

## **Chapter 1**

### **Introduction and Overview**

#### **Introduction**

The papers contained in Volume I deal with various facets of Japan's economic history, especially highlighting Japan's development of its domestic textile industry following the Meiji period in the 19th century. The papers in this volume cover topics in Japanese technological development and innovation, Japan's comparative advantage, trade and trade policies, and Japanese macro/financial issues and policies. Saxonhouse's curriculum vitae is included in the Appendix.

#### **Overview**

##### **A. Technology and Innovation**

#### **Chapter 2**

##### **Industrial Restructuring in Japan**

Japan experienced dramatic structural adjustment between 1955 and the early 1970s in response to the occurrence of internal changes. Successful Japanese industrial performance and Japanese thriftiness changed Japan to a capital-rich country. Individuals who were the product of Japan's already comprehensive educational opportunity were given the opportunity to gain relevant industrial experience and thereby changed Japan to a skill-rich economy. However, high energy prices, slow growth, yen appreciation, and competition from less developed countries greatly impacted Japanese industrial structure in the second half of the 1970s. It is noteworthy that there was substantial sectoral variation

across Japanese industries; some sectors performed well while others experienced stressful adjustment. The Japanese government introduced a number of policies in an effort to mitigate the adjustment problems experienced by depressed industries.

### **Chapter 3**

#### **What Is All This About ‘Industrial Targeting’ in Japan?**

In examining the various instruments of industrial policy, Saxonhouse notes that Japan gives less formal assistance to its high-technology sectors as compared to most advanced industrialized countries. Targeting is largely reserved for Japanese agriculture. Japan’s high-profile government intervention is best understood as a response to Japan’s distinctive institutions as a means of accumulating capital and labor skills. Japan’s industrial policy should be viewed accordingly as an effort to overcome the distortions resulted from the absence of well-developed capital markets. In the same light, Japan’s government-sponsored cooperative R&D projects should be understood as an effort to insure that the barriers to informal inter-firm transfer of information created by Japanese employment practices do not slow down the pace of technology diffusion within Japan. Saxonhouse concludes that there is nothing abnormal about Japan’s trade and industrial patterns. Japan’s high-profile but mostly informal industrial policy should thus be viewed as a means of addressing the drawbacks of its financial system.

### **Chapter 4**

#### **Biotechnology in Japan: Industrial Policy and Factor Market Distortions**

There is a widespread feeling that the Japanese government is unfairly acquiring the few really good tickets to prosperity for its economy in the 21st century. Foreign reactions to Japanese targeting have ranged from concern that such practices are unfair and inconsistent with the international economic system and that Japan should be forced to eliminate them, to intense admiration and a hope the other countries can somehow emulate Japan. Understanding Japanese practices, particularly

as they relate to high technology industries, requires an analysis not only of the relationships between government and business in Japan, but also of the relationships between government and education and between education and business. From the perspective of an analysis of the inter-relationships between these institutions, it is possible to understand the character of the market distortions and market failures with which Japanese policy has sought to cope. It should also then be possible to assess whether other countries face a similar set of problems requiring similar interventions. These analyses will proceed with particular focus on the development of the biotechnology industry in Japan and the United States.

## **Chapter 5**

### **Industrial Policy and Factor Markets: Biotechnology in Japan and the United States**

This paper discusses Japanese government policy to develop the biotechnology industry, considering the industrial policy tools of trade policy (tariffs, which were low), product standards, government subsidies and grants, tax policy, capital availability, regulation of market structure, and funding (the lack of a Japanese venture capital market). The basic conclusion is that the Japanese government was giving less financial aid and comfort to its high technology sectors and to biotechnology in particular than most governments of other advanced industrialized economies, including the United States.

## **Chapter 6**

### **Technology and the Future of the Economy (co-authored with Daniel I. Okimoto)**

This paper focuses on Japan's R&D system and discusses three ways in which it is different from the US system: the larger role of small companies in Japan; the (limited) role of the Japanese government in R&D funding; and the advanced training for technical personnel located more in firms than educational institutions. It consists of tables with comparative data on productivity change, patenting, and it discusses

differences in government policies, corporate environments, and organizational structures.

## **Chapter 7**

### **Technological Progress and R&D Systems in Japan and the United States**

This paper notes that Japan's technological progress in the period under study has outstripped the performance of all the other advanced industrialized economies. Japan's technological success was built on a rapid increase in its commitment of resources to R&D. Differing fiscal choices made in Japan and the United States have shaped the R&D systems in both countries. Japanese firms have played a critical role in the training of scientists and engineers in contrast to the US economy's pervasive extra-firm training programs and market allocation of experienced personnel. As a consequence in the United States, large amounts of potentially proprietary and technological information readily become global public goods. Japanese government science and technology policy has been designed to ensure that the barriers to inter-firm transfer of information created by Japanese employment practices do not slow the pace of technology diffusion within Japan.

## **Chapter 8**

### **Japanese High Technology, Government Policy, and Evolving Comparative Advantage in Goods and Services**

This paper develops and expands Saxonhouse's earlier published discussion of the role of Japanese industrial policy as a way of dealing with imperfect, and rigid capital and labor markets. It briefly discusses the governments' comparative research programs for VLSI electronic chips and other areas, and their various difficulties. The appendix presents the formal framework of his Heckscher-Ohlin-Samuelson (H-O-S) model that is extended to technological services as well as goods.

## **Chapter 9**

### **Optoelectronics in Japan: A Market Evaluation of Government High-Technology Policy**

Insofar as aggregate fiscal support is concerned, there appears to be little basis for the view firmly expressed by US optoelectronic firms that Japanese government financial aid has played a critical role in the development of Japanese optoelectronics. Direct grants and tax expenditures in Japan over a 15-year period are less than what the US government provides to the American industry in a single year. While over 90% of US funding is defense-related, much of this funding appears to have direct commercial relevance. The Japanese optoelectronics industry finds MITI's role marginal at best and more likely a nuisance. Japanese assistance does not have a significant impact on equity prices, whereas American equity values have a strong and significant negative impact. Japan has reached a point of technological maturity such that even signaling to the private sector is troublesome.

## **Chapter 10**

### **Technological and Information Transfer: How Do Some Nations Learn What Other Nations Know? Japan's Experience**

The returns to the rapid acceleration in the growth of GDP per capita in the past century and a quarter have been very inequitably distributed across nations. Nations that were already relatively wealthy in 1870 have received most of the benefits of this increase in material well-being. Thus far, Japan is the only major example of a country that is able to fully traverse the vast gulf separating poorer nations from wealthier ones. Lately other economies in East Asia have experienced such sustained high rates of growth in GDP per capita, suggesting that they will join Japan as non-Western examples of the world's wealthiest nations. Some doubt has been cast on these optimistic projections by findings that economies such as Taiwan and Korea have grown rapidly, seemingly Soviet-bloc style, without the benefit of rapid growth in total factor productivity (TFP) change. Characterizing growth without TFP change

as Stalinist, however, is ahistorical. The United States, the United Kingdom and Japan, among other nations, all experienced long periods of rapid growth in per capita GDP without simultaneously experiencing rapid increases in TFP. In each instance, such phases were succeeded by periods where per capita GDP growth was increasingly augmented by improvements in TFP.

One puzzle here is the periods characterized by little TFP change do appear to be times when substantial technological improvement was taking place. In the case of the United States, there was considerable evidence that the extraordinary increases in factor accumulation were driven by what appear to be substantial advances in technology. A case study of the cotton textile industry suggests much the same may have been true in Japan. The character of the product markets and the factor markets faced by the Japanese cotton-spinning industry in the Meiji period created an environment within which technological adaptation and innovation came to be a network phenomenon with the industry's trade association and the industry's prime machinery supplier serving as a critical link. Later with product market and credit market changes, the role these institutions played diminished to be replaced by information transfers that were the by-product of a very well-functioning market in experienced, and by the standards of other nations, very well-educated textile engineers.

Half a century after 1945, the rise of permanent employment practices in Japan has created barriers to information flows and collective technological innovation and adaptation that were so much a part of the experience of Japan's leading industry in the early 20th century. Curiously, this is just the time when TFP change has become an important component of Japan's very rapid growth in per capita GDP. The past half-century has also been a time when the Japanese government has been actively involved in attempting to shape industrial structure in an otherwise market-based economy. One set of policy instruments that has attracted particular attention overseas has been government-sponsored R&D consortia. These consortia can be thought of as government programs designed to break down the walls preventing

information flows among Japanese firms. Japan's cooperative R&D projects can be thought of as ways to capture some of the benefits of American-style and pre-war Japanese-style labor markets, even while continuing to avoid some of the costs associated with relatively high labor mobility. There is great disagreement as to the efficacy of these Japanese government programs, with overseas firms looking enviously at projects that Japanese industry sees as having only minor significance or worse. A study of the impact of two Japanese government-sponsored optoelectronics projects on Japanese and American equity markets confirms these differing perceptions, confirms that the speed with which information diffuses back from Japan to the United States has increased substantially over the past decade, but does not suggest which of the two differing perceptions is correct. Knowledge-based growth may have proceeded this last half-century in Japan with less inter-firm diffusion of technology than was characteristic at some points earlier in Japan's history.

Late into the 20th century, changes in global markets and the uncertainty of life close to the technological frontier are forcing changes in Japanese institutions. Japanese firms of the future may prefer to have their labor force bear more both of the risks associated with specialized training and the risks associated with secular and cyclical demand shocks. Although Japan's labor force did a lot in the early 20th century, such steps will require a change in the way in which training is provided and changes in the Japanese government's educational and social policies. At the same time, the type of information-flow problems the government-sponsored R&D consortia were once designed to address may well be as insignificant in the future as they once may have been in Japan's past. In contrast, the type of institutions supporting technological diffusion in Japan's textile industry in the 1920s and early 1930s may be part of Japan's future. On the basis of the evidence presented here, the answer to the question of whether Taiwan, Korea and other East and Southeast Asian countries seeking to follow Japan's full transition to very high standards of material well-being and knowledge-based growth should avoid or emulate Japan's institutional set-up of the past half-century is not at all obvious.

## **Chapter 11**

### **R&D Consortia, News, and Japanese High-Technology Policy: Optoelectronics in Japan**

This is the last of Saxonhouse's series of papers on high-technology. It begins with a prologue of how and why the United States suddenly and dramatically changed its trade policy towards R&D subsidies in the 1993 Uruguay Round negotiations. Saxonhouse then uses the development of the optoelectronics industry in Japan as a case study in Japanese industrial policy. He points out that the US government did far more than Japan in promoting the US optoelectronics industry. He traces the Japanese government's role in some detail, considering the standard policy instruments, including: funding; tax policy; and especially government-sponsored research consortia (in which the government's role was marginal at best). He carries out an event study of the equity performance of Japanese and American optoelectronic firms, laying out the equation system to specify his estimates.

## **B. Comparative Advantage, Trade, and Trade Policies**

### **Chapter 12**

#### **Evolving Comparative Advantage and Japan's Imports of Manufactures**

It was often maintained that the comparatively small ratio of Japan's imports of manufactures to total imports was evidence of Japan's restrictive trade policy. In response to domestic and international pressures, there was an acceleration of the liberalization of Japan's trade policies in the early 1970s. Nonetheless, Japan's import ratio remained well below the levels for other advanced economies. Using the framework of the Heckscher-Ohlin-Samuelson model for estimation purposes, Saxonhouse concludes that special undefined Japanese characteristics or particular foreign failures in the Japanese market do not play a central role in explaining the post-war pattern of Japan's trade. He argues that his results suggest that the commercial policy and attitudinal changes of the 1970s did not greatly alter the structure of Japan's

imports. This was not because of foreign cultural insensitivity to Japan, but because Japan's policies involved only relatively small distortions. When the differing quantity and quality of Japanese labor, capital, natural resources, and distance are properly given their full allowance, the Japanese share of manufactures in total imports is comparable to European and American experiences.

## **Chapter 13**

### **The Micro- and Macroeconomics of Foreign Sales to Japan**

Saxonhouse notes that it is widely believed that foreign access to the Japanese home market has been tightly controlled. This belief has such widespread credence that it may come as a shock when he documents that the traditional indices of the international economic system suggest that foreign access to the Japanese market would have to be considered excellent. Yet the question remains that Japan's imports of manufactured goods appear low by conventional indices and as a percentage of GDP. In this connection, Saxonhouse stresses the distinctive endowments of the Japanese economy that have shaped its trade structure, and, in this light, Japan does not differ appreciably in foreign access as compared to other advanced economies. He further argues that the removal of Japan's illiberal trade barriers would have a negligible impact on Japan's persistent current account surplus. He notes, however, that there may be scope for the liberalization of Japanese agricultural policies and the capital movements.

## **Chapter 14**

### **Services in the Japanese Economy**

Saxonhouse reviews the performance and role of Japan's services sector in the pre-1945 period. He next considers the first four decades of the post-war period, including an assessment of the future growth and productivity performance of Japan's services and their relation to the future growth and productivity performance of the Japanese economy as a whole. He then examines Japan's service industries in a comparative context, in particular Japan's distribution system and the distinctively

small exports of technology services. Saxonhouse concludes that the development of Japan's services sector is remarkably consistent with international patterns. The rapid changes in services that have occurred reflect the rapid changes in the economy as a whole, stemming in particular from the growth in Japan's aggregate capital stock and improvement in the quality of Japanese labor and the education embodied in that labor.

## **Chapter 15**

### **Comparative Advantage, Structural Adaptation, and Japanese Performance**

This paper reviews the role of structural change in the economic performance of the advanced industrialized economies, with a particular focus on Japan. A significant question is whether the international commercial relations of the advanced economies will become more or less important as a source of structural change compared to the first four decades after WWII. Japan's rapid growth after WWII was accompanied by dramatic shifts in the allocation of resources, but there are several other countries that had similar experiences of structural change, such as Italy and Korea. Saxonhouse develops an empirical framework to explain how the growth of domestic resources may alter the trade structure and how trade may affect the reallocation of resources. He shows that the major industrialized economies have become increasingly integrated since WWII as a force for inducing structural change. In conclusion, he reviews the distinctive characteristics of Japanese institutions as the basis for Japan's economic success and takes issue with the pressures being brought to bear to harmonize these institutions along the lines of other major economies.

## **Chapter 16**

### **An Analytical Survey of Formal and Informal Barriers to International Trade and Investment in the United States, Canada, and Japan (co-authored with Robert M. Stern)**

This paper lists the major categories of nontariff measures and related policies that are widely used, and distinctions are drawn between formal and informal barriers; their rationale and possible consequences, with a focus on the United States, Canada and Japan. There is a discussion of the conceptual issues involved in measuring the barriers. The major empirical efforts undertaken to estimate the extent to which Japan's barriers set it apart from the United States, Canada, and other major countries are reviewed and some new results are presented. The model used for estimation purposes is set out in a Technical Appendix. The conclusion of the paper is that there is not much evidence for the contention that Japan relies on a variety of informal barriers to influence the structure of its trade. Further, when cross-national differences in factor endowments are taken into account, Japan's trade structure does not appear distinctive relative to other major countries. The evidence on foreign direct investment was inconclusive.

## **Chapter 17**

### **Economic Growth and Trade Relations: Japanese Performance in Long-Term Perspective**

Japanese trade structure has been historically distinguished by a low level of manufacturing exports, a pattern widely attributed to protectionist distortions of comparative advantage. This paper argues that the pattern is better understood as a consequence of Japan's unusual factor endowments (low natural resources, high-quality labor) and high saving rates, compared to other advanced countries of the world. Elsewhere indices of intra-industry trade have been high and rising; this has not been true of Japan, whose trade with other advanced countries has been largely "difference-based" (and hence subject to political opposition abroad). Extending his 1989 study noted above, Saxonhouse develops a "factor-endowment-based theory of intra-industry trade," and

proceeds to estimation of intra-industry trade equations and import share equations for a sample of 24 economies in 1983. The results show that Japanese trade structure can be captured within tolerance intervals generated without Japanese observations. This finding is consistent with Saxonhouse's earlier study by showing that the result holds even when the sample is restricted to high-income, relatively open countries.

## **Chapter 18**

### **What Does Japanese Trade Structure Tell Us About Japanese Trade Policy?**

Saxonhouse notes that economic research provides little evidence that Japan's trade regime is different. Yet it is widely believed that Japan engages in unfair trade practices on a broad scale. He further points out that Japan's productivity growth and structural transformation have outstripped every other major industrialized economy in the second half of the 20th century. This is not an accident, and it rests on Japan's long history of growth and structural change prior to its opening to trade in the 19th century. He stresses that Japan's geography differs greatly from other major countries. Its poor endowment of natural resources has been combined with a high quality labor force and unusually thrifty households. These circumstances thus can help explain Japan's relatively low level of manufactured goods imports and its limited participation in intra-industry trade. Neither the price behavior of Japanese firms nor the pattern and volume of Japan's trade suggests that its trade regime is different. Some of Japan's economic institutions may be distinctive, but there is little evidence that they produce outcomes that distort the international economic system.

## **Chapter 19**

### **Pricing Strategies and Trading Blocs in East Asia**

Saxonhouse first reviews the consequences of trading bloc formation for countries left outside such blocs, stressing the downside for such countries. He notes that bloc members may have no incentive to admit new members, except when the formation of a rival bloc is threatened.

This is the situation facing East Asian economies whose welfare may be damaged by blocs formed elsewhere. He next reviews the prospects for a regional trade regime in East Asia. Based on estimates of a factor-endowment based version of a gravity model of intra-industry trade, he concludes that there is no bias in the trading patterns of the leading East Asian economies and therefore no evidence that a rival trading bloc is being formed in East Asia in response to developments in Europe and North America. Finally, he examines the exchange rate-induced pricing strategies of East Asian firms across East Asian markets, finding evidence of country-specific pricing strategies in these markets and apparent existence of remaining trade barriers. This suggests that region-wide liberalization could still be of benefit to the East Asian economies.

## **Chapter 20**

### **Do Japanese Firms Price Discriminate in North America?**

This paper addresses issues of market power and export pricing. Saxonhouse sets up equations to estimate strategic pricing behavior for Japanese exports to Canada, the United States, and Mexico (NAFTA) for 41 product lines. He estimates the coefficients for nominal and real exchange rate changes and finds evidence of Japanese strategic pricing. He then tests hypotheses as to whether Japanese strategic pricing varied among the NAFTA markets, and he concludes that it did.

## **Chapter 21**

### **A Short Summary of the Long History of Unfair Trade Allegations Against Japan**

This is a comprehensive overview paper that is especially strong in its analysis and judgments on the issues. It discusses at some length foreign (essentially only American) perceptions of Japan's unfair institutions and behavior, in particular 11 illiberal Japanese institutions discussed by Saxonhouse in his earlier research and updated in this article. Saxonhouse considers such important topics as the saving-investment imbalance, land use, keiretsus, the distribution system, exclusionary business expectations, and the evolution of the Structural Impediments

Initiative (SII) talks undertaken in connection with the early Clinton administration trade policies after 1992. Saxonhouse concludes that the variety of complaints against Japan may end as the result of Japan's slowing economic growth. The maturation of Japan's economy suggests that it will impose no more unwanted structural changes on its trading partners than the median advanced industrialized economy and therefore Japan's participation in the international economic system will finally be fully accepted.

## **Chapter 22**

### **How to Explain Japan's Legal System**

While ostensibly termed as a book review, this paper is substantively and significantly more than a review. In *Japanese Law: An Economic Approach* (University of Chicago Press, 1999) J. Mark Ramseyer and Minoru Nakazato find some functional similarities, but also significant differences between Japanese and US federal legal procedures, notably that "Japanese criminal defendants are loath to go to trial and that Japanese prosecutors are badly overworked." Saxonhouse develops and uses US state data to show that these apparent differences in Japanese and US legal procedures are not borne out in the data.

## **C. Macro-Financial Issues and Policies**

### **Chapter 23**

#### **Equity Markets, Political Markets and the Changing Framework of US-Japan Economic Relations**

The background for this paper is that post-war US-Japan economic relations had to deal with the rapid growth of Japanese exports to the United States in response to US GDP growth, taking into account the continuing evolution of the composition of Japanese exports as its industrial structure was changing. Saxonhouse assesses the impact of the US Super 301 legislation in 1988, the Uruguay Round negotiations (and the dispute settlement mechanism), and the 1995 US-Japan automobile

agreement by looking at equity market data to analyze the consequences of these trade policy changes. He carries out event studies of Japanese and American companies presumably affected by these policy changes. He lays out his equation framework and provides estimates of the effects on company stock prices. Japanese equity prices were significant for Super 301 and the Uruguay Round in the expected direction, but not for US company equity prices. Neither was significant for the auto agreement. Nonetheless, the auto agreement was considered in the United States to be politically beneficial to the Clinton Administration.

## **Chapter 24**

### **Prospective Japanese Economic Recovery: Perspectives from European Economic Recovery in the 1930s**

After introducing a zero-interest rate policy and declining to set a numerical definition of price stability, the Bank of Japan reversed both policies in March 2001 and adopted an inflation-rate target to guide monetary policy in a setting of persistent deflation. Sweden went through a similar experience in the early 1930s when it adopted a quantitative price standard. It appears however, that Sweden did not pursue a domestic price target. Instead, the Swedish Riksbank pegged the Swedish currency to the English pound, and this served to undo deflationary expectations in the United Kingdom, Sweden, and elsewhere. Sweden was fortunate that the devaluation of the pound had a short-run expansionary effect on the global economy. Based on this experience, yen depreciation might conceivably change price expectations and promote economic growth. However, in current circumstances, this policy might not be effective since it could set off a round of competitive devaluations by other major countries.