

**Instructions for Replications of the Results in “Cost Pass-Through in Commodity Markets with Capacity Constraints and International Linkages” by Reinhard Ellwanger, Hinnerk Gnutzmann, and Piotr Śpiewanowski**

**Dataset and Variable Description**

Tables and Figures in the paper are based on several datasets, described below. Note that the ammonia price series are proprietary to Green Markets / Bloomberg and are not part of the replication package. To replicate results involving the ammonia price series, the series must be obtained directly from the provider to replace missing columns in the excel files.

1. The data file “df\_quantities.csv” contains:

<b>Variable</b>	<b>Description</b>
Year	Year
Production	Regional nitrogen production in thousand tonnes nutrients. Source: IFASTAT (International Fertilizer Association)
MC	Regional marginal costs, calculated according to respective equations in the paper
Region	Europe and North America
slack	Indicator variable that takes value 1 in the period of slack capacity, i.e., 1997.1–2006.12, and 0 otherwise
full	Indicator variable that takes value 1 in the period of full capacity, i.e., 2009.7–2017.12, and 0 otherwise
crisis	Indicator variable that takes value 1 in the period of the commodity boom-and-bust cycle, i.e., 2007.1–2009.6, and 0 otherwise

2. The data file “df\_prices.csv” contains:

<b>Variable</b>	<b>Description</b>
Tampa CFR	US Tampa Ammonia CFR Spot Price per MT (Bloomberg/Green Markets, Ticker: GCFPAMTP Index)
Western Europe CFR	Western Europe Ammonia CFR Spot Price (Bloomberg/Green Markets, Ticker: GCFPAMWE Index)
Middle East	Middle East Ammonia Spot Price (Bloomberg/Green Markets, Ticker: GCFPAMME Index)

Caribbean	Green Markets Caribbean Ammonia Spot Price USD/MT (Bloomberg/Green Markets, Ticker: GCFPAMWE Index GCFPAMCB Index)
delta	Regional cost shock, calculated according to the respective equation in the paper, in USD/ short ton
shock_c	Global cost shock, calculated according to the respective equation in the paper, in USD/short ton
slack	Indicator variable that takes value 1 in the period of slack capacity, i.e., 1997.1–2006.12, and 0 otherwise
full	Indicator variable that takes value 1 in the period of full capacity, i.e., 2009.7–2017.12, and 0 otherwise
crisis	Indicator variable that takes value 1 in the period of the commodity boom-and-bust cycle, i.e., 2007.1–2009.6, and 0 otherwise
MC_US	Regional marginal costs in North America, calculated according to the respective equation in the paper
MC_EUR_ETS	Regional marginal costs in Europe, calculated according to the respective equation in the paper
NGAS_US	Natural gas Henry Hub spot prices in USD/MMBtu. Source: World Bank GEM
NGAS_EUR	Natural gas long term contract prices in Europe calculated according to Platt’s formula: weighted average of gas oil (45%) and fuel oil (55%) ARA (Amsterdam-Rotterdam-Antwerp) spot prices at 30% discount in USD/MMBtu
EUA	EU ETS Allowance prices in USD/ tonne CO2. Source: Quandl
CRUDE_US	WTI crude oil prices in USD/ barrel CO2. Source: World Bank GEM
CRUDE_EUR	Brent crude oil prices in USD/ barrel CO2. Source: World Bank GEM

3. The data file “df\_panel.csv” contains:

<b>Variable</b>	<b>Description</b>
date	Date, in monthly frequency
Region	Europe and North America
MC	Marginal cost of ammonia production in Europe and North America, see details above
Ammonia	Ammonia spot price in Europe (Western Europe CFR) and North America (Tampa CFR), see details above
NGAS	Natural gas prices in Europe and North America, see description in the table above

4. The data file “demand\_shifters\_wide.csv” contains:

<b>Variable</b>	<b>Description</b>
year	Year
food_production_EUR	Cereals (Rice Milled Eqv), Annual production in Europe. Source: Food and Agriculture Organization of the United Nations (2023)
food_production_US	Cereals (Rice Milled Eqv), Annual production in North America. Source: Food and Agriculture Organization of the United Nations (2023)
food_production_GR_EUR	Cereals (Rice Milled Eqv), Change in annual production in Europe. Source: Food and Agriculture Organization of the United Nations (2023)
food_production_GR_US	Cereals (Rice Milled Eqv), Change in annual production in North America. Source: Food and Agriculture Organization of the United Nations (2023)
population_GR_EUR	Population growth rate (percentage) in Europe, Annually interpolated demographic indicators. Source: UN, World Population Prospects
population_GR_US	Population growth rate (percentage) in North America, Annually interpolated demographic indicators. Source: UN, World Population Prospects
GDP_GR_EUR	Annual percentage growth rate of GDP at market prices based on constant local currency in Europe. Source: World Bank, World Development Indicators
GDP_GR_US	Annual percentage growth rate of GDP at market prices based on constant local currency in North America. Source: World Bank, World Development Indicators

5. The data file “food\_price.csv” contains:

<b>Variable</b>	<b>Description</b>
date	Date, in monthly frequency
FPI	FAO Food Price Index
FPI_GR	FAO Food Price Index, Annual change

6. The data file “capacity\_micro.csv” contains:

<b>Variable</b>	<b>Description</b>
year	Year
plant_number_nonindle	Number of non-idled ammonia plants in the US. Source: Nitrogen Minerals Yearbook, USGS
precent_plants_with_slack	Share of plants operating with slack capacity (defined as < 80% of nameplate capacity). Estimate obtained by combining information on production from corporate reports and 10-K forms of publically traded North American ammonia producers with capacity data from

the USGS.

7. The data file “capacity\_utilisation.csv” contains:

<b>Variable</b>	<b>Description</b>
year	Year
Capacity	Regional nameplate ammonia production capacity in million metric tons. Source: Nitrogen Statistics and Information, USGS
Region	Europe and North America
Utilisation	Regional utilisation rate: Regional annual production divided by nameplate ammonia production capacity in million metric tons. Source: Nitrogen Statistics and Information, USGS

8. The data file “ifa.prod.csv” contains:

<b>Variable</b>	<b>Description</b>
Region	Europe and North America
Year	Year
Production	Regional nitrogen production in thousand tonnes nutrients. Source: IFASTAT (International Fertilizer Association)

### **Code Description**

All figures and tables except Table 3 (IV estimations) are produced in R.

The main file is “Replication\_file\_part1.Rmd”. It relies on the auxiliary file “helper.R”.

The simulations in the online appendix are produced by the file “Replication\_file\_IV\_simulations.Rmd”.

The results presented in Table 3 are produced in STATA. The data and code in Table 3 is contained in the folder “Table 3”. The variables are described in the STATA do-file.