1930s*, p.331; Schedvin, "Staples," p. 554; van der Eng, *Agricultural Growth*, p. 17; Feeny, "Infrastructure Linkages," pp. 6, 7; McAlpin, "Price Movements," p.894; Hopkins, "Economic History of West Africa," pp. 180, 181.

colonial conquest, population is estimated to have grown at an annual rate between 1% and 1.5% during the period 1920-40, which was followed by a 2% plus expansion after W.W.II. Evidence exists to show that a population explosion was well under way also in interwar India and Thailand. Settler economies like Argentina and Australia recorded even higher population growth rates, aided by immigration.[41]

In primary producing areas outside Monsoon Asia with relatively low initial population densities and abundant land, the population explosion need not entail Malthusian deterioration in living standards. In colonial Africa, "population was nearly everywhere denser in 1940 than it had been in 1905, or in 1880. But apart from areas where alienations to white land owners had created artificial scarcity, it was only in a few special districts ... that there was yet any real pressure on the land, or any serious threat to the ancient assumption that everyone had a right to enough land for his subsistence."[42] If abundant land attracted a large number of immigrants before the First World War to settler economies, the closing of frontiers in the interwar period led to reduced levels of immigration, which seem to have helped stave off population pressure.[43]

In Asian countries with limited room for acreage expansion and/or stagnant agricultural technology, the interwar population explosion could only result in declining living standards. While population grew 28% between 1921-41 in British India, the cultivated area was hardly enlarged, and food grain yield

---

[41] Maddison, "Dutch Income," p. 655; Wrigley, "Aspects of Economic History," pp. 135, 138, 139; Visaria and Visaria, "Population," p. 490; Ingram, *Economic Change*, p.46; Taylor, "External Dependence," p. 913.

[42] Wrigley, "Aspects of Economic History," p.139. Wrigley argues that colonial Africa was a high wage area like Australia and the USA, and that a "backward bending labor supply is also applicable in some parts of colonial Africa" (p.123, 124).

[43] Taylor, "External Dependence," p. 913.

declined.[44] In colonial Java, population growth started to accelerate in the mid-nineteenth century (earlier than in most Asian rice producers), which in the absence of a major technological breakthrough led to "agricultural involution".[45] Although Thailand seemed to have a greater room for acreage expansion, extensive growth encountered a rapidly falling rice yield after the First World War.

One of the important causes of such technological stagnation seemed to lie in the conservatism of laissez faire policy, which remained a rule rather than an exception in the interwar world. If governments of many present-day developing areas are accused of failures of commission (e.g. high-cost public enterprises), most interwar Asian governments appeared guilty of failures of omission (e.g. not providing adequate amount of infrastructure facilities).[46] In this sense, Charlesworth argues "Indian development was inhibited not by exploitative overtaxation, but by undertaxation and consequent government inability to play an energetic role." And Pray found evidence suggesting that greater investment in agricultural research, extension and education or irrigation by the British colonial government would have improved the Indian welfare.[47] If the falling rice yield in Thailand was due to the lack of a major investment in irrigation, Feeny attributes the underinvestment in water control to the fact that keeping independence in the face of an imperialist threat took precedence over economic growth as the Thai government's policy goal.[48]

---

[44] Mitchell, *International Historical Statistics: Asia and Africa*, p. 143; Pray, "The Impact of Agricultural Research in British India."

[45] Geertz, *Agricultural Involution.*

[46] Krueger, "Government Failures in Development," pp. 10, 16, 17.

[47] Pray, "The Impact of Agricultural Research in British India," pp. 431-434; Charlesworth, "British Rule," p. 67.

[48] Ingram, *Economic Change*, pp. 48, 49; Feeny, "Paddy, Princes and Productivity," p.142.

Similarly suffering population pressure on resources, Korea differed in being ruled by a developmental state[49], whose growth-promoting interventions went far to counter diminishing returns due to population explosion, mitigating, if not blocking, the decline in living standards. In interwar Taiwan, another Japanese colonial possession acquired in 1895, developmental policies proved more effective. While both Korea and Taiwan served as agricultural suppliers to Japan and were exposed to more or less the same set of shocks, the Taiwanese enjoyed a substantially higher and rising level of consumption despite a substantially faster population growth (2.39% vs. 1.47% per year in Taiwan and Korea, respectively).[50] Taiwan benefited from climatic conditions permitting double-cropping and the presence of greater room for land expansion. And colonial protection of the Taiwanese sugar industry - paid for by the Japanese - probably helped the Taiwanese to tide over the agricultural depression.[51] Perhaps more importantly, agricultural productivity improved rapidly enough in Taiwan to outweigh the demographic pressure, as well as the terms of trade shocks in the late 1920s and early 1930s. The higher rate of productivity advance in Taiwan was attributable chiefly to the faster increase in the irrigation ratio, facilitating the introduction of high yield seed varieties.[52] Interwar Taiwan could afford to devote more resources to water control, because, being colonized fifteen years earlier than Korea, Taiwan had a more

---

[49] Kohli, “Where Do High Growth Political Economies Come From?”

[50] Ho, *Economic Development of Taiwan 1860-1970*, pp. 97-98. For other evidence showing improvement in Taiwanese living standards, see Chang, "A Study of the Living Conditions," Table 17.

[51] Lockwood, *Economic Development of Japan*, pp. 386, 387; Yamada, "Taiwan, chosen no nogyo seisan," p.40.

[52] *Ibid*, Tables 9-5, 9-7. Yamada, "Taiwan, chosen no nogyo seisan" pp.42, 43, Table 4-9. In Taiwan land productivity rose at an annual rate of 3.1% from 1920-35, almost three times as rapid as the Korean rate of 1.1%.

prosperous agriculture. This allowed the colonial government to run large budget surpluses and to use them to help finance the cost of infrastructure projects. In contrast, the colonial government in Korea had to rely on a transfer from the Japanese government to make up its chronic budget deficits, and costs of building irrigation works had to be financed mostly by peasants' debts.[53]

Dutch Indonesia seemed one of the uncommon cases outside the Japanese Empire, where growth-promoting policies were implemented on a substantial scale to deal with demographic pressure on living standards. Dutch colonial government intervened actively both to disseminate seed-fertilizer technology and to provide irrigation. The government was more successful in the latter than in the former due to "practical problems caused by the propensities of the indigenous types of rice varieties ..., such as unfavourable reaction to nitrogen fertilizer and superior quality."[54] The policy measures, nevertheless, allowed colonial Indonesia to avoid such drastic deterioration in food consumption as seen in other part of southeast Asia.

Conclusions

Studies of interwar Korean economic history have been preoccupied with Korea's colonial status, and the "starvation exports" phenomenon tended to be seen as evidence of Japan's forced extraction of resources out of the colony. In this paper, interwar Korea is portrayed as a market economy exposed not only to various colonial economic interventions, but also to shocks generated by the world economy. A dynamic computable general equilibrium model of the interwar Korean economy was constructed to

[53] Kimura, "Public Finance in Korea under Japanese Rule"; Twu, *Nihon Teikokushugi ka no Taiwan*, p.80.

[54] van der Eng, *Agricultural Growth in Indonesia*, p. 250. See also Maddison, "Dutch Income," pp.342-345.

isolate and measure the impact of a particular policy or shock. Counterfactual experiments using the model indicate that the downward consumption trend was primarily caused by population explosion initiated by a health campaign, and aggravated by the interwar agricultural depression. While the colonial government imposed increasingly heavier tax burdens on the Korean people, the fiscal extraction helped to mitigate, rather than aggravate, the population pressure over the long run, for the expanding tax receipts were used to finance public investment. More important, the colonial government promoted a "Green Revolution" and an industrialization drive. All these efforts however proved less than adequate to overcome the population pressure, to a significant extent because the structural change led by the faster productivity improvement in manufacturing in the 1930s prevented sectoral capital intensities and real wages from rising. Had the war not intervened, at the end of this transiton caused by the unbalanced productivity advance real wages would have started to rise *pari passu* with capital accumulation and productivity advance.

Colonized fifteen years earlier than Korea, Taiwan had a far more prosperous economy, which could better afford to invest in irrigation, an important element of the "Green Revolution." With fast expanding irrigated area and agricultural productivity, the Taiwanese could enjoy rising living standards in the face of population explosion and the agricultural depression. Exposed to demographic and world price shocks of similar magnitude, interwar Asia outside the Japanese Empire (with a possible exception of Dutch Indonesia) suffered severer declines in per capita food consumption, mainly because governments, committed to the laissez-faire principle, failed adequately to counteract these adverse shocks.

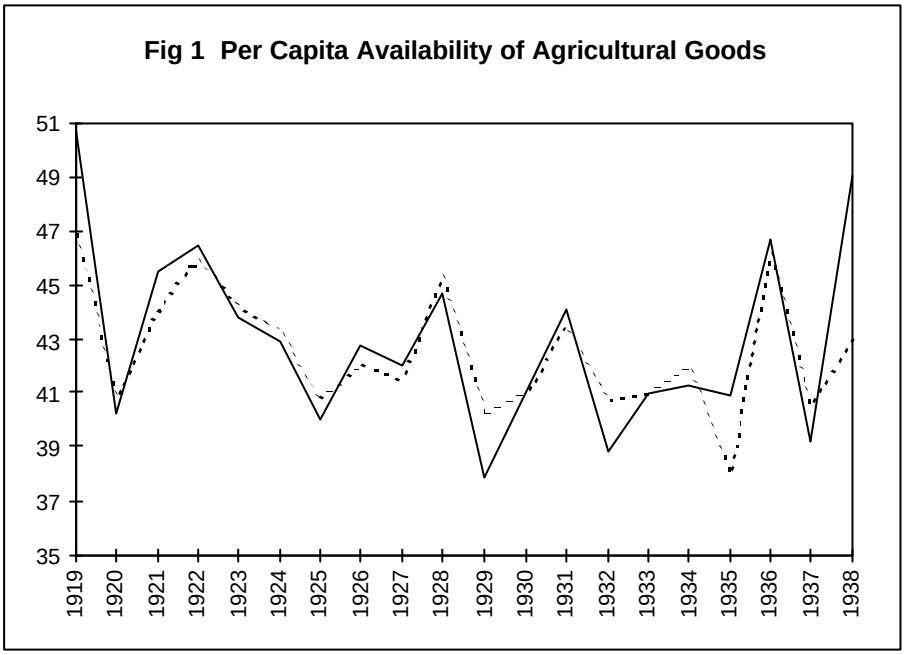
Data Appendix

Quantitative information required to build the CGE model of interwar Korea is taken mostly from *Chosen Sotokufu Tokei Nempo* (Statistical Yearbook of the Government-General of Korea), *Chosen Kokusei Chosa Hokoku* (National Census Reports of Korea) and the statistical volume produced by

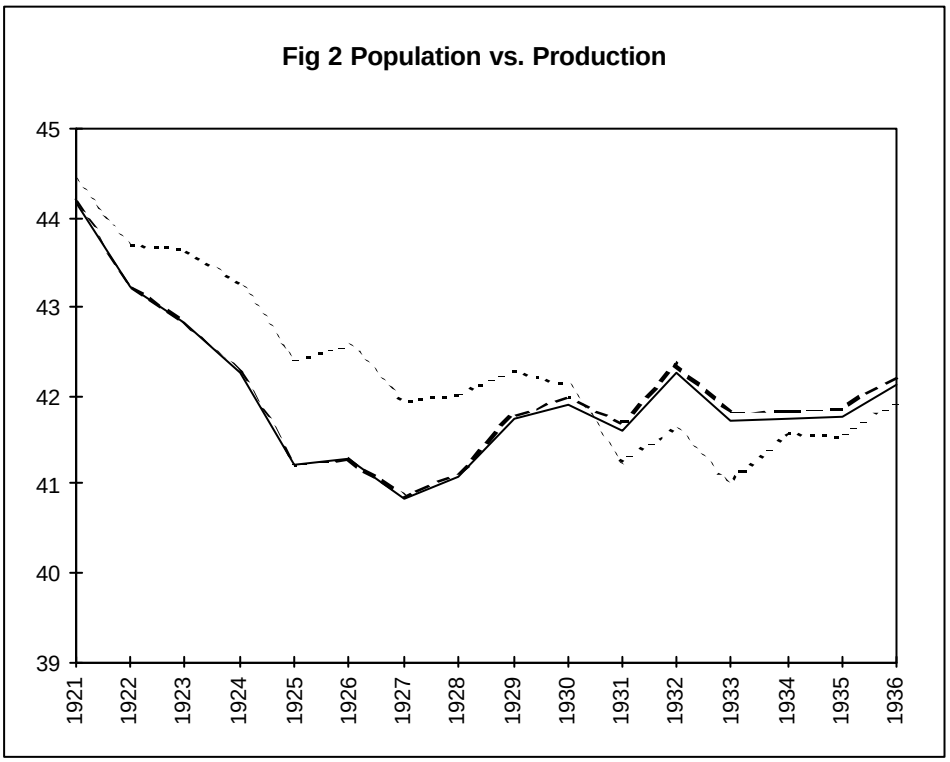
collective efforts led by Professors Mizoguchi and Umemura, *Kyu Nihon Shokuminchi Keizai Tokei* (Basic Economic Statistics of Former Japanese Colonies). Mizoguchi's volume estimates based upon 1934/6 prices were converted into 1924/6 constant price series. Since Mizoguchi's estimate of capital stock does not include agricultural capital stock in northern Korea, we made an adjustment for the geographical undercoverage. Other sources of data include the gross value added ratio in Korean agriculture estimated by Ban[55] and Nishikawa and Koshihara's estimate of the net value added ratio in the Japanese service sector of 1935, which was used to derive the Korean gross service production.[56]

[55] Ban, "Agricultural Growth in Korea," p.24.

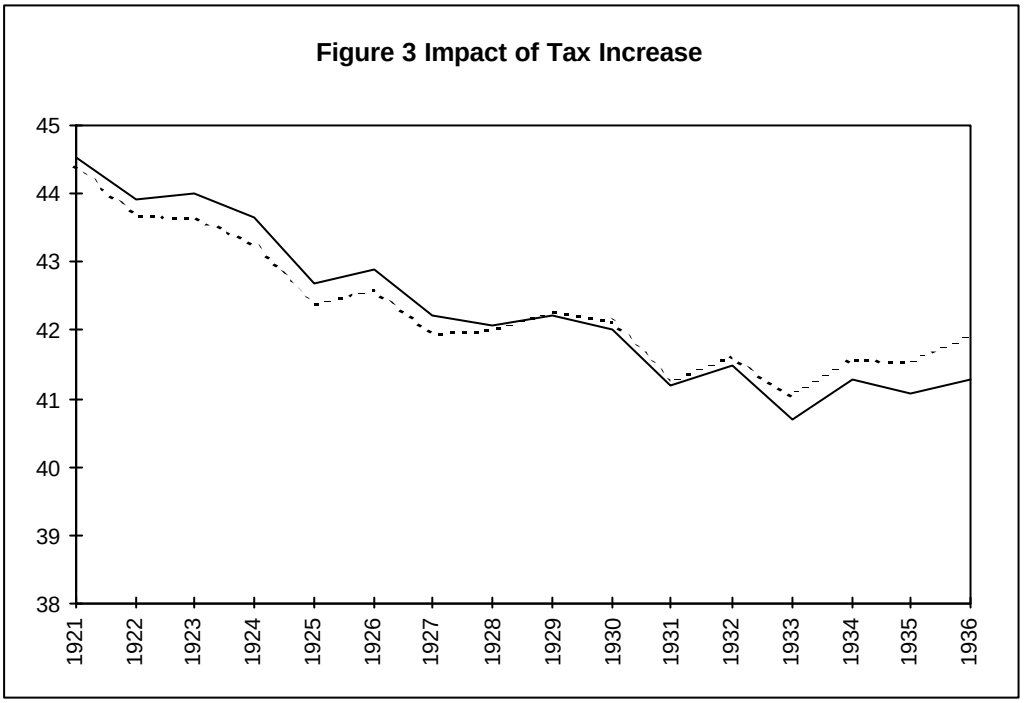
[56] Nishikawa and Koshihara, "1935 nen no tonyu sanshutsu-hyo".



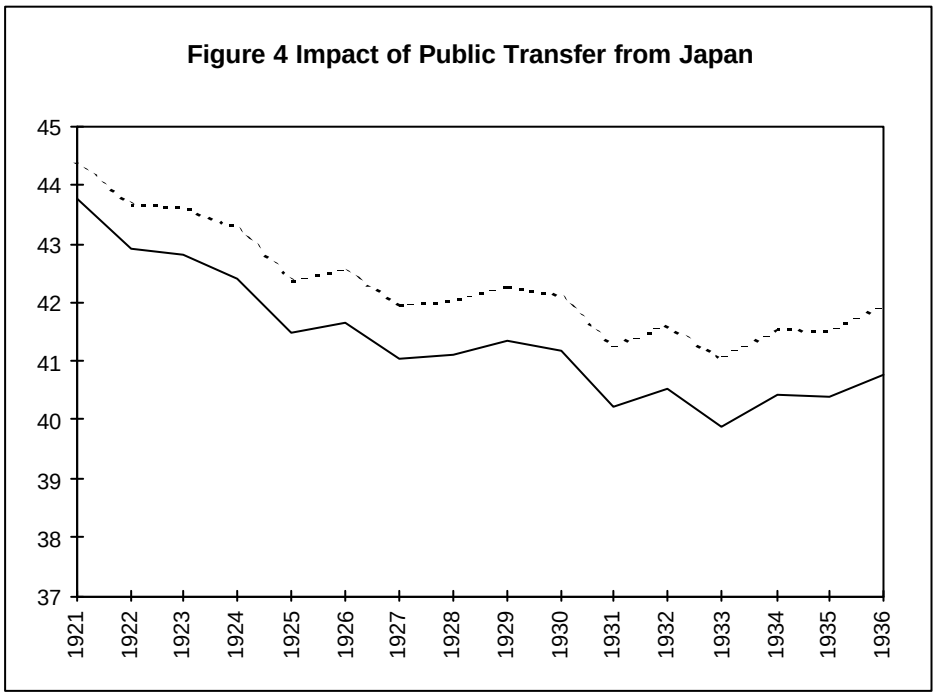
Notes: solid line - actual value; dotted line - simulated value.



Notes: 1) five year moving averages; 2) dotted line - simulated value; 3) solid line - counterfactual value with world prices held constant; 4) dashed line - counterfactual value with world prices and the land tenancy ratio held constant

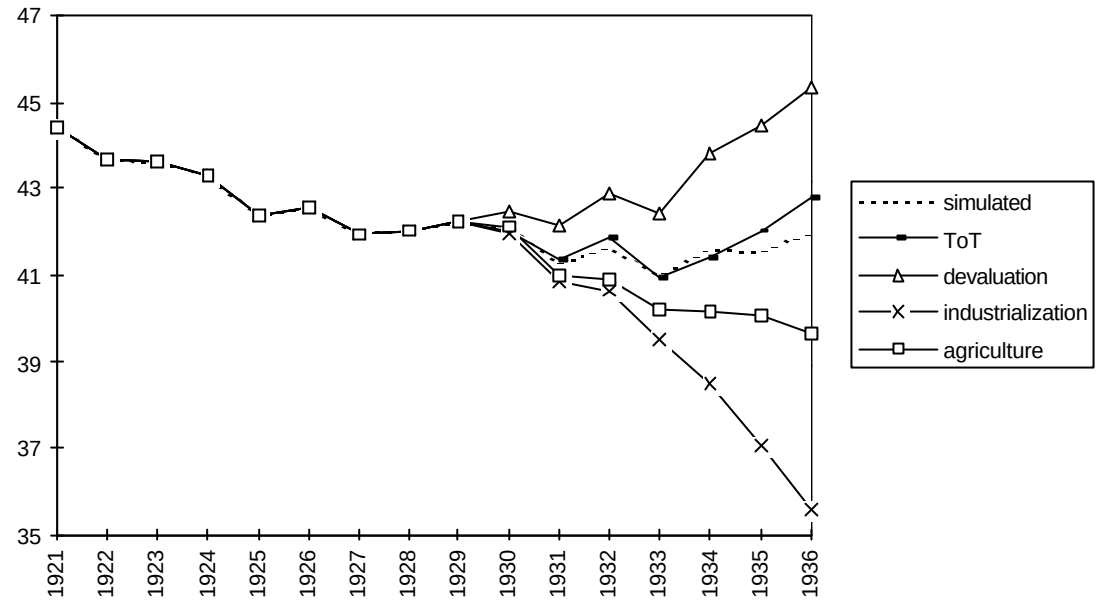


Notes: 1) five year moving averages; 2) dotted line - simulated value; 3) solid line - counterfactual value with constant tax rates.



Notes: 1) five year moving averages; 2) dotted line - simulated value; 3) solid line - counterfactual value with zero transfer from Japan.

Figure 5 Causes of Recovery in the 1930s



Note: five year moving averages.

References

Alston, Lee, "Farm Foreclosures in the US during the Interwar Period," *Journal of Economic History*, 43 (Dec. 1983), pp. 885-903.

Aschauer, David, "Is Public Expenditure Productive?," *Journal of Monetary Economics*, 23 (1989), pp. 177-200.

Ban, Sung Hwan, "Agricultural Growth in Korea," in Yujiro Hayami, Vernon Ruttan and H. M. Southworth, eds., *Agricultural Growth in Japan, Taiwan, Korea and the Philippines* (Hawaii, 1979), pp. 90-116.

Ban, Sung Hwan, Pal Yong Moon, and Dwight H. Perkins, *Rural Development* (Cambridge, Mass., 1980).

Brandt, Loren, "Interwar Japanese Agriculture: Revisionist Views on the Impact of the Colonial Rice Policy and the Labor-Surplus Hypothesis," *Explorations in Economic History*, 30 (July 1993), pp.259-93.

Cha, Myung Soo, "Segye nong'op konghwang kwa ilcheha choson kyongje" (Interwar Agricultural Depression and the Korean Economy under Japanese Rule), *Kyongje' sahak*, 15 (Dec. 1991), pp. 67-97.

Chang, Han-yu, "A Study of the Living Conditions of Farmers in Taiwan 1931-1950," *The Developing Economies*, 7 (March 1969), pp.35-62.

Charlesworth, Neil, *British Rule and the Indian Economy 1800-1914* (London, 1982).

Chosen Sotokufu, *Chosen Sotokufu Tokei Nempo* (Statistical Yearbook of the Government-General of Korea) (Seoul, 1912-1942)

Chosen Sotokufu, *Showa 5 nen Chosen Kokusei Chosa Hokoku* (National Census of Korea in 1930) (Seoul, 1932-1935), vols. 1, 2.

Ciccone, Antonio, "Falling Real Wages during an Industrial Revolution," Universitat Pompeu Fabra Economics Working Paper 195 (October 1996).

Clark, Gregory, Michael Huberman and Peter Lindert, "A British Food Puzzle," *Economic History Review*, 48 (May 1995), pp. 215-237.

Deaton, Angus and John Muellbauer, "An Almost Ideal Demand System," *American Economic Review*, 70 (June 1980), pp. 312-326.

Dervis, K., J. de Melo, and S. Robinson, *General Equilibrium Models for Development Policy* (Cambridge, 1982).

Diaz-Alejandro, C., *Essays on the Economic History of the Argentine Republic* (New Haven, 1970).

Fieldhouse, D. K. *Colonialism, 1870-1945* (London, 1983).

Feeny, D., "Paddy, Princes, and Productivity," *Explorations in Economic History* 16 (Apr. 1979), pp.132-150.

Feeny, D., "Infrastructure Linkages and Trade Performance: Thailand, 1900-1940," *Explorations in Economic History* 19 (Jan. 1982), pp.1-27.

Geertz, C., *Agricultural Involution: the Process of Ecological Change in Indonesia* (Berkeley, 1963).

Gragert, E. H., "Land Ownership Change in Korea under Japanese Colonial Rule, 1900-1935" (Ph.D. diss., Columbia, 1982).

Hayami, Yujiro and Vernon Ruttan, "Korean Rice, Taiwan Rice and Japanese Agricultural Stagnation: An Economic Consequence of Colonialism," *Quarterly Journal of Economics*, 84 (Nov. 1970), pp. 562-589.

Hayami, Yujiro and Vernon Ruttan, *Agricultural Development: An International Perspective* (Baltimore, 1985).

Heston, A., "National Income," in Kumar, D., ed., *The Cambridge Economic History of India*, vol. 2 (Cambridge, 1983), pp. 376-462.

Ho, Samuel, *Economic Development of Taiwan 1860-1970* (New Haven, 1978).

Ho, Samuel, "Colonialism and Development: Korea, Taiwan, and Kwantung," in Myers, Ramon H. and Mark R. Peattie, eds., *The Japanese Colonial Empire, 1895-1945* (Princeton, 1984), pp. 347-98.

Hopkins, A. G., *An Economic History of West Africa* (London, 1973).

Ingram, J. C., *Economic Change in Thailand, 1850-1970* (Stanford, 1971).

Jones, S. R., "The Economic Development of Colonial Korea," (Ph.D. diss., Michigan, 1984).

Kim, O. *Ilcheha Choson Chaejongsa Non'go* (A Study on the Public Finance in Korea under Japanese Rule), (Seoul, 1994).

Kimura, Mitsuhiko, "Public Finance in Korea under Japanese Rule: Deficit in the Colonial Account and Colonial Taxation," *Explorations in Economic History*, 26 (July 1989), pp. 285-310.

Kimura, Mitsuhiko, "Standards of Living in Colonial Korea: Did the Masses Become Worse Off or Better Off under Japanese Rule?", this JOURNAL, 53 (Sept. 1993), pp. 629-52.

Kohli, Atul, "Where Do High Growth Political Economies Come From? The Japanese Lineage of Korea's "Developmental State"," *World Development* (volume 9, 1994), pp. 1269-93.

Krueger, A., "Government Failures in Development," Journal of Economic Perspectives, 4 (Summer, 1990), pp. 9-23.

Kwon, Tae Hwan, Hae Young Lee, Yunshik Chang, and Eui-young Yu, *The Population of Korea* (Seoul, 1973).

Latham, A. J. H. and Larry Neal, "The International Market in Rice and Wheat, 1868-1914," *Economic History Review*, 36 (May 1983), pp. 260-80.

Lee, Hoon K., *Land Utilization and Rural Economy in Korea* (Oxford, 1936).

Lockwood, W. W., *The Economic Development of Japan* (Princeton, 1968).

McAlpin, M., "Price Movements and Fluctuations in Economic Activity," in Kumar, D., ed., *The Cambridge Economic History of India*, vol. 2 (Cambridge, 1983), pp. 878-904.

Maddison, A., "Dutch Income in and from Indonesia 1700-1938," *Modern Asian Studies*, 23 (1989), pp. 645-70.

Mitchell, B. R., *International Historical Statistics: Americas and Australasia* (London, 1983).

Mitchell, B. R., *International Historical Statistics: Asia and Africa* (London, 1982).

Mizoguchi, Toshiyuki and Noriyuki Nojima, "Kokumin keizai keisan" (National Income Calculation), in Toshiyuki Mizoguchi and Mataji Umemura, eds., *Kyu Nihon Shokuminchi Keizai Tokei* (Economic Statistics of Former Japanese Colonies) (Tokyo, 1988), pp.137-143.

Mizoguchi, Toshiyuki, and Mataji Umemura, eds., *Kyu Nihon Shokuminchi Keizai Tokei* (Basic Economic Statistics of Former Japanese Colonies, 1895-1945) (Tokyo, 1988).

Mueller, E., "The Economic Value of Children in Peasant Agriculture," in R. G. Ridker, ed., *Population and Development* (Baltimore, 1976), pp.98-153.

Myers, Ramon H. and Saburo Yamada, "Agricultural Development in the Empire," in Ramon. H. Myers and Mark R. Peattie, eds., *The Japanese Colonial Empire, 1895-1945* (Princeton, 1984), pp. 420-454.

Nanto, Dick. K. and Shinji Takagi, "Korekiyo Takahashi and Japanese Recovery from the Great Depression,." *American Economic Review, Papers and Proceedings*, 75 (May 1985), pp.369-74.

Nishikawa Koshihara, "1935 nen no tonyu sanshutsu-hyo" (Input Output Table for 1935), in Takafusa Nakamura, ed., *Sengangi Nihon Keizai Seicho Bunseki* (Analysis of Interwar Japanese Economic Growth) (Tokyo, 1980), pp. 53-74.

Odaka, K., "Nihon tochi ka ni okeru chosen no rodo keizai" (Labor Economy in Korea under Japanese Rule), *Keizai Kenkyu*, 26 (Apr. 1975), pp. 145-158.

Ouchi, Tsutomu, " Agricultural Depression and Japanese Villages," *The Developing Economies*, 5 (May 1967), pp. 597-627.

Peattie, M. R., "The Japanese Colonial Empire, 1895-1945," in Duus, P., ed., *The Cambridge History of Japan*, vol. 6 (Cambridge, 1988), pp. 217-270.

Pray, Carl, E., "The Impact of Agricultural Research in British India," this JOURNAL 44 (June 1984), pp. 429-440.

Schedvin, C. B., "Staples and Regions of Pax Britannica," *Economic History Review* 43 (Nov. 1990), pp. 533-559.

Suh, Sang-Chul, *Growth and Structural Changes in the Korean Economy* (Cambridge, Mass, 1978).

Taylor, Alan, "External Dependence, Demographic Burdens, and Argentine Economic Decline after the Belle Époque," this JOURNAL 52 (Dec. 1992), pp. 907-936.

Thorp, R., ed., *Latin America in the 1930s* (London, 1984)

Tohata, Seiichi and Kazushi Ohkawa, "Chosen beikoku keizairon" (rev. edn.) (Rice Economy in Korea), in Nihon Gakujutsu Shinkokai, ed., *Beikoku Keizai no Kenkyu* (Studies in Rice Economy) (Tokyo, 1939), vol. 1, pp. 297-446.

Twu, T., *Nihon Teikokushugi ka no Taiwan* (Taiwan under Japanese Colonialism) (Tokyo, 1975).

Visaria, L. and P. Visaria, "Population," in Kumar, D., ed., *The Cambridge Economic History of India*, vol. 2 (Cambridge, 1983), pp. 463-532.

Yamada, Mitsuo, "Kyu nihon teikoku no keizai kozo" (Economic Structure of Former Japanese Empire), in Mizoguchi, Toshiyuki, and Mataji Umemura, eds., *Kyu Nihon Shokuminchi Keizai Tokei* (Economic Statistics of Former Japanese Colonies) (Tokyo, 1988), pp. 3-13.

Van der Eng, P., *Agricultural Growth in Indonesia* (New York, 1996).

Yamada, Saburo, "Taiwan, chosen no nogyo seisan" (Agricultural Production in Taiwan and Korea), in Mizoguchi, Toshiyuki, and Mataji Umemura, eds., *Kyu Nihon Shokuminchi Keizai Tokei* (Economic Statistics of Former Japanese Colonies) (Tokyo, 1988), pp. 35-46.

Yasuba, Yasukichi, "The Japanese Economy and Economic Policy in the 1930s", in Gregory, R. G. and N. G. Butlin, eds., *Recovery from the Depression* (Cambridge,1988), pp.135-147.

Wickizer, V. D. and M. K. Bennett, *The Rice Economy of Monsoon Asia* (Stanford, 1941).

Wrigley, C. C., "Aspects of Economic History," in Roberts, A.., ed., *The Cambridge History of Africa*, vol. 7 (Cambridge, 1986), pp. 77-139.