A Regional Export–Weighted Dollar:
A Different Way of Looking at
Exchange Rate Changes

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Abstract

Midwest manufacturing industry has experienced a resurgence in its ability to compete in export markets during the last ten years. There is a view held by some observers that this increased competitiveness is importantly attributable to the depreciation in the foreign exchange value of the dollar—a development that has reduced the foreign currency price of U.S. goods exports. This article calls into question this latter presumption, in particular with regard to selected geographical regions of the United States. Based on the development of a real (producer price-adjusted) export-weighted aggregate exchange rate index for eight economic regions of the United States, this study finds that since 1988 Midwest exporters of manufactured goods (especially durable goods), in the aggregate, have faced an appreciating dollar, not a depreciating dollar. Indeed, as of mid 1996 the export-weighted dollar for Midwest exporters of manufactured durable goods was higher than in 1970, the last full year prior to the 1971 devaluation of the dollar.

Introduction

During the last decade and a half, manufacturing industries in the industrial heartland of the United States, the Midwest, have undergone a restructuring that contributed to a resurgence in the region's economic strength. An important contributor to this renewed economic vitality has been the rapid growth in the volume of Midwest originated goods entering international markets and the apparent ability of Midwest industries to more effectively compete in those markets.

The industrial deterioration in the Midwest during the 1970s and early 1980s and subsequent recovery that began in the latter half of the 1980s occurred during a period that coincided with considerable turmoil in the foreign exchange value of the dollar. The economic recovery in the late 1980s that occurred coincident with rapid growth in export markets and a broadly spread decline in dollar exchange rates (*vis-à-vis* a number of major currencies) from 1985 into the 1990s spawned a widely held view about the relationship between the dollar exchange rate and the rejuvenation of economic activity in the Midwest.[1] This view held that the resurgence in manufacturing in the Midwest, and elsewhere across the country, was importantly attributable to the sharp depreciation of the dollar during the period 1985-1987, *and* the continued and gradual depreciation of the dollar since then. In short, the depreciation of the dollar materially contributed to Midwest manufacturing industries' ability to compete in export markets.

It is our contention in this paper that this "view" *as it relates to exports* of manufactured goods is misleading, at least in-so-far as the Midwest is concerned. Without question, export markets have become more important to the U.S. economy during the past two decades. The dollar value of manufactured goods exports from the Midwest, for example, are estimated to have increased by more than five-fold between 1969 and 1991.[2] But, the contention that the strength of Midwest export growth since 1988, and in turn the resurgence of Midwest manufacturing, is due in a substantially degree to the depreciation of the dollar is open to question, we believe. Indeed, taken as a whole, we suggest that Midwest manufactured goods export industries, in fact, currently face a real aggregate dollar exchange rate that is higher (as of mid-1996) than was the case in 1970, the last full year prior to the 1971 dollar devaluation and the subsequent floating of dollar exchange rates. We explore this unconventional view in this paper.

Before progressing further there is an important distinction that must be noted, a distinction that will be highlighted throughout the paper. At this stage in our work we are restricting our reference to manufacturing industries and their *exports to foreign markets*. Because of data limitations, reference to *international markets*, which we interpret to include all of an industry's markets–exports to foreign markets as well as shipments to domestic markets–is not appropriate here. This is a distinction that is critical with regard to any conclusions drawn from the work.

Historical perspective

During recent decades demand generated by foreign goods markets became a progressively more important element in the dynamics of the U.S. economy. Since 1960 the constant dollar volume of U.S. goods exports increased nearly eight-fold. Foreign demand also increased for goods exports relative to the total volume of U.S. goods production. This is reflected in a substantial increase over time in the proportion of domestic goods production that enters the export market. In 1960 the value

of U.S. goods shipped to foreign markets accounted for about 8-1/2% of domestic goods output. By 1970, the export share of domestic goods output increased to about 11%. Since 1970, rapid growth in demand from foreign markets pushed the U.S. export share of goods output sharply higher, reaching 24% in 1995.[3]

Clearly, foreign markets are an important component of the overall demand for U.S. goods-output. It follows that economic and political developments that influence these foreign markets are of substantial importance to the overall demand conditions facing domestic goods producing industries. The vitality of the international economies, access to, or openness of, foreign markets, and the relative competitiveness of the various industries and countries are of more than just marginal importance to the economic well being of U.S. goods producing industries, their owners, employees, suppliers, and the communities in which they are located.

Numerous interrelated factors affect the ability of any given industry/country to compete in world markets. (In this context, "world markets" should be taken to include domestic markets as well as those abroad.) These factors, which one might place under the general rubric of indicators of relative competitiveness, include such characteristics as openness of the respective economies (i.e., barriers to trade), the extent and quality of infrastructure development, relative productivity levels, relative unit labor costs, variety and quality of products available, relative rates of gain in prices (inflation), and real values of exchange for the relevant currencies. If one accepts the proposition that these factors affect relative competitiveness in world markets of whole countries, it seems reasonable to expect that such factors might differentially influence the relative competitiveness of different regions within a country, in particular a country with an economy as large and diverse as is the case of the United States. In short, we expect that international trade–specifically, exports of manufactured goods–differentially influences the economies of different geographical regions of the U.S. economy.

Research intent

In this paper we take a first cut at defining in a new way the measurement of one of the factors that might be expected to influence the ability of various regions of the U.S. economy to compete in foreign markets. Our interest is in identifying whether *exchange rate variation* differentially influences selected geographical regions of the United States in their export markets. While it is obvious that at any given time there is only one exchange rate for the U.S. dollar *vis-à-vis* any other particular currency, it is our contention that different geographical/economic regions of the United States, by virtue of their different industrial makeup and the different foreign markets their industries are active in, do in fact face a different composite of exchange rates. Thus, for example, a general observation that "the dollar is *depreciating*" in international currency markets may have quite different implications for different geographical regions of the country.

Specifically, we propose to examine this issue by constructing a set of *export-weighted* dollar exchange rate indexes that are identified by selected regions of the United States and broad industry composition. Underlying the construction of these indexes are differentials between regions' export product composition and differentials in the market destination of exported manufactured goods.

Why aggregate dollar indexes?

In August 1971 the fabric of the dollar based fixed exchange rate system began to unravel. Foreign holdings of U.S. dollars were increasingly viewed as excessive by the holders of those dollars assets (this resulted in downward pressure on the foreign exchange value of the dollar). In order to maintain fixed exchange rates under the then existing dollar-exchange regime, foreign monetary authorities necessarily had to pursue "easier" monetary policy (lower foreign interest rates), relative to that in the United States, in order to induce foreign holders of dollars to continue to hold them and/or to acquire additional dollar denominated assets. Coincidentally, inflationary pressures were building abroad and foreign central bankers became progressively less willing to reduce their interest rates for the sake of maintaining the fixed exchange rate of their respective currencies against the U.S. dollar.

In this environment, the frequency of speculative attacks against the dollar increased. In mid-August 1971, the United States' government suspended the convertibility of foreign official holdings of dollars into gold. A "controlled float" (depreciation) of the dollar followed. Formal devaluation of the U.S. dollar against gold (only the second since 1792) took effect December 31, 1971, and was approved by the Congress and signed into law in April 1972. An additional formal dollar devaluation took place in February 1973. Final abandonment of the Bretton Woods fixed dollar-exchange standard occurred the following month. A floating dollar exchange rate *vis-à-vis* numerous other currencies followed.

During the ensuing 25 years the dollar depreciated against some currencies (e.g., the Japanese yen and numerous Western European currencies). Against other currencies, the dollar appreciated (e.g., currencies of other Western Hemisphere countries and the currencies of some Pacific Rim countries). Some governments chose to hold their currencies tied in a fixed relationship with the U.S. dollar. Given this environment, a series of questions naturally arise. Among them: Has the U.S. currency lost or gained in value in the foreign exchange markets? What impact, if any, have changes in dollar exchange rates had on United States' international competitiveness? A common perception with regard to the foreign exchange value of the dollar is that it has trended downward since mid-1971 (with the exception of the first half of the 1980s); that is, the dollar has recorded a secular depreciation during the past 25 years. But has it?

One approach to shedding light on such questions has been through the development of aggregate "trade-weighted" or "effective exchange rate" currency indexes. The intent underlying the construction of such indexes is to obtain some "representative average" measure of a specific currency's exchange rate. The "average" that such indexes attempt to portray utilize various methodologies that aim to measure in some aggregate sense what has happened to the "overall" foreign exchange value of the "index" currency, in our case the U.S. dollar. A characteristic of all such indexes is that they incorporate a weighting scheme, the intent of which is to identify and measure the relative importance of various trading partners (countries) in the over-all scheme of the index-country's international trade. For example, in a trade-weighted U.S. dollar index, the more important a foreign county's trade is in total world trade (a multilateral trade-weighted index) or alternatively, the more important a foreign county's trade is to total trade of the United States (a bilateral trade-weighted index), the larger the weight applied in the index to the exchange rate of that country, *vis-à-vis* other country currencies incorporated in the index.

Some methodologies carry the construction of aggregate indexes an additional step by adjusting the index for relative changes (between the index currency and other currencies in the index) in inflation, or production costs, or unit labor costs. Underlying such "real" adjustments is an attempt to more accurately identify *changes in competitiveness* that are associated solely with changes in exchange rate values. It is an adjustment that is especially critical to the validity of an index that includes currencies of countries between which there are substantial disparities in rates of inflation or productivity.

Why a regional dollar index?

The United States is a unified market with a single monetary authority and a single currency. In terms of international trade the individual states, or a regional aggregation of states, face a common external border. An exchange rate of 110 yen to the dollar means the same in Illinois as it does in Maine or Washington. From a firm's perspective, exchange rates are of no direct concern with regard to a decision whether to locate a plant in Alabama, California, or Ohio. A dollar is a dollar. Given a single-market and a single-currency one might reasonably ask then, what justification is there for the proposition that different regions of the United States face different exchange rates, and as such might be differentially influenced by changes in foreign exchange markets?

The primary rationale for an aggregate dollar index of any type is that during any given period exchange rate changes across countries are neither uniform in magnitude nor in direction of change. As we were constantly reminded by the public press and numerous international observers during 1994 and the first half of 1995, the exchange value of the U.S. dollar was depreciating rapidly. This of course was true with respect to the Japanese yen, the German mark, and most other major European currencies. But by no means was the dollar depreciating *vis-à-vis* all currencies. Indeed, the U.S. dollar appreciated or remained stable against other Western Hemisphere currencies and several of the Pacific Rim currencies, e.g., Hong Kong, Taiwan, and Singapore, (markets that accounted for 47% of U.S. goods exports and 41% of goods imports during 1995).[4] The appeal, then, of an *aggregate exchange rate index* is that it to some degree takes into account varying and counter trends among numerous exchange rates. As such it provides a weighted measure of the "average" exchange rate of the U.S. dollar *vis-à-vis* other currencies–currencies "that count" in so far as the U.S.'s international interactions are concerned.

Taking the rationale of the aggregate exchange rate index a step further, the premise underlying construction of a *regional dollar index* maintains that there are differences in the foreign markets, or export shares, served by different geographical regions of the United States. These differences are in part dependent on the variation across regions in industrial mix and the location/proximity to foreign markets for the output of that industrial mix. Specific geographical regions, because of proximity or industrial mix tend to engage in international trade with certain countries. Consequently, to the extent that exchange rate changes are not uniform across countries, one might expect that goods exports (and economic activity associated with those exports) from the different U.S. regions would be differentially affected by exchange rate movements.

Export shares

A comparison between the market shares of major export market destinations for total U.S. exports and the market shares of major export market destinations for several of the geographic subregions of the U.S. helps provides a clue as to the kind of diversity one might expect in a regional aggregate exchange rates. Figures 1, 2, and 3 show the share of manufactured goods exports (total, durable, and nondurable) to the ten largest foreign markets in 1994 for the United States as a whole, a five-state aggregation that in this study we refer to as the Midwest, and four other geographic regions. These regions are defined below.
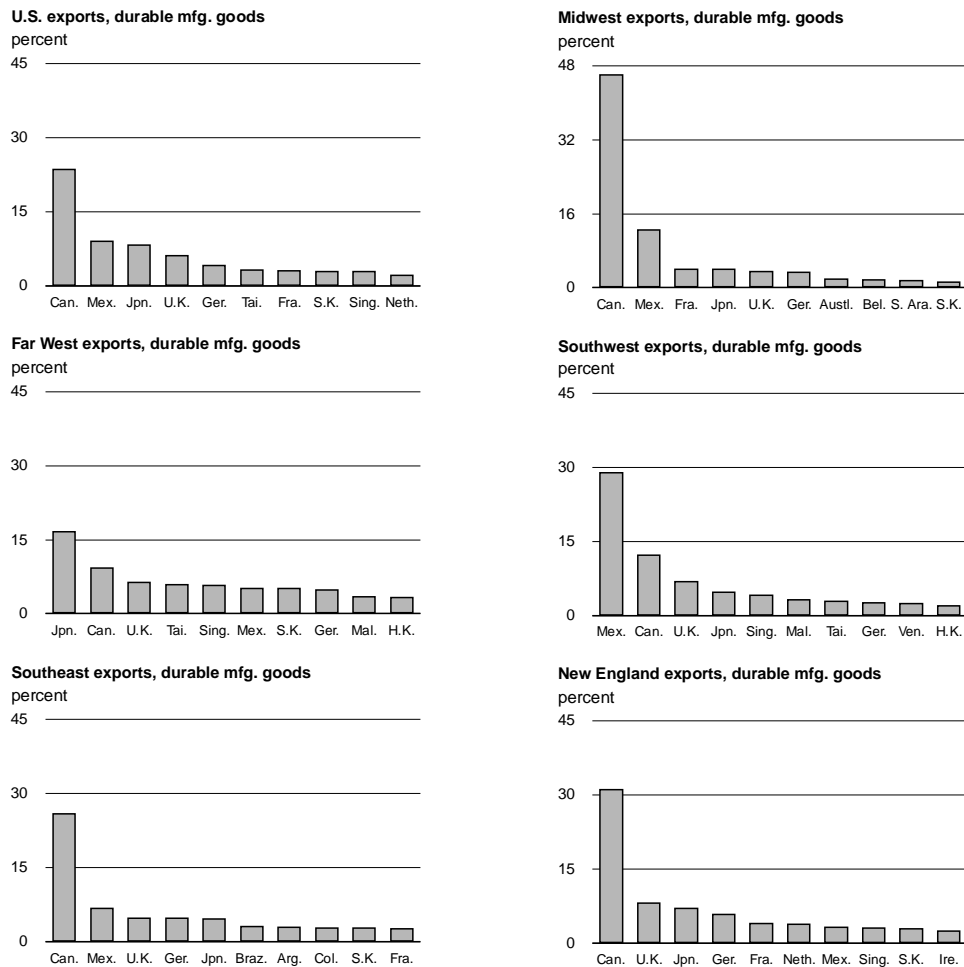
Figure 1 Share of Total Manufactured Goods Exports by U.S. Region, by County of Destination
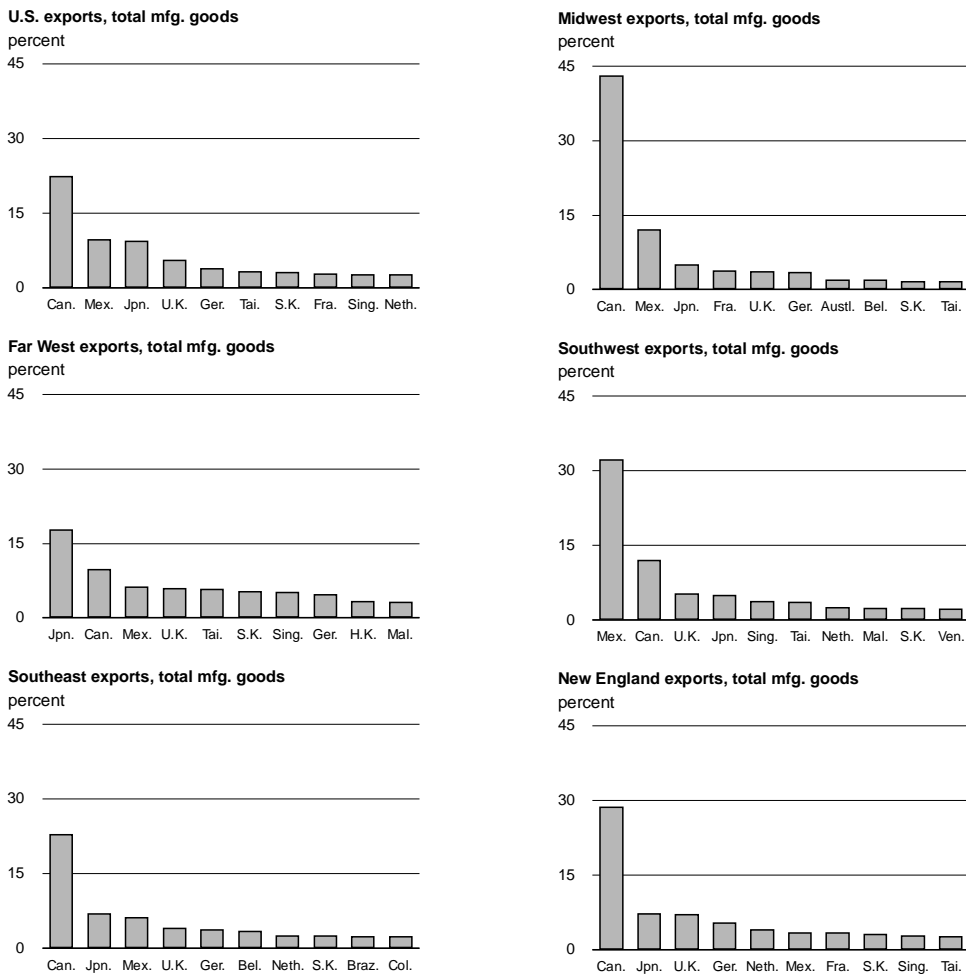
Source: Compiled from Massachusetts Institute for Social and Economic Research, "MISER," State of Exporter Location Data (Series II), 1993 and 1994.

Differences in magnitude between the U.S. total and the regional totals appear to support the idea that regional aggregate exchange rate indexes might prove useful to our understanding of trade developments and aggregate movements in economic activity in various regions of the United States. Note for example, that the Midwest exports nearly 43% of its manufactured goods exports to Canada, more than 13% to Mexico, another 13% to major European markets, and only a little over 5% to Japan. On the other hand, the United States as a whole, ships only 23% of its manufactured goods exports to Canada and about 10% to Mexico, while it ships 17% to major European markets and just under 10% to Japan. An examination of the export to country share data for the Far West shows, as might be expected, that the region's shipments to Japan account for around 18 percent of its total exports. These share data strongly suggest that Midwest exporters of manufactured goods depend substantially more heavily on foreign markets in which the dollar has actually appreci-

Figure 2 Share of Durable Manufactured Goods Exports by U.S. Region by County of Destination

Source: Compiled from Massachusetts Institute for Social and Economic Research, "MISER," State of Exporter Location Data (Series II), 1993 and 1994.

ated in recent years (Canada and Mexico) relative to U.S. exporters of manufactured goods overall. For the latter, exports to Europe and Japan (currencies against which the dollar has depreciated) are relatively more important in the overall export of goods mix.

General framework of the regional index construction

Regions The underlying characteristics of the regional export-weighted dollar indexes are defined as follows: A number of geographical regions could be identified. We have chosen to identify nine indexes. Eight state aggregations correspond to the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), geographical breakdown of the United States.[5] An aggregate U.S. index is also constructed. Our central focus, geographically, is on the BEA's "Great Lakes" region, which we hereafter refer to as the **Midwest** (Illinois, Indiana, Michigan, Ohio, and Wisconsin).
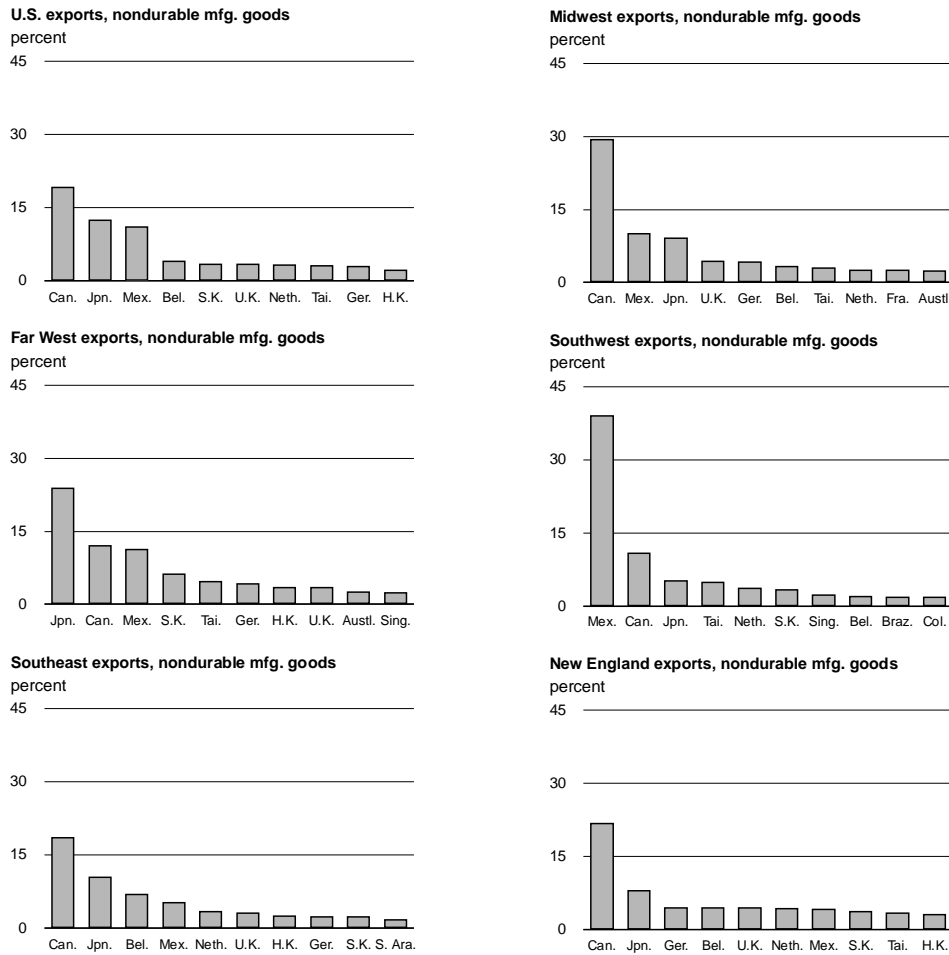
With regard to regional definition, it should be noted that the size of a "region" can be defined as small as an individual state. We chose not to do so, because of certain data problems that are exaggerated with the use of individual state data. For example, it is common practice for the manufacture of intermediate components to be carried out in one state with the component then shipped to one or more other states during the various stages of assembly before it is finally exported as part of a final product. Individual state export data are not based on value added in the state but rather by the state of location of the exporting "Shipper's Export Declaration." This means that the value of intermediate goods that are eventually exported may not be attributed to the appropriate state's exports. The aggregation of states into multiple state "economic regions" reduces, but does not fully eliminate this mismeasurement.

Country currencies Currencies of 44 countries are incorporated in our dollar indexes. These are the same countries used in the J.P. Morgan "real effective exchange rate indices").[6] Trade weights (see below) applied to the individual currencies are based on the average of 1993/1994 *manufactured goods exports* by state to these 44 countries, respectively, by industry [at the two-digit Standard Industrial Classification (SIC) code].

Weighting scheme The use of export only weights requires some explanation. The use of unilateral export trade weights is unusual in the construction of an aggregate exchange rate index. Aggregate exchange rate indexes that use trade volume as the weighting mechanism typically use bilateral trade weights for the currencies/ countries included in the index (e.g., U.S. exports-to, plus imports-from, by country of destination/source) or multilateral trade weights [e.g., total world trade (i.e., exports-to-the-world plus imports-from-the-world) for each country in the index]. While multilateral trade weights have the great advantage of taking into account the third-country effects of exchange rate changes, they are not applicable to U.S. regional indexes (in a multilateral weighting scheme all states would have the same country weight). Bilateral trade weights suffer from the lack of meaningful individual state data on imports (at any level—for state of initial destination or state of final utilization). Thus, at this stage of the project we rely solely on export weights.

The use of export weights requires that we be specific about conclusions drawn from the results. These indexes relate only to an aggregation of exchange rates that

Figure 3   Share of Nondurable Manufactured Goods Exports by U.S. Region by County of Destination

U.S. exports, nondurable mfg. goods
percent

Can. Jpn. Mex. Bel. S.K. U.K. Neth. Tai. Ger. H.K.

Midwest exports, nondurable mfg. goods
percent

Can. Mex. Jpn. U.K. Ger. Bel. Tai. Neth. Fra. Austl.

Far West exports, nondurable mfg. goods
percent

Jpn. Can. Mex. S.K. Tai. Ger. H.K. U.K. Austl. Sing.

Southwest exports, nondurable mfg. goods
percent

Mex. Can. Jpn. Tai. Neth. S.K. Sing. Bel. Braz. Col.

Southeast exports, nondurable mfg. goods
percent

Can. Jpn. Bel. Mex. Neth. U.K. H.K. Ger. S.K. S. Ara.

New England exports, nondurable mfg. goods
percent

Can. Jpn. Ger. Bel. U.K. Neth. Mex. S.K. Tai. H.K.

Source: Compiled from Massachusetts Institute for Social and Economic Research, "MISER," State of Exporter Location Data (Series II), 1993 and 1994.

exporters face. While we believe that the question, "what aggregate exchange rate do exporters face?" is an important issue to address, it nonetheless begs the question, "what are the effects of exchange rate change on the domestic market?" Bilateral indexes (export and import weights) would more fully address that question. There are then, at least two questions of interest–the impact of exchange rate changes on the export market and the impact of exchange rate changes on the import market. At this stage in the study, we address only the exporter side of the question.[7]

As already noted, an important issue that aggregate exchange indexes attempt to address is the differential movement of exchange rates. An industry may face, for example, an appreciating foreign currency in markets to which it exports but at the same time a depreciating foreign currency with regard to its major import competitors. In short, differential exchange rate changes may mean that a domestic industry is more competitive in its export markets *but* less competitive in its domestic market. An export only weighted index can not deal with this latter issue.

Since regional import data are not available, an alternative measure holds some promise for getting at the import competitiveness issue. A scheme utilized by Hayward and Erickson, who in a somewhat different context sought to measure the size of import competing industries, by state by SIC, holds some promise in this regard.[8] They derive an "import competitiveness" measure by industry by state. They do so by allocating total U.S. imports of manufactured goods by SIC by country of origin to the *Census of Manufactures/Annual Survey of Manufactures* data on production of goods by SIC by state. We suspect that in some cases the relationship between SIC industry production and export by state is probably close enough (especially at the broad 2-digit SIC classification) that we would not gain a great deal by incorporating the Hayward and Erickson "import competing industries" measure in the trade weighting scheme. However, we expect that certain industries, such as automotive and electronics, may be substantively influenced by an "import competing industries" measure. Consequently, we are in the process of extending our work to the construction of an aggregate bilateral index that utilizes a modification of the Hayward-Erickson measure. The "import competing industries" weights will use U.S. imports of manufactured goods by SIC by country of origin allocated by State by SIC based on manufacturing employment by state by SIC for the base years 1993 and 1994.[9]

Industry classifications--durable and nondurable For this study the state data are aggregated to form geographic regions, and the 20 two-digit manufacturing SICs are aggregated into classes of durable goods, nondurable goods, and total manufactured goods.[10] Our intention is that at a later date we will expand examination of the impact of industry trade weights to the more detailed 2-digit SIC industry breakdown.

Export data Basic data for the state/industry weights are compiled by the U.S. Bureau of the Census "state of export–location of exporter" series.[11] Our preference for export weights would be to use a three-year moving average to account for changes over time in the composition of trade by goods and destination. We are, however, constrained to use fixed-year weights because of the availability of such data. Exports by country of destination by SIC for the years 1993 and 1994 are used. The "location of exporter" series was first made available in 1993. We view this data series to be superior to the "origin of exporter" series, available from 1987, which biases state of exports toward the port where exportation occurred. The "location" data are adjusted for exports unallocated by state and industry and made available by the Massachusetts Institute for Social and Economic Research (MISER).[12] Three industry classifications for each of the eight regional aggregations, plus the U.S. total, result in a total of 27 indexes.

"Real" adjustment In any aggregate exchange rate index one must be concerned about the relative rate, across countries, of within-country price or productivity changes. This is especially true in those cases where countries within the index record marked differences in their relative rates of inflation or productivity. Consequently, from the perspective of measures of international competitiveness a simple change in the exchange rate between two currencies tells only half the story. We are, in fact, concerned about two levels of change. In this paper we focus on:

    1). The price of one currency in terms of another (the nominal exchange rate)

and

    2). The internal change in prices of the traded goods (i.e., domestic inflation). In short, we are interested in a "real" exchange rate; one that is adjusted to

account for differences in *relative rates of inflation* between the index currency (U.S. dollar) and the other currencies included in the index.[13]

Ideally, the "internal" price series we would prefer to use would be one that relates specifically to the goods traded. Price indexes with such detail are not available for the broad spectrum of countries included in the regional indexes. Rather, the "real" adjustment to the regional indexes is constructed using producer prices for the respective 44 countries incorporated in the index, relative to producer prices for the United States.[14]

The exchange rate series for countries used in the indexes are monthly averages taken from the International Monetary Fund, *International Financial Statistics* series, except for Taiwan and Hong Kong, which are from the Federal Reserve Board series.

Calculation of the regional "export-weighted" dollar takes the following form:

$$\text{RGTWD}_{k,i,t} = 100\left[\prod_{j=1}^{44} \left[\frac{\text{XR}_{j,t}}{\text{XR}_{j=0}} \right] \frac{\text{PPI}_{j,t}}{\text{PPI}_{u.s.,t}} \right]^{\text{Wgt}_{k,i,l}}\right]$$

Where:

|		
RGTWD	=	Regional export-weighted dollar
k	=	U.S. region with n states
j	=	Country (1 to 44)
i	=	U.S. manufacturing industry category
t	=	Time period, observations are monthly beginning January 1970 and currently through June 1996
XR	=	Exchange rate of country j with respect to the U.S. dollar (foreign currency/U.S. dollar)
PPI	=	Producer (wholesale) price index for country j or the U.S., 1990=100
Wgt	=	Share of U.S. exports of industry i, from region k, to country j (weights are an average of 1993 and 1994 U.S. goods exports)

What do the aggregate indexes show?

The pattern of movement in dollar exchange rates since 1970 can be divided into roughly three phases. The last full year of fixed exchange rates, during which the dollar serving as the standard of reference, was 1970; it is the starting point for this work. In the first phase, mounting pressures on an overvalued dollar in foreign exchange markets set the stage for a secular and broadly based depreciation in the dollar's international exchange value well into 1980.

In the second phase, the downward pressure on the dollar turned around. Beginning in late 1980 and extending for the next four and one-half years the dollar exchange rate recorded a large and broadly based appreciation–through February 1985. Thereafter, it turned downward again and recorded a sharp depreciation that continued into early 1988.

There is a common perception that during the third phase, the years following the 1980-1988 broad swing in the dollar, a gradual and protracted depreciation of the dollar continued. This view was heavily influenced by developments during 1990 and again during the period 1994 through mid-1995. Indeed, against certain currencies, especially the Japanese yen and to a lesser degree the German mark, the dollar has recorded substantial depreciation since 1988, most noticeably from 1994 to mid-1995 (see figure 4 which highlights movements in the yen/dollar and DM/dollar rates over

the 1970-1996 period). But, it is also the case that over this same period, the dollar appreciated against the currencies of several other major U.S. trading partners, such as Canada, the U.K. (see figure 5) and Mexico, with the result that aggregate measures of the dollar exchange rate show a rather "flatter" trend, albeit with substantial variation.   Figure 6 highlights movements in the aggregate dollar exchange rate as

Figure 4   Indexes of Exchange Rate Movements: Yen/U.S. $ and DM/U.S. $

index, 1970=100

DM/U.S. $

Yen/U.S. $

1971   '76   '81   '86   '91   '96
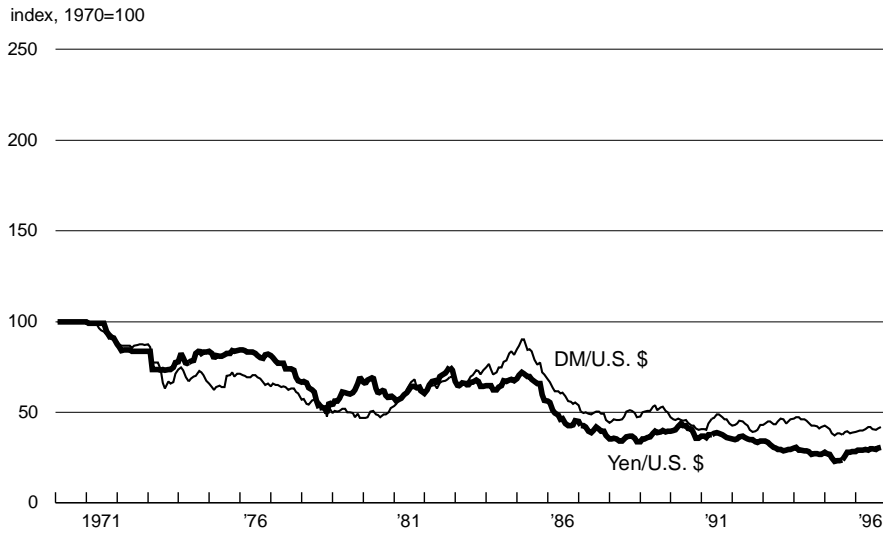
Source: Board of Governors, Federal Reserve System.

Figure 5   Indexes of Exchange Rate Movements: U.K. Pd/U.S. $ and C$/U.S.$

index, 1970=100

U.K. pound/U.S. $

Can. $/U.S. $

1971   '76   '81   '86   '91   '96
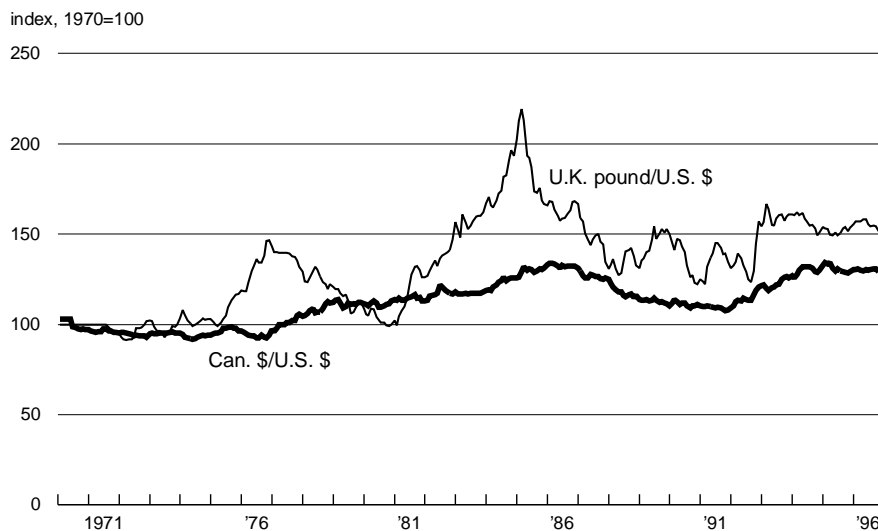
Source: Board of Governors, Federal Reserve System.

measured by two prominent indexes: the 10-country nominal aggregate index reported by the Federal Reserve Board and the 44-country real aggregate index reported by J.P. Morgan.

Changes in trading patterns may be a factor influencing the real exchange rates facing different regions of the U.S. economy. Figure 7 presents two aggregate dollar exchange rate indexes. One is the J.P. Morgan 44-country real index, which uses U.S. bilateral *export/import* trade in 1990 as trade weights and relative wholesale

Figure 6   Aggregate Exchange Rate Indexes: FRB-TWD Nominal and J.P. Morgan Real

index, 1970=100
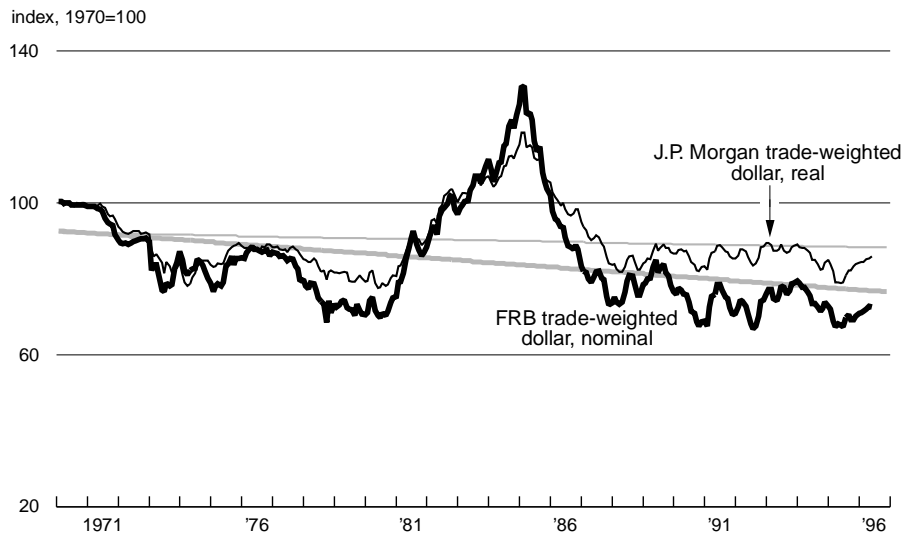
Source: *World Financial Markets,* J.P. Morgan and Board of Governors, Federal Reserve System.

Figure 7   Aggregate Exchange Rate Indexes: U.S. Export-Weighted Real and J.P. Morgan Real, 1970-1996

index, 1970=100
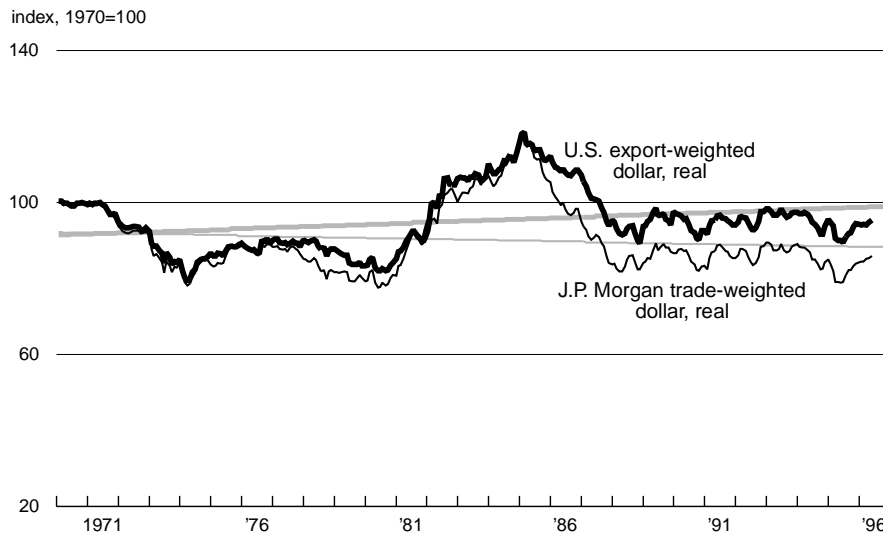
Source: *World Financial Markets,* J.P. Morgan and computed from results of this study.

or producer price indexes for the "real" adjustment to the index. The other is a U.S. aggregate dollar index constructed in this study. This latter real index utilizes the same 44 countries and the same price indexes for the real adjustment used in the Morgan index. However, as noted earlier, its trade weights are based on average U.S. unilateral *exports* by country of destination for 1993 and 1994.

Notice that in figure 7 the two series begin to diverge in the mid-1980s, which suggests a divergence between the *export/import* series and the *exports only* series. However, from 1988 to date the two indexes remained virtually flat (see figure 8). In contrast the FRB-TWD nominal index recorded a perceptible downward trend from 1988 to date (see figure 9).

Some myths die hard

An argument has been made during the last decade that international competition was a major contributing factor that forced the restructuring of U.S. manufactured goods industries during the 1980s. An important element of this argument centers on the dramatic appreciation of the dollar that occurred during the first half of the 1980s and the consequent deterioration in the competitive position of domestic industries that resulted. The exchange rate impact resulted in higher foreign currency costs for U.S. goods *vis-à-vis* foreign goods and lower U.S. prices for foreign made goods *vis-à-vis* domestically produced goods. In short, U.S. manufacturing industries were faced with two hard choices: Restructure so as to remain viable competitors in world (*foreign and domestic*) markets, or close up shop. Because of the importance of manufacturing to the Midwest economy, dollar exchange rate developments during the last 15 years were critical to manufacturing industries in the Midwest and the Midwest economy in general.[15]

Figure 8   Aggregate Exchange Rate Indexes: U.S. Export-Weighted Real and
J.P. Morgan Real, 1988-1996
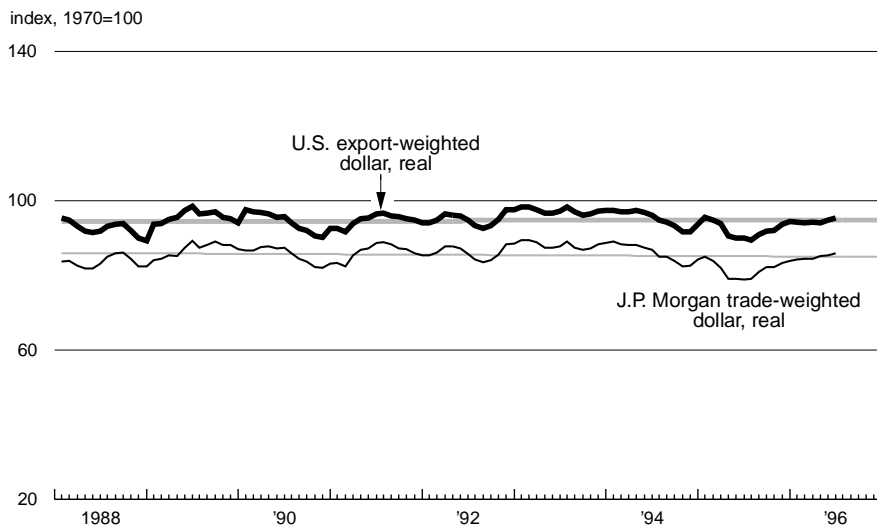
index, 1970=100

Source: *World Financial Markets,* J.P. Morgan and computed from results of this study.

index, 1970=100
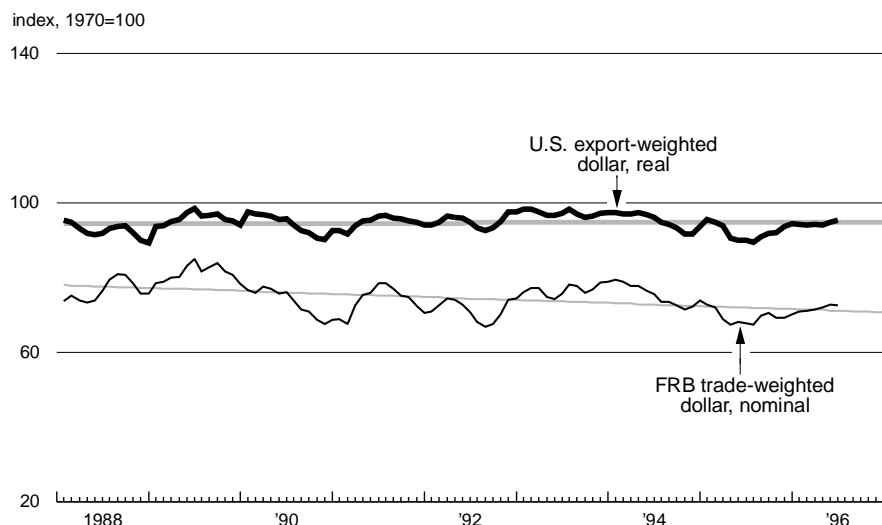
Source: Board of Governors, Federal Reserve System, and computed from results of this study.

The argument continues: The depreciation of the dollar that occurred during the last half of the 1980s, and extended into the mid-1990s, was an important factor that contributed to the rejuvenation of the Midwest's industrial economy during that period. Expanding export markets, encouraged by a cheaper dollar, it is argued, was a critically important factor contributing to that rejuvenation. Indeed, Midwest industry became more competitive in export markets in the late 1980s through the mid-1990s; but was a depreciating dollar an important contributor to that development?

One could reasonably expect that the large gyrations in the dollar's international exchange value during the period 1980 through 1987 would have had an impact on industries' competitive positions in foreign markets. Indeed, it has become conventional wisdom that the restructuring of Midwest industries into a more competitive force in export markets during the last 10-15 years was due, in part, to industries' reaction to the dramatic dollar exchange rate appreciation during 1980-1985.

Clearly, there was a large appreciation of the dollar during the 1980-1985 period that adversely affected the competitive position of U.S. industry in export markets. That development contributed to an awakening of U.S. industry to the need to become more competitive if it expected to remain a factor in export markets. It is also clear that a large depreciation of the dollar from early 1985 through 1987 reversed the adverse competitive impact of the earlier appreciation.

The results of out work suggest, however, that contrary to common perception, the real dollar did not continue a depreciating trend, relative to export markets, following the large gyrations recorded during the 1980–87 period–a depreciation that is often credited with contributing further to the increasing competitiveness of U.S. and Midwest manufacturing industries in export markets. In fact, the aggregate *Midwest* export-weighted real dollar index, which we construct, shows an *appreciating* trend, not only for the period 1988-1996, but for the entire period 1974-1996 (see figure 10, panels 1a and 1b). This appreciation is due primarily to the fact that in

recent years Midwest manufactured goods exports to Canada and Mexico have accounted for 50% to 60% of total goods exports from the region. (The U.S. dollar has recorded a long running appreciation against these currencies.) On the other hand, these two markets have a smaller impact on the U.S. total; about one-third of U.S. manufactured goods exports go to Canada and Mexico.

Marked regional differences also show up in the aggregate indexes. This is particularly true for durable goods manufactures. The data presented in figure 10 also show a substantial contrast between the durable goods based index for the Midwest and the comparable indexes for New England (panels 2a and 2b) and the Far West (panels 3a and 3b), for example. Exports from the latter two regions rely relatively more heavily on Pacific Rim and/or European markets, currencies against which the dollar generally has depreciated. Figure 10a shows comparisons of the durable manufactured goods exports for the Midwest and the remaining five regions. Substantial differences show up in several of these indexes, in particular between the Midwest and the Mideast and the Rocky Mountain states.

Figure 10   Regional Exchange Rate Indexes for Durable Goods-Midwest vs Selected Other Regions, 1970-1996 and 1988-1996
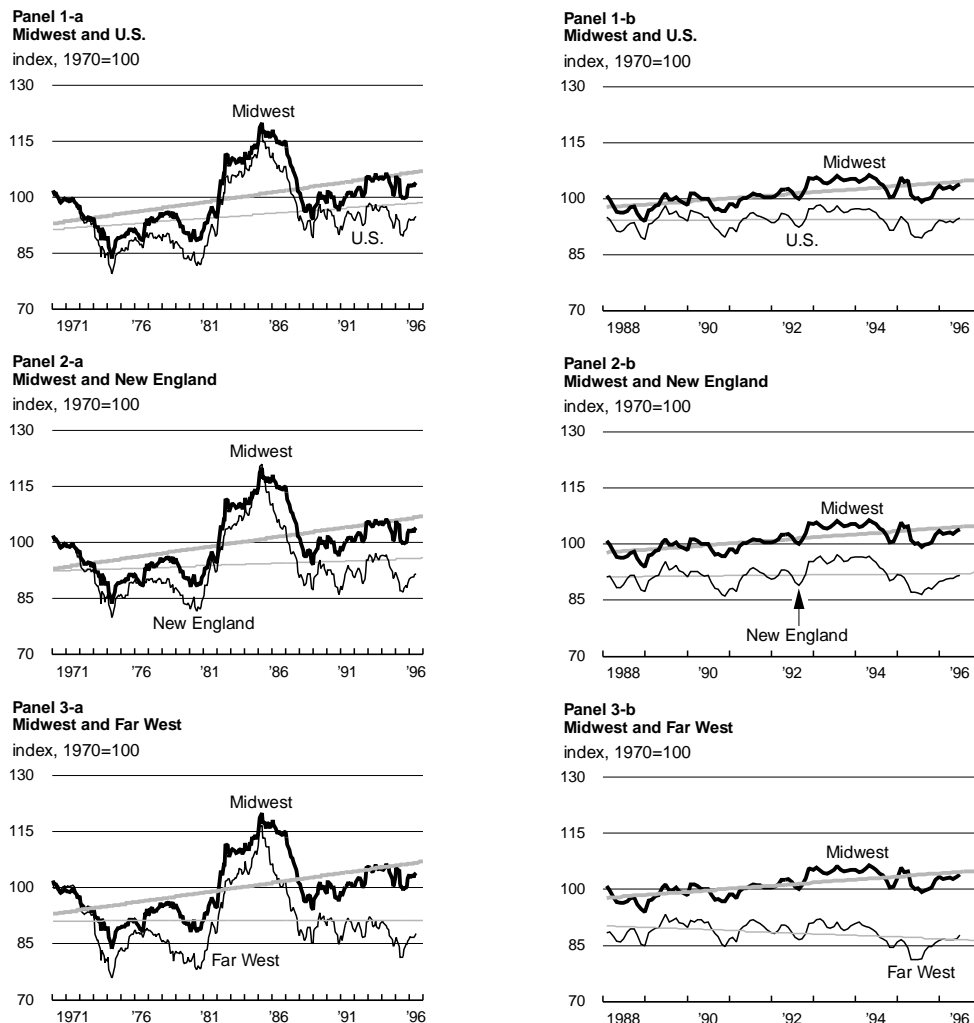
The differential between the Midwest and Far West indexes (figure 10) for durable goods is of particular interest. The Midwest index shows an appreciation over the 1970-1996 (4.0% from the 1970 average to mid 1996) and 1988-1996 (6.8% from the 1988 average to mid 1996) periods. The Far West records a flat to downward trending index for the two respective periods. The Far West's dollar index in June 1996 stood 12.8% below the average for 1970 and 0.6% above the 1988 average. These differences are attributable to the markedly different export market compositions of the two regions (see figure 2).

Indexes and trends for other selected regions as compared with the U.S. aggregate index are presented in figure 11. Regions, in addition to the Midwest, where the export weighted dollar index showed an appreciation are the Southeast and the Southwest. A dollar depreciation is most pronounced in the Far West and the Mideast.

Industrial composition of exports also appears to influence the regional exchange rate pattern. Figures 12 and 13 break out the constructed indexes for the Midwest and the other geographic regions based on exports of durables manufactures
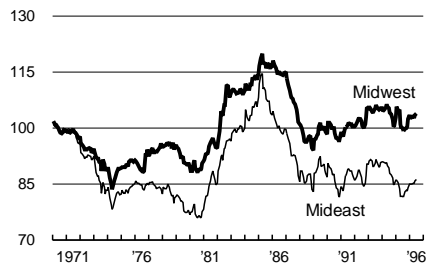
Figure 10a   Regional Exchange Rate Indexes for Durable Goods-Midwest vs Selected Other Regions, 1970-1996
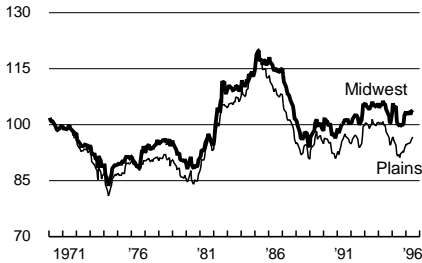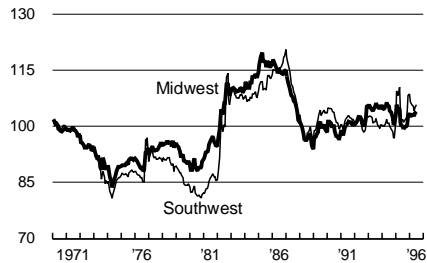
Panel 1-a
Midwest and Southeast
index, 1970=100
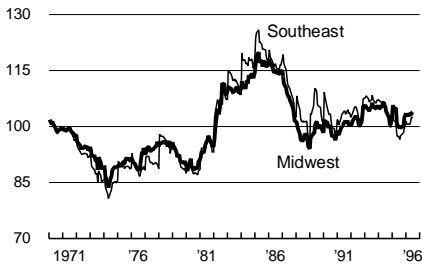
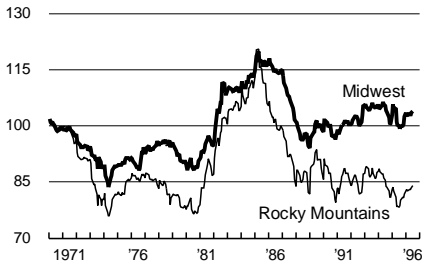**Panel 1-b**
Midwest and Mideast
index, 1970=100

Panel 2-a
Midwest and Plains
index, 1970=100

Panel 2-b
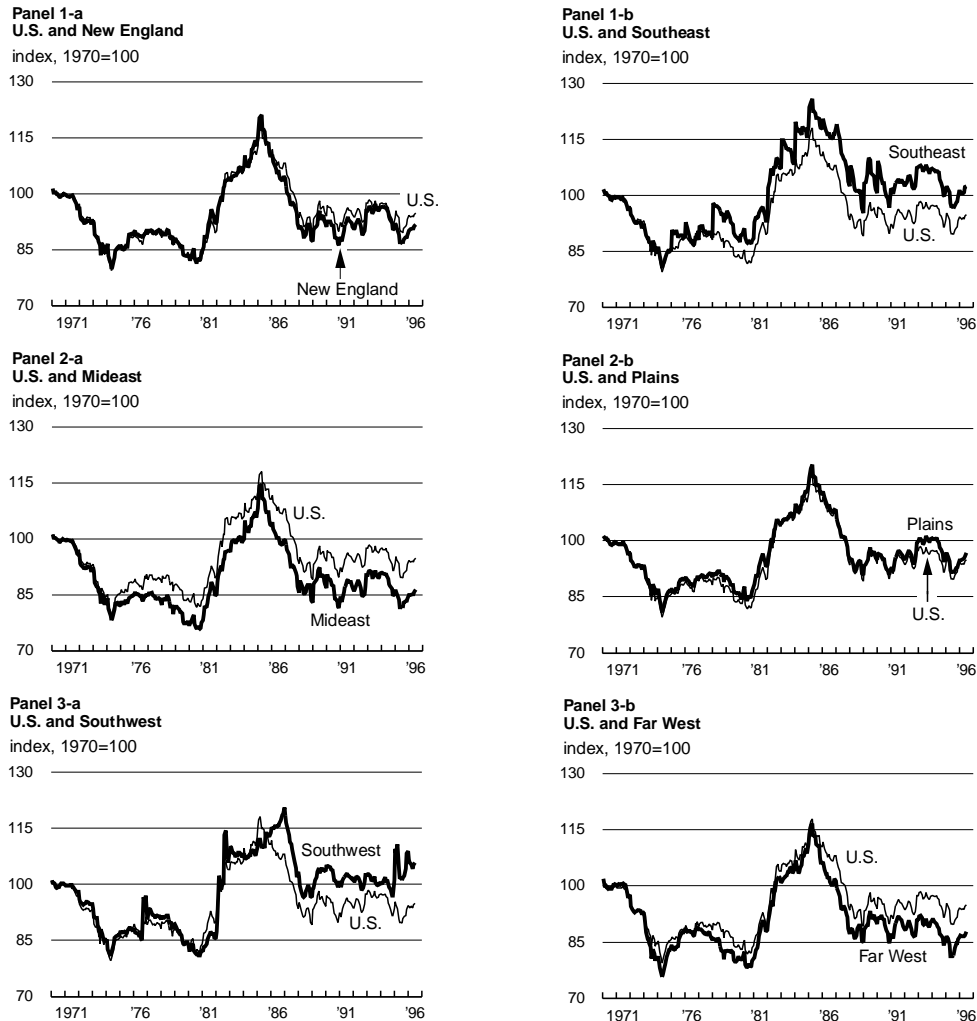**Midwest and Southwest**
index, 1970=100

Panel 3-a
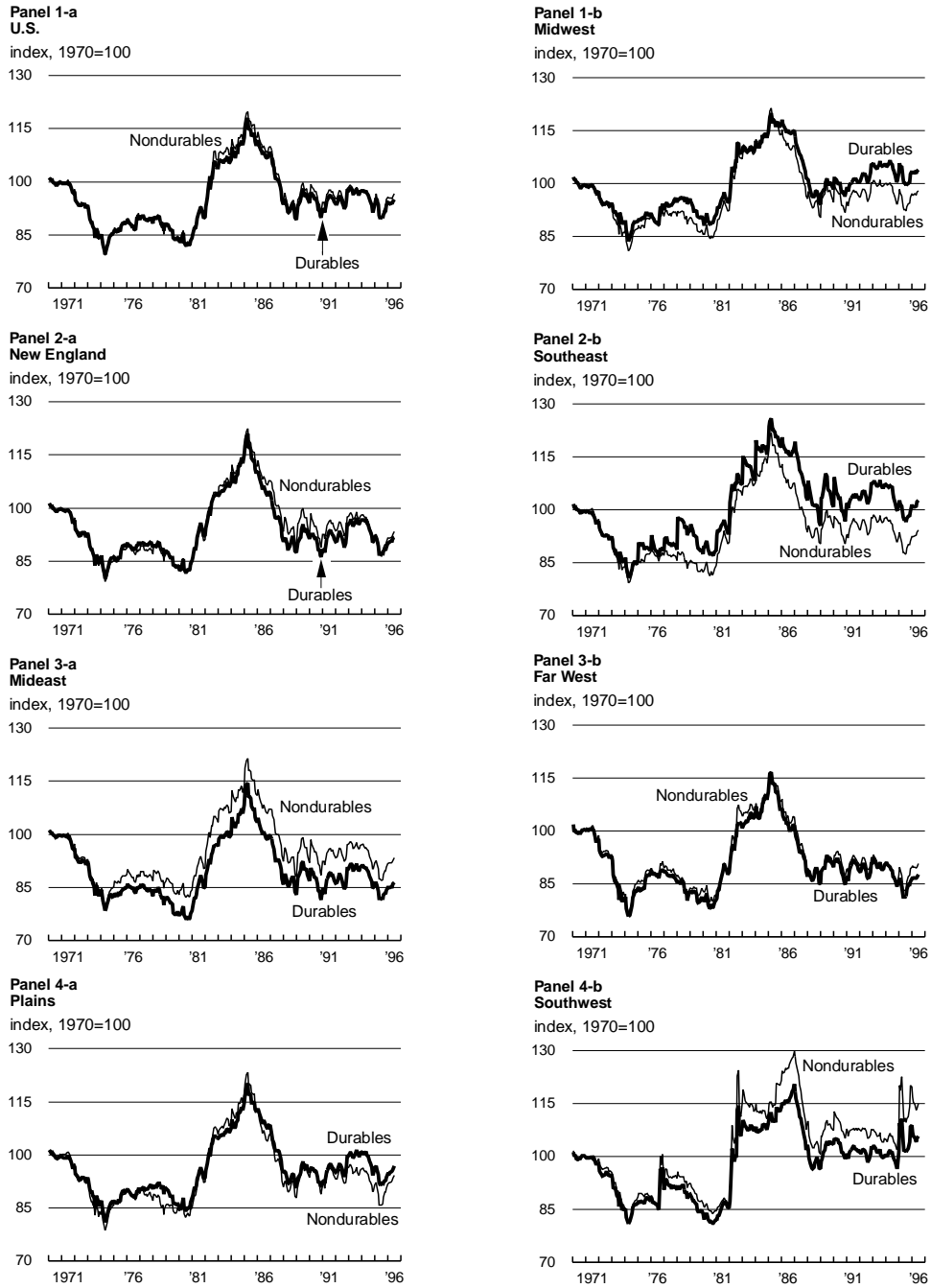**Midwest and Rocky Mountains**
index, 1970=100

and nondurables manufactures, respectively. Figure 12 plots the durable/nondurable indexes by region. The data in figure 12 suggest that for the U.S. in the aggregate, the durable and nondurable based indexes track very closely. There is, however, some divergence between the two indexes on a regional basis. The differences across regions in the nondurable indexes appears less pronounced than is the case for the durable goods based indexes. Exceptions to this pattern appear in the Far West and Southwest regions. Figure 13 shows these relationships more directly with measures of the percent difference of the regional durable/nondurable/ indexes from that of the respective aggregate U.S. durable/nondurable indexes.

The difference between the Midwest index and the U.S. index is more pronounced for durables than for nondurables. This is generally the case for different regions, with the exception of the Southwest and possibly the plains states.

Figure 11   Regional Exchange Rate Indexes for Durable Goods-Midwest vs Selected
Other Regions, 1970-1996

Panel 1-a
U.S. and New England

Panel 1-b
U.S. and Southeast

Panel 2-a
U.S. and Mideast

Panel 2-b
U.S. and Plains

Panel 3-a
U.S. and Southwest

Panel 3-b
U.S. and Far West

Figure 12   Regional Exchange Rate Indexes, Durable and Nondurable Goods
U.S. and Selected Regions, 1970-1996

Panel 1-a
U.S.

index, 1970=100

Panel 1-b
Midwest

index, 1970=100

Panel 2-a
New England

index, 1970=100

Panel 2-b
Southeast

index, 1970=100

Panel 3-a
Mideast

index, 1970=100

Panel 3-b
Far West

index, 1970=100

Panel 4-a
Plains

index, 1970=100

Panel 4-b
Southwest

index, 1970=100

Panel 1a
Midwest
percent difference, U.S.=0

Panel 1-b
New England
percent difference, U.S.=0

Panel 2-a
Southeast
percent difference, U.S.=0

Panel 2-b
Mideast
percent difference, U.S.=0

Panel 3-a
Far West
percent difference, U.S.=0

Panel 3-b
Southwest
percent difference, U.S.=0

Panel 4-a
Plains
percent difference, U.S.=0

Panel 4-b
Rocky Mountain
percent difference, U.S.=0

Note: Percentage differences–region from the U.S.–are in logs.

It is clear that the export of goods to Canada is an important element in the Midwest's manufacturing market. A similar characteristic appears to be the case for the Mexican market, particularly with respect to the U.S. Southwest region. Indeed, it is this type of relationship that we hope to be able to identify by the construction of regional indexes. There is, however, a unique economic relationship between the U.S./Canadian and U.S./Mexican economies that raises some concern regarding the interpretation of the resulting indexes. At the outset, it is an issue that needs to be acknowledged even though we have no way of knowing the extent to which it poses an interpretive concern.

For certain industries there is a high level of integration of the production facilities across the borders (in particular, the automotive industry for U.S./Canada and the *maquiladoras* industries along the U.S./Mexico border) and the more geographically diverse U.S./Mexico auto industry. The question, arises: Is, for example, a change in the Canada/U.S. exchange rate viewed the same for intra-company transactions where intermediate components are shipped by a U.S. based firm to its assembly facility in Canada (a U.S. export), incorporated into a final product and shipped back to the U.S. (a U.S. import)—-are these transactions booked in U.S. dollars?—-or do exchange rates make a difference?

Apparently there is no simple answer to this question. It is our understanding that for some integrated industries, apart from the *maquiladoras*, exchange rates changes do indeed make a difference and that the existence of an integrated market across borders does not appreciably bias upward the impact of exchange rate changes on the regional indexes. In other integrated industries cases, transactions are denominated in dollars and the exchange rate translation occurs only if the good enters the foreign market. For the *maquiladoras* industries, most cross-border transactions *are* denominated in U.S. dollars. Thus, change in the peso/dollar exchange rate does not have a direct effect on these transactions.

Nonetheless, a peso devaluation, for example, will influence the local value-added portion ("cheaper" labor and components content) of the transaction if the final product is shipped back (imported) to the United States. So, even in this case exchange rate change counts to some degree.

Summary

Aggregated dollar exchange rate indexes have the potential to give a more realistic overall view of the impact of exchange rate changes *vis-à-vis* the dollar across a number of countries. When adjusted for relative rates of inflation or productivity across countries, such indexes can contribute to our understanding of developments in the international competitiveness of the U.S. While it is true that industries within the U.S. that are engaged in international trade face a common external border and a common set of national exchange rates, from a regional perspective and an industry perspective the specific set of exchange rates faced may be quite different, depending upon the market destination of their products.

This study suggests that in the aggregate Midwest manufactured goods exporters, by the nature of the composition of their foreign markets and their heavy concentration in durable goods industries, have in fact faced an appreciating dollar since the late 1980s. Indeed, except for the 1980–1988 "blip" in the dollar exchange rate, Midwest exports have faced an appreciating-trend dollar since early 1974. As of mid 1996, the aggregate real dollar exchange rate faced by the aggregate of durable goods manufacturing exporters located in the Midwest stood 17% higher than in 1974 and 4% higher than in 1970, a date well before the initial formal devaluation of the dollar. Since 1988, the export weighted dollar has generally strengthened. In June of 1996 the Midwest's real export dollar stood 6.8% above its 1988 level.

It is widely acknowledged that Midwest manufacturing exporters have become more competitive in exports markets over the past two decades. However, given the foreign markets that Midwest manufacturing are active in, it would appear that this increased competitiveness has been accomplished without the help of a depreciating

dollar exchange rate, as conventional wisdom has often contended. Indeed, if Midwest manufacturing exporters, in the aggregate, have become more competitive in their export markets they have done so in the face of an appreciating real dollar.

It should be remembered, however, that this conclusion tells only half of the story. We can not tell from these results what the regional implications are of changes in the dollar exchange rate on import competition in the primary market for U.S. manufacturing industries–that is, the domestic market. Examination of that issue will be undertaken in a forthcoming study.

Footnotes

[1]Examples of this view are seen in articles recorded in: *Business Week,* "Will U.S. Factories Need Another Exchange-Rate Fix?" by Gene Koretz, August 8, 1988, p. 18 and *Financial Times,* "Midwest toasts dollar's decline," by Michael Prowse, March 23, 1995, p. 6.

[2]Estimated from data presented in *Exports from Manufacturing Establishments,* Analytical Report Series, Annual Survey of Manufacturers, selected issues 1983-1991, and *Origin of Exports from Manufacturing Establishments,* selected issues 1969-1981, U.S. Department of Commerce, Bureau of the Census.

While the dollar value of Midwest exports of manufactured goods increased substantially during this period the Midwest's share of U.S. manufactured goods exports actually declined, from over 30% in the early 1970s to a little over 20% in the early 1990s (also see footnote number 15).

[3]These figures are based on U.S.D.C. National Income and Product Account data, *Survey of Current Business* table 1.4 and 4.1 (selected issues). A more complete discussion of export shares of output is contained in "Foreign trade and the U.S. economy," *Chicago Fed Letter,* Jack L. Hervey, Federal Reserve Bank of Chicago, No. 91, March 1995.

[4]Based on data contained in U.S.D.C., Bureau of the Census, *U.S. Merchandise Trade,* FT-900 for 1995.

[5]**New England**, Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; **Mideast**, Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania; **Great Lakes**, Illinois, Indiana, Michigan, Ohio, Wisconsin; **Plains**, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; **Southeast**, Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia; **Southwest**, Arizona, New Mexico, Oklahoma, Texas; **Rocky Mountain**, Colorado, Idaho, Montana, Utah, Wyoming, **Far West**, Alaska, California, Hawaii, Nevada, Oregon, Washington.

[6] J.P. Morgan "real effective exchange rate indices," reported in *World Financial Markets* (quarterly). The JPM "Broad" index incorporates 21 OECD currencies (plus the U.S. dollar) and 23 LDC currencies. The foreign currency markets are: Canada, Japan, Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, Ireland, New Zealand, Turkey, Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Venezuela, Hong Kong, Indonesia, the Republic of Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand, India, Kuwait, Morocco, Nigeria, Pakistan, Saudi Arabia, and South Africa.

[7]Actually, there is a third question of substantial importance, which we do not address in this paper. That is, the third country impact on trade of exchange rate changes. This issue is alluded to in section "Weighting scheme" above. In sum, the issue boils down to this: The dollar may experience a real depreciation (appreciation) relative to a bilateral trading partner. That exchange rate change affects the relative competitiveness not only of U.S. goods *vis-à-vis* the bilateral partner, but also the relative competitiveness of U.S. goods *vis-à-vis* third country trading partners. Unfortunately, the aggregate exchange rate construction that we pursue in this paper does not allow us to say anything about this potentially important issue.

[8]Hayward, David J. and Erickson, Rodney A., "The North American Trade of U.S. States: A Comparative Analysis of Industrial Shipments, 1983-91," *International Regional Science Review,* Vol.18, No. 1: pp. 1-31, 1995.

[9]Imports are allocated to SIC categories according to an algorithm developed to convert them from the reported Standard International Trade Classification (SITC).

[10]**Durable goods** include: SIC-24, lumber and wood products; 25, furniture and fixtures; 32, stone, clay, and glass products; 33, primary metal industries; 34, fabricated metal industries; 35, industrial machinery and equipment; 36, electronic and other electric equipment; 37, transportation equipment; 38, instruments and related products; and 39, miscellaneous manufacturing industries. **Nondurable goods** include: SIC-20, food and kindred products; 21, tobacco manufactures; 22, textile mill products; 23, apparel and other textile products; 26, paper and allied products; 27, printing and publishing; 28, chemicals and allied products; 29, petroleum and coal products; 30, rubber and miscellaneous plastics products; and 31, leather and leather products.

[11]Bureau of the Census, U.S. Department of Commerce, *FT-900 Supplement* "location of exporter" series.

[12]Massachusetts Institute for Social and Economic Research, "MISER State of Exporter Location Data (Series II)." The state export data as reported by the Bureau of the Census contains a substantial category of "unallocated" exports. MISER adjusts these data to account for the unallocated portion. These adjusted data series are made available on a by-state-by-country of destination at the 2-digit SIC industry classification basis. In 1994, these adjustments accounted for nearly 7% of total manufactured exports.

[13]To help understand the relationship between relative internal price changes and changes in exchange rates, consider the following two country ("A" and "B") example: The internal prices of traded goods in country "A" increase relative to internal prices in country "B", (exchange rates remain the same). The real

cost of country "A" goods has increased in terms of country "B" currency because it talks more "B" currency to purchase the additional "A" currency needed to acquire the now higher priced "A" goods. Similarly, if currency "A" appreciates relative to currency "B", (relative internal prices remain the same) the real cost of currency "A" goods has also increased in terms of currency "B" because it takes more units of currency "B" to buy the same number of units of currency "A" that are required to purchase good "A".

From the above example one can see that relative internal price changes across countries can accentuate, offset, or leave unchanged the observed changes in nominal exchange rates. A country with an *appreciating nominal exchange rate* and *higher relative internal price gains than abroad* will find that its "real" or "effective" exchange rate has appreciated more than its nominal exchange rate. That is, its real international competitive position *deteriorated* more than that reflected solely by the nominal appreciation of its currency. On the other hand, a country with a *depreciating nominal exchange rate* and *lower relative internal price gains than abroad* will find its real exchange rate has depreciated more than its nominal rate. Its real international competitive position improved more than that reflected solely by the nominal depreciation of its currency.

Over time, exchange rates can be expected to adjust for or compensate for relative domestic price changes. All else equal, if prices in country "A" increase (more inflation) relative to prices in country "B" in order for country "A" to remain competitive in international markets, *vis-à-vis* country "B," the exchange rate for currency "A" must depreciate relative to currency "B" such that a unit of currency "B" will still purchase the same amount of the now higher domestic priced good "A.." Thus, under a regime of floating exchange rates we would expect that a country that experiences relatively higher inflation will also experience a depreciation in its currency's exchange rate. Maintenance of international competitiveness, all else equal, under a regime of fixed exchange rates when there is a differential in relative inflation between countries must eventually be remedied by a realignment of currency exchange rates or a change in monetary policy to negate the inflation differential.

[14]These price indexes were provided by the Economic Research group of J.P. Morgan. In this version of the paper the JPM provided price indexes carry through April 1996. May and June exchange rate indexes are computed carrying the April price index for the respective countries forward for those two months.

[15]There is an interesting note regarding the development of manufacturing in the Midwest during the last 25 years that is missed in these arguments. In fact the Midwest's share of U.S. manufacturing shipments and manufactured goods exports declined sharply during the *latter half of the 1970s*–a period during which the nominal dollar was depreciating in European and Japanese exchange markets. The Midwest's share of U.S. manufacturing shipments and manufactured goods exports *remained rather stable from 1983 through 1991.* (Refer to: U.S. Department of Commerce, Bureau of the Census, Annual Survey of Manufactures, Exports from Manufacturing Establishments, selected years, 1969 through 1991, the last year this survey was conducted.

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