THE VALUE OF THE "SOUTHERN" DOLLAR

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Abstract–This paper constructs a trade-weighted regional exchange rate index for the Southern states and compares it to a similar index comprising the rest of the United States. Results indicate there are nontrivial differences between them. The two indexes are not cointegrated, and the index comprising the rest of the United States does not appear to be causing movements in the Southern dollar. In an international trade sense, the South is still distinctive. Researchers investigating how exchange rate changes affect regional exports and economic growth should be cautious in making inferences based upon a national exchange rate index.

I. INTRODUCTION

Information on the value of the Confederate dollar has been unavailable since 1865 when the Confederate States of America (CSA) ceased to exist as a "country." We will use this former political entity to demonstrate a point. In international economics, changes in a country's trade flows are typically linked to some form of a weighted-average exchange rate. Regional science research has started to examine the role of international trade in the economic growth of regions within a large country such as the United States. According to Krugman (1991), regions of the U.S. differ more in terms of industrial mix than do countries that comprise the European Union (EU). Regional disparities in the concentration of industrial activity will create different regional export patterns. Research on the effects of trade policy changes, such as the passage of NAFTA or the expansion of the EU on regional exports, provides a base from which to consider potential differences in exchange value effects of the dollar on various U.S. regions.[1] Changes in a U.S. trade-weighted exchange rate are expected to exert different effects on regional exports. However, before considering the effects of exchange rate changes on regional exports, one should consider the applicability of using a national trade-weighted exchange rate to analyze effects of currency changes on regional exports.

U.S. regions are very different in two important respects. First, the composition of industries among various regions is quite distinct.[2] Second, transportation costs lead regions to trade more heavily with some countries than others.[3] These considerations explain why the export basket of each U.S. region differs consider-

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ably from the composition of total U.S. exports. An important implication is that using a national trade-weighted value of the dollar may not be appropriate for the analysis of regional exports.

The purpose of this paper is to construct a trade-weighted regional exchange rate index. For illustrative purposes, we have chosen a relatively familiar region (the former CSA) that was historically once a "country" with its own currency. It may also be more immediately familiar as a region in comparison to the nine Census regions defined by the U.S. government. Issues involved in the construction of an exchange rate index are discussed in the next section. A measure of the "Southern" dollar is given in the third section, as well as some indications of the differences it has with a similar measure comprising the rest of the U.S. Conclusions are summarized in the final section.

II. CONSTRUCTION OF A TRADE-WEIGHTED EXCHANGE RATE

Five key issues are involved in the construction of our index. The first issue concerns the choice of weights for the weighted average exchange rate index. There are three choices: an export weight, an import weight, or the sum of the two.[4] Since state trade data are based on information obtained from the Shippers Export Declaration form, only export data are collected by state of shipment.[5] Values of U.S. exports classified by state of shipment and country of ultimate destination will serve as our weights. Further, research on international trade and state and/or regional economic performance has focused on exports.

The second issue in the computation of an exchange rate index involves the choice of base period. We have selected 1973:3, which is the period when the U.S. "officially" left the Bretton Woods fixed exchange rate system.[6] A third issue concerns the type of average to use. Trade-weighted exchange rates are typically constructed using a geometric average. We have followed that practice here.[7] Fourth, there is the question of which countries to include (exclude). A small country sample has the advantage of being easy to compute. Exclusion of a significant portion of trade, however, is troubling. Ideally, one might wish to include all countries, but the timeliness of data emerging from some developing countries may pose a problem. Given these tradeoffs, we have included 50 countries in each index.[8] This group covers approximately 92 percent of total U.S. exports and approximately 87 percent of total exports emanating from the former CSA. This should be enough coverage to be realistic while avoiding the data problems mentioned above.[9]

A final issue concerns the choice between a nominal exchange rate index and a real exchange rate index. We have chosen the latter. Floating exchange rates frequently deviate significantly from purchasing power parity. A nominal exchange rate change unadjusted for relative inflation can be misleading. For example, the crawling pegs common in Latin America look like devaluations in nominal terms, but when adjusted for inflation differentials, many of these currencies are simply retaining their real value vis à vis foreign currencies.[10] As is common in this literature, we have used the Producer Price Index as the "domestic" measure of inflation and, where possible, for each foreign country.[11] The degree of aggregation used in the indexes is total merchandise exports. Optimally, one would also like to include service exports, but data on state and/or regional exports of services are not currently available.

Specifically, each regional exchange rate index is constructed on a quarterly basis as:

$$E_t = 100\prod_{i=1}^{50}\left[\left(\frac{E_t^i P_t^{US}}{P_t^i}\right) / \left(\frac{E_B^i P_B^{US}}{P_B^i}\right)\right]^{w^i}$$

where

- E_t = the real dollar exchange rate index in period t,
- E^i_t = the number of units of currency i per dollar in period t,
- P_t = the wholesale price index in period t,
- B = the base period (1973.3), and
- w^i = the trade weight assigned country i based on U.S. exports in 1994 by region of the country.

Bilateral exchange rates and domestic price indexes are taken from an International Monetary Fund (1995) data file. Export figures by state and foreign destination are from a U.S. Bureau of the Census (1995) report, which records the value of export shipments by firms within states, rather than the (unknown) value of exported goods produced within states. Export values are biased toward states of exportation, since there is a tendency for exports to be attributed to these states rather than to true states of production.[12] We expect to lessen this bias by aggregating states to larger Census regions.

III. A REGIONAL EXCHANGE RATE INDEX

Figure 1 below shows results of this exercise for states comprising the former CSA and for the rest of the U.S.[13] The movements in the two indexes are similar, but hardly identical. Both indexes depreciated during the 1970s, appreciated during the early to mid-1980s, and have depreciated since then. The visual picture of movements of the Southern index and the other states index is illustrative of the general movements, but a closer analysis indicates they are not quite as similar as they appear at first glance.

Summary statistics for the two indexes are given in Table 1. The "Southern" dollar has both a mean and median value higher than the index comprising the other states. Its maximum value has been lower and its minimum value higher than the index comprising the other states. The standard deviation of the two indexes is similar. In addition, the correlation between the two exchange rate indexes is approximately 0.88.

Plots and descriptive statistics indicate there are nontrivial differences between the two exchange rate indexes. To be more confident about these potential differences, formal statistical tests are employed. Each of the exchange rate indexes were tested for nonstationarity using the Augmented Dickey-Fuller (ADF) test.[14] The test for a unit root in each exchange rate index contained a constant term and five lagged difference terms. The test for a unit root in the case of first-differences contained the five lagged difference terms. Results are provided in Table 2. In both cases, the exchange rates are not stationary in level form, although each of the exchange rates is stationary in first-differences.

Figure 1
Exchange Rates for CSA and the Rest of the U.S.

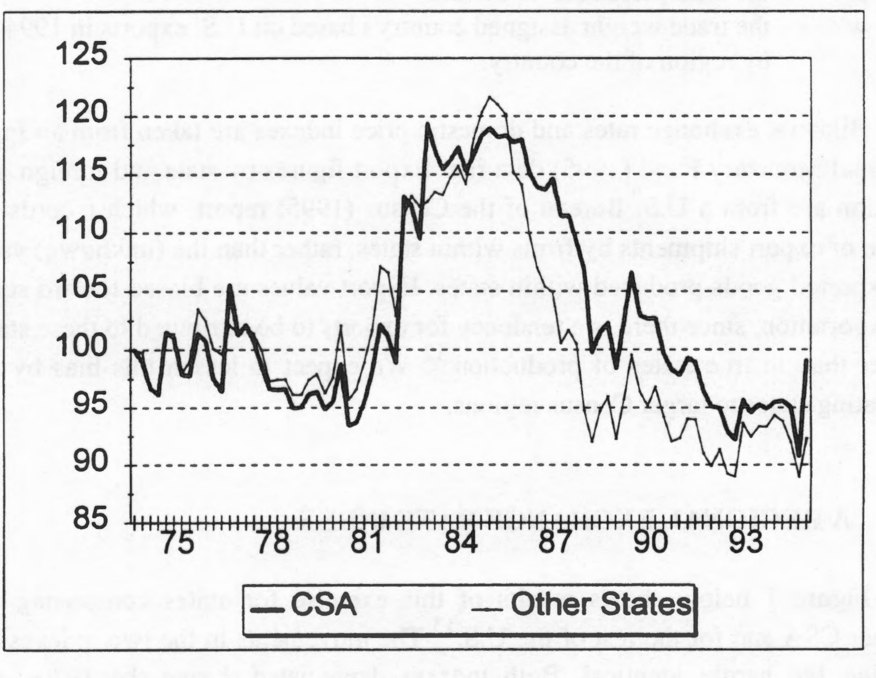

TABLE 1
Descriptive Statistics

	CSA	OTHER STATES
Mean	102.77	100.87
Median	99.68	98.95
Maximum	119.38	121.66
Minimum	90.74	88.94
Std. Dev.	8.28	8.42
Correlation (CSA & OTHER STATES)		0.88

Given the above, differences between the CSA exchange rate index and the other-states index can be compared using cointegration analysis. Intuitively, if two variables are cointegrated, they are following a common time trend, and a linear combination of them is stationary. The typical interpretation of the cointegrating equation is as a long-run equilibrium relationship between the two variables. Thus, if two indexes are following a common time trend, one could infer that factors influencing the two are not only the same, but are affecting them in a similar time frame. According to Stock and Watson (1988), cointegration analysis can be used not only to check the reliability of time series regressions, but also to test for expected economic relationships. If the two indexes are *not* cointegrated, this would be evidence that they are, at least to some degree, independent of one another, and any estimated relationship between the two indexes would have to be conducted after first-differencing.

We employ the Johansen test for cointegration based on the eigenvalues and likelihood ratios.[15] For our test of cointegration the estimated VAR contained a constant term and five lagged terms. Results of this exercise, also shown in Table 2, indicate that at the .05 level of significance the two exchange rate indexes are not cointegrated. While these results are not definitive, they provide evidence that regional exchange rate indexes are, in an important way, different from one another.

A final test of the relationship between the two indexes involves determining whether one exchange rate can be shown to be causing changes in the other exchange rate. In this case we have employed the standard Granger-Causality test with five lagged terms. Results, also presented in Table 2, indicate the index comprising the rest of the U.S. does not, in the sense of the test, appear to be causing changes in the Southern index.

TABLE 2
Unit Root, Cointegration and Granger-Causality Tests

Unit Root Test Exchange Rate	Levels	First-Differences
CSA	-1.7126	-2.9733 **
OTHER STATES	-1.6188	-2.6520 **
5 percent Critical Value	-2.8976	-1.9443
1 percent Critical Value	-3.5132	-2.5922
Cointegration Test Series	Eigenvalue	Likelihood Ratio
CSA & OTHER STATES	0.065693	7.135994
The 5 percent (1 percent) Critical Value for the likelihood ratio test is 15.41 (20.04)		
Granger-Causality Test	F-Statistic	Probability
TOTAL Granger causes CSA	1.9902	0.09071
CSA Granger causes TOTAL	0.7092	0.61850

**Significant at the .01 level.

IV. SUMMARY AND CONCLUSIONS

The purpose of this paper was to present estimates of a regional exchange rate index for the Southern states and compare this with a similar measure comprising the rest of the United States. Results indicate there are nontrivial differences between them. While there is some commonality between movements in the two real exchange rate indexes, the absolute magnitude of the peaks and troughs, as well as the timing of changes in the indexes, are different. The two indexes are not cointegrated and the index comprising the rest of the U.S. does not appear to be causing movements in the Southern regional exchange rate index.

Results indicate that a regional exchange rate can differ from the national exchange rate. There are some tentative conclusions to be drawn. First, the results above constitute one more piece of evidence on the utility of regional science. A large region like the South has a different pattern of trade both with respect to commodities and foreign trading partners than does the United States. In an international trade sense, the South is still distinctive. Second, the study of relationships between the international trade of a region and regional economic development is still quite new. Research concerning how changes in the exchange rate affect regional exports should consider the appropriateness of using a national exchange rate index to make inferences concerning regional trade.

ENDNOTES

1. Hayward (1995) provides an excellent survey of this emerging research. Cox and Hill (1988) examine effects of exchange rate changes on states.

2. See Krugman (1991) or Coughlin and Cartwright (1988).

3. See Erickson and Hayward (1991).

4. A related issue is whether to use bilateral weights or multilateral weights. The usual choice in the literature is the former. For details on this issue, see Kercheval (1987).

5. Import data are not collected by state of ultimate destination, but by port of entry, which is not useful for our purposes.

6. For a more detailed treatment of this issue, see Deyak, Sawyer and Sprinkle (1989).

7. Advantages inherent in using the geometric mean to calculate the average value of the dollar are discussed in Coughlin and Pollard (1996) and in Rosensweig (1987).

8. Countries included in the exchange rate indexes are as follows: Algeria, Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Finland, France, Germany, Greece, Guatemala, Honduras, Hong Kong, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Korea, Kuwait, Malaysia, Mexico, Netherlands, New Zealand, Norway, Panama, Peru, Philippines, Portugal, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, and Venezuela.

9. See Cox (1986) for a discussion of these tradeoffs.

10. Calculations of the two nominal exchange rate indexes look considerably more dramatic than the real indexes reported below. Plots of nominal exchange rate changes are available upon request.

11. The Producer Price Index is the preferred measure of inflation, as most Consumer Price indexes contain a substantial number of nontradeable goods, such as services. In cases where no producer price index was available, the country's Consumer Price Index was used. The Consumer Price Index was used for the following countries: Algeria, Dominican Republic, France, Guatemala, Honduras, Jamaica, Kuwait, Malaysia, Peru, Portugal, Saudi Arabia, Singapore, and Turkey.

12. See Coughlin and Mandelbaum (1991) for a discussion of biases inherent in this data series.

13. The states included in the former CSA are as follows: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia. The index for the rest of the U.S. comprises the other 39 states.

14. For details on the ADF test, see Fuller (1976) or MacKinnon (1991).
15. For additional details concerning this test, see Johansen (1991).

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