ONLINE APPENDIX

(not for publication)

The Trade-Comovement Puzzle

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All calculations for Section 1 have been performed using Mathematica symbolic operations engine and are documented in Mathematica files posted online:

1. File *Baseline-model.nb* contains calculations for the baseline model and baseline model under financial autarky.
2. File *Baseline-fixed-capital.nb* contains calculations for the baseline model with fixed capital and baseline model with fixed capital under financial autarky.
3. File *GHH-baseline.nb* contains calculations for the baseline model with GHH preferences.
4. File *GHH-fixed-capital.nb* contains calculations for baseline model with GHH preferences and fixed capital.

Dynare codes with calibrated models are in zipped file allDynare.zip. Refer to read-me.txt file for instructions how to run these codes.

I. Relation of measure of comovement in Section 1 to correlation

Note that the system in text can be written as:

$$\begin{aligned} \hat{y} &= (1-\nu)\hat{A} + \nu\hat{A}^* \\ \hat{y}^* &= (1-\nu)\hat{A}^* + \nu\hat{A}, \end{aligned}$$

where

$$0 < \nu < 1/2.$$

(To obtain the above $\hat{y}, \hat{y}^*$ need to be re-scaled to ensure weights sum up to one. Since rescaling variables by a positive constant does not change the correlation coefficient this is without loss of generality.)

For simplicity, we can normalize the variance of symmetric shock,

$$var(\hat{A}^*) = var(\hat{A}) = 1,$$

which implies

$$0 \leq cov(\hat{A}, \hat{A}^*) = corr(\hat{A}, \hat{A}^*) \leq 1.$$

By definition,

$$corr(y, \hat{y}) = \frac{cov\,(y, \hat{y}^*)}{var\,(\hat{y})},$$

hence

$$\begin{aligned} cov\,(\hat{y}, \hat{y}^*) &= cov((1-\nu)\hat{A} + \nu\hat{A}^*, (1-\nu)\hat{A}^* + \nu\hat{A}) = \\ &= \left((1-\nu)^2 + \nu^2\right) cov(\hat{A}, \hat{A}^*) + 2(1-\nu)\nu, \end{aligned}$$

and

$$var\,(\hat{y}^*) = var\,(\hat{y}) = var((1-\nu)\hat{A} + \nu\hat{A}^*) = ((1-\nu)^2 + \nu^2 + 2(1-\nu)\nu corr(\hat{A}, \hat{A}^*)),$$

from which we obtain

$$corr\,(\hat{y}, \hat{y}^*) = \frac{\left((1-\nu)^2 + \nu^2\right) corr(\hat{A}, \hat{A}^*) + 2(1-\nu)\nu}{(1-\nu)^2 + \nu^2 + 2(1-\nu)\nu corr(\hat{A}, \hat{A}^*)}.$$

The above expression is strictly decreasing in $\nu < 1/2$

$$\frac{\partial corr\,(\hat{y}, \hat{y}^*)}{\partial \nu} = -\frac{2(1 - corr(\hat{A}, \hat{A}^*)^2)(2\nu - 1)}{(1 - 2(1 - corr(\hat{A}, \hat{A}^*))(1-\nu)\nu))^2} < 0,$$

which proves the claim made in text (if $corr(A, A^*)$ is independent of trade).

II. Volatility ratio across countries in the sample

Table 1 reports estimated volatility ratio for each country in our sample.

III. Data sources for Section 2

Bilateral trade statistics were taken from International Monetary Fund, Direction of Trade Statistics, 2005. From SourceOECD.org, Quarterly National Accounts: Gross Fixed Capital Formation ("P51: Gross fixed capital formation," "VOBARSA: Millions of national currency, volume estimates, OECD reference year, annual levels, seasonally adjusted"), GDP in constant prices ("B1_GE: Gross domestic product - expenditure approach," "VOBARSA: Millions of national currency, volume estimates, OECD reference year, annual levels, seasonally adjusted"). Our measure of labor is civilian employment or employment from the Quarterly National Accounts or the International Labor Organization (based on data availability). GDP is available from 1980Q1 to 2011Q4 for all countries in our sample. Employment data are missing for some countries for some years (see the Online Appendix for more details on what data we used). Since labor data are often not seasonally adjusted, we apply the X-12-ARIMA Seasonal Adjustment Program from census.gov. Nominal GDP series come from World Development Indicators. Gross Fixed Capital Formation, GDP in constant prices and Civil Employment series come from SourceOECD.org, Quarterly National Accounts. The series for physical capital have been constructed using the perpetual inventory method with a constant depreciation of 2.5%. Aggregate GDP for blocks of countries has been computed from growth rates of GDP in constant prices (recent years, varies by country) weighted by the nominal GDP of each country in 2004 (we applied the growth rates backward).

Table 1: Volatility ratio in a cross-section of major industrialized countries.

	Detrending method	
Country	Hodrick-Prescott filter (1600)	Linearly detrended
Australia	0.88	0.78
Austria	2.76	2.31
Belgium	1.21	1.27
Canada	1.27	1.24
Denmark	1.17	1.52
Finland	1.67	1.31
France	0.77	0.86
Germany	1.38	1.36
Italy	1.07	1.12
Japan	0.68	0.63
Korea	0.59	0.65
Netherlands	0.99	0.77
Norway	1.18	1.21
Portugal	1.07	1.04
Spain	1.89	1.21
Sweden	1.59	2.14
Switzerland	1.05	0.87
United Kingdom	0.90	0.67
United States	1.20	0.88
Median	1.17	1.12