CAN FOREIGN TRADE HELP TO STABILIZE A METRO ECONOMY?

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ABSTRACT

Is it possible for a metro economy to reduce its instability through time by changing its international trading partners? The concept is a simple one: if the metro area's firms expand their trade with countries that have counter-cyclical patterns compared to the MSA's own economy, the metro area will tend to be more stable. When the MSA's domestic customers are slowing down, its international customers will be experiencing an expansion, and vice versa. The key question is whether there are countries that have counter-cyclical patterns with the MSA in question. If all countries of the world tend to experience expansions and contractions together, this policy cannot work.

This paper examines that issue for one metro economy: Erie Pennsylvania. Using data from 1950 to 1992, it examines 147 countries for pro- and counter-cyclical relationships. It then examines the results for patterns based on region and income level of potential trading partners. The analysis identifies several potential counter-cyclical trading partners for Erie. The technique used here could easily be applied to other metro areas.

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I. INTRODUCTION

Is it possible for a metro area economy to reduce its instability through time by actively selecting its international trading partners? The concept is a simple one: if the metro area's firms expand their trade with countries that have counter-cyclical patterns compared to the metro area's own economy, the metro area will tend to be more stable. If the metro area trades with counter-cyclical foreign customers, when the metro area's domestic customers are slowing down, its international customers will be experiencing an expansion, and vice versa.

The key question is whether there are countries that have counter-cyclical patterns with the metro area in question. If all countries of the world tend to experience expansions and contractions together, this policy cannot work.

This question is especially relevant currently, when many observers seem to think the U.S. economy is in a recession, officially recognized or not. Economies around the world appear to be in similar circumstances, some moreso, some less. A key issue is whether the international economies are synchronized with regard to their business cycles. Chyi (1998) found that patterns of the G7 nations tend to be positively correlated, and that patterns among seven developing nations were also correlated, but that the G7 nations were not correlated with the developing nations. Work done at the Economic Cycle Research Institute for 18 nations over the period from 1948-1998 found that cycles are not always synchronous, and that some countries may experience cycles that others do not (Economic Cycle Research Institute, and Banerji and Hiris, n.d., p. 29). The resulting implication is that the approach suggested in this paper may be feasible, at least for some areas.

Taking this issue to the sub-national level, Carlino and DeFina (1999) found differential cyclical responses of American states to monetary policy. And Coughlin and Pollard (2000) note that Thailand's troubles during the Asian crisis affected some states' economies. The implication is that trade with one country can have a significant impact on a state economy, and that the effect can vary across (sub-national) regions. More broadly, Kurre, Vidovic and Weller (1997) examined the cyclical patterns of U.S. states relative to foreign economies, and found that some states have economies that are substantially out of sync with others. They succeeded in identifying international trading partners that could help stabilize some state economies. But states are political rather than economic constructs. A better approach would be to examine this issue for a metropolitan economy, formally a Metropolitan Statistical Area (MSA.)

Indeed, MSAs vary dramatically in terms of their industrial structure, output, and exports. This makes it reasonable to expect differing metro responses to business cycles, even within a single state. For example, over the period from 1969-1999, Pennsylvania's economy was highly correlated with movements in the national economy. The correlation between PA's real earnings by place of work and

[2] Special thanks to Dr. Kenneth Louie of Penn State Erie for help on some of the international aspects of this research.

those of the U.S., after first differencing to remove trends, was .948 over that 31 year stretch. However, the fourteen MSAs within the state were less highly correlated with US patterns, with correlation coefficients ranging from .924 (Philadelphia) to .559 (Johnstown.) And while all the correlations among the 14 Pennsylvania MSAs were positive, in first difference form for the 1969-99 period, some ranged as low as .405 (between Philadelphia and Johnstown.) One conclusion to be drawn is that metro areas will tend to experience similar--but not identical—cyclical patterns; Philadelphia and Johnstown are not necessarily turning up or down at the same time. If that is the case, it is reasonable to expect that one of them may be counter-cyclical with other economies, somewhere in the world.

And the differences among domestic, regional economies become more pronounced when we consider foreign trade. Wall (2000) points out that states have experienced wide differences in their rates of growth of international trade volume between 1993 and 1998. Real export growth averaged 4.4% during this period, but ranged from –3.1% in Alaska to 41.5% in New Mexico. Wall concludes that "the spatial dimension of globalization bears further attention." All of this implies that it would be useful to examine the timing relationships of a metro economy with various countries of the world.

This issue is of special interest to metro areas that have pronounced cyclical fluctuations. The Erie Pennsylvania area, which has an industrial structure heavily biased toward manufacturing--especially durables manufacturing--certainly falls into this category.

II. DATA

The goal of this study is to examine correlations between the Erie economy and other foreign economies. This should be done using an overall measure of output for the economies, such as real Gross Domestic Product.

A. International Data

The data for GDP of countries came from the Penn World Tables (PWT), Mark 5.6, (Heston and Summers, 1991). The PWT include data for 152 countries, and cover the period from 1950 through 1992, although data are not available for all years for all countries. (Appendix A of this paper presents a list of the data that are available by country.) Unfortunately, data more recent than 1992 are not available. The PWT data are annual data, and in a study of cyclical timing, data with a greater frequency would be preferable to allow more precise identification of turning points. Unfortunately only annual data are available.

The Penn World Tables present data for population and GDP per capita, calculated using a chain price index and 1985 international prices, so it is possible to calculate total real GDP for each country, the variable needed for this study. Since our study covers more than 40 years, the chain price index is used for adjusting the nominal GDP data to avoid the fixed-base problem of the Laspeyres index. In our correlation analysis, the data were first-differenced to remove trend.

B. Metro Area Data

The ideal metro data to use for this study would be an output measure, such as Gross Metropolitan Product (GMP), the analogue to Gross Domestic Product.[3] Unfortunately there is no official government source for U.S. GMP data currently. DRI-WEFA (2001) has estimated GMP for American metro areas annually for 1997-2000 for the U.S. Conference of Mayors, but the relatively short time period for which these data are available is not sufficient for a study like that proposed here.

[3] In their factor analysis of a large number of American time series, Stock and Watson (1998) found production/output measures to be crucial for the first factor, followed by earnings, money and prices, and then by employment variables.

Other possible metro data series include earnings by place of work (EPW), personal income (PI), and employment. Of these three, we focus on the first. Earnings by place of work includes wages, salaries, other labor income, and proprietors' income, and excludes unearned income such as dividends, interest payments, rents and transfer payments. The BEA says that EPW "can be used in the analyses of regional economies as a proxy for the income that is generated from participation in current production." (BEA 2001, documentation file) A proxy for production is just what is required for the current analysis. Unfortunately, metro area EPW data only go back to 1969. We would also like to use data that are at a higher frequency than annual, to give a clearer picture of turning points and cyclical behavior. While the BEA's REIS-CD provides quarterly data on earnings by place of work back to 1969, these data are only for states, and not metro areas. The metro data are annual.

Another alternative would be personal income (PI). While PI is a more comprehensive measure of income, it is a less desirable alternative for our purposes since it includes transfer payments along with production income. Our goal is to look at fluctuations in production/output caused by market forces, before being offset by such transfers. PI also includes unearned income, which again is not our focus. Metro PI data also go back to 1969.

Finally, employment data is another possible choice for this type of analysis. The typical employment series that are used for regional analysis are the establishment data series, either from the BLS790 or ES202 series. Each is a count of jobs in a local area. Employment data have the benefit of being available on a monthly basis, as far back as 1950 for the Erie area. But the employment series are not as useful for our purposes since they do not distinguish between full- and part-time jobs. In these data series, when a person is laid off from a high-paying full-time job and settles for two part-time jobs, total employment rises. However, this situation would probably result in much less use of his/her skills and thus a reduction in regional output. EPW captures this effect better than employment data. For these reasons, the EPW data are used in this study.

To determine the extent to which annual metro EPW data are a good proxy for gross metro product (for which data are not available), we examined the relationship between EPW and gross product for the U.S. and for the U.S. states (for which data *are* available.) Gross State Product (GSP) and EPW data came from the BEA's REIS CD-ROM. EPW data are currently available for the 31 year period 1969 to 1999, but the GSP data start in 1977 so the correlation analysis below covers the 23 years from 1977 to 1999. All nominal data were converted to real values using the CPI for all urban consumers (CPI-U), and were differenced to remove trend.[4]

Correlations between real EPW and real gross product are presented in Table 1. For the U.S., the correlation coefficient between EPW and gross product was .949. For the 50 states and the District of Columbia, the coefficients ranged from a low of .011 in Alaska to a high of .970 in Indiana, with a simple mean of .875 and a median of .923 Table 2 shows that two-thirds of the correlations were greater than .900, and 44 states had a correlation coefficient higher than .800. Figures 1-3 show these patterns for the U.S., Indiana (highest correlation) and Alaska (lowest correlation), to give the reader a sense of the closeness of the two series. Our conclusion is that EPW and gross product are closely related for the states, which makes us more confident in our use of EPW data as a proxy for gross metro product.

[4] Chain indexes, as used for the PWT data, may be more appropriate for comparisons over long spans of time than a Laspeyres index like the CPI. However, Aizcorbe and Jackman (1993) point out that the CPI can be considered a chain index when applied to long periods, since adjustments of the changing expenditure patterns of consumers are integrated into the CPI at regular intervals.

Table 2
Correlation of Gross Product and Earnings by Place of Work
for States and the U.S., 1977-1999*

Alphabetical		Sorted	
Area	Correlation Coefficient	Area	Correlation Coefficient
US	**0.949**	IN	0.970
AL	0.905	GA	0.967
AK	0.011	VA	0.965
AZ	0.961	MD	0.965
AR	0.943	MA	0.965
CA	0.946	NV	0.964
CO	0.957	OH	0.962
CT	0.956	AZ	0.961
DE	0.673	CO	0.957
DC	0.929	CT	0.956
FL	0.921	NY	0.956
GA	0.967	VT	0.952
HI	0.926	IL	0.951
ID	0.904	**US**	**0.949**
IL	0.951	CA	0.946
IN	0.970	AR	0.943
IA	0.933	WI	0.939
KS	0.879	NJ	0.936
KY	0.930	IA	0.933
LA	0.652	ME	0.931
ME	0.931	KY	0.930
MD	0.965	DC	0.929
MA	0.965	WA	0.927
MI	0.896	HI	0.926
MN	0.923	PA	0.925
MS	0.908	NC	0.924
MO	0.897	MN	0.923
MT	0.809	TN	0.922
NB	0.910	OR	0.922
NV	0.964	FL	0.921
NH	0.899	NB	0.910
NJ	0.936	SC	0.910
NM	0.368	MS	0.908
NY	0.956	AL	0.905
NC	0.924	ID	0.904
ND	0.787	NH	0.899
OH	0.962	MO	0.897
OK	0.809	MI	0.896
OR	0.922	SD	0.884
PA	0.925	UT	0.882
RI	0.877	KS	0.879
SC	0.910	WV	0.878
SD	0.884	RI	0.877
TN	0.922	MT	0.809
TX	0.779	OK	0.809
UT	0.882	ND	0.787
VT	0.952	TX	0.779
VA	0.965	WY	0.731
WA	0.927	DE	0.673
WV	0.878	LA	0.652
WI	0.939	NM	0.368
WY	0.731	AK	0.011
Mean	0.875		
Minimum	0.011		
Maximum	0.970		

*EPW and gross product series were deflated (CPI-U, 1982-84=100) and differenced.

Figure 1: Real U.S. Gross Product and EPW, First Differenced

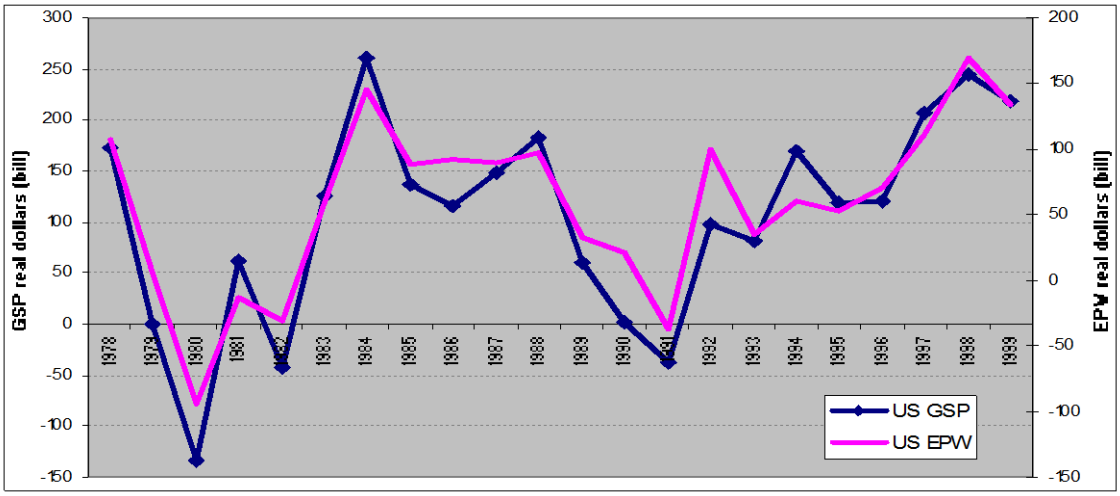


Figure 2: Real Indiana Gross Product and EPW, First Differenced

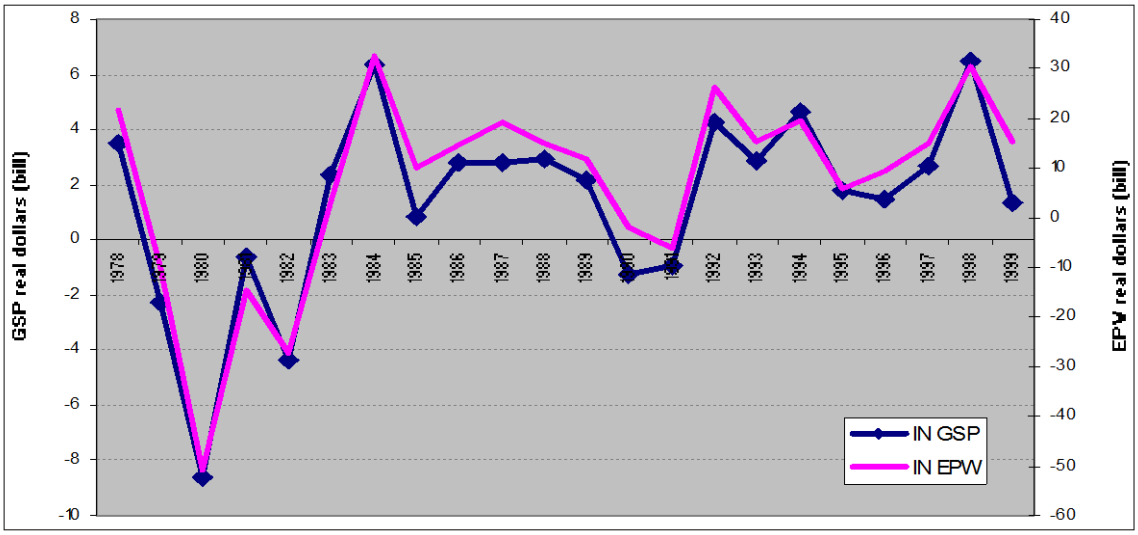


Figure 3: Real Alaska Gross Product and EPW, First Differenced

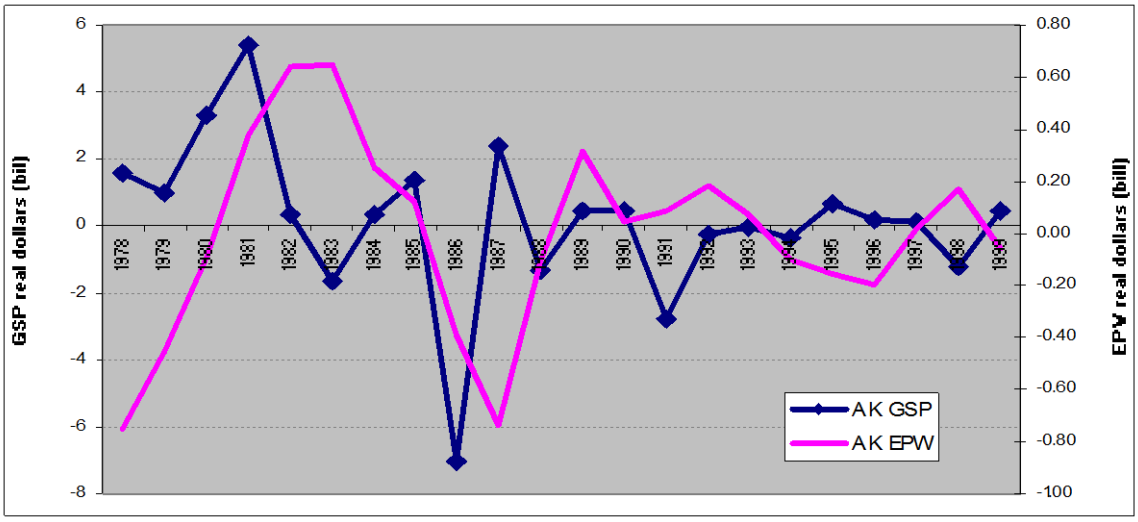


Table 2
Frequency Distribution of Correlation Coefficients of
Real State Earnings by Place of Work and Gross State Product, First Differenced

Correlation Coefficient	Number
0.0 to 0.2	1
0.2 to 0.4	1
0.4 to 0.6	0
0.6 to 0.8	5
0.8 to 0.9	10
0.9 to 1.0	34
Total	51

III. ANALYSIS

A. Earnings by Place of Work

Correlations were calculated for Erie and the 147 countries (including the U.S.) for which the Penn World Tables had at least 7 data points. (Five countries were eliminated as a result.) Table A-2 in the Appendix identifies the countries. While some countries had relatively little data available, 51 countries had real GDP data for all 43 years, and another 72 had at least 30 years of data.

Correlation coefficients were calculated using real, first-differenced data for GDP for the countries and EPW for Erie. Tables 3 and 4 present summary information for the results. The correlation coefficients ranged from -.532 to +.817, with a median of .132. Surprisingly, nearly a third of the countries exhibited negative correlations with Erie. The strongest negative correlation, -.532, occurred for Egypt, while the greatest positive correlation was .817 for Western Samoa. Only four negative correlations had an absolute value greater than 0.4, and another 14 were between –0.2 and –0.4.

Table 3
Summary Statistics for Erie EPW Correlations, 1969-1992

Number of countries	147
Average correlation	.145
Median correlation	.132
Minimum	-.532
Maximum	.817
# of negatives	46
# of positives	101
% negative	31%
% positive	69%

Table 4
Frequency Distribution of Erie EPW Correlation Coefficients

Correlation +Coefficient	Number
less than -0.6	0
-0.6 to -0.4	4
-0.4 to -0.2	14
-0.2 to 0.0	28
0.0 to 0.2	36
0.2 to 0.4	34
0.4 to 0.6	23
0.6 to 0.8	7
0.8 to 1.0	1
Total	147

To see patterns in these results, we will present them in a number of ways. Table 5 simply presents the correlation coefficients alphabetically, by country, and Table 6 ranks them from lowest correlation coefficient to highest. It will be noticed that those clustering near the top of Table 6, with negative correlation coefficients, tend to be African and Asian nations with lower income levels. Those near the bottom of the table tend to be western and more developed nations.

Table 5
Erie EPW Correlation Coefficients—Alphabetical, 1969-1992

Country	Region	Income Level	EPW Correlation
Algeria	Africa	2	-0.0716
Angola	Africa	1	0.3698
Argentina	South America	3	0.0187
Australia	Australia	4	0.3069
Austria	Europe	4	0.3867
Bahamas	Central America	4	0.3643
Bahrain	Asia	3	0.2643
Bangladesh	Asia	1	-0.1475
Barbados	Central America	3	0.3136
Belgium	Europe	4	0.4089
Belize	Central America	2	0.2661
Benin	Africa	1	0.1190
Bhutan	Asia	1	
Bolivia	South America	2	0.3972
Botswana	Africa	3	0.0294
Brazil	South America	3	0.1044
Bulgaria	Europe	2	-0.0112
Burkina Faso	Africa	1	-0.3699
Burundi	Africa	1	0.0877
Cameroon	Africa	1	-0.2904
Canada	North America	4	0.4318
Cape Verde	Africa	2	-0.3091
Central African Rep.	Africa	1	0.3682
Chad	Africa	1	0.4239
Chile	South America	3	0.3586
China	Asia	2	0.1111
Columbia	South America	2	0.4534
Comoros	Africa	1	0.1112
Congo	Africa	1	-0.4193
Costa Rica	Central America	2	0.6470
Cyprus	Europe	4	0.3284
Czechoslovakia	Europe	3	0.2330
Denmark	Europe	4	0.3617
Djibouti	Africa	2	0.1672
Dominica	Central America	3	
Dominican Rep.	Central America	2	0.0228
Ecuador	South America	2	0.0904
Egypt	Africa	2	-0.5317
El Salvador	Central America	2	0.7163
Ethiopia	Africa	1	-0.2654
Fiji	Australia	2	0.4129
Finland	Europe	4	0.0198
France	Europe	4	0.5468
Gabon	Africa	3	-0.0917
Gambia	Africa	1	0.4048
Germany, East	Europe		0.1503
Germany, West	Europe	4	0.4872
Ghana	Africa	1	0.4413
Greece	Europe	4	0.4397
Grenada	Central America	3	-0.0669
Guatemala	Central America	2	0.4491
Guinea	Africa	1	-0.2013
Guinea-Bissau	Africa	1	0.3048
Guyana	South America	2	-0.1411
Haiti	Central America	1	-0.0919
Honduras	Central America	2	0.4283
Hong Kong	Asia	4	0.0896
Hungary	Europe	3	0.0941
Iceland	Europe	4	-0.0334
India	Asia	1	-0.0516
Indonesia	Asia	1	-0.2248
Iran	Asia	2	0.2348
Iraq	Asia	2	0.1649
Ireland	Europe	4	0.4483
Israel	Asia	4	-0.0122
Italy	Europe	4	0.2727
Ivory Coast	Africa	n/a	0.4071
Jamaica	Central America	2	0.2177
Japan	Asia	4	0.3074
Jordan	Asia	2	-0.2832
Kenya	Africa	1	0.2780
Korea	Asia	3	0.3136
Kuwait	Asia	4	0.3461
Laos	Asia	n/a	-0.0809
Lesotho	Africa	1	0.1775
Liberia	Africa	1	0.3430

Table 5, continued
Erie EPW Correlation Coefficients—Alphabetical, 1969-1992

Country	Region	Income Level	EPW Correlation
Luxembourg	Europe	4	0.5817
Madagascar	Africa	1	-0.0135
Malawi	Africa	1	0.0588
Malaysia	Asia	3	0.0129
Mali	Africa	1	0.0542
Malta	Europe	3	-0.0488
Mauritania	Africa	1	-0.0990
Mauritius	Africa	3	0.2471
Mexico	North America	3	0.0706
Mongolia	Asia	1	0.1844
Morocco	Africa	2	-0.1589
Mozambique	Africa	1	0.5301
Myanmar	Asia	1	-0.1139
Namibia	Africa	2	0.5556
Nepal	Asia	1	0.3686
Netherlands	Europe	4	0.6113
New Zealand	Australia	4	0.2084
Nicaragua	Central America	1	-0.0601
Niger	Africa	1	-0.2546
Nigeria	Africa	1	0.0360
Norway	Europe	4	0.0767
Oman	Asia	3	-0.3447
Pakistan	Asia	1	-0.0680
Panama	Central America	3	-0.2402
Papua New Guinea	Asia	2	0.2112
Paraguay	South America	2	-0.1301
Peru	South America	2	-0.1405
Philippines	Asia	2	-0.0824
Poland	Europe	3	0.4628
Portugal	Europe	4	0.3123
Puerto Rico	Central America	3	0.5650
Qatar	Asia	4	0.6161
Reunion	Africa	n/a	-0.0508
Romania	Europe	2	0.1785
Rwanda	Africa	1	-0.4430
Saudi Arabia	Asia	3	0.1321
Senegal	Africa	1	-0.4070
Seychelles	Africa	3	0.0244
Sierra Leone	Africa	1	-0.1397
Singapore	Asia	4	0.0753
Solomon Island	Asia	1	0.5650
Somalia	Africa	1	0.0762
South Africa	Africa	3	-0.0391
Spain	Europe	4	0.4887
Sri Lanka	Asia	2	-0.3451
St. Kitts and Nevis	Central America	3	0.1297
St. Lucia	Central America	3	
St. Vincent & Gre	Central America	2	
Sudan	Africa	1	-0.2737
Suriname	South America	2	0.0485
Swaziland	Africa	2	0.2215
Sweden	Europe	4	0.0468
Switzerland	Europe	4	0.3043
Syria	Asia	2	-0.1890
Taiwan	Asia	2	0.2904
Tanzania	Africa	1	0.4733
Thailand	Asia	2	0.2302
Togo	Africa	1	0.0807
Tonga	Australia	2	
Trinidad and Tobago	Central America	3	-0.1341
Tunisia	Africa	2	-0.0967
Turkey	Europe	2	0.1821
U.K.	Europe	4	0.5188
U.S.A.	North America	4	0.6802
U.S.S.R.	Europe	n/a	0.2473
Uganda	Africa	1	-0.3419
United Arab E.	Asia	4	0.6111
Uruguay	South America	3	0.0575
Vanuatu	Australia	2	0.6204
Venezuela	South America	3	0.3064
Western Samoa	Australia	n/a	0.8169
Yemen	Asia	1	0.0361
Yugoslavia	Europe	2	0.1512
Zaire	Africa	n/a	0.2116
Zambia	Africa	1	-0.0302
Zimbabwe	Africa	1	-0.3008

Table 6
Erie EPW Correlation Coefficients—Sorted, 1969-1992

Country	Region	Income Level	EPW Correlation
Egypt	Africa	2	-0.5317
Rwanda	Africa	1	-0.4430
Congo	Africa	1	-0.4193
Senegal	Africa	1	-0.4070
Burkina Faso	Africa	1	-0.3699
Sri Lanka	Asia	2	-0.3451
Oman	Asia	3	-0.3447
Uganda	Africa	1	-0.3419
Cape Verde	Africa	2	-0.3091
Zimbabwe	Africa	1	-0.3008
Cameroon	Africa	1	-0.2904
Jordan	Asia	2	-0.2832
Sudan	Africa	1	-0.2737
Ethiopia	Africa	1	-0.2654
Niger	Africa	1	-0.2546
Panama	Central America	3	-0.2402
Indonesia	Asia	1	-0.2248
Guinea	Africa	1	-0.2013
Syria	Asia	2	-0.1890
Morocco	Africa	2	-0.1589
Bangladesh	Asia	1	-0.1475
Guyana	South America	2	-0.1411
Peru	South America	2	-0.1405
Sierra Leone	Africa	1	-0.1397
Trinidad & Tobago	Central America	3	-0.1341
Paraguay	South America	2	-0.1301
Myanmar	Asia	1	-0.1139
Mauritania	Africa	1	-0.0990
Tunisia	Africa	2	-0.0967
Haiti	Central America	1	-0.0919
Gabon	Africa	3	-0.0917
Philippines	Asia	2	-0.0824
Laos	Asia	n/a	-0.0809
Algeria	Africa	2	-0.0716
Pakistan	Asia	1	-0.0680
Grenada	Central America	3	-0.0669
Nicaragua	Central America	1	-0.0601
India	Asia	1	-0.0516
Reunion	Africa	n/a	-0.0508
Malta	Europe	3	-0.0488
South Africa	Africa	3	-0.0391
Iceland	Europe	4	-0.0334
Zambia	Africa	1	-0.0302
Madagascar	Africa	1	-0.0135
Israel	Asia	4	-0.0122
Bulgaria	Europe	2	-0.0112
Malaysia	Asia	3	0.0129
Argentina	South America	3	0.0187
Finland	Europe	4	0.0198
Dominican Rep.	Central America	2	0.0228
Seychelles	Africa	3	0.0244
Botswana	Africa	3	0.0294
Nigeria	Africa	1	0.0360
Yemen	Asia	1	0.0361
Sweden	Europe	4	0.0468
Suriname	South America	2	0.0485
Mali	Africa	1	0.0542
Uruguay	South America	3	0.0575
Malawi	Africa	1	0.0588
Mexico	North America	3	0.0706
Singapore	Asia	4	0.0753
Somalia	Africa	1	0.0762
Norway	Europe	4	0.0767
Togo	Africa	1	0.0807
Burundi	Africa	1	0.0877
Hong Kong	Asia	4	0.0896
Ecuador	South America	2	0.0904
Hungary	Europe	3	0.0941
Brazil	South America	3	0.1044
China	Asia	2	0.1111
Comoros	Africa	1	0.1112
Benin	Africa	1	0.1190
St. Kitts and Nevis	Central America	3	0.1297
Saudi Arabia	Asia	3	0.1321
Germany, East	Europe		0.1503
Yugoslavia	Europe	2	0.1512

Table 6, continued
Erie EPW Correlation Coefficients—Sorted, 1969-1992

Country	Region	Income Level	EPW Correlation
Iraq	Asia	2	0.1649
Djibouti	Africa	2	0.1672
Lesotho	Africa	1	0.1775
Romania	Europe	2	0.1785
Turkey	Europe	2	0.1821
Mongolia	Asia	1	0.1844
New Zealand	Australia	4	0.2084
Papua New Guinea	Asia	2	0.2112
Zaire	Africa	n/a	0.2116
Jamaica	Central America	2	0.2177
Swaziland	Africa	2	0.2215
Thailand	Asia	2	0.2302
Czechoslovakia	Europe	3	0.2330
Iran	Asia	2	0.2348
Mauritius	Africa	3	0.2471
U.S.S.R.	Europe	n/a	0.2473
Bahrain	Asia	3	0.2643
Belize	Central America	2	0.2661
Italy	Europe	4	0.2727
Kenya	Africa	1	0.2780
Taiwan	Asia	2	0.2904
Switzerland	Europe	4	0.3043
Guinea-Bissau	Africa	1	0.3048
Venezuela	South America	3	0.3064
Australia	Australia	4	0.3069
Japan	Asia	4	0.3074
Portugal	Europe	4	0.3123
Barbados	Central America	3	0.3136
Korea	Asia	3	0.3136
Cyprus	Europe	4	0.3284
Liberia	Africa	1	0.3430
Kuwait	Asia	4	0.3461
Chile	South America	3	0.3586
Denmark	Europe	4	0.3617
Bahamas	Central America	4	0.3643
Central African Rep.	Africa	1	0.3682
Nepal	Asia	1	0.3686
Angola	Africa	1	0.3698
Austria	Europe	4	0.3867
Bolivia	South America	2	0.3972
Gambia	Africa	1	0.4048
Ivory Coast	Africa	n/a	0.4071
Belgium	Europe	4	0.4089
Fiji	Australia	2	0.4129
Chad	Africa	1	0.4239
Honduras	Central America	2	0.4283
Canada	North America	4	0.4318
Greece	Europe	4	0.4397
Ghana	Africa	1	0.4413
Ireland	Europe	4	0.4483
Guatemala	Central America	2	0.4491
Columbia	South America	2	0.4534
Poland	Europe	3	0.4628
Tanzania	Africa	1	0.4733
Germany, West	Europe	4	0.4872
Spain	Europe	4	0.4887
U.K.	Europe	4	0.5188
Mozambique	Africa	1	0.5301
France	Europe	4	0.5468
Namibia	Africa	2	0.5556
Puerto Rico	Central America	3	0.5650
Solomon Island	Asia	1	0.5650
Luxembourg	Europe	4	0.5817
United Arab E.	Asia	4	0.6111
Netherlands	Europe	4	0.6113
Qatar	Asia	4	0.6161
Vanuatu	Australia	2	0.6204
Costa Rica	Central America	2	0.6470
U.S.A.	North America	4	0.6802
El Salvador	Central America	2	0.7163
Western Samoa	Australia	n/a	0.8169

Figure 4
Erie EPW and Egypt GDP, Real, First Differenced

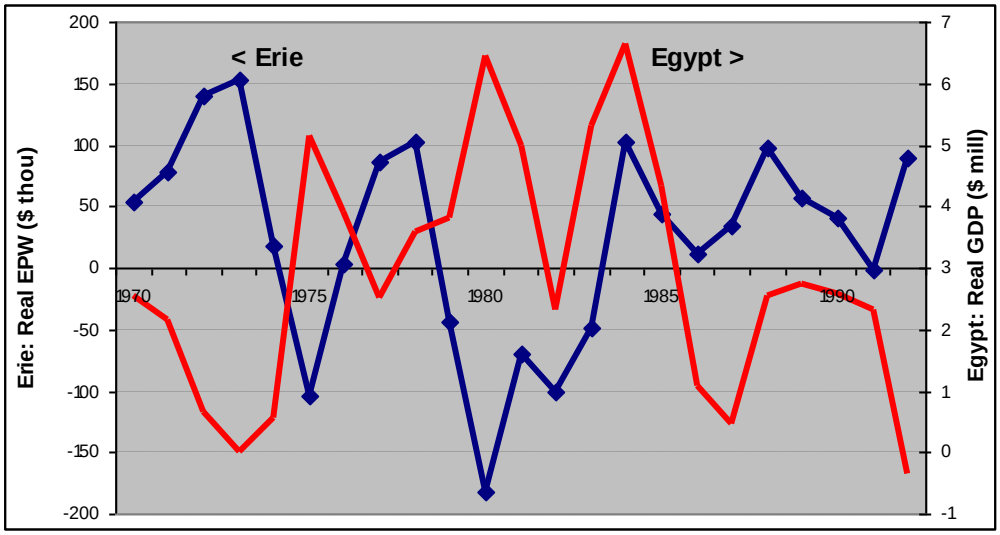
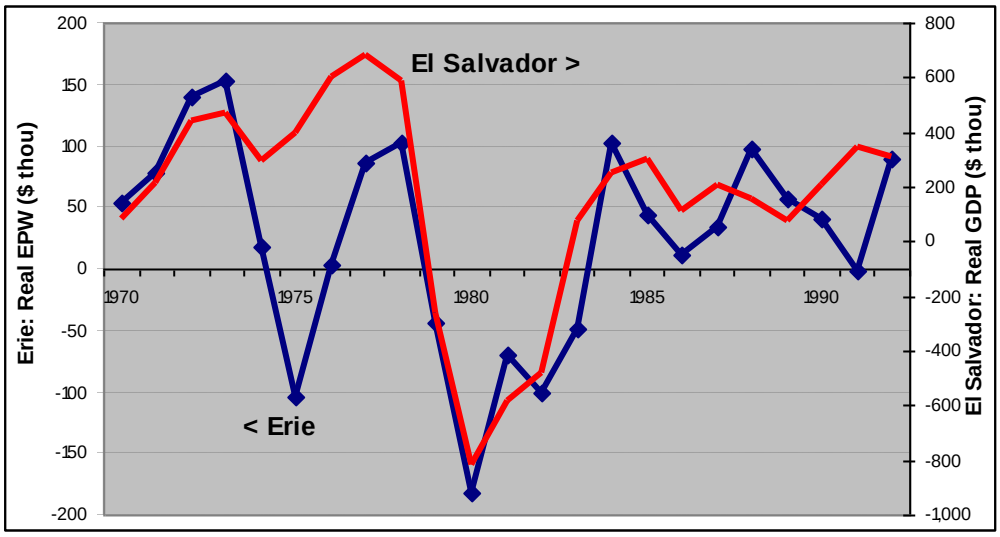


Figure 4 shows the negative correlation between Erie and Egypt, the country with the most counter-cyclical pattern compared to Erie's. Throughout Erie's cycles of the early 1970's, Egypt's economy was consistently moving in the opposite direction from Erie's. In the especially difficult recession that started in 1979 in Erie and continued until 1983, Egypt's economy was still expanding through 1981. If Erie firms had been selling a significant amount of their product in Egypt during this period, it might have helped soften this contraction for Erie. It should be noted that the relationship was less close in later years, however, prompting the question about whether the world's economies have become more integrated recently, removing this opportunity for counter-cyclical trade.

Contrast this with Figure 5, which shows the patterns for El Salvador, a country which exhibited a correlation coefficient of 0.716 with Erie.[5] Clearly, trade with El Salvador would have done little to help stabilize Erie's cycles over this period.

[5] El Salvador is used here since it had complete data for the 1969-99 period, whereas Western Samoa, which had a higher positive correlation coefficient, only had data for 1979-90.

Figure 5
Erie EPW and El Salvador GDP, Real, First Differenced



A clearer picture of the relationships between Erie and foreign nations develops if we consider the results based on two characteristics of the countries involved. First, we'll examine the relationships by region, and second, by income level. Table 7 presents a summary of the results by region. The Erie economy is most closely correlated with nations in the Australian region, followed by North America and Europe. While Erie was positively related to all regions of the world, on average, five of the seven regions had several countries with which Erie was negatively correlated. The greatest negative correlations occurred with African, Asian and Central American nations on average. This suggests that the search for trading partners that will help stabilize Erie's cycle should focus on the latter regions.

Table 7
Erie EPW Correlations by Region, 1969-1992

Region	# Countries	Mean Correlation	# negatives	# positives	% negative	% positive	High	Low
Africa	50	0.028	23	27	46	54	0.556	-0.532
Asia	32	0.101	12	20	38	63	0.616	-0.345
Australia	5	0.473	0	5	0	100	0.817	0.208
Central America	16	0.220	5	11	31	69	0.716	-0.240
Europe	29	0.284	3	26	10	90	0.611	-0.049
North America	3	0.394	0	3	0	100	0.680	0.071
South America	12	0.119	3	9	25	75	0.453	-0.141
All	147	0.306	46	101	31	69	0.817	-0.532

Table 8 shows the correlations by income level, using categories assigned by the World Bank.[6] The World Bank uses Gross National Income per capita as the key criterion, which they consider to be the single best indicator of economic capacity and progress. The Bank assigns each country to one of four categories based on 2000 GNI per capita:

[6] See the World Bank's "Classification of Economies" at http://www.worldbank.org/data/databytopic/class.htm. Income level indicators were missing for seven of our 147 nations.

1) Low income: $755 or less
2) Lower middle income: $756 - $2,995
3) Upper middle income: $2,996 - $9,265
4) High income: $9,266 or more

This table shows that Erie was more highly correlated with higher income countries, and that negative correlations tended to show up in the less developed countries. Specifically, the percentage of countries with negative correlations decreases as we move down this table, to higher income levels. This suggests that Erie's business cycles may be more closely correlated with those of countries with higher income per capita, and that the targeted economies with counter-cyclical patterns will tend to be those with lower income levels.

To test this idea, we correlated each country's GDP per capita with its Erie correlation coefficient as reported in Table 5 above.[7] The results show a .368 correlation between a country's GDP per capita and its synchronization with Erie's business cycles over the study period. In other words, there is a weak positive relationship between the synchronization of Erie's business cycle with that of another country, and the income level of that country. Again, this suggests that Erie's potential counter-cyclical partners will be found among the ranks of the lower- rather than the higher-income countries.

Table 8
Erie Correlations by Income Level, 1969-1992

Income Level	# Countries	Mean Correlation	# negatives	# positives	% negative	% positive	High	Low
1-Low Income	45	0.029	22	23	49	51	0.565	-0.443
2-Lower Middle	38	0.131	13	25	34	66	0.716	-0.532
3-Upper Middle	26	0.107	7	19	27	73	0.565	-0.345
4-High Income	31	0.343	2	29	6	94	0.680	-0.033
Missing Category	7	0.243	2	5	29	71	0.817	-0.081
All	147	0.145	46	101	31	69	0.817	-0.532

B. Erie Employment Data

As mentioned above, EPW data go back to 1969. But it is possible to examine patterns in earlier periods by using employment data. Despite their drawbacks, explained earlier, the employment data have the key advantage of being available for a long span of time. Employment data for Erie go back to 1950, allowing an expansion of the analysis from the 24 years of the 1969-1992 period to the 43 years of the 1950-1992 period for many countries. They also have the added advantage of being available monthly, which can be useful if monthly or quarterly data are found for the international economies. For the current study, annual employment averages were used for this part of the analysis, since only annual GDP data are available.

As a check on the robustness of the EPW results above, we ran correlations of the Erie employment series with the international GDP data. The same technique was used as with the EPW data, using first differences of all series, and real GDP data for the international economies. A key difference is that the series could extend back to 1950 in many cases, including more business cycles than the EPW data which only reach back to 1969.

Results were very similar, despite the longer period of the data and the different measure of the Erie economy. Table 9 presents summary statistics, and table 10 shows the frequency distribution of the

[7] Real GDP per capita for 1986 was used since that is the most recent year that allows inclusion of all 147 countries. The data came from the Penn World Tables; the specific series is "real GDP per capita in constant dollars using chain index (1985 international prices in PWT5)."

results. The simple correlation of the EPW results with the employment results was .882. Appendix B presents the actual correlation coefficients from both variables, side by side.

Table 9
Summary Statistics for Erie Employment and EPW Correlations

	Employment 1950-92	EPW 1969-92
Number of countries	147	147
Average correlation	.153	.145
Median correlation	.168	.132
Minimum	-.478	-.532
Maximum	.719	.817
# of negatives	37	46
# of positives	110	101
% negative	25.2	31%
% positive	74.8	69%

Table 10
Frequency Distribution of Erie Employment and EPW Correlation Coefficients

Correlation Coefficient	Employment 1950-92	EPW 1969-92
less than -0.6	0	0
-0.6 to -0.4	1	4
-0.4 to -0.2	9	14
-0.2 to 0.0	27	28
0.0 to 0.2	46	36
0.2 to 0.4	47	34
0.4 to 0.6	13	23
0.6 to 0.8	4	7
0.8 to 1.0	0	1
Total	147	147

Figures 6 and 7 show the Erie employment series (first differenced) with India, which had a correlation of -.154 and the Netherlands, which had a correlation of .540. While there were countries with more extreme correlations, these two had complete data for the period. Even though they are not extreme cases, it is apparent that Erie's cyclical patterns are much more closely related with those of the Netherlands than with those of India.

Figure 6
Erie Employment and India Real GDP, First Differenced

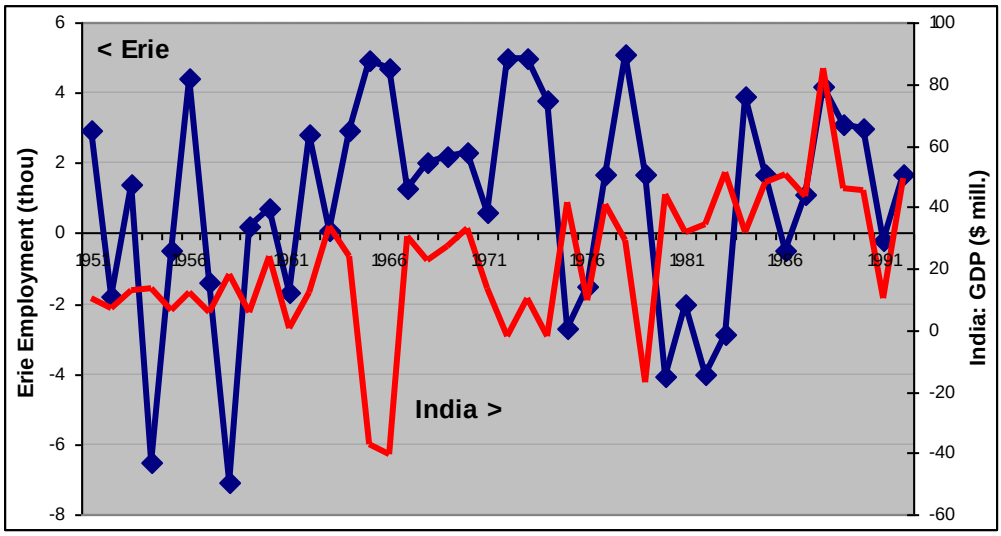
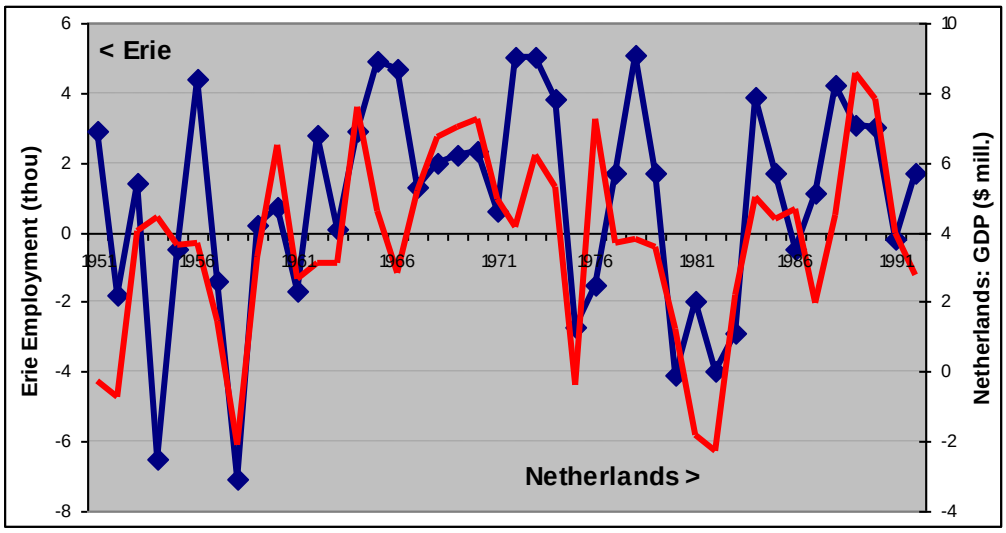


Figure 7
Erie Employment and Netherlands Real GDP, First Differenced

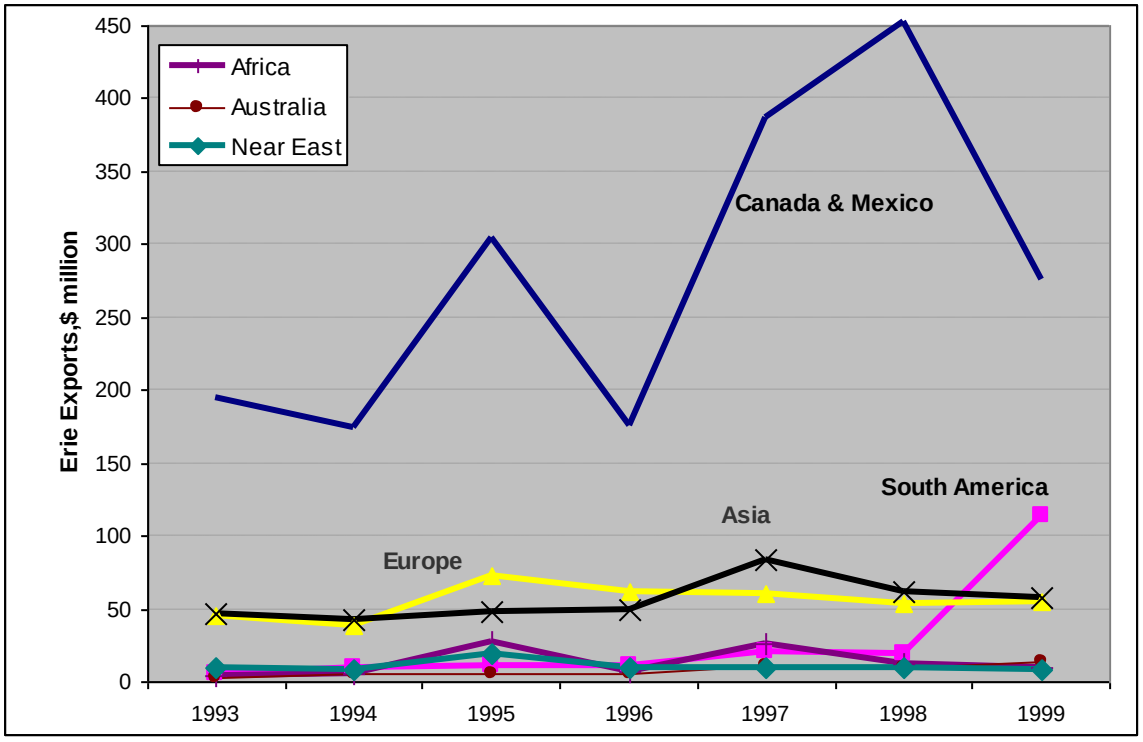


C. Erie Exports

But with which countries is Erie actually trading? Table 11 gives data for Erie's exports over the 1993-99 period and the correlation coefficients calculated above.[8] Data are not available for all countries, but the table shows exports to Erie's most important customer countries. It is clear from this table that most of Erie's major trading partners are countries with similar cyclical timing patterns. In 1999 over six of every ten dollars of Erie exports went to NAFTA and European countries, which tend to have cyclical timing patterns similar to those of Erie.

But Erie's trading patterns have been changing over this period, as can be seen in Figure 8. Are these changes likely to help stabilize the local business cycle or exacerbate it? Examination of the data with a focus on the countries whose Erie exports are the fastest growing provides some good news on the "cyclical stability" front. Trade with South American nations generally and Brazil in particular, Indonesia, and the African nations increased by much greater than average rates over the period. These countries accounted for more than 24% of all of Erie's exports in 1999, up from about 3% in 1993. These countries tend to have low or negative correlations with the Erie economy, and thus will help to stabilize Erie's cycles. Trade with our NAFTA partners has grown, also, but not as fast as the average, resulting in trade with NAFTA nations falling from 77% to 62% of total Erie exports between 1993 and 1999. And even within the NAFTA category, trade with Mexico grew at a much faster rate than with Canada; Mexico has a cyclical pattern that is much less closely aligned with Erie's. From these data we can infer that changes in Erie's export patterns over the last six years have tended to help stabilize the local business cycle.

Figure 8
Erie Exports, 1993-1999



[8] The data are for exports to selected countries, in thousands of dollars. 1999 is the year for which the most recent data are available. Source: the International Trade Administration of the U.S. Department of Commerce, online at: http://www.ita.doc.gov/td/industry/otea/metro/destinations/EriePA.txt. Note that export data are for international exports only, and do not include exports from Erie to the rest of the United States. The correlation coefficient in this table for NAFTA countries is for all North American countries, however, including the U.S..

Table 11
Erie Export Patterns, 1993-1999

Market	Erie Exports ($ thousands) 1993	1999	% of 1993 exports	% of 1999 Exports	% change 1993-99	Corr Coeff
NAFTA Countries	**195,214**	**275,929**	**62.7**	**51.4**	**41.3**	**0.394**
Canada	182,067	203,803	58.4	38.0	11.9	0.432
Mexico	13,147	72,127	4.2	13.4	448.6	0.071
Caribbean & Cen. Am.	**3,394**	**1,807**	**1.1**	**0.3**	**-46.7**	**0.220**
South America	**5,482**	**114,485**	**1.8**	**21.3**	**1,988.3**	**0.119**
Argentina	604	1,270	0.2	0.2	110.2	0.019
Brazil	2,452	108,571	0.8	20.2	4,328.7	0.104
Other S. America	2,427	4,644	0.8	0.9	91.4	
Europe	**44,965**	**54,497**	**14.4**	**10.2**	**21.2**	**0.284**
Belgium	2,023	790	0.6	0.1	-60.9	0.409
France	3,389	5,380	1.1	1.0	58.7	0.547
Germany	11,826	13,621	3.8	2.5	15.2	0.108
Netherlands	1,753	3,446	0.6	0.6	96.6	0.611
United Kingdom	6,404	9,960	2.1	1.9	55.5	0.519
Turkey	729	942	0.2	0.2	29.3	0.182
Former Soviet Rep.	0	146	0.0	0.0	.	
Poland	32	792	0.0	0.1	2,391.6	0.463
Other E. Europe	354	130	0.1	0.0	-63.2	
Other Europe	18,457	19,290	5.9	3.6	4.5	
Asia	**46,757**	**58,131**	**15.0**	**10.8**	**24.3**	**0.101**
Japan	6,583	10,545	2.1	2.0	60.2	0.307
China	3,095	4,734	1.0	0.9	53.0	0.111
Hong Kong	2,165	6,329	0.7	1.2	192.4	0.090
Taiwan	12,315	8,819	4.0	1.6	-28.4	0.290
Singapore	2,086	4,981	0.7	0.9	138.8	0.075
S. Korea	12,109	6,273	3.9	1.2	-48.2	0.314
Indonesia	549	5,454	0.2	1.0	892.7	-0.225
India	3,972	1,647	1.3	0.3	-58.5	-0.052
Other Asia	3,883	9,349	1.2	1.7	140.8	
Africa	**3,714**	**9,760**	**1.2**	**1.8**	**162.8**	**0.028**
North Africa	302	4,003	0.1	0.7	1,227.2	
Rep. of S. Africa	3,021	3,009	1.0	0.6	-0.4	-0.039
Other Subsaharan Africa	391	2,748	0.1	0.5	603.5	
Near East	**9,381**	**8,457**	**3.0**	**1.6**	**-9.8**	
Australia	**2,672**	**13,258**	**0.9**	**2.5**	**396.2**	**0.473**
Rest of World	**5**	**0**	**0.0**	**0.0**	**-100.0**	
World	**311,584**	**536,325**	**100.0**	**100.0**	**72.1**	**0.306**

IV. CONCLUSIONS AND EXTENSIONS

A. Conclusions

This paper has asked whether there are countries in the world that exhibit counter-cyclical patterns with the Erie economy. The short answer is that there seems to be some.

The policy implication is that if Erie develops stronger trading relationships with these countries, it might help to stabilize the local economy. While foreign trade makes up only a small part of most local economies, there may be important multiplier effects that will yield a greater impact than might at first be expected.[9]

On the other hand, expanding foreign trade may also be adding another port of entry for an external shock. It may be argued that an economy that doesn't trade with Asia won't be affected by an Asian crisis. But this is why the proposed policy places so much importance on identifying counter-cyclical economies. Of course, to the extent that Erie's domestic customers trade with Asia, their economies will be affected by any future Asian crisis and we will feel the impact second hand, at least. And two centuries of comparative advantage lectures in Economics classes suggest that the benefits from trade may more than offset the downside risk.

B. Extensions

Extensions of this work can proceed in several directions.

First, do the correlation patterns of the past continue? If the nations of the world are becoming more integrated through ever-expanding trade and continually dropping barriers, might we expect to see cyclical patterns of different counties becoming more and more similar? Clearly, as the world economies become more intertwined, the old patterns may change. The good news is that this may help stabilize economies, since countries that trade more broadly might be expected to connect with at least some that are counter-cyclical. The bad news is that it may remove the opportunity for a local area to take advantage of the approach proposed here, if most countries develop similar cyclical patterns. Future work can examine the correlations among countries for different time periods, to see if they have been changing over time.

A key methodological extension of this work is to apply cross-correlation analysis to the data. While more complicated to implement, cross-correlation analysis will allow consideration of leads and lags in the relationships between Erie and other nations, rather than simply looking at contemporaneous correlation patterns as this paper has done.

Another extension would be to identify data series that are available on a more frequent basis than the annual data used in this paper. If quarterly or monthly series that proxy for aggregate output were available for both the local and international economies, it would be possible to examine timing relationships much more closely.

It would also be useful to disaggregate Erie's total output series into individual industries. If a specific Erie industry, say steel, were found to be counter-cyclical with selected countries, this would provide guidance as to what our trade representatives should be trying to sell to have the maximum stabilizing impact.

[9]Coughlin and Cartwright (1987) and Webster, Mathis and Zech (1990) estimate the effects of foreign exports on local demand, finding significant multipliers. For example, the latter authors found the foreign multiplier to be five times the domestic multiplier.

Of course, attendant on this is the whole issue of whether our targeted international partners want what we have to sell. For the stabilizing policy proposed here to be effective, it will be necessary to match up the products which our targeted customer countries would like to buy with things that we actually produce. Identifying Erie's comparative advantage vis-à-vis potential trading partners would need to be part of this policy.[10] This is yet another issue for future research.

And finally, the study needs to be replicated for a broad set of metro areas. Cross-sectional metro cyclical patterns might logically be expected to follow industrial breakdowns, so that MSAs with similar industrial compositions will exhibit similar cyclical patterns. If so, they would share similar international targets for trade.

[10] Noponen, Markusen and Driessen (1997) discuss the issue of the comparative advantage of American cities.

APPENDIX A
GDP Data Available from the Penn World Tables
Table A-1: Alphabetical List

# of years	Country
33	Algeria
30	Angola
41	Argentina
43	Australia
43	Austria
11	Bahamas
14	Bahrain
34	Bangladesh
30	Barbados
43	Belgium
13	Belize
33	Benin
1	Bhutan
43	Bolivia
30	Botswana
43	Brazil
33	Burundi
13	Bulgaria
34	Burkina Faso
33	Cameroon
43	Canada
33	Cape Verde
33	Central African Republic
33	Chad
43	Chile
33	China
43	Columbia
33	Comoros
33	Congo
43	Costa Rica
43	Cyprus
31	Czechoslovakia
43	Denmark
18	Djibouti
1	Dominica
43	Dominican Republic
43	Ecuador
43	Egypt
43	El Salvador
37	Ethiopia
31	Fiji
43	Finland
43	France
33	Gabon
31	Gambia
19	Germany, East
43	Germany, West
38	Ghana
42	Greece
7	Grenada
43	Guatemala
34	Guinea
33	Guinea-Bissau
41	Guyana
30	Haiti
43	Honduras
33	Hong Kong
23	Hungary
43	Iceland
43	India
33	Indonesia
38	Iran
35	Iraq
43	Ireland
40	Israel
43	Italy
33	Ivory Coast
39	Jamaica
43	Japan
37	Jordan
43	Kenya
39	Korea
10	Kuwait
8	Laos
33	Lesotho
27	Liberia
43	Luxembourg
33	Madagascar
39	Malawi
38	Malaysia
32	Mali
36	Malta
33	Mauritania
43	Mauritius
43	Mexico
7	Mongolia
43	Morocco
33	Mozambique
40	Myanmar
33	Namibia
27	Nepal
43	Netherlands
43	New Zealand
41	Nicaragua
30	Niger
43	Nigeria
43	Norway
23	Oman
43	Pakistan
43	Panama
33	Papua New Guinea
43	Paraguay
43	Peru
43	Philippines
23	Poland
41	Portugal
35	Puerto Rico
10	Qatar
30	Reunion
30	Romania
33	Rwanda
30	Saudi Arabia
32	Senegal
31	Seychelles
32	Sierra Leone
33	Singapore
9	Solomon Island
30	Somalia
43	South Africa
43	Spain
43	Sri Lanka
10	St. Kitts and Nevis
1	St. Lucia
1	St. Vincent and Grenada
22	Sudan
30	Suriname
30	Swaziland
43	Sweden
43	Switzerland
32	Syria
40	Taiwan
29	Tanzania
43	Thailand
33	Togo
1	Tonga
42	Trinidad and Tobago
33	Tunisia
43	Turkey
43	Uganda
10	United Arab E.
43	United Kingdom
43	Uruguay
43	USA
30	USSR
8	Vanuatu
43	Venezuela
12	Western Samoa
21	Yemen
31	Yugoslavia
40	Zaire
37	Zambia
39	Zimbabwe

Table A-2: Sorted by Number of Years Available

# of years	Country
43	Australia
43	Austria
43	Belgium
43	Bolivia
43	Brazil
43	Canada
43	Chile
43	Columbia
43	Costa Rica
43	Cyprus
43	Denmark
43	Dominican Republic
43	Ecuador
43	Egypt
43	El Salvador
43	Finland
43	France
43	Germany, West
43	Guatemala
43	Honduras
43	Iceland
43	India
43	Ireland
43	Italy
43	Japan
43	Kenya
43	Luxembourg
43	Mauritius
43	Mexico
43	Morocco
43	Netherlands
43	New Zealand
43	Nigeria
43	Norway
43	Pakistan
43	Panama
43	Paraguay
43	Peru
43	Philippines
43	South Africa
43	Spain
43	Sri Lanka
43	Sweden
43	Switzerland
43	Thailand
43	Turkey
43	Uganda
43	United Kingdom
43	Uruguay
43	USA
43	Venezuela
42	Greece
42	Trinidad and Tobago
41	Argentina
41	Guyana
41	Nicaragua
41	Portugal
40	Israel
40	Myanmar
40	Taiwan
40	Zaire
39	Jamaica
39	Korea
39	Malawi
39	Zimbabwe
38	Ghana
38	Iran
38	Malaysia
37	Ethiopia
37	Jordan
37	Zambia
36	Malta
35	Iraq
35	Puerto Rico
34	Bangladesh
34	Burkina Faso
34	Guinea
33	Algeria
33	Benin
33	Burundi
33	Cameroon
33	Cape Verde
33	Central African Republic
33	Chad
33	China
33	Comoros
33	Congo
33	Gabon
33	Guinea-Bissau
33	Hong Kong
33	Indonesia
33	Ivory Coast
33	Lesotho
33	Madagascar
33	Mauritania
33	Mozambique
33	Namibia
33	Papua New Guinea
33	Rwanda
33	Singapore
33	Togo
33	Tunisia
32	Mali
32	Senegal
32	Sierra Leone
32	Syria
31	Czechoslovakia
31	Fiji
31	Gambia
31	Seychelles
31	Yugoslavia
30	Angola
30	Barbados
30	Botswana
30	Haiti
30	Niger
30	Reunion
30	Romania
30	Saudi Arabia
30	Somalia
30	Suriname
30	Swaziland
30	USSR
29	Tanzania
27	Liberia
27	Nepal
23	Hungary
23	Oman
23	Poland
22	Sudan
21	Yemen
19	Germany, East
18	Djibouti
14	Bahrain
13	Belize
13	Bulgaria
12	Western Samoa
11	Bahamas
10	Kuwait
10	Qatar
10	St. Kitts and Nevis
10	United Arab E.
9	Solomon Island
8	Laos
8	Vanuatu
7	Grenada
7	Mongolia
1	Bhutan
1	Dominica
1	St. Lucia
1	St. Vincent and Grenada
1	Tonga

APPENDIX B
Employment and Earnings by Place of Work Correlations

	Employment 1950-1992	EPW 1969-1992
Algeria	-0.019	-0.072
Angola	0.312	0.370
Argentina	0.009	0.019
Australia	0.210	0.307
Austria	0.280	0.387
Bahamas	0.575	0.364
Bahrain	0.144	0.264
Bangladesh	0.037	-0.147
Barbados	0.328	0.314
Belgium	0.470	0.409
Belize	0.157	0.266
Benin	0.168	0.119
Bolivia	0.333	0.397
Botswana	0.022	0.029
Brazil	0.086	0.104
Bulgaria	-0.068	-0.011
Burkina Faso	-0.280	-0.370
Burundi	-0.202	0.088
Cameroon	-0.174	-0.290
Canada	0.494	0.432
Cape Verde	-0.225	-0.309
Central African Republic	0.301	0.368
Chad	0.282	0.424
Chile	0.315	0.359
China	0.159	0.111
Columbia	0.334	0.453
Comoros	0.251	0.111
Congo	-0.357	-0.419
Costa Rica	0.446	0.647
Cyprus	0.241	0.328
Czechoslovakia	0.286	0.233
Denmark	0.195	0.362
Djibouti	0.369	0.167
Dominican Republic	0.033	0.023
Ecuador	0.219	0.090
Egypt	-0.132	-0.532
El Salvador	0.490	0.716
Ethiopia	0.000	-0.265
Fiji	0.344	0.413
Finland	0.159	0.020
France	0.528	0.547
Gabon	-0.089	-0.092
Gambia	0.261	0.405
Germany, East	0.208	0.150
Germany, West	0.331	0.487
Ghana	0.381	0.441
Greece	0.322	0.440
Grenada	-0.227	-0.067
Guatemala	0.354	0.449
Guinea	-0.196	-0.201
Guinea-Bissau	0.204	0.305
Guyana	-0.051	-0.141
Haiti	0.025	-0.092
Honduras	0.369	0.428
Hong Kong	-0.065	0.090
Hungary	0.104	0.094
Iceland	0.041	-0.033
India	-0.154	-0.052
Indonesia	-0.172	-0.225
Iran	0.057	0.235
Iraq	0.152	0.165
Ireland	0.438	0.448
Israel	0.088	-0.012
Italy	0.357	0.273
Ivory Coast	0.257	0.407
Jamaica	0.192	0.218
Japan	0.350	0.307
Jordan	-0.197	-0.283
Kenya	0.270	0.278
Korea	0.239	0.314
Kuwait	0.187	0.346
Laos	0.100	-0.081
Lesotho	0.185	0.178
Liberia	0.215	0.343
Luxembourg	0.356	0.582
Madagascar	0.111	-0.013
Malawi	0.164	0.059
Malaysia	0.123	0.013
Mali	0.014	0.054
Malta	0.123	-0.049
Mauritania	-0.172	-0.099
Mauritius	0.114	0.247
Mexico	0.286	0.071
Mongolia	-0.061	0.184
Morocco	-0.091	-0.159
Mozambique	0.335	0.530
Myanmar	0.001	-0.114
Namibia	0.470	0.556
Nepal	0.193	0.369
Netherlands	0.540	0.611
New Zealand	0.092	0.208
Nicaragua	-0.154	-0.060
Niger	-0.019	-0.255
Nigeria	0.059	0.036
Norway	0.149	0.077
Oman	-0.206	-0.345
Pakistan	0.205	-0.068
Panama	-0.114	-0.240
Papua New Guinea	0.195	0.211
Paraguay	0.028	-0.130
Peru	-0.049	-0.141
Philippines	0.045	-0.082
Poland	0.289	0.463
Portugal	0.310	0.312
Puerto Rico	0.410	0.565
Qatar	0.664	0.616
Reunion	-0.086	-0.051
Romania	-0.049	0.178
Rwanda	-0.216	-0.443
Saudi Arabia	0.275	0.132
Senegal	-0.323	-0.407
Seychelles	0.013	0.024
Sierra Leone	0.103	-0.140
Singapore	-0.007	0.075
Solomon Island	0.585	0.565
Somalia	-0.127	0.076
South Africa	0.212	-0.039
Spain	0.395	0.489
Sri Lanka	-0.070	-0.345
St. Kitts and Nevis	0.254	0.130
Sudan	-0.478	-0.274
Suriname	0.067	0.049
Swaziland	0.294	0.222
Sweden	0.183	0.047
Switzerland	0.340	0.304
Syria	-0.053	-0.189
Taiwan	0.260	0.290
Tanzania	0.442	0.473
Thailand	0.233	0.230
Togo	0.304	0.081
Trinidad and Tobago	-0.111	-0.134
Tunisia	-0.126	-0.097
Turkey	0.127	0.182
United Kingdom	0.322	0.519
USA	0.565	0.680
USSR	0.081	0.247
Uganda	-0.218	-0.342
United Arab E.	0.707	0.611
Uruguay	0.161	0.058
Vanuatu	0.678	0.620
Venezuela	0.181	0.306
Western Samoa	0.719	0.817
Yemen	0.166	0.036
Yugoslavia	0.178	0.151
Zaire	0.252	0.212
Zambia	0.265	-0.030
Zimbabwe	-0.068	-0.301

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