
FRBSF WEEKLY LETTER

Number 94-36, October 21, 1994

Growth and Government Policy: Lessons from Hong Kong and Singapore

An important current policy debate within the United States has centered on the government's role in encouraging investment in new technologies. Whether it be electric automobiles, flat-panel display technologies, or the "information super-highway," the current administration has demonstrated an increased willingness to subsidize applied nondefense technology development.

Economists have tended to regard these sorts of "high tech" industrial policies as the same old pork barrel politics in new packaging. However, recent developments in growth theory suggest that these programs may have merit after all, depending on the nature and relative importance of various potential sources of economic growth. This *Letter* briefly outlines the circumstances under which it makes sense to have a national "technology policy," and then goes on to discuss a case study involving Hong Kong and Singapore, which sheds light on the empirical validity of these circumstances.

Growth models

Models of the growth process link an economy's output to its use of factors of production, like capital and labor. Therefore, if an economy is to grow it must either accumulate factors of production or learn to use its existing factors more efficiently. The mechanisms governing factor accumulation are clear. To accumulate capital an economy must invest. To accumulate labor an economy must either add to its population or increase the percentage of its population that works in the market. Empirical evidence has shown, however, that for developed countries like the United States factor accumulation has played a relatively minor role in generating growth in (per capita) income. Instead, most of the growth has come from the second source, that is, from improvements in productivity.

Unfortunately, unlike factor accumulation, productivity is not well understood by economists. In fact, until the recent work of Romer (1986) and Lucas (1988), economists simply viewed productivity as being "exogenous," that is, determined outside the economic system. In contrast, the models of Romer and Lucas make productivity "endogenous" by assuming that factor accumulation is itself a source of productivity growth. Specifically, in their models 'positive externalities' accompany the processes of physical and human capital accumulation. Such externalities occur when improvements in knowledge, acquired either in school or on the job, confer benefits to other individuals in a way that makes it difficult to collect a fee for them. Because no market price is attached to these benefits, they are not reflected in the value of inputs. Instead, they show up in the data as productivity increases.

The presence of externalities associated with capital accumulation has two important implications for growth theory. First, such externalities provide an explanation for how a competitive economy can overcome the forces of diminishing returns to factor inputs and thus sustain growth in per capita income. Productivity continually improves as a by-product of capital accumulation. Second, the existence of externalities implies that the growth process is inefficient. Because individuals do not receive the full returns from their investments, there will be too little investment and too low a growth rate in the economy. As a result the government can improve matters by adopting policies that encourage investment.

Unfortunately, putting this type of program into practice is beset by difficulties. First and foremost, economists lack the requisite empirical

PACIFIC BASIN NOTES

Pacific Basin Notes appears on an occasional basis. It is prepared under the auspices of the Center for Pacific Basin Monetary and Economic Studies within the FRBSF's Economic Research Department.

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knowledge with which to conclude that a given economy invests too little, and that a given subsidy is therefore justified. Ideally, one would like to run a series of controlled experiments in which economies that are alike in all dimensions except government policy are followed over time, and their performance monitored and compared. One would then know if a policy is beneficial. Of course, economics is not physics, and controlled experiments are not possible. Nonetheless, history occasionally offers examples of country-pairs that come close to being controlled experiments in the effectiveness of government policy.

Recently, Young (1992) has examined one such country-pair that has particular relevance for evaluating alternative growth theories. Specifically, he compares and contrasts the policy and growth experiences of Hong Kong and Singapore during the postwar period.

Similarities

The similarities between Hong Kong and Singapore are striking. Both are small city-states that began as British colonies, each serving as an entrepot trading post for the British empire. Hong Kong processed trade between China and the outside world, while Singapore served as a conduit for western trade with Malaysia and Indonesia. Given their historical origins as British colonies, both countries began the postwar period with relatively developed political institutions. Moreover, the political climate in each country was relatively calm.

Demographically, both countries began the postwar period with populations that consisted primarily of immigrants from Southern China, although Singapore had a fairly significant minority population of Malays, Indians, and Pakistanis. In terms of population density, both countries are off the scale. Singapore currently boasts a population density of about 15,000 per square mile, while Hong Kong somehow manages to support over 200,000 people per square mile.

With the exception of fine natural harbors, neither country contains much in the way of natural resources, and in particular, neither country has ever had a significant agricultural sector. Instead, residents of these countries earned their living by trading and, increasingly, by manufacturing. Both are highly dependent on exports and, by international standards, are extremely open to trade. Interestingly, Hong Kong and Singapore underwent very similar processes of industrial transformation. Both started by manufacturing textiles,

and then shifted in successive stages to clothing, plastics, and electronics. Recently, both countries have emerged as major financial centers, with employment rapidly moving into banking and other financial services.

Finally, the growth performance of both countries was spectacular—and nearly identical. In 1960, GDP per capita was roughly the same—\$2323 in Hong Kong and \$2409 in Singapore (both expressed in terms of 1985 U.S. dollars). Then, during the ensuing 30 years, annual growth in real GDP per capita averaged 6.0 percent in Hong Kong and 6.2 percent in Singapore.

Differences

Despite their similarities, Hong Kong and Singapore differed in three important ways, and these three differences reveal the most about the nature of the growth process. First, their timing and pace of industrial restructuring were quite different. Hong Kong started up the ladder of manufacturing sophistication earlier. Explosive growth in manufacturing began in the early 1950s in Hong Kong, as Shanghainese refugees flooded into the peninsula and opened textile factories. When developed countries began to impose quotas on textiles in the late 1950s, Hong Kong moved up-market and began producing clothing. In the 1960s, Hong Kong began to manufacture plastics, eventually becoming the world's leading toy manufacturer. The 1970s was a period of rapid growth in electronics manufacturing, led by digital quartz watches. The electronics boom continued into the mid-1980s, when Hong Kong began shifting into financial services.

This same sequence of industrial transformation also occurred in Singapore, but it started ten to fifteen years later, and proceeded much more rapidly. To get an idea of the breathtaking pace at which industrial transformation took place, consider that (1) Between 1971 and 1980 annual production of televisions increased by a factor of 56, and (2) in 1980 Singapore did not produce any computer components or peripherals, but by 1983 Singapore had become the world's largest exporter of disk drives!

How did Singapore achieve such phenomenal restructuring? The answer is found in the second key difference between Hong Kong and Singapore, which concerns the government's role in the economy. In contrast to the avowed laissez-faire policy of Hong Kong, the Singaporean government pursued an aggressive policy of industrial targeting that focused on imported technological know-how. Inward foreign direct investment was actively courted by Singapore's government via generous tax breaks to foreign corporations. This investment was financed by a combination of

foreign borrowing and a domestic "forced savings" policy. For example, during much of the 1960s and 1970s Singapore ran current account deficits of between 10 and 20 percent of GDP. In contrast, Hong Kong's current account remained roughly in balance.

Finally, although income in Hong Kong and Singapore grew at nearly the same rate, the underlying sources of this growth differed. As noted earlier, a nation can grow either because it can accumulate factors of production or because it can learn to use its existing factors more efficiently. Singapore followed the first route, while Hong Kong followed the second. For example, investment as a share of GDP skyrocketed in Singapore, rising from under 10 percent in 1960 to over 40 percent in the mid-1980s, while in Hong Kong the investment rate remained relatively constant at about 20 percent. How did Hong Kong keep up? Simply put, entrepreneurs in Hong Kong were more efficient than their Singaporean counterparts. Improvements in productivity contributed over 50 percent of the growth in Hong Kong, whereas they contributed next to nothing in Singapore.

Lessons

These differences between Hong Kong and Singapore provide evidence on the nature of growth. Specifically, they cast doubt on externality-driven endogenous growth models. If capital accumulation confers positive externalities, then Singapore should have exhibited a higher rate of productivity growth, given its more rapid accumulation of capital. Instead, the country that invested less had a higher productivity growth rate.

Young (1992) argues that this apparent paradox is explained by Singapore's overzealous policy of industrial targeting. Although a persistently high investment rate enabled Singapore to sustain a high growth rate, the investment took the form of a rapid succession of new technology acquisitions. As soon as managers and workers began to get used to a given manufacturing process, the government introduced a new one. As a result, the usual processes of "learning by doing" and "knowledge spillovers" were stunted in Singapore, and this adversely affected its productivity. Young goes on to conjecture that, if continued, Singapore's growth strategy ultimately will prove to be unsustainable.

In contrast, Young argues that Hong Kong's growth was supported by productivity improvements that had their roots in a highly educated and highly skilled labor force. Of course, to a certain extent, Hong Kong's "human capital" advantage was an historical accident. Following the Communist takeover in China, Hong Kong experienced a massive influx of Mainland refugees. Fortunately for Hong Kong, these refugees were highly educated and highly skilled. In principle, this infusion of human capital could be considered factor accumulation. In practice, however, growth in human capital tends to be reflected in productivity increases.

The lesson appears to be that, if a government wants to foster growth, it should do so by supporting education rather than by attempting to funnel resources into "sunrise" industries. One indicator of the superiority of this strategy comes from comparing consumption growth in Hong Kong and Singapore. Ultimately, countries grow so that their citizens can enjoy a greater level of consumption, either in the form of material goods, or in the form of such goods as leisure and environmental quality. Tellingly, while output growth was nearly identical in both countries, consumption growth in Hong Kong nearly matched output growth, whereas consumption growth in Singapore was only half of output growth. This suggests that the citizens of Hong Kong benefited more from their economy's growth than did the citizens of Singapore.

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Index to Recent Issues of *FRBSF Weekly Letter*

DATE	NUMBER	TITLE	AUTHOR
4/1	94-13	Monetary Policy in a Low Inflation Regime	Cogley
4/8	94-14	Measuring the Gains from International Portfolio Diversification	Kasa
4/15	94-15	Interstate Banking in the West	Furlong
4/21	94-16	California Banks Playing Catch-up	Furlong/Soller
4/29	94-17	California Recession and Recovery	Cromwell
5/6	94-18	Just-In-Time Inventory Management: Has It Made a Difference?	Huh
5/13	94-19	GATS and Banking in the Pacific Basin	Moreno
5/20	94-20	The Persistence of the Prime Rate	Booth
5/27	94-21	A Market-Based Approach to CRA	Neuberger/Schmidt
6/10	94-22	Manufacturing Bias in Regional Policy	Schmidt
6/24	94-23	An "Intermountain Miracle"?	Sherwood-Call/Schmidt
7/1	94-24	Trade and Growth: Some Recent Evidence	Trehan
7/15	94-25	Should the Central Bank Be Responsible for Regional Stabilization?	Cogley/Schaan
7/22	94-26	Interstate Banking and Risk	Levonian
8/5	94-27	A Primer on Monetary Policy Part I: Goals and Instruments	Walsh
8/19	94-28	A Primer on Monetary Policy Part II: Targets and Indicators	Walsh
9/2	94-29	Linkages of National Interest Rates	Throop
9/9	94-30	Regional Income Divergence in the 1980s	Sherwood-Call
9/16	94-31	Exchange Rate Arrangements in the Pacific Basin	Glick
9/23	94-32	How Bad is the "Bad Loan Problem" in Japan?	Huh/Kim
9/30	94-33	Measuring the Cost of "Financial Repression"	Huh/Kim
10/7	94-34	The Recent Behavior of Interest Rates	Trehan
10/14	94-35	Risk-Based Capital Requirements and Loan Growth	Laderman

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