

The Export Potential of Tenth District States

By Chad R. Wilkerson and Megan D. Williams

After collapsing during the financial and economic crisis, exports have grown rapidly in the nation and across much of the Tenth Federal Reserve District. Despite some risks, most economic forecasts for national exports point to continued robust growth. An export boom, however, could have disparate effects across the country, given sizable differences in the volume, composition, and trends of state exports.

Future export growth in the district is likely to be strong, although most states are likely to benefit less from the expected boom than the nation as a whole. Most states in the district have smaller export sectors than the nation and slightly less favorable export industry mixes. There are exceptions in the district, though, and most states have an adequate mix of trading partners. And, as in the past, other factors will play a role in the district's export potential.

This article assesses the export potential of the Tenth District. The first section reviews recent trends in U.S. and Tenth District exports and discusses the importance of export sector size. The second section explains why export growth can vary across states and analyzes the key

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factors that contribute to recent differences between district states and the nation. The third section assesses the intermediate-term outlook for exports in district states by examining their current export industries, destination mixes, and other factors that could affect exports in the future.

I. RECENT TRENDS IN U.S. AND DISTRICT EXPORTS

Exports have grown solidly both in the nation and the Tenth District since mid-2009. Some U.S. export categories have risen much higher than others, and recent export trends have varied widely across the seven states in the Tenth District.¹ While there are exceptions, the recent downturn and rebound have affected the economies in district states less than that of the nation, due primarily to the generally smaller size of the district's export sector.

The national rebound

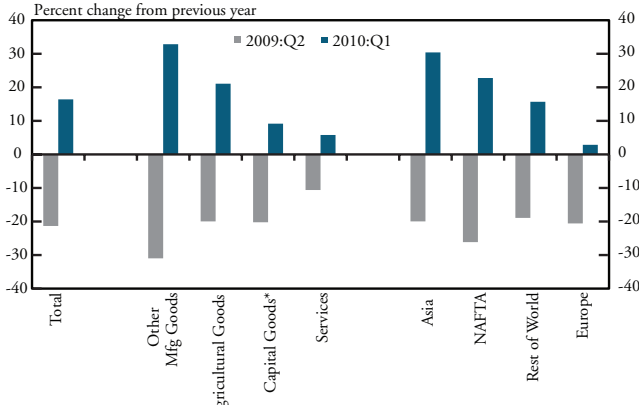
As the financial and economic crisis intensified in the fall of 2008, world trade collapsed. From 2008:Q2 to 2009:Q2, U.S. exports plunged more than 20 percent, the steepest drop in over 50 years (Chart 1). But exports rebounded rapidly starting in mid-2009 as the world economy began to stabilize. Annualized U.S. export growth in the second half of 2009 exceeded 25 percent, and by the first quarter of 2010 exports were up 16 percent from year-ago levels.

Virtually all categories of U.S. exports suffered during the downturn but had rebounded by early 2010. However, gains across major sectors varied. The fastest year-over-year U.S. export growth through 2010:Q1 was in manufactured goods other than capital goods—especially in automobiles and parts and in materials and supplies. These two export industries suffered the largest declines during the financial crisis and so had more room to rebound. Services exports had the weakest growth during the early rebound but also dropped the least during the crisis.

U.S. exports to all major destinations also had rebounded above year-ago levels by early 2010. But, just as industries rebounded to different degrees, there was considerable variation in the strength of exports across world markets. Exports to Asia jumped nearly 30 percent, and exports to Canada and Mexico also grew solidly. By contrast,

Chart 1

GROWTH IN U.S. EXPORTS BY MAJOR INDUSTRY AND DESTINATION



* Machinery & Equipment; Computers & Software; Aircraft & Parts

Source: Bureau of Economic Analysis

exports to Europe improved only marginally from previous-year levels, especially exports to Euro zone countries.

Recent district trends

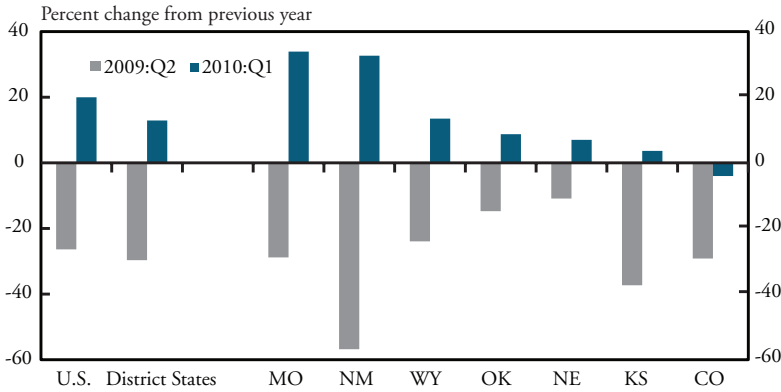
The collapse in U.S. exports had disparate effects across the country. While exports of manufactured goods fell in all 50 states during the downturn, some states were hit much harder than others.² Within the Tenth District, for example, New Mexico suffered a manufacturing export decline of over 50 percent, while the declines in Nebraska and Oklahoma were less than 15 percent. (Chart 2)

While manufacturing exports in most states had rebounded by the first quarter of 2010, the rebound in district states varied considerably. In Colorado, manufacturing exports fell even lower than in the previous year. Exports in Kansas, Nebraska, and Oklahoma gained less than 10 percent. Gains in Missouri and New Mexico exceeded 30 percent.

For most Tenth District states, the overall economic impact has generally been more muted than in the nation, due to their smaller export sectors. In 2008, the last year for which full state export estimates are available, exports accounted for just below 9.5 percent of GDP in the district, compared with about 13 percent in the nation (Chart 3).³ Only one district state—Kansas—has a larger export sector than the

Chart 2

GROWTH IN MANUFACTURING EXPORTS



Source: WISERTRADE

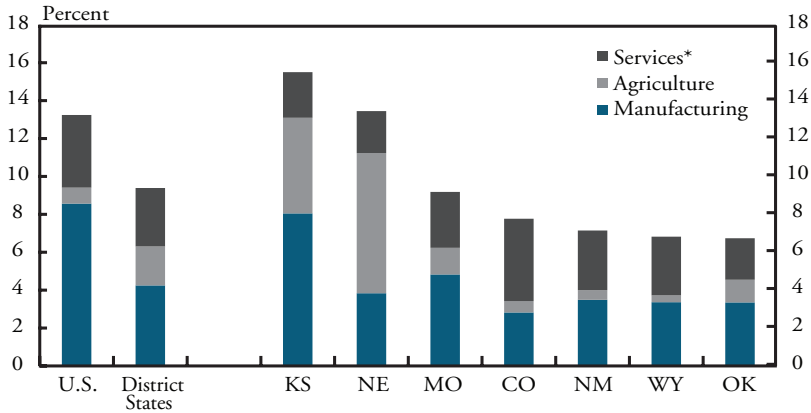
national average, although Nebraska's exports in 2008 were similar to the nation, driven by strong agricultural exports. As such, the negative impact of the export collapse on the district's GDP in late 2008 and early 2009 was likely only about two-thirds of that in the nation, despite slightly larger percentage declines of manufacturing exports in the district and several district states. Similarly, as exports have rebounded since mid-2009, GDP in the district as a whole has received less of a boost than the nation, although across states the effects have differed.

The district's smaller overall export sector is likely the result of several interrelated factors. First, the region is landlocked—it has no international border or ocean port—and distance from trading partners generally makes it more difficult for a state to export (Gries and others; Coughlin).⁴ Second, the region has historically relied less than the nation on several sectors that tend to export (Kim). While agriculture is a much larger share of the district economy than in the nation, the district's manufacturing and tradable services sectors are somewhat smaller shares overall. Third, productivity in the region is generally lower than in the nation, and exporters tend to concentrate in areas where high endowments of human and physical capital contribute to high productivity (Erickson and Hayward). In 2005, for example, GDP per employee was about 12 percent lower in the Tenth District than in the nation.

Based on export sector size alone, most district states would seem to be less well-positioned to gain from a national export boom. But

Chart 3

TOTAL EXPORTS AS A SHARE OF GDP, 2008



* Actual for U.S., estimates for District states.

Sources: Bureau of Economic Analysis, USDA, WISERTRADE

as recent experience has shown, export growth can vary widely across states. As such, states with smaller initial export sectors but rapid export growth could potentially gain large economic boosts from an export boom while at the same time increasing the relative size of their export sectors. Conversely, states with larger export sectors but slower export growth might benefit less than expected from a boom. As a result, understanding the factors that drive differences in export growth is important for determining the export potential for states.

II. WHY DOES EXPORT GROWTH VARY ACROSS STATES?

A state’s export composition—that is, what it exports and where—can account for much of the difference from the nation in its export trends. The export sectors of several Tenth District states are unique. This section examines the industry mix and destination of exports from states in the district, as well as other local factors that might have influenced exports.

Potential reasons for variation

Export trends can be affected by the mix of goods and services that an area exports. For various reasons, foreign demand for some U.S. goods and services grows faster than for others. In addition, different areas of a country tend to produce different types of products. Research generally finds very little annual turnover in exporting firms and the goods or services they export and that the industry mix of exports can be an important factor for local export growth over the short to intermediate term (Bernard and Jensen; Bernard and others; Gazel and Schwer). Some studies of variation in state exports over 10-year periods, by contrast, find industry mix to be less important than other factors (Coughlin and Mandelbaum; Coughlin and Pollard).

The industry mix of exports in Tenth District states clearly differs from that of the nation, providing potential for differing rates of overall export growth. As a share of its total exports, the Tenth District as a whole is more concentrated than the nation in five of 10 major industry groups—agriculture and food; aircraft and parts; travel; business and financial services; and royalties and other services (Table 1).⁵ In the district's four Plains states—Kansas, Missouri, Nebraska, and Oklahoma—agricultural exports are much more important than in the nation. They are also slightly more important in Colorado and New Mexico. In Kansas and Missouri, aircraft exports are sizable. In the district's three Rocky Mountain states—Colorado, New Mexico, and Wyoming—travel is a major export.⁶ In Colorado, Missouri, New Mexico, and Oklahoma, business and financial services, as well as royalties and other services, are estimated to be key exports.⁷ Several individual district states also have other high export concentrations.

The destination of an area's exports can likewise be important in explaining differing trends across states. Indeed, some research finds that destination plays as important a role as any other factor in a state's relative export growth (Gazel and Schwer). Areas that export heavily to fast-growing countries or to countries with appreciating currencies can have an advantage over areas that do not (Cronovich and Gazel). This is especially true in the short run since, as with export industry mix, research has found that export trading partners tend to remain largely the same from year to year (Bernard and others).

Differences between district states and the nation in export destinations are somewhat smaller than differences in export industries,

Table 1

INDUSTRIAL MIX OF U.S. AND TENTH DISTRICT EXPORTS, 2008

(percent of total exports; above U.S. average in bold)

Industry	U.S.	District	CO	KS	MO	NE	NM	OK	WY
Agriculture & Food	6	22	8	33	15	55	7	18	5
Materials & Supplies	24	12	11	8	18	7	6	10	44
Machinery & Equipment	12	10	5	8	2	13	6	21	4
Computers & Software	11	8	14	6	3	2	33	5	0
Aircraft & Parts	4	7	1	22	8	1	1	3	0
Automobiles & Parts	6	4	1	3	15	3	1	3	1
Consumer & Other Goods	8	5	4	4	7	4	3	8	1
Travel*	8	9	16	4	8	4	14	6	30
Business & Financial Services*	10	12	19	6	12	7	18	11	8
Royalties & Other Services*	11	12	21	5	12	6	12	15	7

*Actual for U.S., estimated for district and states

but they are still sizable in some cases. As in the nation, the two biggest export markets for most district states are Western Europe and Canada (Table 2). Most district states export relatively more to Canada and less to Western Europe than the nation. The share of exports from district states, especially Kansas and Nebraska, to Japan and Eastern Europe is also relatively higher than from the nation. And, as with export industries, several district states have especially high concentrations of exports to specific destinations.

In addition to export destinations, some other local factors can contribute to differences in export trends across states. These other factors can cause a state's export industries to grow faster or slower than the same industry at the national level, either through attraction or loss of exporting firms or through more or less exporting from current firms.

Table 2

DESTINATION MIX OF U.S. AND TENTH DISTRICT EXPORTS, 2008

(percent of total exports; above U.S. average in bold)

Destination	U.S.	District	CO	KS	MO	NE	NM	OK	WY
Canada	17	19	16	16	23	18	11	22	20
Mexico	10	8	7	8	8	11	10	7	5
Latin America	11	11	10	12	10	12	7	11	20
Western Europe	26	21	31	20	21	11	22	19	19
Eastern Europe	4	7	4	8	5	11	3	7	4
Middle East & Africa	6	5	5	10	4	5	4	8	5
Australia & Oceania	2	3	2	2	3	5	2	3	3
China	5	4	4	3	6	3	14	3	2
Japan	6	8	7	10	7	12	6	7	7
Other Asia	13	13	13	11	14	13	22	11	15

Sources: Bureau of Economic Analysis, USDA, WISERTRADE

Changes in the importance of proximity to trading partners due to new free trade agreements can influence the location of exporting firms, as can longer-run changes in the transportation and communication costs of exporting (Coughlin and Wall; Coughlin). Export-friendly policies in some states or local areas may also play a role in this, although most research finds changes in human and physical capital are more important (Bernard and Jensen).

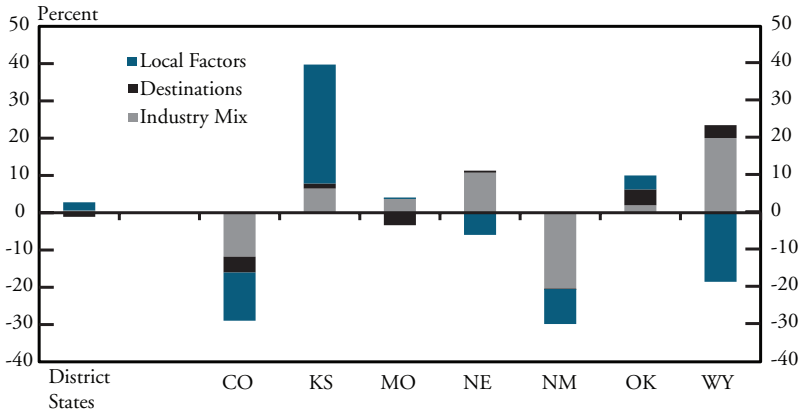
Explaining recent trends in district exports

As during the recent recession and recovery, state export growth also varied widely during the national export boom of 2003-08, when the volume of the nation's exports rose more than 80 percent. For example, total exports from Kansas grew about 40 percent faster than national exports. Exports from Colorado and New Mexico grew about 30 percent less.

Shift-share analysis can help determine quantitatively which factors contributed the most to such differences in state export growth relative to the nation (see Appendix for a detailed description of shift-share

Chart 4

CONTRIBUTING FACTORS TO RELATIVE GOODS EXPORT GROWTH, 2003-2008



Sources: USDA, WISERTRADE, authors' calculations

analysis). In Chart 4, the bar for each state is broken down into the contributions of industry mix, destination mix, and other local factors to the overall difference in export growth from 2003 to 2008.⁸

In the district as a whole, exports grew just slightly faster than in the nation, as a more favorable industry mix and a modest positive contribution from other local factors offset a drag from a slightly less favorable mix of trading partners. More specifically, a higher district presence in fast-growing agriculture and aircraft exports, along with lower concentrations in slower-growing automobile and computer-related exports, provided a relative boost to regional export growth. Also contributing to the region's slightly faster export growth were some positive local factors, especially in Kansas, where aircraft and machinery exports became more concentrated. These offset the negative impact of higher regional concentrations of exports to Canada and Japan, where exports grew more slowly.

Looking across district states, the factors contributing the most to relatively faster or slower export growth than the nation varied somewhat. In four states, industry mix was the most important factor. In Missouri and Nebraska, high concentrations in agricultural exports and low concentrations in computer-related exports provided a boost, while Wyoming's strength came from its sizable exports of materials and supplies—especially of sodium carbonate, or soda ash. By contrast, New

Mexico was dragged down by its very high concentration in computer-related exports, which grew slowly.

In Oklahoma, the destination of its exports was slightly more important than either industry mix or other local factors in explaining its faster-than-average export growth from 2003 to 2008. The state's high concentration of exports to Africa and the Middle East, which grew quickly, and its lower concentration of exports to Mexico, which grew more slowly, explain the result.

In Colorado and Kansas, other local factors played the biggest role in explaining differences from national export trends. That is, exports in these two states grew much differently than would be expected given the composition of their export sectors. For example, Colorado's exports of aircraft and computer-related equipment fell during the period, even as such exports rose nationally, likely due to the loss of specific exporting firms.⁹ By contrast, aircraft exports from Kansas grew more than twice as fast as from the nation as the sector greatly increased its presence in Wichita. The state's exports of machinery and equipment also grew much faster than the nation.

III. THE OUTLOOK

Most economic forecasters expect U.S. export growth to be strong in coming years, producing a boom that could approach the 80 percent increase in national exports from 2003 to 2008. As during that period, however, future export growth is expected to vary widely by industry and destination. This section analyzes what these national export forecasts could mean for district states and discusses other future export risks and opportunities in the region.

Forecasts for U.S. exports

Economic forecasters generally anticipate continued rapid increases in U.S. exports in the years ahead, for a number of reasons. One near-term reason, already under way, is the cyclical rebound. Companies that dramatically cut exports in early 2009 have begun to resume more normal levels of export activity, as trade finance flows and the world economy have begun to improve. The dollar is also somewhat weaker against many currencies than during most of the past decade, making U.S. exports more attractive in many world markets.¹⁰

Policymakers have also been increasing their call to reduce the large U.S. trade deficit and are actively seeking to increase U.S. exports. For example, in his 2010 State of the Union address, President Barack Obama announced a goal of doubling U.S. exports within the next five years by enhancing export promotion and removing export controls, as well by expanding trade financing for small and medium-sized businesses.

But perhaps most important, world economic growth is generally expected to be strong in the years ahead—especially in emerging markets. For example, July 2010 world economic forecasts by the International Monetary Fund anticipate real global GDP growth of about 4.5 percent in both 2010 and 2011, including annual growth exceeding 8.5 percent in developing countries in Asia. These forecasts obviously come with some risks, including potential fallout from the financial turmoil in Europe in mid-2010.

Most forecasters anticipate rapid U.S. export growth in the years ahead. Two firms that report detailed intermediate-term forecasts of U.S. exports are Macroeconomic Advisors and IHS Global Insight. As of the second quarter of 2010, both firms project average annual nominal U.S. export growth to exceed 10.5 percent through 2014. This translates to expected real export growth of over 8.5 percent, which would be nearly three times as fast as their forecasts for projected real GDP during the period.

But some export industries and destinations have better outlooks than others. Global Insight provides forecasts for exports of nine of the 10 major industry groups described earlier in this article.¹¹ In addition, Global Insight forecasts import growth for foreign countries, which can be used as a proxy for potential growth of U.S. exports by destination.¹² While subject to uncertainty and revision, these forecasts can provide a baseline for determining the favorability of Tenth District states' export mixes by industry and destination in coming years.¹³

Looking across industries, the fastest U.S. export growth expected during the five years from 2010 through 2014 will be in automobiles and parts and in machinery and equipment. The strong expectations for automobile exports are driven in part by the especially steep collapse in such exports during the recent economic downturn. Computer-related exports and exports of materials and supplies are also projected to grow rapidly. By contrast, export growth is expected to be much

slower—though still more than 6 percent annually—in agriculture and food and in services other than travel.

The outlook for U.S. exports by destination also varies widely, depending primarily on expected future economic growth in foreign countries. Import demand from China and the rest of Asia excluding Japan is expected to be robust, and exports to Mexico are forecast to grow strongly. By contrast, exports to Canada, Latin America, and Western Europe are expected to grow much more slowly—though still over 7 percent annually.

Implications for the Tenth District

Based on these forecasts, the outlook for the Tenth District's export sector as a whole appears slightly less favorable than for the nation—though regional export growth should still be rapid. Specifically, if district export industries were to grow at their currently expected national rate through 2014, nominal exports in the region would grow slightly faster than 9 percent annually (Chart 5). While strong, this rate of growth would be about 12 percent slower than in the nation as a whole. On the other hand, if district exports grew just as their destination mix suggested, export growth in the region would closely resemble the nation, as shown in the grey bars in Chart 5.

The primary factors responsible for the district's different export outlook are shown in Table 3. Industries and destinations listed in the table are those that are expected to grow at least 20 percent faster or 20 percent slower than the average across all industries or destinations in coming years and those that are at least 20 percent more or 20 percent less concentrated in the district (or a district state) than the nation.

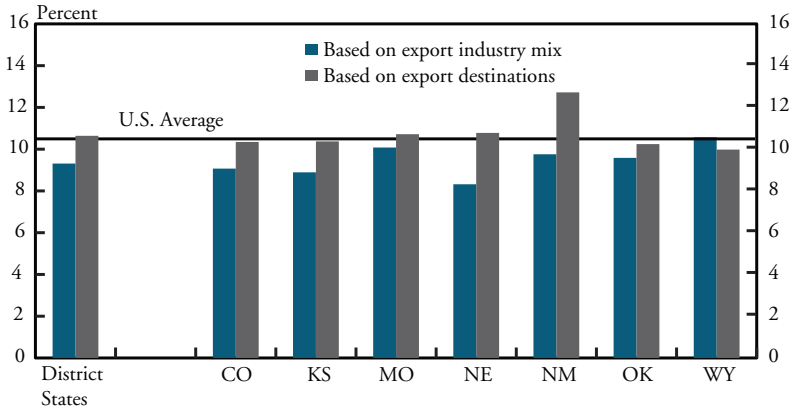
The lower export projection based on industry mix in the district is due to its especially high concentration in the slower growing agriculture export sector and its low concentrations in exports of automobiles and machinery and equipment, which are expected to grow robustly.

On the destination side, the district's export projection is similar to that of the nation. The two projections are similar because the district does not have particularly high or low concentrations of exports to parts of the world that are expected to grow especially rapidly or slowly.

Taking these factors into account, along with the district's smaller export sector, the outlook for the district is less favorable than that of

Chart 5

PROJECTED ANNUAL EXPORT GROWTH, 2009-2014



Sources: Global Insight, WISER, USDA, BEA, authors' calculations

the nation. The same is likely true for most district states. There are, of course, important differences across the states.

The outlook for district states

Colorado's export sector shows somewhat less potential than the nation's. The state's export destinations closely resemble those of the nation, suggesting similar future export growth, but, based on its export industry mix, exports would grow about 15 percent slower than in the nation. Still, export growth may exceed 9 percent annually. Specifically, high concentrations of agricultural products exports and of services other than travel put a drag on Colorado's export prospects, as do low concentrations in some export industries expected to grow quickly. Given that Colorado's total export sector (relative to GDP) is only about 60 percent as large as the nation's, the state's economy would receive a much smaller boost from the expected export boom. In addition, local factors other than industry mix and destination reduced Colorado's relative export growth during the 2003-08 national export boom, which could also be worrisome.¹⁴ As such, it could be especially important for Colorado to look for ways to improve its overall attractiveness to exporting firms.

In *Kansas*, the current mix of export industries is less favorable than in the nation—even slightly more so than in Colorado. Its destination

Table 3
INDUSTRIES AND DESTINATIONS CONTRIBUTING THE MOST TO RELATIVE DIFFERENCES IN PROJECTED EXPORT GROWTH, 2009-2014

STATE	Contributing positively		Contributing negatively	
	HIGH EXPECTED GROWTH, HIGH CONCENTRATION	LOW EXPECTED GROWTH, LOW CONCENTRATION	HIGH EXPECTED GROWTH, LOW CONCENTRATION	LOW EXPECTED GROWTH, HIGH CONCENTRATION
Tenth District			Machinery & Equipment	Ag & Food
Colorado			Autos & Parts Machinery & Equipment <i>China</i> <i>Mexico</i>	Ag & Food Other Services <i>Western Europe</i>
Kansas		Other Services <i>Western Europe</i>	Autos & Parts Machinery & Equipment <i>China</i>	Ag & Food
Missouri	Autos & Parts		Machinery & Equipment <i>Mexico</i>	Ag & Food <i>Canada</i>
Nebraska		Other Services <i>Western Europe</i>	Autos & Parts <i>China</i>	Ag & Food
New Mexico	<i>Other Asia</i> <i>China</i>	<i>Latin America</i> <i>Canada</i>	Machinery & Equipment Autos & Parts	Other Services
Oklahoma	Machinery & Equipment		Autos & Parts <i>China</i> <i>Mexico</i>	Ag & Food <i>Canada</i>
Wyoming		Other Services <i>Western Europe</i>	Machinery & Equipment Autos & Parts <i>China</i> <i>Mexico</i>	<i>Canada</i> Latin America

*Includes industries and destinations expected to grow more or less than 20 percent of the national average and are 20 percent more or less concentrated than the nation.
 Note: destinations shown in italics.

mix is fairly neutral. The state's smaller-than-average volume of exports to fast-growing China is offset by similarly small exports to Western Europe, which is expected to grow slowly in coming years. At the same time, high concentrations in agricultural exports and low concentrations in some faster-growing export industries suggest that Kansas' exports could grow considerably slower than the nation's. The state may receive a similar boost from the expected export boom as the nation, however, due to its somewhat larger export sector. Such a gain would be even more likely if Kansas can maintain positive export contributions from other local factors, which enhanced the state's export growth more than in any other district state in the 2003-08 boom.¹⁵

Missouri's export sector outlook is slightly less favorable than the nation's, even though its mix of trading partners is modestly more favorable overall. Based on current forecasts and the state's export industry mix, exports should grow a bit slower than in the nation, due to high concentrations in agricultural exports and a low concentration in fast-growing machinery and equipment exports. But automobiles are an especially important export industry in the state, keeping its projected annual export growth rate above 10 percent through 2014, based on industry mix. Missouri's mix of trading partners is slightly positive overall, despite its high concentration of exports to Canada, where exports are expected to grow relatively slowly, and its low concentration to Mexico, where exports are expected to grow rapidly. Given the smaller size of Missouri's export sector than the nation, the state is likely to receive less of an overall economic boost than the nation from an export boom. Seeking to improve local factors other than export industry and destination mix that would be attractive to exporting companies could give the state a slight boost.

Based on current forecasts, *Nebraska* has the least favorable export industry mix for future growth of any Tenth District state, while its mix of trading partners is generally favorable. If the state's export industries grow as expected through 2014, its export growth would equal only about three-fourths of the growth in the nation. Still, its export growth would be about 8 percent annually. Nebraska's export sector is unique. Over half of its total exports in 2008 were agricultural, much more than any other district state. This concentration is a heavy drag on projected export growth, since agricultural exports are expected to grow

more slowly than the average of all industries in coming years. On the destination side, however, Nebraska exports much less than the nation to slower-growing Western Europe, while exporting relatively more to several rapidly growing destinations in developing parts of the world. Given that the size of Nebraska's export sector is similar to that of the nation, the state seems likely to benefit somewhat less from the national export boom. This outlook may depend in part on local factors, which caused a drag on state exports from 2003 to 2008. One opportunity for growth might be exporting more to fast-growing China, which is currently a relatively minor trading partner.

New Mexico has a unique export sector. While its export industry mix is slightly less favorable than the nation's for future growth, its huge share of exports to China and other developing Asian countries gives it a favorable mix of trading partners. Intermediate-term export growth in New Mexico will likely hinge on exports of high-tech components bound for developing Asia. In 2008, such exports accounted for over a quarter of the state's exports—more than five times such exports in any other district state. Many of these exports come from the large Intel plant in Rio Rancho, outside of Albuquerque. A recent story in *The Economist* highlighted Intel's export potential from components made there.¹⁶ However, the firm's Portland, Oregon plant was noted as likely benefiting the most from this trend, perhaps due to its closer proximity to Asian markets. But New Mexico's overall export sector is only about half the size of the nation's. As a result, its boost from the expected export boom is likely to be smaller.

Oklahoma has a slightly less favorable outlook for exports than the nation, based on the mixes of both export industries and destinations. The state's high volume of agricultural exports, especially to Canada, should place a drag on overall export growth in the state through 2014. A low volume of exports to China also pulled down its overall projection, as did its small amount of automobile-related exports. At the same time, however, sizable exports of machinery and equipment, especially to the energy sector, provide a boost. Given Oklahoma's relatively small overall export sector, the state is likely to receive a smaller boost from an export boom than most other states—but Oklahoma's exports are still likely to grow relatively quickly. Local factors other than industry mix

and destination played a slightly positive role in the state's exports from 2003 to 2008. Such factors may need to become even more important in the years ahead.

In *Wyoming*, the mix of export industries is nearly as favorable as in the nation, while the state's trading partners are slightly less favorable. High reliance on exports of materials and supplies—particularly soda ash—provide a modest boost to the state's export industry outlook. This boost helps offset Wyoming's lack of exports of automobiles and of machinery and equipment. Meanwhile, the state's relatively few exports to China but sizable exports to Canada and Latin America leaves Wyoming with the least favorable trading partners in the district, based on current forecasts. As such, given its smaller overall export sector, the state appears likely to receive less of a boost than the nation from an export boom in the years ahead. This seems especially true given the highly negative contribution of other local factors to Wyoming's growth from 2003 to 2008.

Forecast risks and opportunities

Of course, these export outlooks for district states are subject to a high degree of uncertainty. They depend largely on how U.S. exports actually perform in coming years, in terms of which export products and markets grow most rapidly. As such, identifying the factors that could alter the export forecasts should shed light on how any changes to them might affect district states.

The factors that could affect Tenth District states the most are those in areas of especially high or low concentrations of exports, whether in industries or destinations. Thus, factors that might increase agricultural exports more than expected would help most states in the region. Greater demand for protein-based diets in developing countries could potentially provide such a boost, given the significant beef and grain exports from the district. Likewise, increases in travel exports beyond current expectations would help the district's mountain states. In contrast, decreases in virtually any type of manufacturing export growth would generally hurt the nation more than the district, since manufacturing exports have generally low concentrations in the region. Typically, however, at least one district state is *highly* concentrated in each detailed

manufacturing industry. Factors that might increase exports to Canada or decrease exports to Western Europe would also generally help the region relative to the nation. Depending on their intermediate-term severity, the recent financial woes in the euro area may provide such a scenario. Unexpected changes in exchange rates could also alter the outlook for exports across district states and the nation.

IV. SUMMARY AND CONCLUSIONS

Tenth District states are likely to experience strong export growth in coming years, given the size of the expected boom in U.S. exports over the intermediate term. However, given current forecasts for U.S. export growth by industry, the district and most of its states would see slightly less rapid export growth due to their mix of export industries. More positively, the trading partners of most district states are expected to grow solidly, and factors other than the composition of exports often play an important role in export growth as well.

As global export opportunities emerge, the most successful regions could be those that develop local resources to tap an emerging global marketplace. Policymakers have a number of options in seeking to expand their state's export sector. One choice would be to identify export industries and markets expected to grow quickly in coming years and consider attempting to increase the state's presence in such areas.

But given the uncertainty of future trends in exports, trying to pick "winners" and "losers" among export industries and destinations could be risky. Moreover, most research finds only minimal, if any, impact from such focused exporter attraction efforts. Thus, taking longer-term steps to improve the local factors that might make an area attractive to exporters—such as seeking to improve worker skills and productivity or trying to enhance export-related infrastructure—may be a surer approach.

APPENDIX: APPLYING SHIFT-SHARE ANALYSIS TO STATE EXPORTS

Shift-share analysis is an accounting method that separates the contribution to a region's growth during a period relative to the nation into its initial industry mix and to other factors. If each industry within a region grows at the same rate as that industry at the national level, then all of the relative difference in the region's growth can be attributed to its different industry mix. But if regional industries grow differently than in the nation, other factors have contributed.

In the case of exports, one factor other than industry mix could be the destination of a region's exports, since some areas of a country could export more of the same type of product to different parts of the world, perhaps due in part to proximity. Using the advanced shift-share technique of Gazel and Schwer (1998), this analysis shows that differing relative export growth between states and the nation can be attributed to states' mix of export industries, mix of export destinations, or other local factors.

Mathematically, this advanced shift-share technique can be described as:

$$\text{Net relative export growth } X_t^s(x^s - x^n) =$$

$$\text{Industry mix effect } \sum_i X_{i,t}^s(x_i^n - x^n) +$$

$$\text{Destination effect } \sum_d X_{d,t}^s(x_d^n - x^n) +$$

$$\text{Other local factors } \left[\sum_i X_{i,t}^s(x_i^n - x_i^n) - \sum_d X_{d,t}^s(x_d^n - x^n) \right]$$

where X is the value of exports, x is the export growth rate during the period, s is a state, n is the nation, t is the first year of the period, i is an export industry, and d is an export destination.

ENDNOTES

¹The Tenth District consists of the entire states of Colorado, Kansas, Nebraska, Oklahoma, and Wyoming, as well as the western third of Missouri and the northern half of New Mexico.

²Reliable estimates on state agricultural and services exports are not yet available for the period.

³While complete state data on manufactured exports—which account for nearly two-thirds of U.S. exports—are available on a timely and detailed basis, reliable state data on agricultural exports are available only annually and require combining two separate sources to have full detail. Specifically, WISERTrade’s data on the composition and destination of U.S. agricultural exports are combined with USDA’s data on the volume and composition of state agricultural exports. State services export estimates are produced much like the USDA constructs state agricultural export data—by attributing identical shares of each service industry’s output in all states to exports. An exception is the services export category of royalties, for which actual state data on patents are used as estimates to distribute U.S. royalties exports across states, in a method similar to that used by Miloslavsky and Shatz (2006) in estimating various types of services exports for California. Given this method of producing state services export estimates, they should be viewed with caution. Unlike many types of agricultural exports, which are commodities that are similar if not identical across producers and thus states, services are more unique across producers and thus their exports likely vary much more widely across U.S. states.

⁴The Tenth District includes only the northern half of New Mexico, though data analyzed later in this article includes the entire state of New Mexico. Thus, technically it has an international border. Also, while the district has no ocean port, it does have ports along the Missouri and Arkansas Rivers that deliver agricultural and other goods to the Mississippi River and ultimately the Gulf of Mexico.

⁵Agricultural and services export breakdowns are straightforward. Among manufacturing industries for this article, Materials and Supplies includes NAICS 211, 212, 313, 314, 321, 322, 324, 325, 327, and 331; Machinery and Equipment includes NAICS 332, 333, and 3365; Computers and Software are NAICS 334 and 511; Aircraft and Parts is NAICS 3364; Automobiles and Parts are NAICS 3361, 3362, and 3363; and Consumer and Other Goods are NAICS 315, 316, 323, 326, 335, 337, and 339.

⁶International travel from residents of other countries is considered a U.S. export.

⁷Exports of advertising services and of research and development services are estimated to be especially large in Colorado and New Mexico.

⁸Because state services estimates are based largely on the industrial structure of a state, a shift-share analysis that includes them would be inappropriate. For robustness, shift-share analyses were also conducted for 1998-2003 and for 1998-2008. In general, industry mix was somewhat less important in each of these time periods, while local factors were more important. The focus in this article is on 2003 to 2008 primarily because exports boomed over that period.

⁹See, for example, “Colorado Exports Slumping,” *Rocky Mountain News*, November 30, 2007.

¹⁰Despite strengthening during the recent financial crisis, the dollar’s value in the first half of 2010 versus a broad trade-weighted set of currencies was about 6.5 percent lower than in the first half of 2005 and about 12 percent lower than in the first half of 2000.

¹¹The only exception is that Global Insight forecasts only two categories of services exports instead of three—travel and all other.

¹²This method thus largely leaves aside expectations for relative changes in exchange rates between countries.

¹³The most up-to-date data on district exports go just through 2008, so 2009 estimates of district state exports are produced by assuming state exports grew exactly as their industry mix would suggest in 2009.

¹⁴Specifically, exports of aircraft and computer-related equipment fell in Colorado even while rising nationally, likely due to the exit of exporting firms in these industries.

¹⁵Specifically, exports of aircraft and of machinery and equipment grew much faster in Kansas than in the nation.

¹⁶“Export or Die,” March 31, 2010.

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