Chicago Fed Letter

Midwest manufacturing and trade with China
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U.S. trade with China has grown dramatically in recent years. The growth in imports, in particular, has raised some challenges for domestic manufacturers competing against lower-cost Chinese production. At the same time, households benefit from falling prices for imported goods, firms benefit from falling prices on intermediate components and parts, and U.S.-domiciled multinationals benefit from selling to and investing in the burgeoning Chinese market.

As U.S. imports from China have climbed in recent years, some domestic manufacturers have voiced concerns about competing against low-cost Chinese goods in the U.S. market. At the same time, however, U.S. households benefit from falling prices for imported goods; firms benefit from falling prices on intermediate components and parts; and U.S.-domiciled multinationals benefit from selling to and investing in the burgeoning Chinese market. This Chicago Fed Letter examines our growing trade relationship with China, especially as it relates to the Midwest manufacturing economy.

China’s growth

Although the accuracy of Chinese gross domestic product (GDP) data is questionable, there is little doubt that China is experiencing rapid growth. Reported GDP growth averaged 9%–10% annually during the 1980s and 1990s. China has been able to sustain much of this growth recently, when many of the world’s economies have slipped below trend.

An increased openness to trade and investment has led China’s growth. Since 1990, China’s exports have grown at an annual pace of 14%; imports have grown apace. Foreign direct investment (FDI) in China has averaged $44 billion per year since 1995, originating from developed countries on every continent.

Prior to the 1980s, very little trade and FDI could be observed between China and developed countries. However, economic reforms beginning in 1978 launched China onto a robust path of export-led industrial growth and urban development. These reform efforts reached a milestone with China’s entry into the World Trade Organization (WTO) in 2001. WTO membership promises greater attractiveness for China as a domicile for FDI, along with access to the markets of other member countries. In return, China has to comply with the rules of WTO membership, including nondiscriminatory tariff schedules on imports and the protection of intellectual property.

To date, China’s internal policies have favored the build-up of domestically owned, mostly state-owned, industrial plants. In addition, China has selectively

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<th>Regions</th>
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*Figures are rounded to 1/1,000. IP is import penetration.
encouraged FDI, especially in manufac-
turing. Many of these FDI operations
produce goods that serve the Chinese
market, but many more are platforms to
export goods back to their country of or-
igin or to other markets. Indeed, trade
statistics for China are difficult to inter-
pret because, for one thing, re-export of
goods is quite common. For some prod-
ucts, such as computers and other elec-
tronics, high-value-added components
are shipped into China from countries
such as Taiwan and Japan for further
processing and ultimately re-exported.
Typically, this processing takes advantage
of the very low relative wages in China.
This sometimes leads to double counting
of underlying export values from China.
From the U.S. perspective, much of what
we see as imports from China—espe-
cially in electronics—has other Asian
country origins embedded in its value.

**U.S. trade with China**

From 1997 to 2002, trade volumes (com-
bined exports and imports) between the
U.S. and China increased at an average
annual pace of 12.5%, reaching $147
billion last year. In comparison, trade
with America’s North American Free
Trade Agreement (Nafta) partner,
Mexico, increased at a pace of 6.3%
anually. As a result, in 2002 China be-
came our fourth largest trading part-
ner after Canada, Mexico, and Japan.

Both exports and imports have grown
rapidly, but China’s imports into the
U.S. have easily outpaced U.S. exports
to China. Since 1989, the nominal dol-
lar value of U.S. imports from China
has multiplied more than eightfold, re-
aching $125 billion in 2002, allowing
China to surpass Japan for the first time.
China’s manufactured exports to the
U.S. represented 10.8% of manufactured
imports for 2002.\(^5\)

What has been the impact of rising im-
ports on domestic U.S. manufacturing
production? We sometimes think of ris-
ing imports as displacing production at
home. Rather than displacing domestic
production, however, rising imports may
serve rising demand for some types of
goods in the home country. So too, im-
ports can consist of intermediate com-
ponents that become embodied in
domestic production of a final good.
To the extent that such components are
most cheaply sourced overseas, they may
help keep domestic production competi-
tive for the final good in the domestic
market, or even allow domestic produc-
cers to export the final good to third
country markets.

To understand the extent that domestic
production is being superceded by im-
ports, economists measure “import pene-
tration” as the ratio of imports from
abroad relative to the domestic market,
where the domestic market includes
goods purchased in the home country,
regardless of whether the goods are pro-
duced at home or abroad. We use an
index that ranges between zero and one,
with a value of zero meaning that all
domestic purchases are produced at
home and a value of one meaning that
all domestic purchases are produced
abroad. For 2001, we estimate China’s
manufactured imports to be 2.7% of
the U.S. domestic market—defined as
domestic production plus imports—up
from .4% in 1989.\(^6\)

There are several reasons to believe
that the growth in import penetration
overstates the potential displacement
of domestic production by imports from
China. This is especially so when we consider that, owing to
China’s economic growth, *exports* from the
U.S. to China have also expanded,
lifting domestic production beyond
what it otherwise would have been. Ex-
ports to China grew from 0.5% of U.S.
manufacturing output in 1989 to 1.5%
by 2002.\(^7\) In addition, low-cost imports
from China have restrained price in-
creases and raised the real income of
U.S. households, allowing them to pur-
chase more goods—both domestic and
foreign. An additional factor that is not
easy to quantify is the extent to which
China’s exports to the U.S. are substi-
tuting for exports that would otherwise
have entered the U.S. market from al-
ternative low-cost countries.

U.S. manufacturing output growth has
been weak, and year-over-year job
growth in manufacturing has been neg-
ative for over three years. However, the
bulk of the current U.S. manufacturing
weakness cannot be attributed to rising
imports and outsourcing. The overhang
of excess capital goods investment and
other production capacity continues to
weigh on the pace of orders for new
manufactured goods, as does the shallow
U.S. economic recovery from the 2001
downturn. Moreover, flagging economic
growth in developed countries in Asia,
South America, and Europe continues

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**China functions for Asian manufacturing companies much as Mexican *maquiladora* plant locations do for many U.S. producers.**

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\(^5\) The Grubel–Lloyd Index, which measures
the degree of intra-industry trade as a
proportion of all trade. Between the
U.S. and China, the index is lower, but it climbed significantly between 1989 and 2001.\(^8\)
China and the Midwest

How important has China’s emergence as a major trading partner been for the Midwest economy? One would expect growth in China’s imports to have penetrated the region’s domestic markets because the Midwest economy is more highly concentrated in manufacturing than other U.S. regions.

We find that the penetration of Midwest manufacturing by Chinese production operations in China has been asking suppliers for the “China price” on their purchases. Some suppliers have been asked to relocate or outsource at least some operations to China—either to better serve customers overseas or to stay price-competitive in domestic sales.

So far, overseas shifts of factories and capital from the U.S. to China have been substantial, but far from extraordinary. U.S. flows of foreign direct investment into China have climbed rapidly, doubling since the mid-1990s. However, for 2002, this FDI accounted for just 8% of total FDI into China, with countries of the Pacific basin investing much more in aggregate. In particular, FDI from Hong Kong, Japan, Korea, and Taiwan accounted for 42% last year. For these countries, investment represents a way to cut costs and stay competitive. Often, their production operations involve re-shipments and trade across multiple countries, with components and parts sent to China for (labor-intensive) assembly or further processing and then shipped home or exported overseas.

In this way, China functions for Asian manufacturing companies much as Mexico’s maquiladora plant locations do for many U.S. producers. Likely because of its distance from the U.S., China has not tended to function as a platform for U.S. manufacturers to produce goods for the U.S. market. In the latest reported year, 2000, only 13% of the sales of U.S. multinationals producing in China were shipped back to the U.S. Instead, two-thirds of their products were sold to the Chinese market. The pattern is even more pronounced for machinery and chemicals, both of which are important industries in the Midwest. However, some U.S. FDI affiliates in China may serve to contract with China-owned plants for export to the United States. This phenomenon is not reported on nor has it been investigated to date.

With its robust development and rapid growth, China has become a growing market for U.S. (and Midwest) exports. But while U.S. exports to China have grown rapidly since 1988, they as yet comprise only 1.5% of the value of U.S. manufacturing production. Some regions, such as the Far West, have parlayed their concentration in computing equipment and other electronics up to a 3.6% production share. However, the Midwest exports only 6% of its manufacturing production to China.

Conclusion

China’s rapid economic growth has benefited U.S. consumers. And, for some U.S. companies, the opening up of the Chinese market represents an opportunity for growth in exports of U.S. manufacturing goods and services, or for investment and production in China. At the same time, the growth in imports from China is challenging domestic producers to lower costs to remain competitive.
We define the Midwest here as Illinois, Indiana, Michigan, Ohio, and Wisconsin, which is also known as the East North Central region.

The World Bank, 2003, ICT’s China at a Glance. Others estimate China’s growth at 7%–8% per annum.

Ministry of Foreign Trade and Economic Cooperation of the People’s Republic of China.

U.S. Census Bureau, “U.S. international trade in goods and services,” No. FT-900, annual revisions issues.

China’s import penetration is measured as \( \frac{M(China)}{VS - X + M} \), or the ratio of Chinese imports to total domestic U.S. market, where \( X = \) all U.S. manufactured exports, \( M = \) all U.S. imports of manufactured goods, and \( M(China) = \) imports of manufactured goods from China. VS, the value of manufactured shipments in the U.S., is reported by the U.S. Census Bureau, Census of Manufactures and Annual Survey of Manufactures.

GDP by industry from the U.S. Bureau of Economic Analysis, U.S. Department of Commerce.

The index is based on the ratio of net to gross trade across for each industry, averaged across all industries (at a country level):

\[ GL = \frac{1}{n} \sum (1 - |X_i - M_j|)/(X_i + M_j). \]

As measured by GDP by industry (and gross state product for states), the Midwest concentration in manufacturing exceeded the nation by 46% in 2001.

Specifically, import penetration in state \( i = \) Sum over all industries \( j MP_i \), where \( MP_i = L_i^c \times MP_j \) and \( L_i^c = \) state \( i \)’s share of its own manufacturing employment employed in industry \( j \), and \( MP_j = \) U.S. import penetration of good \( j \).

State-level industry employment is drawn from the U.S. Dept. of Commerce, County Business Patterns, available (and used here) at the four-digit SIC (Standard Industrial Classification) level and the six-digit NAIC (North American Industrial Classification) level.

This regional weighting of national penetration ratios assumes that 1) local industries sell into the U.S. market, and 2) employment by industry accurately reflects industry production in each state.

Imports and exports by country, which are mapped from international harmonized system categories into SIC and NAIC codes, are reported at http://data.econ.ucdavis.edu/international/.

We corroborate these numbers by examining average annual growth in U.S. imports from China for both the U.S. and Midwest (top industries are proxied by rankings of industry employment in the region). For an aggregate of the import categories for the 30 most prominent categories measured at both four-digit level and five-digit level product codes, we find greater import growth in the Midwest than in the nation.

Chinese agencies report annual FDI figures four times higher than reported by U.S. agencies.

A recent theme has been that Mexico is losing favor as a location of production to China. See “The sucking sound from the East,” in The Economist, July 26, 2003, pp. 35–36. Domestic automakers often have labor-intensive parts of their production value chain, such as the wiring of interior consoles on automobiles for example, performed in Mexico and shipped back north for final installation into the automobile.