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State and National Economic Fluctuations

Not all local economies are related to the national economy in the same way. For example, economic fluctuations in California are linked more closely to national economic fortunes than are economic fluctuations in Alaska.

Although most economists agree that such differences among states exist, the nature of these differences is not well understood. Recent research at this Bank finds that states that are linked more closely to the national economy tend to be large, with greater-than-average dependence on manufacturing, and less-than-average dependence on agriculture and oil. Economic forecasts for these states therefore should incorporate national economic forecasts more fully than is necessary for states without these characteristics. This *Weekly Letter* discusses the research behind these findings, and draws implications for the nine Western states that comprise the Twelfth Federal Reserve District.

Defining linkages

Most studies of linkages between state and national economies have explored the *magnitudes* of the changes in states' economies associated with national business cycles. Another interesting aspect of the relationship is the extent of *comovement* between the two economies. "Comovement" refers to fluctuations in national and state economies that are positively correlated and synchronous with each other.

Measuring the comovement between two economies is different from measuring the relative magnitudes of their economic fluctuations. Some regions experience only small fluctuations associated with national fluctuations, even though their fluctuations follow national cycles quite closely. Other regions respond sharply to shocks associated with national business cycles, but they respond sharply to so many other shocks that their economic changes bear little resemblance to national fluctuations.

How comovement occurs

Comovement between the pace of economic activity at the state and national levels can occur for many reasons. Since national personal income is the sum of personal incomes of the states, state growth rates in a sense "cause" the national growth rate. Thus, a large state may exhibit comovement between its own growth rate and that of the nation in part because its economy simply represents a large share of national economic activity. Comovement also can result from common factors that drive all states' economies. For example, lower interest rates tend to stimulate economic activity in all states.

It also is possible for changes in national economic activity literally to cause changes in states' economies. For example, if the national economy is healthy, consumers in all states are more likely to purchase computers (stimulating growth in California) or construction materials (stimulating growth in Oregon).

A state's economy also could exhibit comovement with the nation's because of an indirect rather than a direct chain of causation between the two economies. For example, economist Thomas Cargill's work suggests that Nevada's economy depends heavily on California's, which in turn is closely linked to the national economy. This indirect link between Nevada and the U.S. may be difficult to distinguish from a direct link between the two economies.

Measuring comovement

In this *Letter*, comovement is measured by determining the extent to which the national economy "predicts" the pace of state economic activity, where economic activity is measured by personal income. This measure of comovement can range from 0 to 100, with 100 indicating perfect synchrony. (A forthcoming article in this Bank's *Economic Review* describes the derivation of this measure in greater detail.) Based on this measure,

the fifty states plus the District of Columbia exhibit a wide range of values, from 75 for Florida to 8 for West Virginia. The average across these fifty-one jurisdictions is 44.

Among the nine states in the Twelfth District, comovement is strongest for California, at 73, and weakest for Alaska, at 13. Five Western states (Arizona, California, Nevada, Oregon, and Washington) have comovement measures well above the national average, and three (Alaska, Hawaii, and Idaho) have measures well below the national average. Utah's is only slightly higher than the national average.

The substantial differences in the measure of comovement among states suggest that differences in certain characteristics such as state size or industry composition may be associated with the degree to which a given state's economy exhibits comovement with the nation's.

State size

One might expect larger states to exhibit greater comovement with the nation than smaller states do, if only because their economies comprise a relatively large proportion of the nation's output. Larger states also could exhibit greater comovement because their economies are likely to be more diversified, insulating them to some extent from wide fluctuations in a single industry's fortunes. A related factor is that larger states tend to have a mix of industries that resembles the nation's more closely.

In fact, there is a striking difference between the sizes of economies in high-comovement and low-comovement states. The Twelfth District states with higher-than-average comovement have economies more than nine times as large as the states with below-average comovement. Even if California, by far the largest state in the District, is removed from this high-comovement group, the high-comovement states in the West still have economies more than three times as large as those of the low-comovement states. This relationship between state size and the degree of comovement with the national economy is borne out in other regions as well.

Resource dependence

Another characteristic of states that likely is associated with differences in comovement is the level of dependence on resource industries. Some states depend heavily on resource industries such as agriculture and oil; economic fluctuations in these states may be more closely associated with factors peculiar to these industries than with changes associated with national business cycles. Since the early 1970s, oil-dependent states frequently have encountered economic fortunes that have differed sharply from those of the rest of the nation, since higher oil prices benefit producers but hurt consumers of energy. Thus, the relatively few resource-dependent states might be expected to exhibit low comovement.

Likewise, states that are dependent on agriculture may exhibit low comovement since agriculture is influenced by a wide variety of shocks, such as world commodity prices and weather, that have little to do with national business cycles. In contrast, economists Rausser and Tweeten, in two recent articles, emphasize the sensitivity of agriculture to interest rates and inflation. They conclude that macroeconomic factors played a key role in explaining the farm problems of the early 1980s. Nonetheless, it still is possible for macroeconomic factors to influence the farm economy and for farm states to exhibit low comovement with the national economy. A farm state could respond sharply to interest rates or other factors associated with changes in the national economy without exhibiting strong comovement if its economy also responded sharply to other forces, such as drought and other weather conditions, that tend not to be associated with national business cycles.

Among the states in the West, greater resource dependence is associated with low comovement. None of the five high-comovement states exhibits substantially greater-than-average dependence on either agriculture or oil. In contrast, Idaho depends very heavily on agriculture, and Alaska depends very heavily on oil. Only the third low-comovement state, Hawaii, does not rely heavily on resources, since agriculture comprises only a small share of Hawaii's total income.

Durable manufacturing

Durable manufacturing industries appear particularly sensitive to macroeconomic fluctuations. For example, many analysts have noted that automobile and steel manufacturers seem to bear a

disproportionate share of the burden associated with national downturns. As a result, regions that specialize in producing these goods (the Detroit and Pittsburgh areas, for example) may have economies that are more sensitive to national cycles than are most regions. Consistent with these impressions, some early studies found a correlation between dependence on durable manufacturing industries and the extent to which state economies declined during national recessions.

It is therefore not surprising to find that four of the five high-comovement states in the West depend more heavily on durable manufacturing than the average state does, whereas the three low-comovement states all exhibit lower-than-average dependence on these industries. Only Nevada's economy does not depend heavily on durable manufacturing, even though it is a high-comovement state.

Tourism

It is interesting that Hawaii and Nevada do not fit the more general patterns described above. Both states have extremely tourist-dependent economies. Nevada's high comovement likely is due to a strong connection between the health of the California and U.S. economies, on the one hand, and the number of visitors to Nevada hotels and casinos, on the other.

Hawaii, in contrast, exhibits weak comovement, even though, as in Nevada, a healthier national economy should stimulate tourism in Hawaii. There are several possible reasons why comovement is weak, despite the intuitive appeal of a connection between the U.S. and Hawaii economies. First, it is possible that retired people, who make up a significant share of Hawaii's population and whose incomes generally vary little with business cycles, have a strong influence on Hawaii's economy. However, both Florida and Arizona have large retired populations and still exhibit strong comovement. Another possibility is that travelling to Hawaii is a luxury good, and people who travel there are relatively unaffected by business cycles. This possibility could explain the sharp difference between Nevada and Hawaii, since the Nevada resorts are less expensive destinations and tend to cater to a middle-class clientele. Finally, Hawaii's location in the Pacific region may tie Hawaii's economy more closely to developments in Asian economies and changes in exchange rates. The influence of foreign investors and tourists correspondingly reduces the direct influence of the U.S. economy.

Help in forecasting?

The comovement between national and state economies varies widely among states. It is stronger in states that have larger economies or depend more heavily on durable manufacturing, and is weaker in states that depend more heavily on resource industries. Results from Nevada and Hawaii suggest that the strength of comovement in tourist-dependent states depends on the nature of the tourist industry and the geographic location of the state.

These findings suggest that good forecasts of the national economy would make forecasts of some states' economies considerably more reliable, but would add little to the reliability of other states' forecasts. Specifically, predictions of national economic activity may be relatively unimportant predictors of the Alaskan, Hawaiian, and Idahoan economies since factors other than national business cycles seem to be more closely associated with economic changes in these states.

In contrast, California, Oregon, Washington, Nevada, Arizona, and, to a lesser extent, Utah, seem to track national business cycles relatively closely. It is important, however, to point out that these six states are far from homogeneous in their relationships with national cycles. For example, although California tends to have cycles that track the nation's fairly closely, the magnitude of the state's fluctuations tend to be muted relative to those seen nationally. Oregon, on the other hand, tends to experience cycles that are more severe than are national cycles. Thus, if the U.S. economy continues to grow, these states are likely to grow as well, although their rates of growth are likely to vary widely.

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