COMPETITIVENESS

Capital productivity:

Higher capital returns can compensate for lower savings • German and Japanese managers need to make better decisions about asset investment and capacity utilization • Buying local can mean a 60 percent premium

“High telecom performance levels in the US are attributable to the fact that firms are owned by private investors, not the government, and that regulators focus on maintaining low prices.”
Why the US leads and why it matters

Raj Agrawal, Stephen Findley, Sean Greene, Kathryn Huang, Aly Jeddy, William W. Lewis, and Markus Petry

How well a country uses its capital ought to be extremely important to its citizens and policymakers. While labor productivity is a topic of constant debate and was the subject of earlier McKinsey Global Institute studies, far less attention has been paid to questions about the productivity of a nation’s capital stock.

“Capital” actually has two interrelated meanings: physical capital (machinery and buildings) and financial capital (stocks and bonds), which lays claim on physical capital and the income it generates. Capital productivity is the measure of how well physical capital is used in providing goods and services. Productive use of physical capital and labor are the two most important sources of a nation’s material standard of living.

In addition, how well a nation uses its physical capital affects the return that people get on the money they save. The higher the returns, the less they need to save for the future, and the more they can consume today. This is especially critical because most developed countries have a rapidly growing proportion of retirees. Very small differences in rates of return create large differences in future retirement income.

To measure how productively major economies use capital and to understand the causes for differences in performance, the McKinsey Global Institute has studied capital productivity in Germany, Japan, and the US. We analyzed economywide performance and also conducted case studies in five industries: auto, food processing, retail, telecommunications, and electric utilities.

Raj Agrawal, Steve Findley, Sean Greene, Kathryn Huang, Aly Jeddy, and Markus Petry are consultants who served at the McKinsey Global Institute from 1995 to 1996. Bill Lewis is Director of the McKinsey Global Institute. Copyright © 1996 McKinsey and Company. All rights reserved.
Our principal findings are:

- Significant differences exist in capital productivity across nations: productivity in Germany and Japan is about two-thirds US levels.

- Managers in Japan and Germany could close most of the gap without a single change in regulation but do not because of lack of incentives and lack of market pressure.

- Combining this work with the previous work of MGI on labor productivity, we find that the US achieves leading economic performance by having higher productivity in both labor and capital. Japan’s low productivity is due to subpar performance in both factors, while Germany’s lower overall productivity stems primarily from less productive use of a very high level of capital (Exhibit 1).

- Higher capital productivity in the US has led to higher financial returns, which have more than compensated for lower savings and investment rates by generating more capital income (Exhibit 2). As a result, the US has maintained greater financial wealth and consumed more at the same time.

The following sections summarize our findings about differences in capital productivity and how those differences affect economic and financial performance.

Standards of living – two paradoxes

The differing overall economic performance of the three countries poses two important paradoxes:

- Why is Japan’s GDP per capita not higher than that of the US when Japan has saved so much more and worked so hard?

- Why has German labor productivity not exceeded US levels when Germany has invested so much more capital per worker?
The resolution of the Japanese paradox is straightforward. GDP per capita is simply a product of labor and capital, and how productively they are used (Exhibit 1). Although Japan invests more capital and uses more labor than either the US or Germany, extremely low productivity in both capital and labor drags down their GDP. Japan has a market sector GDP per capita similar to that of Germany, and only 77 percent of US levels. Simply put, the Japanese invest a lot of money and a lot of time and energy and get comparatively little back in return.

Germany’s situation is different. As Exhibit 1 shows, Germany uses far more capital than the US but works significantly less. As a result, there is about 40 percent more plant and equipment for each worker hour than there is in the US. We would expect, therefore, that German labor would be more productive. It is not, however, because capital has not been used efficiently and effectively. This explains the German labor productivity paradox and shows up as capital productivity that is only two-thirds of the US level.

The combination of much lower capital productivity and slightly lower labor productivity results in an overall productivity level in the German market sector that is 20 percent below the US level. As shown in Exhibit 1, this lower overall productivity is the primary reason why Germany’s market sector GDP per capita is 26 percent below US levels. The other, less important, reason
### Exhibit 3

**Summary of capital productivity results***

<table>
<thead>
<tr>
<th>Index: United States = 100</th>
<th>United States–Germany</th>
<th>United States–Japan</th>
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<tr>
<td>Auto 1991–93 average</td>
<td>65</td>
<td>110</td>
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<tr>
<td>Food 1992</td>
<td>70</td>
<td>38</td>
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<tr>
<td>Retail 1992</td>
<td>110</td>
<td>78</td>
</tr>
<tr>
<td>Telecom 1994</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Electric/CR utilities 1993</td>
<td>100</td>
<td>46</td>
</tr>
<tr>
<td>Economywide 1990–93 average</td>
<td>64</td>
<td>49</td>
</tr>
<tr>
<td>Auto 1991–93 average</td>
<td>65</td>
<td>63</td>
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<tr>
<td>Food 1992</td>
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<tr>
<td>Economywide 1990–93 average</td>
<td>64</td>
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</table>

*For latest year in which data was available. Averages taken where there was significant volatility in results due to changes in the business cycle.

### Exhibit 4

**Summary of causality analysis**

<table>
<thead>
<tr>
<th>Strength of factor in explaining capital productivity differences</th>
<th>Auto</th>
<th>Food</th>
<th>Retail</th>
<th>Telecom</th>
<th>Electric/CR utilities</th>
<th>Summary</th>
</tr>
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<tr>
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</tr>
<tr>
<td><strong>Not important</strong></td>
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<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>

1. **Components of differences in productivity**
   - Capacity created with assets
   - Capacity utilization

2. **Managerial decisions**
   - Marketing
   - Industry chain management
   - Production technique
   - Capital expenditure decision making
   - Operations effectiveness

3. **Industry dynamics (Level and nature of competition for customers, capital, and labor)**
   - Product market
   - Labor market
   - Capital market
     - Alignment of goals with productivity
     - Ongoing improvement pressure
     - Forcing of exit

4. **External factors affecting industry dynamics**
   - Macroeconomic environment
   - Product market factors
     - Demand factors
     - Competition laws/enforcement
     - Monopoly regulation
     - Regulation/market interference
   - Labor market factors
     - Skills
     - Demographics
     - Rules/unionism
   - Capital market factors
     - Sources of funding/market for corporate control
     - Ownership/governance mechanisms
     - Upstream and downstream market factors

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*For latest year in which data was available. Averages taken where there was significant volatility in results due to changes in the business cycle.*
is lower labor inputs. In this sense, capital productivity is the most important factor in understanding Germany’s lower GDP per capita.

Analysis of individual industries supports our overall results (Exhibit 3). For both Germany and Japan, in four out of our five case studies, capital productivity was significantly below US levels.

Managers’ choice

Detailed industry analysis also permits us to understand why capital productivity really differs. Exhibit 4 summarizes the hierarchy of factors that caused productivity differences. Surprisingly, we found that managers in Japan and Germany could achieve performance close to US levels if they ran their companies differently, which they appear to be free to do. Formal external constraints, such as labor laws and rules, do not fundamentally restrict improvement opportunities.

Capital productivity shows up in two ways: the amount of assets used to create a given level of capacity, and the extent to which that capacity is utilized. Different levels of capacity utilization explain 70 percent of the productivity gap between Germany and the US, while Japan’s lower productivity is almost equally accounted for by each of the two factors. We found that managers’ actions, especially their marketing decisions and the effectiveness of their operational processes, directly affect performance on both variables (Exhibit 5).

Summary of critical factors in explaining differences in performance

Exhibit 5

Key managerial actions

- Effective operations to increase line speed and product quality
- Effective marketing to raise value added of output
- Avoidance of goldplating/overengineering
- Effective marketing: pricing and product management to create high levels of demand (over fixed asset network)
- Effective planning to minimize excess capacity and maintain high operating hours
- Operational excellence in maintenance and changeovers reduces downtime
- Global sourcing

Effective capital management

- High levels of operational productivity
- Capacity created with assets
- Maximum output
  - Throughput “speed”
  - Quality and value to customer of output
- Minimum capital expenditure
- Fixed network utilization
- Running hours
- Operational excellence in maintenance and changeovers reduces downtime
- Lower prices paid for equipment
- Global sourcing
Why is marketing so important? Good decisions on pricing and product lines can influence demand to increase capacity utilization, which in turn means higher productivity. For example, in electric utilities, time-of-use pricing reduces peak loads and raises average utilization of power plants. Marketing can also increase the value to the consumer of each unit produced, as it does in retail through effective merchandising and new format development.

Excellent “shopfloor” operational practices are also crucial. For instance, Toyota’s production system illustrates the many ways that effectiveness in operations can raise capital productivity. Interestingly, the same operational practices that improve labor productivity boost capital productivity as well. Thus, we find that high capital productivity is not achieved by throwing in more labor, nor vice versa.

We also found that for many German firms ineffective investment planning lowered capacity utilization, and “goldplating” and overengineering were common. For example, the phone cables of Deutsche Telekom must be

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**HOW WE MEASURED CAPITAL PRODUCTIVITY**

Productivity reflects the efficiency and effectiveness with which resources are used to create value in the marketplace. It is measured by computing the ratio of output to input. Difficulties in measuring capital productivity arise both from the output and input sides, depending mainly on the availability and accuracy of data.

**How to measure output**

We used physical units and value-added. In the studies of telecoms and of electrical utilities, where data from the same part of the value chain for every industry was available, and thus directly comparable, we were able to use physical units – call minutes and kilowatt hours.

For all the other case studies we used value-added – defined roughly as factory-gate gross output less purchased materials and energy. Value-added accounts for differences in vertical integration across countries. Furthermore, it accommodates quality differences between products, as higher quality goods normally receive a price premium which translates into higher value-added. However, one complication arises from the fact that value-added is not denominated in the same currency across countries.

**Currency conversion (industry purchasing power parity)**

The problem of simply converting values to a common currency using market exchange rates is illustrated by fluctuations in the exchange rate; in 1992, for example, the dollar was 7 percent lower relative to the deutsche mark than in 1993, and US output would therefore have appeared to be 7 percent lower than in 1993.

The appropriate way to convert currencies is to use industry purchasing power parities (PPPs) constructed by using comparable products made by a given industry in all three countries. Suppose the factory-gate price of a car in the US was $15,000, while the price of the same car in Germany was DM 30,000. The PPP in this case would be DM 2 per US$1. The price of the standard item in marks in relation to the price in dollars gives a PPP exchange rate for the industry for the US-Germany comparison and similarly for the Japan-US comparison.

**How to measure input**

Physical capital used in the business sector is very heterogeneous and there is no consistent methodology to measure the capital stock and its services directly. Standard practice is...
to construct the capital stock indirectly using the “perpetual inventory method.” Starting from an initial capital stock, one year’s capital expenditures are added and depreciation subtracted to compute the new capital stock, and so forth year after year. However, although perpetual inventory data is published in national accounts, because accounting conventions differ so much across countries, a meaningful international comparison is impossible.

Therefore, for the aggregate analysis, we extended the standardized capital stock estimates calculated by O’Mahony* from 1989 through 1992 and split her capital stock estimates into market and non-market sectors. For the industry studies, we constructed our own capital stock estimates using the perpetual inventory method applied to published data on historical capital expenditures, deflated by the investment goods deflator. We assumed “sudden death depreciation” under which each piece of capital provides a constant service flow until the end of its useful life.

Productivity measures
Although we chose to use average capital productivity for the major parts of our analyses, we did not ignore the contribution of other inputs to production. We realize that capital productivity can increase because of increases in the amount of labor, management, and organization, improvements in technology, or advances in the skills of the workforce. We have included these factors in our causality analysis.

A more direct measure of the contribution of capital to output is marginal capital productivity; the additional output made possible by an additional unit of capital services when all other inputs remained unchanged. We used this approach to link productivity to rates of return at the aggregate level.


able to withstand being run over by a tank. We found other examples of goldplating in the auto industry.

These results further explain the two paradoxes above. Goldplated or underutilized equipment in Germany does not improve labor productivity. In addition, the US achieves higher overall productivity, especially relative to Japan, through better marketing and operational practices that improve both labor and capital productivity at the same time. Amassing more resources, without changing managerial practices, does not improve productivity.

Although not impacting physical productivity, global sourcing of equipment is another way to improve financial return on capital. German and Japanese managers tend to buy their equipment locally. Yet they could vastly reduce equipment prices by buying more on the global market. The potential savings range from 10 percent in the food industry to as much as 60 percent in telecom.
Motivating managers

We do not believe that managers in one country are any more skilled, or have acted any more rationally, than in another. Rather, they have responded to the pressures and incentives placed upon them by their environments. Productivity differences across countries arise because economic systems create different dynamics of innovation, improvement, and creative destruction.

A competitive product market is critical in creating a positive dynamic. Low entry barriers, intense competition on price/value trade-offs, and frequent start-ups and exits spur managers to improve productivity. In all of our “non-monopoly” case studies—food, auto, retail—the more intense the product market competition, the higher the productivity. Regulations, from zoning to trade protection, were often the basic cause of differences in the nature of competition, because they raised entry barriers and constrained managerial actions.

Interestingly, in the regulated monopoly industries—telecom and electric utilities—performance differences across countries were significant. We found that higher performance levels in the US were attributable to the fact that firms were owned by private investors, not the government, and that regulators focused on maintaining low prices. Both of these factors combined put more pressure on US managers to use their resources well.

The capital market is also important in stimulating higher productivity. More so in the US than elsewhere, the capital market boosts productivity because it gives managers a clear primary objective—financial performance—that generally guides them to use their resources productively. Furthermore, the US capital market complements the competitive pressures of the product market by cutting off funds to failing firms. Consequently, the high levels of productivity attained in most US industries do not square with the “conventional wisdom” that the US capital market undermines economic performance by forcing firms to be too focused on short-term results.

Capital productivity and wealth

Capital also has the role as the storage device for saving some of current income for future consumption. The accumulation of these savings represents the wealth of a nation. The connection between savings and wealth raises another paradox: how could the US, which has saved relatively little, have created more new wealth than the other two countries (Exhibit 6)? As the exhibit shows, a large part of US wealth existing in 1970 was eroded by underlying physical depreciation. This depreciation was offset by the creation of more new wealth than in Germany and Japan.

The explanation of higher US wealth and the resolution of the paradox lies in combining the right savings numbers with the differences in capital
productivity. First, US savings invested in the business sector have not actually been as dramatically low relative to Germany and Japan as popular wisdom suggests, once they are measured on a per capita basis and equalized for purchasing power. Commonly published net domestic savings rates feature the well-known, very large differences among Germany, Japan, and the US. Germany’s net domestic savings rate has been more than 60 percent higher than that of the US, and Japan’s has been more than double.

This picture is misleading, however, when we want to explain per capita levels of new wealth creation because it is based on net rather than gross and on rates rather than levels. We care about new wealth creation because it, not net wealth creation, reflects the total, real performance of an economy. New wealth is generated from all new (gross) investment, including investment that replaces old capital. Net wealth takes into account the wearing out of old capital assets (depreciation). However, depreciation is a “fact of life” that depends on the level of initial wealth. Replacing depreciated assets is as much a part of the real performance of an economy as the addition of net wealth. To analyze new wealth created on a per capita basis thus requires starting with gross investment on a per capita basis. These numbers paint a very different picture from net savings rates (Exhibit 7). Between 1974 and 1993,
gross business investment levels have been only about 20 percent higher in Germany and Japan than in the US.

Thus, our approach starts by measuring the levels of new capital invested in business and calculates new income generated, accounting for the consumption of capital in the production process as a reduction in the return generated. We analyzed only wealth generated by businesses, because other forms of wealth (real estate, government infrastructure) cannot be managed through an active production process to create income to capital.

Second, higher capital productivity in the US means that savings worked harder and generated higher capital income, despite the somewhat lower savings.

Our measures of financial performance demonstrate that the US has earned higher returns to capital than the other two countries. By incorporating into our measure of physical capital productivity the prices of outputs and capital inputs, as well as how much of the income generated goes to capital, we can calculate the financial return that investors get in a one-year period. This static measure, which we call the production return to capital, shows that over 1990 to 1993, capital in Germany and Japan earned roughly three-quarters of what it did in the US (Exhibit 8).

We have also calculated a dynamic measure of financial return, the real internal rate of return. This measure is dynamic because it relates current income to past investments and is market based because it includes the appreciation in the value of financial assets. This appreciation is linked to expectations of future earnings, as reflected in increases in stock market prices. Again, we see marked differences in performance over the period 1974 to 1993, with Germany and Japan earning roughly 80 percent of US levels (Exhibit 9). German performance is consistently lower than the US, while for Japan, our results are sensitive to the time period measured because
of high income share to capital in the early 1970s and the stock market “bubble” in the late 1980s.

These two measures of return, taken together, offer several striking conclusions. Both show marked differences in performance between countries. While each measure has its limitations and irreducible sensitivity to assumptions persists, the similarity of results from both static and dynamic measures strengthens the findings.

Differences in physical capital productivity explain the higher returns to capital. Because the income share to capital is roughly the same in the three economies, the higher financial performance in the US is attributable to “a larger pie being created” and not to capital’s “taking a larger share of the pie.” Moreover, this correlation between productivity and return supports our observation in the case studies that a clear managerial goal of high financial performance is generally consistent with high levels of productivity.

Finally, these different rates of return compound to significant differences in wealth creation, and help explain the US “savings/wealth” paradox. Higher returns create more capital income, allowing the US to create more new wealth while saving less and thus consuming more today (see Exhibit 2). Moreover, this higher wealth has been achieved while maintaining the highest labor productivity.

Because we have studied GDP per capita levels and not growth rates, our results have no implications for the relationship between savings rates and GDP growth.

Implications

These results offer clear implications for policymakers, corporations, and investors in all three countries.

Policymakers should recognize the importance of capital productivity to overall standards of living and to financial returns to investors. As economies all over the world increasingly have to rely on funded pension systems, higher financial returns to investors will become a critical requirement for securing
adequate retirement benefits. Policymakers can help investors exert performance pressure on managers of public corporations by improving the quality and clarity of information that investors receive in public filings.

To improve national productivity performance, governments should foster product market competition by eliminating regulations that raise barriers to entry and protect existing corporations. In the case of regulated monopolies, policymakers can increase the performance pressure on managers through the use of price cap (price reduction) regulation or prudence reviews. Finally, remaining government-owned firms should be privatized to create investor pressure on managers, which in turn should increase productivity.

Corporations should establish explicit performance goals that include both financial and operational measures of capital and asset productivity. What gets measured gets done. A growing body of research suggests that capital productivity measures such as return on invested capital are key drivers of returns to investors. Adoption of these measures would go a long way to getting managers to use capital better.

Particularly in Germany and Japan, the bias to procure locally, resulting in significant cost penalties for capital goods relative to global sourcing, should be addressed. In addition, more closely linking investment decisions to customer requirements should help avoid unwarranted goldplating. Finally, a relentless focus on asset and capacity utilization, both through better marketing and adopting global best practice in shopfloor operations, should have significant impact on asset and capital productivity. In this regard, pursuit of global opportunities will provide both a window on global best practice as well as additional markets to reap the benefits of improved productivity performance.

Investors, particularly institutional investors that manage pension funds, should recognize the high cost of lower financial returns. They should demand to be better informed, seeking better financial as well as operational information on capital and asset productivity. They should also become insistent advocates of good investment performance, as they represent all of us who are dependent on investment performance for a secure retirement.
Equal productivity in the US and Japan belies vastly different underlying industry trends. Heavy investment, including some in needless automation, has stifled Japanese capital productivity improvement, while adoption of Japanese style “lean production” has accelerated improvement in the US.

More flexible organization of the shop floor and better cooperation between suppliers and OEMs give Japan and the US their lead over Germany. These practices – embodied in lean production – ultimately allow companies to run plants with faster changeovers between products, more uptime, and less rework of defects. This means that producers get more out of their fixed capital, and as previous McKinsey Global Institute studies have shown, also out of their labor. Japan retains a significant advantage over both the US and Germany in labor productivity.

Unnecessarily heavy investment in Japan has offset its underlying advantages. In 1987, Japan’s industry had a 25 percent capital productivity advantage over the US industry, but by 1993, extremely heavy investment had offset some of the underlying Japanese capital productivity advantage. From 1987 to 1993, Japanese producers invested $72 billion ($91,000 per worker) in structures and equipment, while US producers invested only $50 billion ($61,000 per worker) and German producers $53 billion ($51,000 per worker). The heavy investment in Japan, some of which clearly turned out to be excessive, went toward increased automation, more comfortable factories, and added capacity. Meanwhile, more conservative investment and increasing adoption of Japanese production techniques helped the US industry to continue to improve.

In both the US and Germany the stock market and corporate governance mechanisms failed for years to force managers to fundamentally improve. Instead, change began only after intense competition in the product market destroyed the underlying economics of the auto business in the US and Germany, forcing some companies to the brink. Protected by Voluntary Restraint Agreements and other trade barriers, the German industry did not feel intense competitive pressure until 1993. In the US, the process began a decade earlier when Japanese imports and the growth of Japanese transplants began forcing US automakers to completely rethink how they designed and built cars.
Product proliferation and an excessive focus on freshness hinder Japan’s performance. Surprisingly, just-in-time delivery systems - a boon to productivity in the auto industry - hurt the Japanese food industry. With competition on the increase, Germany is closing the gap with the US.

US plants have higher utilization than their Japanese and German counterparts. In the dairy industry, for example, an average plant shuts down for 40 hours per week in the US, compared with 60 and 56 hours in Germany and Japan, respectively. Moreover, US plants have less downtime for changeovers while they are operating because they produce fewer varieties of products. Downtime associated with product variety amounts to 7 hours per week in the US compared with 11 and 25 hours in Germany and Japan.

Japanese food companies compete primarily on freshness and product variety, not price. In order to provide maximum freshness across their product lines - which often have 50 percent more stock-keeping units than US counterparts - Japanese companies have created a system in which they carry virtually no inventory. Instead, they produce and distribute produce the same day they receive orders. This “just-in-time” system forces them to carry excess plant capacity to meet significant daily peaks in demand. In the Japanese dairy industry, for example, peak capacity is twice the level of average daily demand. This investment in excess capacity hinders capital productivity.

Slower industry consolidation in Germany accounts for more excess capacity relative to the US. In the US intense competition and an unforgiving capital market have forced out inefficient players, allowing the industry to consolidate. Historically in Germany less competitive pressure has been slower to push unproductive players to the brink, and ownership structures such as cooperatives are slower to cut off funding. These trends have reversed in recent years, accelerating consolidation in Germany and fueling fast productivity growth.

The case also shows how an entire industry chain can affect productivity of individual participants in unanticipated ways. Regulations restricting large-scale retailers in Japan, for example, contribute to fragmentation in distribution and manufacturing, which both directly lowers food processing productivity and makes it difficult for productive new players to enter. Although competition is increasing in Germany, a regionalized distribution structure still makes it difficult for efficient national producers to emerge and challenge static regional producers.
Similar performance of the US and Germany masks vast differences in company skills and industry structure. The high productivity, low value-added, German industry will eventually lose ground to high value-added, high-service US-style formats. Japan’s fragmented and antiquated retail industry is badly in need of restructuring.

General merchandise retail is a doubly important industry. Consumers acquire most of their goods via retailers, and the industry uses more capital than any of the other cases we studied. This case study also underscores the importance of capital in achieving distinctive performance: for example, discount stores outperform department stores having roughly the same labor productivity. Their competitive advantage springs from more efficient use of capital.

The US retail industry is highly volatile, fiercely competitive, and exceptionally innovative. Retailers introduce innovative formats and improve performance within existing formats through better merchandising and industry chain management. They raise productivity by constantly adding more value to the goods they sell. This process is energized by a self-reinforcing dynamic of performance improvement: the capital and product markets jointly create an environment in which new, more productive players emerge and challenge incumbents. Existing players who cannot adapt lose market share until the capital market cuts off funds and steers capital to more promising retailers. As a result, the industry’s productivity rises.

This beneficial cycle is all but missing in Japan. Zoning laws that hamper the effectiveness of new formats, barriers to competition, and capital market complacency have led to a retail sector that is the least dynamic of the three we studied. Neither adoption of global best practices in retailing, nor evolution toward more productive formats, has occurred there, with few exceptions.

German retailers add less value than their US peers, but make up for it by minimizing capital usage. Artificially high land prices, severely limited store hours, and less competition – in rural areas as well as in the older formats – have insulated German retailers from global best practices. However, they have aggressively optimized the system within its own constraints. For example, German retailers use far less floor space than US peers. But, since the high performance of German retailers is tailored to the quirks of the German market, rather than to superior delivery of value to customers, it is very doubtful that German formats could work outside Germany. They are also susceptible to competition from high value-added US-style formats if the market opens up.
The high performance of the US shows how good marketing can drive productivity. With little or no incentive to be consumer focused, German and Japanese telcos dramatically underutilized their phone networks.

Even before deregulation, low prices and new products boosted US performance. Capital market pressure and regulations designed to make phone access cheap and widely available forced US telcos to be better at marketing phone services. They priced aggressively and innovated with new products like toll-free numbers, answering machines, and call waiting.

A long history of these marketing efforts has led to significantly more calls. Call volume per capita in the US runs double to that of Japan and Germany. The high volume creates higher utilization of the gigantic fixed network of wires and switches. High utilization results in higher productivity for the US.

Government ownership leads to garbled objectives for managers and low productivity. In Germany, the government, as both owner and regulator, gives managers a host of competing objectives and incentives: universal service for consumers, high quality and reliability, technological excellence, and profits to subsidize the postal system. As a result, managers’ decision making rarely lines up with productivity improvement.

Since deregulation both Japan and the US have become more effective in their capital spending. Since 1984, productivity growth has been much faster in Japan and the US than in Germany, which has just begun the process of deregulation. More effective capital expenditure planning in the US and Japan as well as “goldplating” in Germany - where phone lines must be able to withstand being run over by a tank - account for these trends.

Global sourcing is a big opportunity for corporations. By relying on local suppliers of equipment, both German and Japanese firms have paid well above international prices for their equipment. Despite recent price declines, Deutsche Telekom still pays as much as 60 percent above global prices for some switching equipment.
Cost-conscious, consumer-focused regulators and ownership pressure force US electric utilities to keep prices and costs low. Resulting higher demand per capita and better asset utilization translate into far higher capital productivity.

Electric utilities were the most heavily regulated industry in our case sample. Throughout the three countries studied, regional monopolies were still in place although all were in some way beginning to deregulate their industries. The large productivity differences show that even in heavily regulated monopolies, productivity can vary enormously from country to country. From a capital productivity standpoint, how an industry is regulated is more important than the mere fact that it is regulated.

The differences in productivity can largely be attributed to utilization of assets, especially in distribution. While utilization of power-generating assets in the US and Germany is very close, Germany has far lower utilization for its transmission and distribution (T&D) network. In addition, German utilities tie up far more capital than US counterparts, because they often goldplate and overengineer their systems. Japanese price utilization lags across the board in generation, transmission, and distribution.

Pricing differences lead to underutilization of assets in Japan and Germany. The price of electricity drives per capita consumption. In Germany and Japan high prices have kept consumption at a comparatively low level, reducing utilization of the fixed asset T&D network. Additionally, in Japan managers have not used flexible pricing schemes or other demand management devices to lower electricity use in peak hours, thereby leading to more generating capacity and lower productivity.

Price, demand, utilization, and productivity can all be traced to each country’s regulatory and financial system. Although rate-of-return regulation, which is prevalent in all three countries, gives managers no direct incentive to use their resources productively, US regulators drive their industry to high productivity by more closely scrutinizing capital investment and ensuring that consumers pay low prices for electricity. US shareholders create similar pressure to perform. Low prices, high demand, high utilization, and high productivity are the result. In Germany and Japan the situation is almost completely reversed. Poor regulatory rules and competing goals on the part of both owners and managers combine to produce high prices, low demand, low utilization, and low productivity.