United Nations | DESA / UNCTAD | GLOBAL PULSE | MarineTraffic | AIS Big Data Hackathon, 3-6 September

Matching AIS & CPB Data

Thirteenth Floor Team

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Motivation

- **CPB World Trade Monitor (WTM) is considered the primary source of monthly trade data, but…**
  - there is a two-month lag in data publication due to the limits of customs statistics, and
  - during events such as COVID-19 crisis, this lag strongly impedes the analysis of short-term trends

- **Our team wants to find out if…**
  - AIS vessel traffic data is suitable to nowcast the CPB trade volumes for the world, and
  - there is a difference in the quality of AIS approximation by regions

Data & methodology

- **Data**
  - *Daily*: AIS (000-daily-trade-estimates.zip) [source]
  - *Monthly*: CPB World Trade Monitor (WTM) [source]
  - *Yearly*: CEPII BACI (2018, 6-digit HS-2017) [source]
- **Methodology**
  - Aggregate AIS metric tons by months
  - Match HS codes and vessel types [IMF paper]
  - Weight aggregated AIS data by 2018 trade value
    - Across all vessel types for each country
    - Across countries for each CPB country group

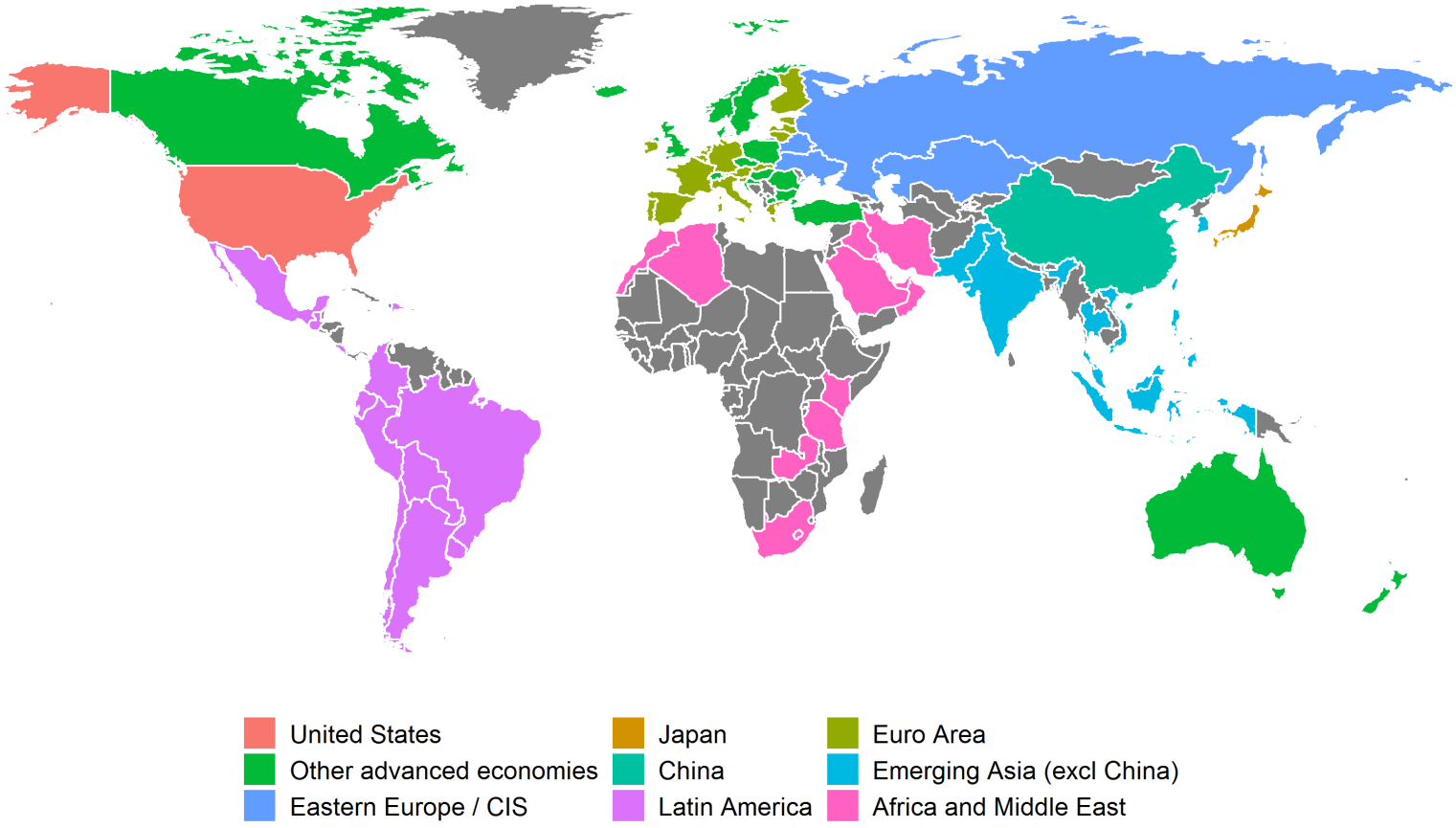
Pic 1 – CPB trade volume data

source: CPB WTM

Message: the huge drop in world trade volume, except China

Pic 2 – CPB country groupings

source: CPB WTM (background document)



Message: CPB data accounts for the bulk of world trade

Tab 1 – structure of AIS data

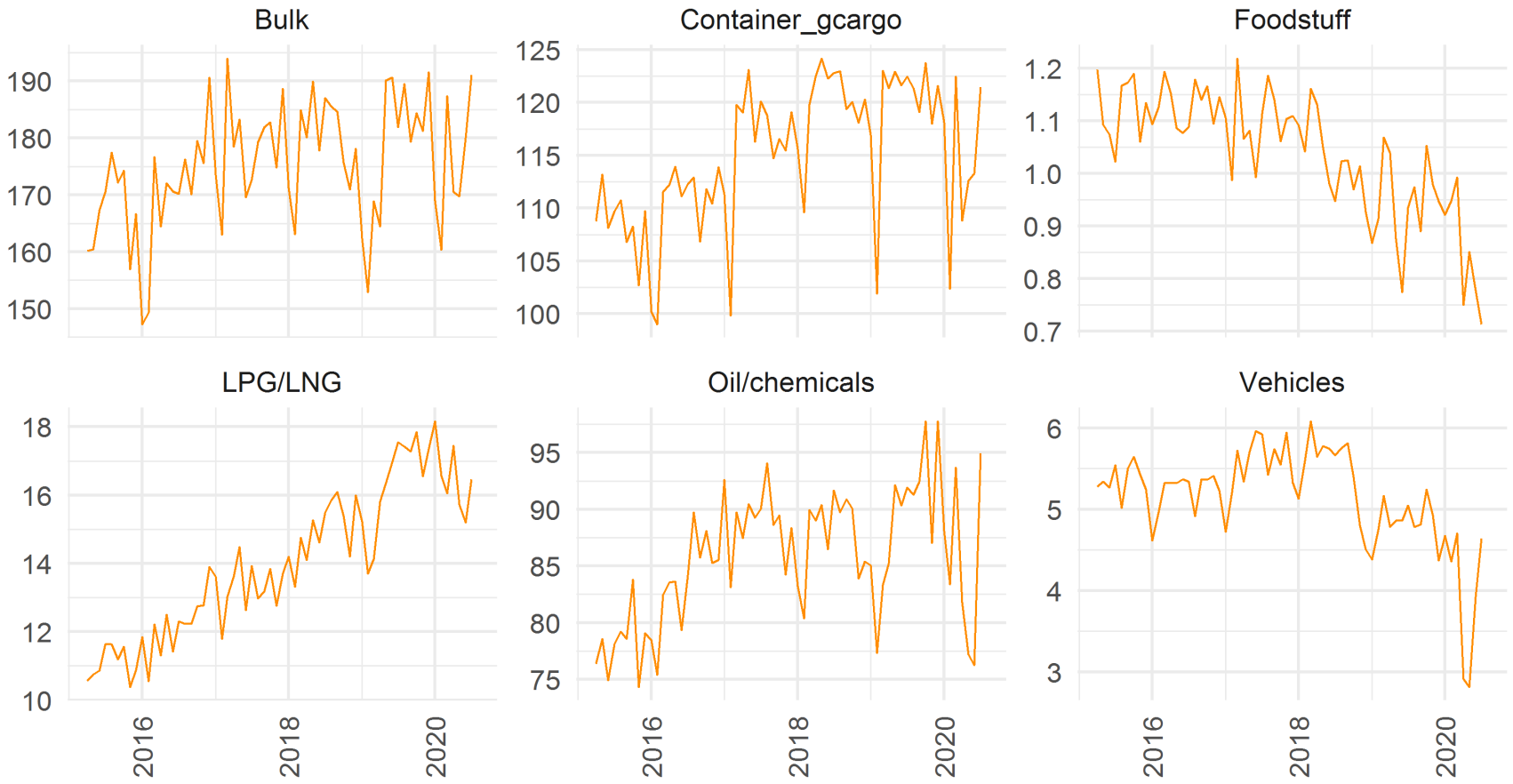
source: AIS (selected columns)

COLUMN	UNIQUE VALUES	DATA CLASS	COMMENT
country	179	character	country code (2-digit)
date	223	character	date (daily)
country_name	179	character	country name
imp_num_pc	--	integer	import (number of port calls)
imp_mtc	**--**	**numeric**	**import (metric tons of cargo)**
imp_dwt	--	integer	import (deadweight tonnage)
VESSEL_TYPE_COARSE	7	character	vessel type (incl. total)
exp_num_pc	--	integer	export (number of port calls)
exp_mtc	**--**	**numeric**	**export (metric tons of cargo)**
exp_dwt	--	integer	export (deadweight tonnage)

Message: trade volume is proxied by metric tons of cargo, dates are then aggregated by months

Pic 3 – world exp. by vessel types

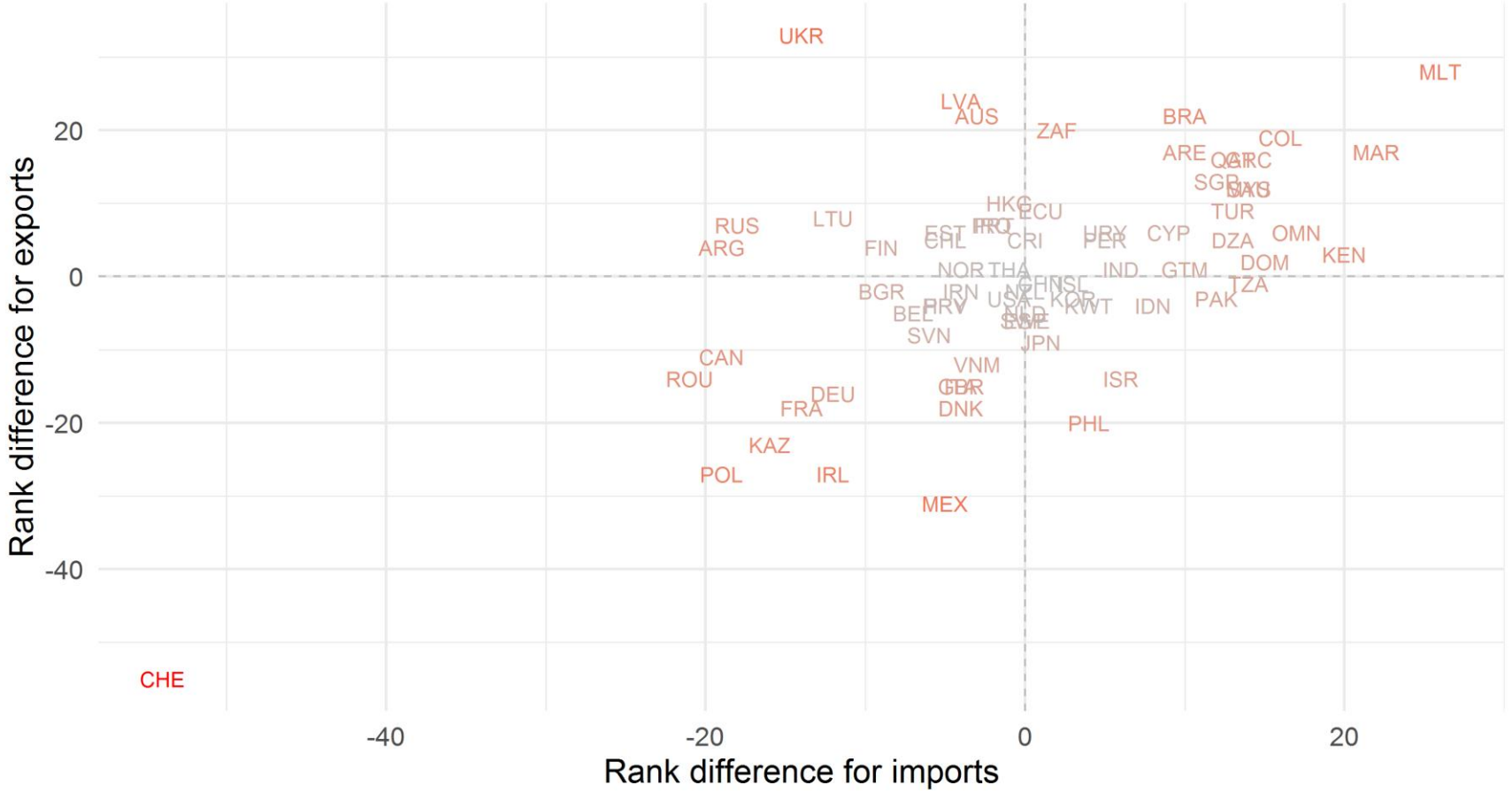
source: AIS



Message: the data in metric tons is readily available for aggregates but should be re-weighted

Pic 4 – AIS-CEPII rank differences

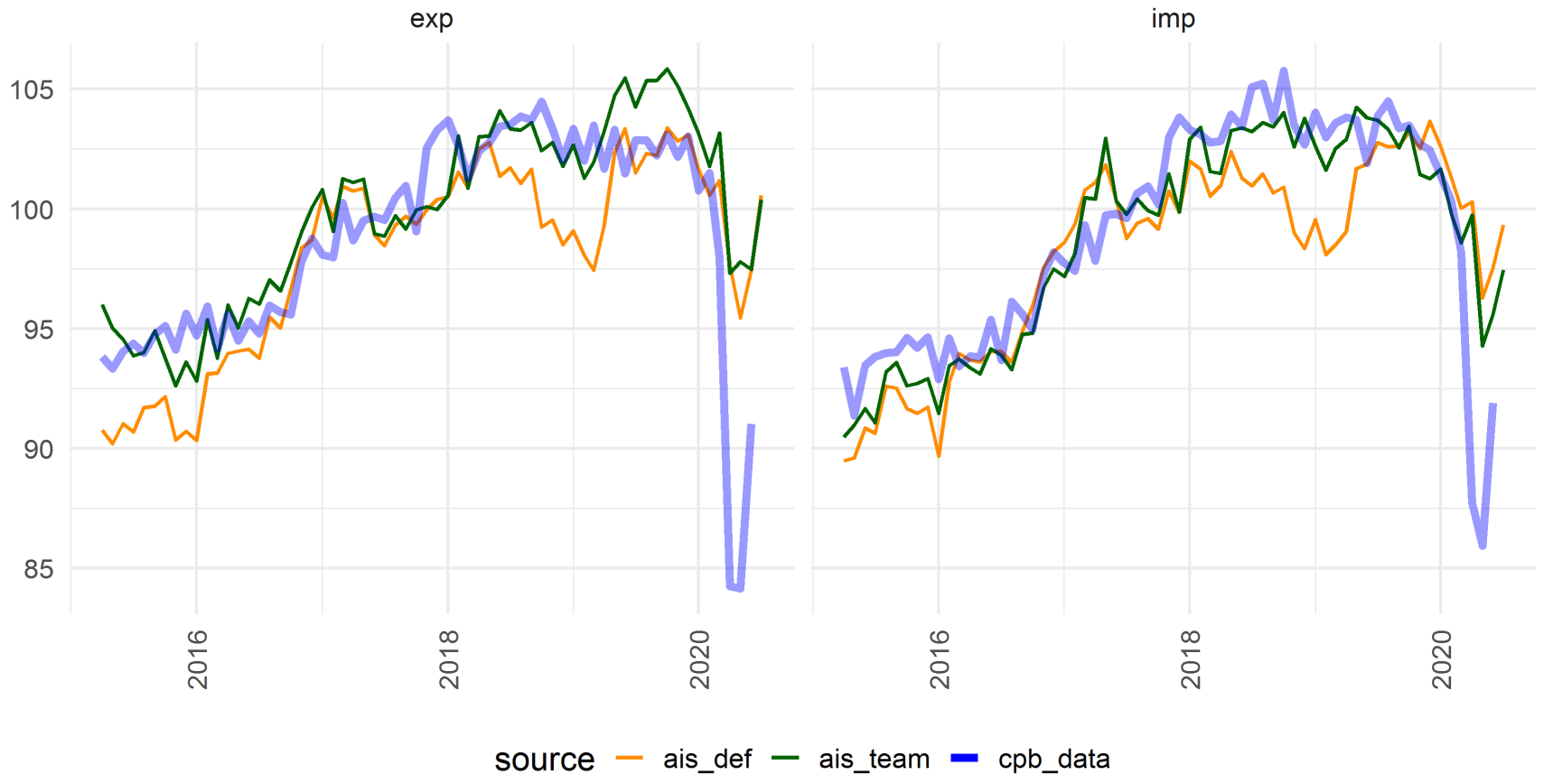
source: CEPII BACI, AIS & team calculations



Message: AIS data quality and coverage differ among countries (weighting needed at a country level)

Pic 5 – world trade aggregates

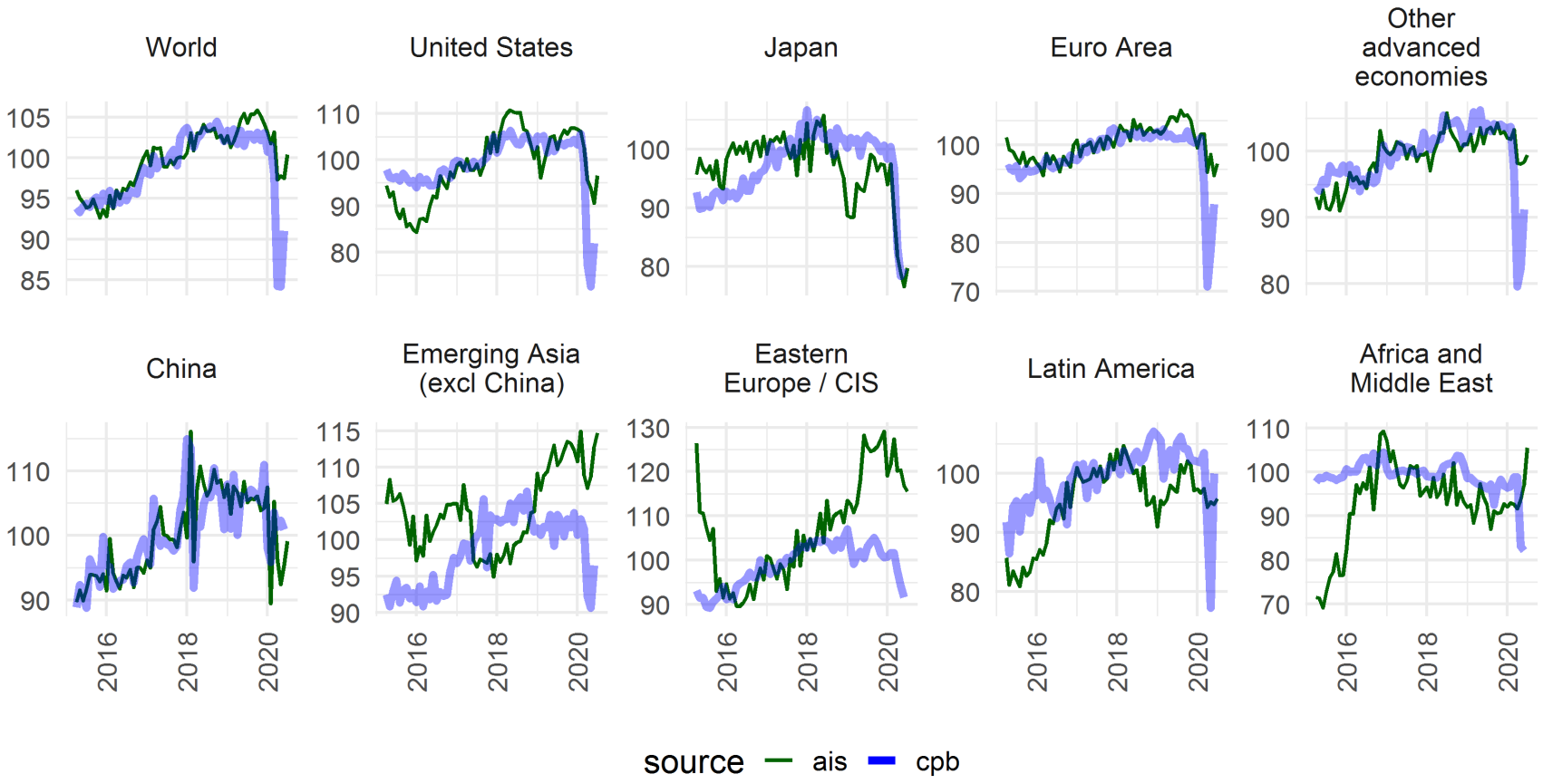
source: CPB WTM, AIS & team calculations



Message: our estimates are closer to CPB data, but the huge 2020 drop is not pronounced in AIS data

Pic 6 – exports by country groups

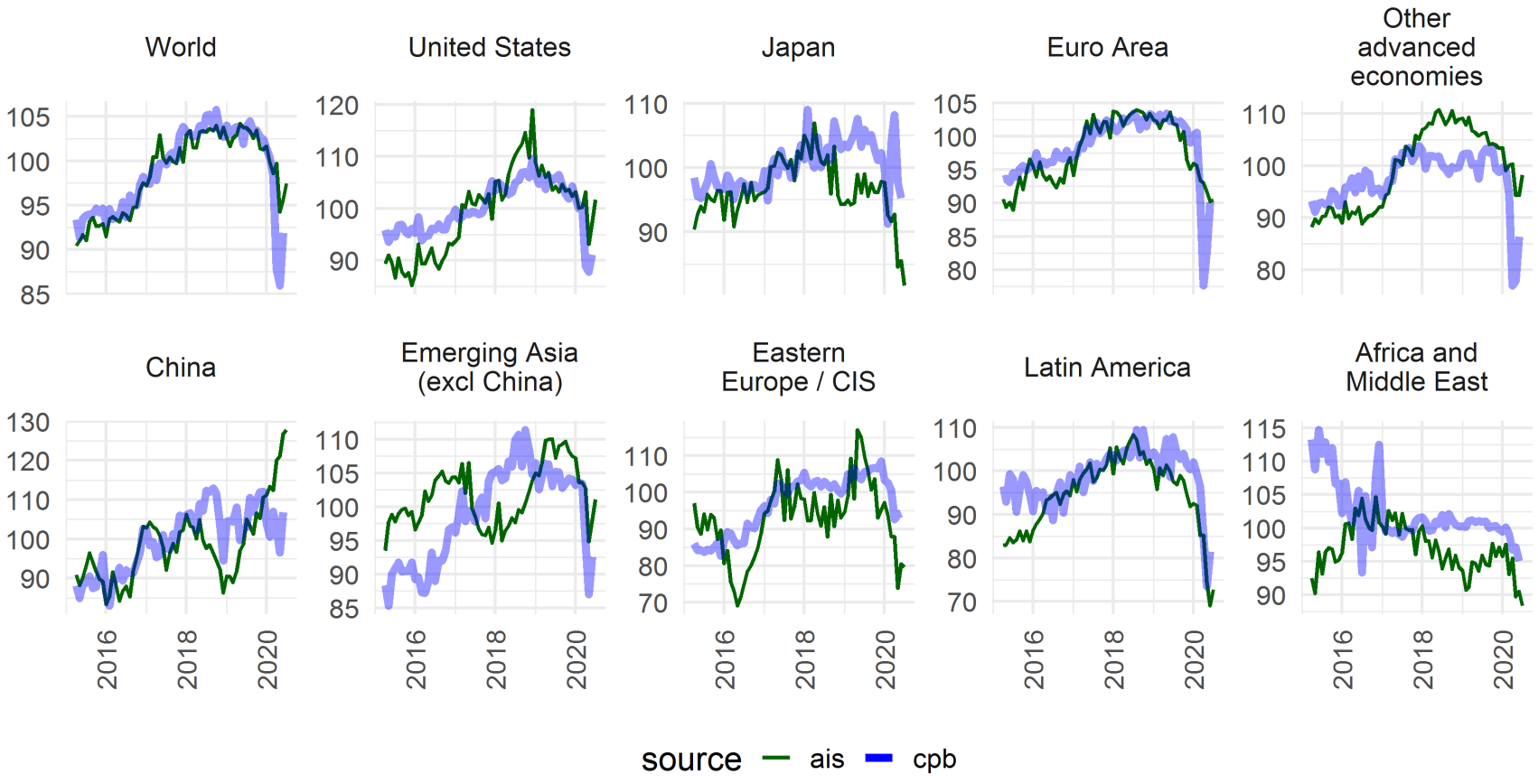
source: CPB WTM, AIS & team calculations



Message: AIS data is a very good proxy for China volumes but performs poor for other country groups

Pic 7 – imports by country groups

source: CPB WTM, AIS & team calculations



Message: AIS data is a good proxy for the World, USA, EA & Latin America (but not for China!)

Conclusions & implications

- **Conclusions**
  - AIS data may be a good proxy for CPB data for the world aggregate and some large country groups…
  - …but it does not replicate COVID-19 trade shock
- **Implications for further research**
  - Weighting scheme is important for the results
    - Some alternative methods are definitely worth trying
  - Smaller country groups should be examined in more detail to improve quality of AIS aggregation

THANKS!

Thirteenth Floor Team

Andrey Gnidchenko *(PhD 2015) has specialized as international trade economist at Center for Macroeconomic Analysis and Short-Term Forecasting (CMASF; Moscow, Russia) since 2011 when he graduated from university. Relying on the detailed trade data, he provides a quarterly comprehensive overview of Russian exports.*

Alexey Rybalka *(PhD 2020) joined CMASF in 2015 with an experience in a rating agency and strong skills in firm-level data analysis. He maintains a regular data-intensive monitoring on firm bankruptcies in Russia.*

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Alexander Apokin *(PhD 2008, CFA) is an independent economist and data consultant who worked for Bank of Russia, CMASF and Gas Exporting Countries Forum. His research interests include global macroeconomic and commodity research, forecasting and data science applications. He designed and managed several economic modelling and forecasting projects for Russian government and Eurasian intergovernmental bodies.*

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