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## The Role Played by Public Enterprises: How Much Does It Differ Across Countries?

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In this article, I study one aspect of national industrial policy: the extent to which governments decide that they will produce and sell goods and services. The article's theme is that many low-productivity countries have pursued a much more aggressive industrial policy (in this sphere) than is typically recognized.<sup>1</sup>

When a government sets up an enterprise to produce and sell goods and services, the enterprise is commonly referred to as a *public enterprise*. I will use that terminology here. Examples of such enterprises are the U.S. Postal Service and other countries' steel companies (for example, those in Ireland and Holland) and airlines (for example, Air France and Iberia). The purpose of the article, then, is to explore the extent to which there are differences in the role played by public enterprises across countries.

Public enterprises have, of course, been studied many times before, and there is a consensus that these enterprises play a greater role in low- as compared to high-productivity countries. While I agree with this view, I disagree with the assessment of how much the role differs. In particular, as I suggested above, I think the current literature dramatically understates the role played by these enterprises in many low-productivity countries.

My argument is a simple one. The current literature focuses on the total value of goods and services produced by public enterprises. I focus on the types of goods they produce. While the total value of goods and services produced by public enterprises (as a share of total output) differs a

bit across countries, the types of goods they produce differ much more dramatically. In many low-productivity countries, the government produces a large share of the country's manufactured goods. In nearly all high-productivity countries, the government stays out of the manufacturing sector. It is based on this fact, and the fact that the manufacturing sector plays a special role in economies, that I say low-productivity countries have pursued a much more aggressive industrial policy (in this sphere) than is typically recognized.<sup>2</sup> For the remainder of the introduction, let me develop this argument more fully.

As mentioned, the role, or impact, of public enterprises is often measured by the public enterprise share of gross domestic product (GDP). For example, in arguing that public enterprises played an important role in Taiwan's economy during its rapid growth, Rodrik (1995, p. 90) points to the fact that the public enterprise share of GDP "actually increased during the critical take-off years of the 1960s." To further buttress his point, Rodrik (1995, p. 90) writes,

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\*The author is grateful to Jason Schmidt for his significant help in preparing this article and to Tianshu Chu for bringing some of the Taiwanese data to the author's attention. The author is grateful as well for comments from Ed Green, Pete Klenow, Rody Manuelli, and Antonio Merlo and for extensive discussions with Tom Holmes and Richard Rogerson.

<sup>1</sup>Productivity is defined throughout the article as output per worker.

<sup>2</sup>For brevity, I will drop the qualifier *in this sphere* for the remainder of the article, though the reader should keep in mind that public enterprises are only one dimension of industrial policy.

“Public enterprises actually accounted for a larger share of GDP in Taiwan than in such ‘socialist’ developing countries as India and Tanzania.”

This measure is also explored in a recent report of the World Bank (1995). Using the public enterprise share of GDP as a measure of policy, the report concludes that public enterprises play a greater role in low- as compared to high-productivity countries. But the differences are not dramatic. The report shows that over the period 1978–88, the average public enterprise share of GDP was about 8 percent in industrialized countries and between 10 percent and 12 percent in developing countries. (Within the developing world, the average in Africa was about 14 percent over the period.) A few low-productivity countries had public enterprise shares of GDP in the range from 20 percent to 35 percent. These few countries, therefore, had public enterprise shares of GDP that were on the order of, say, three times that of the high-productivity country average.

When I examine the public enterprise share of output by sector, I find that the public enterprise share of manufacturing output is often much higher in low-productivity countries than in high-productivity ones. In industrialized countries, the public enterprise share of manufacturing output is typically only a few percent, and often it is zero. But in the low-productivity world, many countries have a public enterprise share of manufacturing output that is in the 30–70 percent range. Many of the countries in this range have a public enterprise share of manufacturing output that is on the order of, say, 15 times that of the high-productivity country average. When I take the public enterprise share of manufacturing output, and not public enterprises’ share of aggregate output, as a measure of the role played by public enterprises, then I am led to the theme stated above: many low-productivity countries have pursued a much more aggressive industrial policy than is typically recognized.

But why take the public enterprise share of manufacturing output as a measure of the role played by public enterprises? Let me give two reasons. First, the manufacturing sector produces the lion’s share of investment goods. This sector produces such final goods as machines and transportation equipment and such intermediate goods as metals and building materials that are used to produce these final investment goods and other investment goods (in the construction industry). Hence, the efficiency of the manufacturing sector influences the incentives to accumulate capital. If, for example, the only difference between public enterprises and private ones is that public ones are

terribly inefficient at producing goods, then a government’s decision that its production should account for a larger share of output in the manufacturing sector will have the effect of increasing the cost of investment. This will lead to less capital accumulation and lower productivity.<sup>3</sup> (Note that increasing the government’s share of manufacturing output may have little effect on the public enterprise share of GDP if the manufacturing share of GDP falls as a consequence.)

Second, other goods, besides investment goods, are produced in the manufacturing sector. Some of these goods are textiles and processed food. Some of these industries are referred to as *light manufacturing* industries. Many economists have emphasized the importance of the learning that goes on in these industries as being helpful in production at more complex tasks, such as manufacturing chemicals and instruments. If these light manufacturing goods are produced by the government, the nature and extent of learning in these industries may be very different than if these goods were privately produced.

Let me now briefly describe the remainder of the article. In the next section, I briefly discuss definitions and data issues. I then review the evidence on the public enterprise share of GDP (taken from Short 1984), showing that in a cross section of countries, there is no strong correlation between this statistic and aggregate productivity. I then examine the public enterprise share of manufacturing output (taken from Short and various other sources), showing that in a cross section of countries, there is a strong negative correlation between this statistic and productivity. These two cross sections illustrate that two countries may have the same public enterprise share of GDP, yet dramatically different public enterprise shares of manufacturing output. For example, during the middle 1970s, Bangladesh and Denmark had similar public enterprise shares of GDP, about 6 percent, yet Bangladesh’s public enterprise share of manufacturing output was about 70 percent and Denmark’s was 0 percent. Tanzania and the United Kingdom had similar public enterprise shares of GDP, about 12 percent, yet Tanzania’s public enterprise share of manufacturing output was 38 percent and the United Kingdom’s was 3 percent.

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<sup>3</sup>In this example, I imagined that governments produce investment goods at higher costs than private enterprises. Obviously, one could take the opposite view and still be led to the conclusion that government production in this sector has an important impact on capital accumulation (now a positive impact).

I next demonstrate that these patterns found in the cross section of countries can be seen in the time series of individual countries. In particular, I show that during the 1950s and 1960s, Taiwan cut its public enterprise share of manufacturing output from 56 percent to 21 percent and ultimately to 10 percent by 1990, yet its public enterprise share of GDP changed little over this period—fluctuating between about 12 percent and 17 percent.

I next briefly examine the experiences of two currently industrialized countries—Great Britain and the United States—during their period of development. I ask whether they, like many developing countries today, pursued an aggressive industrial policy (as measured by the public enterprise share of manufacturing output) when they were developing. The answer is no. If anything, the public enterprise share of manufacturing output is higher today (though, again, the share is very small) than it was when they were developing.

Before proceeding, let me restate that my goal is to explore the role of public enterprises around the world, asking what countries have pursued the most aggressive industrial policy. For most of the article, I avoid making judgments as to the soundness of such policies. I cross that line in the conclusion. There I discuss some of my interpretations of the data I present below.

### Definitions and Data Issues

In this section, I discuss some of the issues that need to be addressed when studying public enterprise data. Let me begin by considering the general issue of classifying enterprises.

Organizations or enterprises that produce output can be classified in several ways. For example, three ways are by asking (1) Is the enterprise owned by the government or by private individuals? (2) Does the enterprise sell its output or provide it free of charge? (3) Who are the enterprise's customers: the government or private individuals? Of course, not every enterprise can be neatly classified according to these criteria; for example, some enterprises are partially owned by the government. But let's ignore these difficulties for the moment. Then according to these criteria, there are eight possible enterprise types. Now, private enterprises typically sell their output, so, in fact, there are six possible types. Let me enumerate them, giving an example from the United States for each.

There are two privately owned enterprise types that sell their output: those that sell to individuals (like your local barber) and those that sell to government (like defense

contractors). There are two government-owned enterprise types that provide output free of charge: those that provide to individuals (like public elementary schools) and those that provide to government (like the General Accounting Office). There are two government-owned enterprise types that sell their output: those that sell to individuals (like the postal service and some electrical utilities) and those that sell to government. There are typically none of these latter enterprises, so there are really five distinct types according to the three criteria above.

In the national income and product accounts, the first two criteria (and not the third) are used to distinguish enterprises for some purposes. So, in particular, when output is assigned to different sectors (that is, the business, government, and household sectors) of the economy, three types of enterprises are contrasted: private, government that provide output free of charge, and government that sell output. The output of all privately owned (nonhousehold) enterprises is attributed to the business sector in the national accounts. The output of government-owned enterprises that provide output free of charge is attributed to the government sector in the national accounts. The output of government-owned enterprises that sell output to private individuals is attributed to the business sector in the national accounts.

The government-owned enterprises that sell output to private individuals are those defined as *public enterprises*. Being a bit more formal, a standard definition in the literature is that public enterprises are government-owned enterprises that engage in commercial activities—that is, they sell output—and that have market sales which cover a substantial portion of operating costs. This is the definition used by Short (1984), whose data I study below.<sup>4</sup>

My motivation for examining public enterprises, as defined by Short, is that these enterprises produce goods that private enterprises could produce (and do, in other countries).

A number of issues need to be considered when public enterprise data are used. Let me describe a few important ones. First, there is the issue of data comparability across countries. The meanings of *government-owned* and *substantial portion of operating costs* may differ across countries. Hence, some enterprises might be classified as private in some countries and public in others. This is a diffi-

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<sup>4</sup>Note that in the national income and product accounts of the United States, the enterprises that Short calls *public enterprises* are called *government enterprises*. (See U.S. Department of Commerce 1988.)

cult problem. The only recourse I have is to use data (such as Short's) that attempt to reconcile statistics across countries.

Second, the significance one wants to assign to the level of public enterprise production may differ across sectors. For example, the United States has a public enterprise share of electricity output that is lower than that in most countries. It has a lower share in manufacturing as well. But whereas private enterprises in electricity are regulated in many ways in the United States, those in manufacturing face far fewer government restrictions on their business practices. Hence, the significance one assigns to the low public enterprise share of manufacturing output may differ from that assigned to the electricity observation.

Third, given that one may assign different degrees of significance to the level of public enterprise production across sectors and given that sectoral shares of output vary across countries, one wants to take care in comparing public enterprise shares of GDP across countries.

### The Public Enterprise Share of GDP

In this section, I briefly review the evidence concerning the public enterprise share of GDP. I use Short 1984 as my source for data. In constructing his data, Short made a large effort to ensure comparability of data across countries. It was difficult to do. In his words (1984, p. 111), "an attempt was made to adjust the statistics to a common definition . . . . This met with only partial success. However, as much of the basic information has not previously been brought together, it was decided to err on the side of comprehensiveness rather than comparability in choosing which statistics to include." Though Short acknowledges that his statistics are still subject to some error, I know of no better statistics.<sup>5</sup>

Short provides observations on the public enterprise share of GDP for a wide range of countries. For some countries, he provides a single observation (typically an average of the public enterprise share of GDP for a three-year period), while for other countries, he provides two or more observations. (Again, an observation is usually an average for a three-year period.) The bulk of the observations are from the 1960s and 1970s. In total, there are 118 observations (from 42 countries) on the public enterprise share of GDP. (See Appendix A.)

In order to summarize the relationship between public enterprise production and productivity in countries, I need a way to compare productivity in different countries at a

point in time as well as at different points in time (since the observations on countries occur in different years). I will use the international (constant) dollar series constructed by Summers and Heston (1991) for this purpose. I will express all productivity as a percentage of U.S. productivity in 1985. (This *relative productivity* of individual countries appears in Appendix A.)

In Chart 1, I plot the 118 observations on the public enterprise share of GDP against each country's relative productivity in the year associated with the observation.<sup>6</sup> (The numbers used for Chart 1 are in Appendix A.) As is easily seen, there is no strong correlation between the public enterprise share of GDP and relative productivity. Being a bit more formal, I categorize relative productivity into four groups: less than 20 percent, 21–40 percent, 41–60 percent, and greater than 60 percent. For these groups, the average public enterprise shares of GDP are 9.2 percent, 11.5 percent, 9.1 percent, and 10.7 percent, respectively, with standard deviations of 7.0, 7.5, 3.2, and 5.1. Hence, as I move from low- to high-productivity countries, the average public enterprise share of GDP does not change much, though the variability in the share decreases.

There is a single high-productivity country that has a public enterprise share of GDP greater than 25 percent. That observation in Chart 1 corresponds to Venezuela. Its share is high primarily because its state-owned mining and minerals sector accounts for about 25 percent of GDP. (I am not sure why its reported productivity is so high.) Besides Venezuela, there are three low-productivity countries that have a public enterprise share of GDP around 25 percent, two greater than 35 percent. Hence, under this measure, those countries pursuing the most aggressive industrial policy have a public enterprise share of GDP that is on the order of three times that of the high-productivity country average (of about 10 percent).

Recall that the World Bank (1995) concludes that over the period 1978–88, the public enterprise share of GDP was higher in developing as opposed to industrialized countries (though the differences were very small: 10 or 12 percent versus 8 percent). In contrast, I find little difference using Short's data. What accounts for the disparity in results? The World Bank report uses data for a larger

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<sup>5</sup>Note that Short's data, as well as data in most other sources that I have seen, include nonfinancial public enterprises only.

<sup>6</sup>Note that in Chart 1, I plot all the observations that Short provides. For example, if a given country has an observation for two different time periods, I plot both observations. I follow this convention in Chart 2 as well.

number of countries than Short. It uses data from Short and a number of other sources. There is not much description of how these sources relate to each other, so I prefer to employ Short's data when examining the public enterprise share of GDP.

When I examine the public enterprise share of manufacturing output in the next section, there is no choice to

make between these two sources. The World Bank report does not give public enterprise output shares by sector. Short does.

## The Public Enterprise Share of Manufacturing Output

I now examine some cross-sectional data on the public enterprise share of manufacturing output. I first look at data from Short 1984. Short has data for a large number of low-productivity countries but for only a few at the high-productivity end. Hence, I have supplemented Short's data with data from other sources for high-productivity countries. I discuss these data after Short's.

### Short's Data

Short (1984) presents public enterprise shares of sectoral output for a limited set of countries. The sectoral breakdown employed by Short is the following: agriculture, mining, manufacturing, electricity (and gas and water), construction, wholesale and retail trade, and transport and communication. These sectors are often referred to as *major sectors*, and they are similar to those in the one-digit industry breakdown used by the U.S. Department of Commerce.

In Chart 2, I plot the public enterprise share of manufacturing output against relative productivity.<sup>7</sup> (The numbers used for Chart 2 are in Appendix A.) As is easily seen, there is a strong negative correlation between the public enterprise share of manufacturing output and relative productivity.<sup>8</sup> Compare this correlation to that in Chart 1.

Though the pattern is striking, there are very few high-productivity countries in Short's data. The observations on high-productivity countries in Chart 2 are from Australia and Austria only. Hence, I have supplemented Short's data by getting observations on other high-productivity countries. I describe those data now.

### Some European Countries and the United States

My goal in supplementing Short's data is to get more information on high-productivity countries. I first discuss

Charts 1 and 2

## Comparing Two Measures of the Role of Public Enterprises

Public Enterprise Share of Output vs. Relative Productivity\*

Chart 1 Public Enterprise Share of Total Output . . .

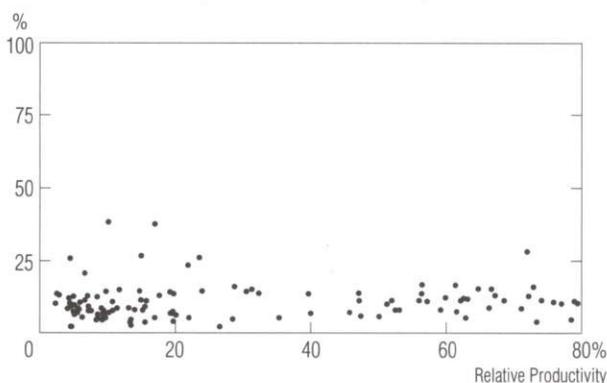
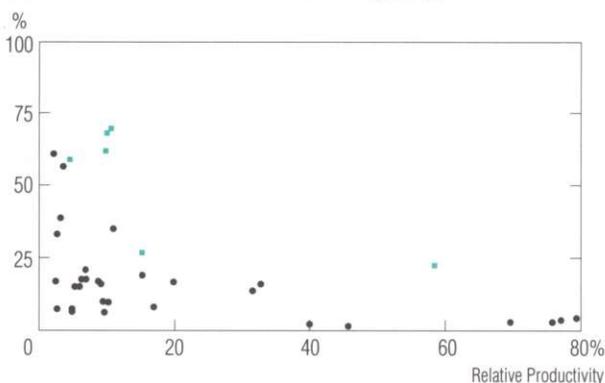


Chart 2 . . . And Share of Manufacturing Output\*\*



\*Relative productivity is defined as the country's real GDP per worker as a percentage of U.S. real GDP per worker in 1985.

\*\*Data plotted as squares include mining or electricity as well as manufacturing.

Sources: Short 1984, Summers and Heston 1991

<sup>7</sup>For most of the countries, Short was able to obtain data for the manufacturing sector by itself. However, for other countries, Short was only able to obtain data that combine manufacturing with either mining or electricity. These sectors (mining and electricity) are typically a much smaller share of GDP than is manufacturing (even in low-productivity countries), and for this reason I include them in Chart 2.

<sup>8</sup>Note that, as can be seen in Appendix A, some countries have observations in Chart 1 but not in Chart 2, and vice versa. Some countries have observations in both Charts 1 and 2.

data collected in Keyser and Windle 1978. This is a study of public enterprises in a large number of European countries. Let me summarize each country's report with regard to the information available on the public enterprise share of manufacturing output. For some countries, it is possible to determine the public enterprise share of manufacturing output; for others, the public enterprise share of manufacturing employment.<sup>9</sup>

Some countries in Europe had essentially no public enterprises in the manufacturing sector—Belgium and Denmark, for example.

In some countries, public enterprises accounted for a positive but very small share of manufacturing output. In the United Kingdom, for example, the public enterprise share of manufacturing output was 3 percent in 1975.

Two of the countries with the largest shares are Italy and France. In Italy, the public enterprise share of manufacturing employment averaged 7.6 percent over the period 1971–73. In France, the public enterprise share of manufacturing employment was 4.1 percent in 1973.

I estimate that for the United States, the public enterprise share of manufacturing output is zero. (See the discussion on the United States below.)

I think these numbers are representative of the rest of the industrialized world.

### *Some Large Differences Across Countries*

To show the contrast between the industrialized world and at least some of the developing world, I list the estimates for the public enterprise share of manufacturing output for European countries and the United States in the first column of the accompanying table. I also list in that column numbers for Australia and Austria that are available from Short. In the second column of the table, I list some of the largest public enterprise shares of manufacturing output that I have seen for the developing world. Some of these numbers are from Short; some are from other sources.<sup>10</sup> (See the table for specific sources.) The observations in the second column of the table are, again, not a random sample, but a sample of some of the countries in which public enterprises play a big role in manufacturing. This is by no means a complete list. There are other countries where public enterprises play a big role in manufacturing, such as Ghana and Turkey.

Recall that when I used the public enterprise share of GDP as a measure, those low-productivity countries pursuing the most aggressive industrial policy had measures on the order of three times those of the high-productivity

## Some Large Differences Across Countries

### Public Enterprise Share of Manufacturing Output in the 1970s

Industrialized World		Developing World	
Australia (1974–77)	3.9%	Bangladesh (1978)	70.6%*
Austria (1970–75)	23.0*	Burma (1980)	56.2
Belgium (1974)	0†	Egypt (1979)	63.0
Denmark (1974)	0	Ethiopia (1979–80)	60.9
France (1973)	4.1†	Somalia (1974–77)	59.1§
Italy (1971–73)	7.6†	Sri Lanka (1974)	33.5
United Kingdom (1975)	3.0	Syria (1977)	58.0
United States (1974)	0	Tanzania (1974–77)	37.9
		Tunisia (1978–81)	60.1
		Zambia (1979–80)	56.4

\*These numbers are for the combined manufacturing and mining sectors.

†These numbers are public enterprise shares of manufacturing employment. Belgium's number is an estimate. The source below presents a table that provides a breakdown of employment in public enterprises by sector according to transport and communication, finance, public utilities, and other sectors. In the category *other sectors* (which includes manufacturing), there are only 1,100 employees. The author concludes that public enterprise employment makes up only a trivial fraction of manufacturing employment. France's number is also an estimate. The source below lists 223,000 public enterprise employees in manufacturing in 1973. In 1973, there were approximately 5.5 million employees in manufacturing (from U.S. Bureau of the Census 1995), so that public enterprises accounted for 4.1 percent of manufacturing employment.

§This number is for the combined manufacturing and electricity sectors.

Sources:

*Australia, Austria, Bangladesh, Burma, Ethiopia, Somalia, Sri Lanka, and Tanzania:* Short 1984

*Belgium:* Keyser and Windle 1978, vol. 1, p. 48, Table 4.1

*Denmark:* Keyser and Windle 1978, vol. 2, p. 5, Table 1.1

*Egypt, Syria, and Tunisia:* Aharoni 1986, p. 24

*France:* Keyser and Windle 1978, vol. 4, p. 32, Table 3.4

*Italy:* Keyser and Windle 1978, vol. 5, p. 151, Table 8.2

*United Kingdom:* Keyser and Windle 1978, vol. 7, p. 43, Table 3.4

*United States:* Author's estimate

*Zambia:* Steel and Evans 1984, p. 62

country average. When I use the public enterprise share of manufacturing output as a measure, those countries pursuing the most aggressive industrial policy have measures on the order of 15 times those of the high-productivity country average (which is on the order of 3–5 percent).

To summarize, if the two reasons (one based on the cost of producing investment goods and the other on the extent

<sup>9</sup>Since these numbers were not collected by Short, there is obviously a potential issue of comparability.

<sup>10</sup>Again, there is a potential issue of comparability here.

of learning) given earlier for focusing on manufacturing are tenable, then many low-productivity countries are pursuing an industrial policy that is much more aggressive than is typically recognized.

Finally, each reason for focusing on the government's role in manufacturing production suggests examination of a different group of subsectors in manufacturing. Data on government production in such detail are hard to obtain. At this point, I have been able to collect data for a few countries (Bangladesh, Taiwan, and Turkey.) I will shortly discuss the Taiwanese data.

### Taiwan: A Look Over Time and Within Manufacturing

In this section, I show that the same patterns found in the two cross sections above can be found in the time series for individual countries. I focus here on the experience of Taiwan. I begin by presenting the time series evidence on the public enterprise share of manufacturing output. Then I discuss public enterprise output shares for industries within manufacturing.

#### *Manufacturing: A Look Over Time*

In Chart 3, I plot the public enterprise share of GDP and the public enterprise share of manufacturing output in Taiwan over the period 1952–90. The data used to construct the chart are from Schive 1995.<sup>11</sup> The public enterprise share of manufacturing output declined dramatically over this period. From 1952 to 1970, the share fell from 56.2 percent to 20.6 percent, a drop of 63 percent. By 1990, the share was 10.6 percent. At the aggregate, economy-wide level, there was not much change over the entire period. (The data for the chart are listed in Appendix B.)

Again, if some of the reasons given for focusing on manufacturing are tenable, then this cut in the public enterprise share of manufacturing output means that there was a significant decrease in the role of public enterprises in Taiwan over this period.

#### *Manufacturing: A Look Within*

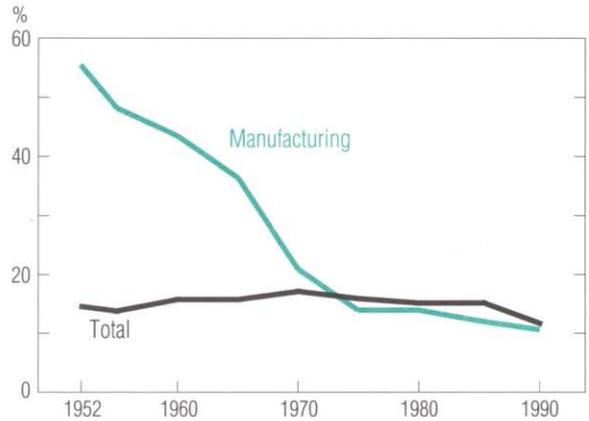
For Taiwan, information is available for the public enterprise share of output for industries within manufacturing. Such industries are often grouped under the categories *consumer goods*, *intermediate goods*, and *capital goods*. During the early 1950s, there was a large public enterprise presence in all three categories of manufacturing in Taiwan.

For example, consider the year 1954. Within the consumer goods industries, the public enterprise share of out-

Chart 3

### Comparing the Two Measures in Taiwan

Public Enterprise Share of Output in Taiwan, 1952–90



Source: Schive 1995

put was 60 percent in food processing, 86 percent in beverages, and 15 percent in textiles. Within the intermediate goods industries, that is, industries that provide goods used to produce investment goods, the public enterprise share of output was 55 percent in basic metals (for example, steel). In nonmetallic mineral products (for example, cement), there were no public enterprises. Within the capital goods industries, the public enterprise share of output was 43 percent in machinery, 37 percent in transport equipment, and 65 percent in metal products. In electrical machinery, there were no public enterprises.

Starting in the mid-1950s, Taiwan began to cut its public enterprise share of output in all these industries. Some of the steepest cuts came in the capital goods industries. For example, from 1954 to 1964, the public enterprise share of output in machinery fell from 43 percent to 15 percent, in transport equipment from 37 percent to 5 percent, and in metal products from 65 percent to 22 percent. (The data reported above are from *Industry of Free China*, November 1965.)

<sup>11</sup>Note that Short (1984) provides data on the public enterprise share of GDP for Taiwan, and these data are used for Chart 1. Short, however, does not provide data for manufacturing in Taiwan. Schive (1995) does provide data on manufacturing. So, to be consistent, when I use Schive's numbers for manufacturing, I use his numbers for the aggregate economy as well.

## A Peek at the Past: Great Britain and the United States

Using the public enterprise share of manufacturing output as a measure of the industrial policy stance of countries, I have shown that many developing countries pursue a much more aggressive policy than the typical industrialized country. An interesting question is whether the current industrialized countries also pursued a more aggressive policy when they had lower aggregate productivity. The answer, for the few countries that I have examined, is no. If anything, the public enterprise share of manufacturing output is higher in the industrialized countries today than it was when they were developing (though, again, the share is very small). Let me discuss the experiences of two countries: Great Britain and the United States.

### *Great Britain*

I base my discussion of Great Britain on two studies that address issues in the historical development of public ownership in that country: Foreman-Peck and Millward 1994 and Millward and Singleton 1995.

Foreman-Peck and Millward (1994) discuss the history of public ownership (and government intervention more generally) in the period from 1820 to recently. According to them, public ownership before World War II was limited to what they term the *network industries*: electricity, gas, and water and transport and communication. The history of government intervention in the network industries (or utilities) before World War II was briefly as follows.

There was little government involvement in these utilities during their early development, what Foreman-Peck and Millward refer to as the *competitive era*, 1820–60. According to Foreman-Peck and Millward (1994, p. 4), the period from 1860 until World War I saw

closer railway regulation by Parliament, nationalization of telegraphy, and acquisition by the larger local government units of 40 per cent of gas undertakings and 80 per cent of water undertakings, together with roughly 60 per cent of the undertakings in the new industries of electricity and trams. Much was however still in private ownership.

Between the world wars, government ownership was extended to some other bits of the network industries, most notably broadcasting. (The British Broadcasting Corporation was established in 1922.) So, until after World War II, the story of public ownership in Great Britain was a rather simple one. Public ownership was a feature only in the network industries. There was very little public ownership at first; the extent of ownership increased over time.

Unlike in many developing countries today, in Great Britain there was little or no public ownership in manufacturing.

After World War II, the Labour Party came to power in Great Britain. The Labour Party had plans to extend public ownership to many more sectors of the British economy. Clause 4 of the Labour Party's constitution called for "the common ownership of the means of production, distribution, and exchange, and the best obtainable system of popular administration and control of each industry or service" (Singleton 1995, p. 14). The Labour Party wanted to nationalize those utilities that were not already owned by the national government. (Some were privately owned; some were owned by local governments.) It also wanted to nationalize a wider range of industries, from some in the mining sector to some in the manufacturing sector. The list of potential industries to be nationalized included coal, steel, sugar, cement, meat supply, and cotton. While the Labour Party's plans were ambitious, the extent of actual nationalizations was limited. The major ones outside of the utilities were steel and coal. So, even at its heights, public ownership in Great Britain did not extend, to any great extent, into the manufacturing sector.

During the 1980s, as is well known, Great Britain reversed most of the nationalizations that occurred under the Labour Party government. (See Vickers and Yarrow 1988.)

### *The United States*

In contrast to Great Britain, which experienced a small increase in government production in manufacturing over time, the United States has always had very little such production. There was some government manufacturing during wartime. For example, in both World War I and World War II, the U.S. Navy engaged in some shipbuilding. There are other examples of government wartime production as well. For nonwar periods, my guess is that there has been no, or only trivial amounts of, government manufacturing production.

I base the above conclusions on three exercises. First, I examined the U.S. Department of Commerce's *Government Transactions* (1988, p. 75), which lists all federal government enterprises.<sup>12</sup> There are very few such enterprises. The only one that might be classified as a manufacturing enterprise is the *Government Printing Office*

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<sup>12</sup>Recall that in U.S. documents, it is standard to call public enterprises *government enterprises*.

*Sales Fund*.<sup>13</sup> Second, I examined issues of the U.S. Department of Commerce's *Census of Manufactures* going back to 1900 and earlier. In these publications, there are breakdowns of government production from private production. The only goods I have seen that are produced by the government are a few military goods I alluded to above (produced, again, during war-related years). For example, data on government shipbuilding are found in these publications.

My third exercise was to examine the U.S. Bureau of the Census' *Historical Statistics of the United States* (1975). This provides data on national income originating in various sectors of the U.S. economy over the period 1929–70, including government commercial enterprises. (See Series F 192–209, p. 237.) The income originating in this sector is very small—it is on the order of 1 or 2 percent of nonagricultural income. (Nonagricultural income is obtained from Series F 226–237, p. 239.) Moreover, I can account for most of the income originating in these government commercial enterprises by summing the income from two sources in the *Historical Statistics of the United States* that I know are classified as government enterprises: the postal service and publicly owned utilities.<sup>14</sup> After subtracting the income originating in the postal service and publicly owned utilities from the total, the residual is trivial compared to manufacturing production. (And my guess is that none of that residual comes from manufacturing.) Hence, over the period 1929–70, there was very little government production in manufacturing.<sup>15</sup>

## Conclusion

In summary, the public enterprise share of manufacturing output may be a better measure of the industrial policy of countries than the aggregate public enterprise share. Under the manufacturing measure, I have shown that many low-productivity countries have pursued a much more aggressive industrial policy than is typically recognized.

As a way to conclude, let me discuss two issues. The first issue concerns measurement. The second issue concerns theory and interpretation.

One issue is that government production is only one aspect of government industrial policy. It would be useful to know how this type of government intervention is related to other types. For example, perhaps those governments that produce manufactured goods are not heavily involved in other types of regulation in this sector. (And perhaps those governments that do not produce manufactured goods are heavily involved in regulating manufac-

turing, and so on.) My impression is that this is not true. Compared to the United States, countries in Europe have greater public production in manufacturing as well as more intervention of other types (for example, greater subsidies to private businesses). In the same way, compared to European countries, many low-productivity countries have greater public production in manufacturing as well as more intervention of other types (for example, significant barriers to imports of manufactured goods).

The other issue goes beyond measurement. My goal in this article has been to explore the role of public enterprises around the world, asking what countries have pursued the most aggressive industrial policies. I have avoided making judgments as to the soundness of such policies. Let me cross that line now. There are, of course, two interpretations of the negative correlation between aggregate productivity and the public enterprise share of manufacturing output. One is that government production is needed in manufacturing when countries are just starting the development process.<sup>16</sup> After development has begun and higher aggregate productivity is achieved, government can leave the manufacturing business. The other interpretation is that government production in manufacturing causes these countries to have low productivity.

I lean toward the second interpretation. One reason is that the experiences of Great Britain and the United States show that government production in manufacturing is not a necessary condition for development. The world is certainly a different place today than when these countries developed. But their experiences are still instructive.

The case of Taiwan is also instructive. Recall that Taiwan's time series mirrors the cross-sectional relationship between aggregate productivity and the public enter-

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<sup>13</sup>There could be government manufacturing at the state and local levels, but I doubt there is any of much consequence.

<sup>14</sup>The income originating in the postal service can be estimated using postal service employment (Series Y 308–317, p. 1102) and postal service wages (Series D 765–778, p. 168). Income originating in publicly owned utilities can be estimated using those utilities' share of all electricity generation (derived from Series S 44–52, p. 821) and the electrical utility industry's share of national income.

<sup>15</sup>I should mention that there are some limitations with public enterprise data in the U.S. Bureau of the Census' *Historical Statistics of the United States* (1975). First, the data comprise payments to factors of production in enterprises and not value added. The payment to factors in public enterprises will overstate the value added if the enterprise receives subsidies. In the United States, these subsidies are typically very small. Another limitation is that the data go back to only 1929. The United States had already achieved a much higher level of development at that time than many developing countries have achieved today.

<sup>16</sup>This might be the case, for example, if there were severe market failures. Such failures, and the absence of government intervention, might cause a country's productivity to remain low.

prise share of manufacturing output. In Taiwan, the sequence of events was not as laid out in the first interpretation above—that first the government became involved in manufacturing production, then the country began to develop, and then the government withdrew from production. No, as far as I can tell, the facts are that the economy began to develop after the government withdrew from manufacturing production.

I have other reasons for leaning toward the second interpretation. Plenty of studies show that public enterprises are less efficient and less profitable than private ones. (Some of these studies are Borcharding, Pommerehne, and Schneider 1982; Boardman and Vining 1989; Galal, Jones, Tandon, and Vogelsang 1994; and Megginson, Nash, and van Randenborgh 1994.) Of course, the government may enter manufacturing production because of failures in the market. In this case, production efficiency and profitability may not be appropriate criteria on which to judge these enterprises. An important question, then, is whether one has confidence that government production in manufacturing (and other forms of intervention) will arise in these cases of market failure (and primarily in these cases).

I think that experience with government policymaking provides a sober view of the ability of governments to intervene in the “correct” instances to fix markets. That is the view of Krueger (1990) concerning the developing world. That seems to be just as true of the industrialized world. If one looks at Europe, government production in manufacturing seems to be directed at saving jobs. Most government manufacturing production in Europe occurs in the declining steel and shipbuilding industries.<sup>17</sup> Even the ability of Japanese industrial policy to pick the winning industries has been challenged. Beason and Weinstein (1994) document that those industries which received the greatest amount of (relative) government support in Japan were textiles and mining, two industries that were in relative decline.

My final remark is on politics or political economy. I mentioned two, according to my criteria, success cases: Taiwan (which cut its public enterprise share of manufacturing output) and Great Britain (which overcame pressures to increase its share). Why were these governments able to succeed? Well, one common thread to their experiences was outside pressure from the United States to limit government manufacturing production. (See Appendix C for a brief discussion of these historical experiences.)

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<sup>17</sup>See, for example, Ford and Snyker 1990, which presents evidence on the subsidies given to the steel and shipbuilding industries in Europe. An exception to my statement that government production in manufacturing seems to be directed at saving jobs is Airbus. With that enterprise, the Europeans are trying to pick a winner.

## Appendix A

### Short's Data on Public Enterprises, by Country

Country	Time Period	Relative Productivity**	Public Enterprise* Share of Output	
			Total	Manufacturing
Argentina	1976-77	47.5%	4.8%	—
	1978-80	50.1	4.6	—
Australia	1954-57	51.3	9.1	—
	1958-62	56.0	10.4	—
	1963-65	62.2	10.5	—
	1966-69	68.6	10.3	—
	1967-69	69.8	—	3.4%
	1970-73	76.0	9.8	3.3
	1974-77	77.1	9.2	3.9
1978-79	79.5	9.4	4.0	
Austria	1970-73	56.6	15.8	—
	1970-75	58.2	—	23.0†
	1974-75	61.4	15.6	—
	1976-77	64.8	14.5	—
	1978-79	66.6	14.5	—
Bangladesh	1974	9.6	5.7	62.0†
	1975-77	9.7	—	69.2†
	1978	10.3	—	70.6†
Benin	1976	5.7	7.6	—
Bolivia	1971-73	15.8	10.2	—
	1973-75	16.8	—	5.9
	1974-77	17.7	12.1	—
Botswana	1974-77	11.3	7.7	—
	1978-79	14.0	7.3	—
Burma	1980	3.3	—	56.2
Chile	1974-77	28.8	15.2	—
	1978-80	32.3	13.0	—
Denmark	1965	53.2	6.9	—
	1974	61.6	6.3	—
Ethiopia	1979-80	2.1	—	60.9
France	1959-61	39.7	12.7	—
	1962-65	47.2	12.8	—
	1966-69	56.4	12.8	—
	1970-73	67.3	12.2	—
	1974	72.2	11.9	—
Germany, Federal Republic	1976-77	74.2	10.3	—
	1978-79	79.0	10.2	—

Country	Time Period	Relative Productivity**	Public Enterprise* Share of Output	
			Total	Manufacturing
Greece	1975	40.1%	5.8%	1.7%
	1979	45.8	6.1	1.3
Guatemala	1978-80	26.6	1.1	—
Guinea	1979	3.9	25.0	—
Guyana	1973	19.8	12.7	—
	1974-77	22.0	22.8	—
	1978-80	17.0	37.2	—
India	1960-61	5.2	5.3	—
	1962-65	5.5	6.1	—
	1966-69	5.1	6.5	—
	1970-73	5.9	7.3	13.1
	1974-77	6.1	9.8	16.2
	1978	6.7	10.3	15.7
Italy	1967-70	52.5	7.0	—
	1970-73	59.2	7.1	—
	1974-77	66.4	7.7	—
	1978	71.2	7.5	—
Ivory Coast	1979	15.0	10.5	25.2†
Kenya	1964-65	4.1	7.5	—
	1966-69	4.6	8.1	—
	1970-73	5.1	8.7	13.1
Korea	1963-64	8.7	5.5	14.8
	1970-73	15.1	7.0	17.3
	1974-77	19.6	6.4	14.9
Liberia	1977	7.7	6.8	—
Mali	1975-77	4.3	11.2	—
	1978	4.5	9.4	—
Malta	1962-65	13.5	3.7	—
	1966-69	17.0	4.2	—
	1970-73	22.1	4.2	—
	1974-77	28.5	3.8	—
1978-80	35.4	4.2	—	
Nepal	1971-73	4.6	1.1	4.0
	1974-75	4.6	1.3	4.4
Netherlands	1971-73	78.6	3.6	—

Country	Time Period	Relative Productivity**	Public Enterprise* Share of Output		Country	Time Period	Relative Productivity**	Public Enterprise* Share of Output		
			Total	Manufacturing				Total	Manufacturing	
Pakistan	1961	6.2%	4.5%	—	Turkey	1952	7.2%	7.0%	—	
	1966	8.8	4.1	—		1957	9.4	7.0	—	
	1970–73	9.6	4.4	4.1%		1962–65	10.8	7.0	—	
	1974–75	9.3	6.0	7.8		1966–69	13.1	7.6	—	
Paraguay	1970–73	13.3	2.9	—		1970–73	15.6	8.1	—	
	1974–77	15.7	2.7	—		1974–77	19.5	5.8	—	
	1978–80	19.8	3.1	—		1978–81	20.1	5.2	—	
Philippines	1974–77	13.5	1.7	—		1982	19.7	5.8	—	
	Portugal	1976	31.4	14.3		12.0	United Kingdom	1962–65	47.2	10.3
Senegal		1970	7.1	8.4	—	1966–69		51.9	10.4	—
		1974	6.7	19.9	19.0	1970–73		57.2	10.0	—
Sierra Leone		1979	9.0	7.6	14.2	1974–77		59.9	11.3	—
	Singapore	1972	32.7	—	14.2	1978–81		63.1	10.9	—
Somalia		1974–77	4.2	—	59.1§	1982	62.7	11.2	—	
		Spain	1979	63.0	4.1	—	Venezuela	1972–73	73.4	2.9
Sri Lanka			1961	9.3	4.8	—		1974–77	73.1	15.0
	1966	10.1	6.1	7.6	1978–80	72.0		27.5	—	
1974	10.8	9.9	33.5	Zambia	1972	10.1	37.8	—		
Taiwan	1951–53	7.0	11.9		—					
	1954–57	8.5	11.7	—						
	1958–61	9.8	13.5	—						
	1962–65	11.8	14.1	—						
	1966–69	14.8	13.6	—						
	1970–73	19.3	13.3	—						
	1974–77	24.0	13.6	—						
	1978–80	30.5	13.5	—						
Tanzania	1966–69	2.2	9.3	14.9						
	1970–73	2.5	12.7	31.9						
	1974–77	2.9	12.3	37.9						
Thailand	1969	8.4	3.5	—						
	1970–73	9.3	3.6	5.2						
Togo	1980	5.0	11.8	—						
Tunisia	1969	15.0	25.9	—						
	1978–79	23.6	25.4	—						

\*Short (1984) defines *public enterprises* as government-owned enterprises that engage in commercial activities and that have market sales which cover a substantial portion of operating costs.

\*\*Relative productivity is defined as the country's real GDP per worker as a percentage of U.S. real GDP per worker in 1985. It is constructed from the variable *RGDPPW* (in 1985 international prices).

†These numbers are for the combined manufacturing and mining sectors.

§This number is for the combined manufacturing and electricity sectors.

Sources:

Relative productivity: Summers and Heston 1991

Public enterprise share of total output: Short 1984, pp. 116–22, Table 1

Public enterprise share of manufacturing output: Short 1984, pp. 126–29, Table 2

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## Appendix B

### Public Enterprise Share of Output in Taiwan

Year	Public Enterprise Share of Output	
	Total	Manufacturing
1952	14.7%	56.2%
1955	14.0	48.7
1960	15.9	43.8
1965	15.9	36.8
1970	17.6	20.6
1975	16.4	14.2
1980	15.2	14.5
1985	14.9	12.3
1990	11.8	10.6

Source: Schive 1995

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## Appendix C

### Two Historical Notes

Why did Taiwan succeed in cutting its public enterprise share of manufacturing output? Why did Great Britain overcome pressures to increase its share? One common thread to their experiences was outside pressure from the United States to limit government manufacturing production. In this appendix, let me very briefly allude to the United States' influence on these countries.

#### Taiwan

Many public enterprises were established in Taiwan during the 1940s as the government took control of formerly Japanese-controlled businesses. These public enterprises, and the whole idea of public ownership, became a point of contention between the United States and Taiwan when the United States took an interest in Taiwan after the start of the Korean War. According to Wade (1990, p. 84), "the United States wanted a strong and stable outpost on its western defenses, and . . . a showcase of non-communist development to contrast with communist development on the mainland." The United States saw public ownership as contrary to these goals. In order to convince the Taiwanese of its views, the United States used its aid as leverage. As Wade (1990, p. 83) argues,

Aid also helped to strengthen the role of the private sector. U.S. advisors used their aid leverage to check the hostility that Nationalist officials had shown toward private business on the mainland, and to exert pressure at the margin in favor of using aid for creating or helping private firms. U.S. officials themselves sought out private investors for new projects (as in plastics, rayon, and glass), and in several instances blocked attempts by the Nationalist government to put projects under public ownership. They also successfully thwarted plans to undertake several large-scale, capital-intensive projects, such as a steel mill, an airline, and a nuclear reactor. The first plastics plant in 1957 was a key battle; many hardliners in the Nationalist party fought to have it as a public enterprise, and their defeat marked a turning point in acceptance within large parts of government that new industries, even if in some sense strategic for the rest of the economy, did not have to be located in the public sector.

So, a precedent was established that many new industries were to be private, not public. This precedent alone would imply that the public enterprise share of manufacturing output would fall. Not only was such a precedent set, but there were also divestitures of existing public firms. Schive (1995) documents that by the early 1950s, Taiwan began selling public enterprises. In 1953, Taiwan passed its Statute for the Transfer of Public Enterprises to Private Ownership. Schive presents information on some of the public enterprises sold during the 1950s and 1960s (such as the Taiwan Cement Corporation, Taiwan Paper and Pulp Corporation, the Industrial and Mining Corporation, and Taiwan Machinery Manufacturing).

#### Great Britain

When the Labour Party rose to power in Great Britain after World War II, it had plans to nationalize many industries. An interesting question is why it nationalized so few industries. This question is addressed by Singleton (1995). He briefly discusses the United States' role in this affair. As Singleton (1995, p. 24) explains,

Labour also had to keep an eye on the political mood in the United States, where nationalisation was viewed by the right as a threat to democracy. Senator James P. Kem of Missouri and Senator Homer Ferguson of Michigan opposed giving aid to Britain whilst Labour continued to nationalise private property. While there is no evidence to suggest that these protests affected US policy, they served as a reminder that socialist Britain was a welfare beneficiary of the mid-western taxpayer and had to watch its step.

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