Stefan Gießler, Katja Heinisch, Oliver Holtemöller,
"(Since When) Are East and West German Business Cycles Synchronised?", *Journal of Economics and Statistics*, forthcoming.

Data Description

Abstract
This document provides a detailed description of the data used.

Data General Information

We distinguish between two regions – East Germany *(East)* and West Germany *(West).*
The former consists of Brandenburg, Saxony, Saxony-Anhalt, Thuringia, Mecklenburg-West Pomerania and Berlin. The remaining 10 states belong to West Germany.
For all indicators we provide the total German time series for completeness in the data set.

- Since quarterly **GDP data** for East Germany is not provided by the German Federal Statistical Office, we make use of a new dataset on quarterly regional GDP series provided by the Halle Institute for Economic Research (IWH).[1] We assess quarterly, seasonally adjusted GDP growth for the period 1991 to 2017.
- Data for monthly unemployment is provided by the Federal Employment Agency (BA) for East and West Germany at monthly frequency. First differences of seasonally adjusted **unemployment rates** are used for the period 1991M1 to 2017M12.
- We use the **ifo business survey indicators** for business situation and business expectations in manufacturing, construction, wholesaling and retailing. ifo business surveys for East Germany do not include Berlin. Data for **ifo business survey indicators** in West Germany are not officially provided by the ifo institute, but can be requested from the ifo center for macroeconomics and surveys.[2]
- Based on the indicators above common factors are derived:
  Factor F1 is generated as **coincident index** determined by an inverse standard deviation weighting for all indicators (gdp, ifo_exp, ifo_sit, u). Detailed description of the approach is given in the paper. Factor F2 is based on a **principal component** analysis. Factors F3 and F4 are determined in a similar way, but only 3 indicators are included (ifo_exp, ifo_sit, u).
- Annual **sectoral growth** rates are provided by Destatis.[3] Sectors are classified as follows: agriculture, forestry and fishing (A); producing industries (B–E); construction (F), services (G–T).[4]

[1] See Claudio et al. (2019) for further description of the data. The data is available at http://www.iwhhalle.de/en/research/data-and-analysis/macroeconomic-reports/macro-datadownload/
[2] Contact: Dr Klaus Wohlrabe, Deputy Director of the ifo Center for Macroeconomics and Surveys and Head of Surveys, E-mail: wohlrabe@ifo.de
[3] "Bruttoinlandsprodukt, Bruttowertschöpfung in den Ländern der Bundesrepublik Deutschland 1991 bis 2017. Reihe 1, Länderergebnisse Band 1", Arbeitskreis "Volkswirtschaftliche Gesamtrechnungen der Länder" im Auftrag der Statistischen Ämter der 16 Bundesländer, des Statistischen Bundesamtes und des Bürgeramtes, Statistik und Wahlen, Frankfurt a. M.
[4] See https://www.destatis.de/DE/Methoden/Klassifikationen/Gueter-Wirtschaftsklassifikationen/Downloads/klassifikation-wz-2008-englisch.xls;jsessionid=207D1380B29DD15C77FB8E99157162CD.internet741?__blob=publicationFile

The data have been in prepared in Excel and empirical analyses are conducted in EViews or Excel.

Table 1: Definition of variables

GDP_EAST	Quarterly, seasonal adjusted GDP East	IWH
GDP_WEST	Quarterly, seasonal adjusted GDP West	IWH
GDP_DE	Quarterly, seasonal adjusted GDP Germany	Destatis
OGAP_EAST	Output Gap for East Germany	own calculations
OGAP_WEST	Output Gap for West Germany	own calculations
OGAP_DE	Output Gap for Germany	own calculations
U_EAST	Monthly, seasonal adjusted unemployment rate for East Germany	Federal Employment Agency (BA)
U_WEST	Monthly, seasonal adjusted unemployment rate for West Germany	Federal Employment Agency (BA)
U_DE	Monthly, seasonal adjusted unemployment rate for Germany	Federal Employment Agency (BA)
U_CYC_EAST	Cyclical component of unemployment rate East	own calculations
U_CYC_WEST	Cyclical component of unemployment rate West	own calculations
U_CYC_DE	Cyclical component of unemployment rate Germany	own calculations
IFO_EXP_EAST	ifo business expectations East	ifo
IFO_EXP_WEST	ifo business expectations West	ifo, requested by the authors
IFO_EXP_DE	ifo business expectations Germany	ifo
IFO_SIT_EAST	ifo business situation East	ifo
IFO_SIT_WEST	ifo business situation West	ifo, requested by the authors
IFO_SIT_DE	ifo business situation Germany	ifo

Data used in Figures

Figure 1: Production in East and West Germany
Year-on-year percentage changes for quarterly GDP growth. The output gap is based on an asymmetric band-pass filter (Christiano and Fitzgerald, 2003) and shown in percent of trend GDP. GDP level data and the output gap data are provided.

Figure 2: Unemployment in East and West Germany
12 months moving averages for unemployment rate. Data for unemployment rates and the cyclical components of the unemployment rates are provided.

Figure 3: Business surveys in Germany
12 months moving averages for ifo business surveys (2005=100). Data for ifo indices are provided.

Figure 4: Common Factors in East and West Germany
Common factor based on four indicators. Factor A1 based on coincident index, Factor A2 based on a factor model. Formulas are provided in eq.1 and eq.2 in the paper. Results for both factors are provided in the data set.

Figure 5: Rolling correlations
Rolling correlation of the 8 (6) year rolling window. Correlation between the indicated indicators for a specific sample and confidence bands based on a 5% significance level are calculated.

Figure 6: GDP growth & recession
Quarterly GDP growth rate and recession periods. The latter has been determined using the approach by Harding and Pagan (2002) (BBQ).

Figure 7: Variance decomposition
Forecast error variance decomposition (FEVD) measures the share of the variance in East German indicators that can be attributed to national shocks for several samples. Corresponding confidence bands based on a 5% significance level. Results have been produced with EViews.

Figure 8: Common factors in East and West Germany
Common factor based on three indicators. Factor 3 is based on coincident index, Factor 4 is based on a dynamic factor model. Both factors are provided.

Figure 9: Rolling correlation for Factors
Rolling correlation of the 8 (6) year rolling window with corresponding confidence bands based on a 5% significance level.

Figure 10: Variance decompositions
Forecast error variance decomposition (FEVD) share of the variance in East German indicators that can be attributed to national shocks for several samples. Confidence bands based on a 5% significance level. Results have been produced with EViews output.

Figure 11: Sectoral growth rates
Year-on-year percentage changes for growth in economic activity in NACE sectors are provided: agriculture, forestry and fishing (A); producing industries (B–E); construction (F), services (G–T).

Figure 12: Correlation between East and West sectoral growth rates
Rolling correlation of the 8(6) year rolling window between East and West data.

Data used in Tables

Table 1: Correlation coefficients
Panel A: Correlation coefficients between indicators for several sub-periods.
Panel B: Test of significance has been conducted by hypothesis tests.

Table 2: Correlation coefficients
(a) cross correlation based on lead/lags of indicators.
(b) multiple correlation based on eq. 3 in the paper.

Table 3: Cycle synchronisation indices
Indices are based on eq. 4 in the paper. Test of difference for the two CSIs are conducted.

Table 4: Cycle synchronisation indices for East-West-Germany
The concordance of boom and recession of the considered business cycle indicators are investigated. And an index is created in a similar way as in eq. 4 in the paper. Test of difference for the two CSIs are conducted.

Table 5: Business cycle statistics
Sample 1991–2017. Averages for unemployment rate and ifo indicators are given for seasonally-adjusted data and the first differences. Volatility and persistence are calculated with standard-deviation and autocorrelations coefficients, respectively.

Table 6: Sectoral correlation
Correlations for economic activity in NACE sectors are provided between East and West Germany: agriculture, forestry and fishing (A); producing industries (B–E); construction (F), services (G–T), for total gross value added (GVA) and GDP at annual frequency.

Table 7: Amplitudes of business cycles
Amplitudes are measured by the standard deviation.