

Appendix I. MATR Data Construction

The IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (hereafter "AREAER") is freely available online from 1999 through 2020. We extended the relevant series back in time through 1949 by hand, examining changes to the relevant variables recorded in hard copies of *AREAER*. We have also filled in some missing *AREAER* data, using information on the relevant country-variable combination at an earlier (if possible) or later (if necessary) date for the same country-variable combination when there are no "changes" to the country-variable combination recorded in *AREAER*.

We focus on five categories of the data: II (*Exchange Measures*); VII (*Imports and Import Payments*); VIII (*Exports and Export Proceeds*); IX (*Payments for Invisible Transactions and Current Transfers*); and IX & X (*Payments and Proceed from Invisible Transactions and Current Transfers*). We are most interested in the components of the *Imports and Import Payments* category, and its immediate sub-components: (i) foreign exchange budget; (ii) financing requirement for imports; (iii) documentation requirements for release of foreign exchange for imports; (iv) import licenses and other nontariff measures; (v) import taxes and/or tariffs; and (vi) state import monopoly³¹, and *Export and Export Payments* category, and its immediate sub-components: (i) repatriation requirements; (ii) financing requirements; (iii) documentation requirements; (iv) export licenses and (v) export taxes and/or tariffs.

We restrict ourselves to the six AREAER categories and their immediate sub-components, though there are up to four levels of sub-components. In all cases, these variables are binary dummy variables, with unity in any sub-component meaning that all higher-level aggregates should be unity.³²

Rules of Coding

- Coding. Restriction is coded as 1, absence of restriction as 0, missing/unavailable as n/a
- Dating. Recent *AREAER* volumes includes about 180 country descriptions; these are the primary source of our text-based data analysis. Most of the country descriptions include, at the very top, a date (e.g., "data as of Dec 31, XXXX"). For any given year (e.g., 2001), most of the country descriptions are dated the preceding year (e.g., 2000). The latter year (2000) is coded as the relevant data year for all countries, so 2001 *AREAER* report data is relevant for 2000. (This is true even if a few countries in, say, the 2001 *AREAER* quote data for a date in 2001 or 1999, not 2000.)
 - Announced future changes. Sometimes a country will state in *AREAER* that it is changing policy in the future (e.g., in the 2001 *AREAER* country x states it will change policy in 2002, though it hadn't as of 2000). In that case, the announced future policy change is dated to the announced future date (2002 in the example).
 - Investigating the changes section. At the end of each country description, there is a "Changes Section" which describes changes during, e.g., 2000. Usually, any change of relevance was investigated. However, we've found changes in the text that are not reported in the "Changes Section". In these cases, we take the changes in the main text.

³¹ Publicly available, along with further details, at <https://www.elibrary-areaer.imf.org/>.

³² Thus, category colV_A_1_b_1 (restrictions on "Transactions in capital and money market instruments") is a sub-component of colV_A_1_b (restrictions on "Capital transactions") itself a sub-component of colV_A_1 (restrictions on "Controls on the use of domestic currency"), which is in turn a sub-component of colV_A (restrictions "Arrangements for Payments & Receipts, Prescription of currencies").

- Granularity. We collect data as granular as reasonably possible. Thus, for instance, we collect data on VII_D_1, an indicator of “Positive list, AREAER” as well as that for VII_D “licenses and other nontariff measures”.
- Frequency. We check for changes from year to year in all issues of *AREAER* via examining the country text descriptions.
- Summary Dummy Variable Tables. There are summary tables of indicators included in each *AREAER*, though the content of these changes in 1996. We have cross-checked to ensure that they are always coherent with the variables we code (though most of the variables we code are not in the summary tables).
- Absence of Change indicates status quo. Suppose that a given variable takes a certain value in a given year for which we have actual data, e.g., 1999 (the earliest available year for which IMF data is currently available). Then absent any information of relevance in 1998, the variable will be coded as having the same value in 1999 and 1998.

Appendix Table A1.1 List of Economies

Angola	Dominican Republic	Kuwait	Romania
Albania	Algeria	Lao PD Republic	Russian Federation
United Arab Emirates	Ecuador	Lebanon	Rwanda
Argentina	Egypt	Liberia	Saudi Arabia
Armenia	Eritrea	Sri Lanka	Sudan
Antigua and Barbuda	Spain	Lesotho	Senegal
Australia	Estonia	Lithuania	Singapore
Austria	Ethiopia	Latvia	Solomon Islands
Azerbaijan	Finland	Morocco	Sierra Leone
		Moldova, Republic of	El Salvador
Burundi	Fiji	Madagascar	Slovakia
Belgium	France		
	Micronesia, Fed. States	Maldives	Slovenia
Benin	Gabon	Mexico	Sweden
Burkina Faso	United Kingdom	Marshall Islands	Syrian Arab Republic
Bangladesh	Georgia	Mali	Chad
Bulgaria	Ghana	Myanmar	Togo
Bahrain	Guinea	Mongolia	Thailand
Bahamas	Gambia	Mozambique	Tajikistan
Bosnia and Herzegovina	Guinea-Bissau	Mauritania	Turkmenistan
Belarus	Greece	Malawi	Timor-Leste
Belize	Guatemala	Malaysia	Tonga
Bolivia	Hong Kong	Namibia	Tunisia
Brazil	Honduras	Niger	Turkey
Barbados	Croatia	Nigeria	Tuvalu
Brunei Darussalam	Haiti	Nicaragua	Tanzania, United Republic of
Bhutan	Hungary	Netherlands	Uganda
Botswana	Indonesia	Norway	Ukraine
Central African Republic	India	Nepal	Uruguay
Canada	Ireland	New Zealand	United States
Switzerland	Iraq	Oman	Uzbekistan
Chile	Israel	Pakistan	Venezuela
China	Italy	Panama	Viet Nam
Côte d'Ivoire	Jamaica	Peru	Vanuatu
Cameroon	Japan	Philippines	Yemen
Congo	Kazakhstan	Palau	South Africa
Colombia		Papua New Guinea	
	Kenya	Poland	Zambia
Costa Rica	Kyrgyzstan	Portugal	Zimbabwe
Czech Republic	Cambodia	Paraguay	
Germany	Kiribati	Qatar	
Dominica	Korea, Republic of		
Denmark			

Appendix Table A1.2 Selected Economies and MATR Values

Country	1976	1986	1996	2006	2016
Angola			17	17	18
Argentina	18	14	8	15	13
Australia	15	7	6	5	4
Brazil	19	19	19	15	14
Canada	4	5	5	7	7
Switzerland	7	4	4	5	5
Chile	17	15	13	4	5
China	17	19	15	14	14
Germany	6	5	4	4	5
Eritrea			13	18	19
Spain	17	9	5	4	5
Finland	14	12	3	3	3
France	14	13	7	5	6
Guinea	19	18	17	18	17
Hong Kong	5	4	3	3	3
Indonesia	14	13	12	12	13
India	19	19	18	19	18
Israel	17	16	11	2	3
Italy	16	15	8	6	5
Japan	7	5	5	6	7
Korea	15	12	9	10	6
Mexico	6	13	6	6	6
Myanmar	19	20	19	19	18
Netherlands	10	6	4	5	4
Pakistan	19	19	15	16	15
Panama	6	6	6	2	4
Philippines	14	13	11	10	12
S. Arabia	4	4	4	5	5
Singapore	9	6	6	6	6
Syria				19	18
Turkey	17	15	12	11	11
Venezuela	11	16	9	15	17
S. Africa	14	13	13	15	16
Zimbabwe		18	16	19	12

Appendix Table A1.3 Examples of Narrative Records in AREAER, 2016

Measure	Sub-Component	AREAER		Country	Example/Text
		Report	Page		
II. Exchange measures	II.A. Restrictions and/or multiple currency practices	2016	22	Angola	<p>"Restrictions on the making of payments and transfers for current international transactions. ... [including]: (i) limits on the availability of foreign exchange for invisible transactions, such as travel, medical or educational allowances; and (ii) limits on unrequited transfers to foreign-based individuals and institutions. In addition, Angola maintained three exchange restrictions ... from: (i) the discriminatory application of the 0.015 percent stamp tax on foreign exchange operations; (ii) the operation of the priority list for access to US dollars at the official exchange rate; and (iii) a special tax of 10 percent on transfers to non-residents under contracts for foreign technical assistance or management services. Angola also maintains three multiple currency practices ..."</p>
	II.B. Exchange measures imposed for security reasons	2016	252	The Bahamas	<p>"Restrictions on Bahamas-licensed banks and financial institutions regarding transactions with: (i) the Democratic Republic of the Congo; (ii) the Islamic Republic of Iran; (iii) the Democratic People's Republic of Korea; and (iv) Osama bin Laden, the Al-Qaida organization ..."</p>
IV. Restrictions to payments	IV.A. Prescription of currency requirements	2016	617-618	Cameroon	<p>"the monetary unit is the CFA franc, the sole official currency and legal tender in all CEMAC members, and all transactions among residents are required to be settled in domestic currency"</p>
	IV.B. Payments arrangements	2016	944	Denmark	<p>Denmark had payments arrangements since it was bound by regional arrangements, as</p>

VII. Import Restrictions					Denmark was a member of the EU.
	IV.C. Administration of control	2016	1017	Egypt	Egypt had administration of control since "Banks [were] authorized to execute foreign exchange transactions within the framework of a general authorization ..."
	IV.D. Payment arrears	2016	1312	Guinea	Guinea had payments arrears "with various financial institutions"
	IV.F. Controls on exports and imports of banknotes	2016	316	Bangladesh	"Residents and nonresidents may take out up to Tk 5,000 in domestic currency."
	VII.A. Foreign exchange budget	2016	1328	Guinea-Bissau	The country had a foreign exchange budget, meaning an a priori allocation of a certain amount of foreign exchange for the importation of specific types of goods..
	VII.B. Financing requirements for imports	2016	1497	India	The country had a financing requirement for imports (minimum financing and advance payment requirements) though "The RBI allows requests from exporters through their AD Category-I banks to offset export receivables against import payables of the same foreign buyer and supplier, subject to certain terms and conditions."
	VII.C. Documentation requirements for release of forex for imports	2016	1681-1682	Kazakhstan	"... importers ... [were obligated to] submit to the bank a foreign trade contract or other corroborating document."
	VII.D. Import licenses and other nontariff measures	2016	1812	Laos	The country required import licenses for 25 categories of goods, mostly for quality control, safety, or animal quarantine, but some (e.g., for cement) to limit the overall level of imports.

	VII.E. Import taxes and/or tariffs	2016	1941	Macedonia	The country had an average unweighted tariff rate for industrial products was 6.1 percent and for agricultural products 15.7 percent.
	VII.F. State Import Monopoly	2016	2359	Niger	The government of Niger, through the Société Nigérienne des Produits Pétroliers, had a monopoly on hydrocarbon imports.
VIII. Export Restrictions	VIII.A. Repatriation requirements	2016	341	Barbados	The country had repatriation requirements on export proceeds "Proceeds must be repatriated within six months."
	VIII.B. Financing requirements	2016	1163	Eritrea	"Exports may be made under LCs -Letters of Credit- on an advance-payment or consignment basis."
	VIII.C. Documentation requirements	2016	1210	Fiji	The country required a confirmation of receipt of export proceeds six months after export of goods.
	VIII.D. Export licenses	2016	931	Croatia	"Exports are free of licensing requirements, except certain products (e.g., weapons, narcotics, dual-use items) for which permits must be obtained."
	VIII.E. Export taxes	2016	1970	Liberia	"Export taxes are imposed on processed and unprocessed goods at rates of zero and 2.5 percent, respectively; on diamonds at a rate of 3 percent; and on iron ore at a rate of 4.5 percent."
IX. Payments and X. Proceeds for Invisibles Restrictions	IX.A. Payments for Invisibles, Transfers & Current Transfers	2016	3121	Sri Lanka	"Indicative limits and bona fide tests are applied to all these transactions."
	X.A. Repatriation requirements on Proceeds	2016	3198	Suriname	The country had repatriation requirements on invisible proceeds.
	X.A.1. Surrender Requirements on Proceeds	2016	3578	Ukraine	The country had a 75 percent surrender requirement
	X.B. Restrictions on use of funds	2016	767	China	The country had restriction on use of funds from invisibles

Appendix Table A1.4 Large Changes in MATR, With and Without Recessions. Recession years are shown in black italic.

Country Code (ISO3)	Year of the Episode	Sign of the Change	Country Code (ISO3)	Year of the Episode	Sign of the Change	Country Code (ISO3)	Year of the Episode	Sign of the Change
AGO	1991	-1	BEN	1987	1	CIV	1995	-1
AGO	1996	1	<i>BFA</i>	<i>2005</i>	<i>1</i>	CMR	1967	-1
AGO	2001	-1	<i>BGR</i>	<i>2006</i>	<i>-1</i>	CMR	1968	1
<i>AGO</i>	<i>2018</i>	<i>-1</i>	<i>BHR</i>	<i>1997</i>	<i>-1</i>	<i>CMR</i>	<i>2006</i>	<i>-1</i>
<i>ARE</i>	<i>2004</i>	<i>1</i>	<i>BHR</i>	<i>2004</i>	<i>1</i>	<i>COG</i>	<i>1967</i>	<i>-1</i>
ARG	1958	-1	<i>BIH</i>	<i>1997</i>	<i>-1</i>	<i>COG</i>	<i>1968</i>	<i>1</i>
ARG	1964	1	<i>BIH</i>	<i>1998</i>	<i>-1</i>	COG	2006	-1
ARG	1967	-1	<i>BIH</i>	<i>2001</i>	<i>-1</i>	COG	2008	1
ARG	1970	1	<i>BIH</i>	<i>2003</i>	<i>1</i>	<i>COL</i>	<i>1955</i>	<i>-1</i>
ARG	1977	-1	BIH	2012	1	COL	1966	1
ARG	1983	1	BLR	1998	1	COL	1991	-1
ARG	1986	-1	<i>BLR</i>	<i>1999</i>	<i>-1</i>	COL	1993	-1
ARG	1989	-1	<i>BLR</i>	<i>2006</i>	<i>-1</i>	<i>COL</i>	<i>2004</i>	<i>-1</i>
ARG	1991	-1	BOL	1956	-1	<i>COL</i>	<i>2007</i>	<i>1</i>
ARG	1992	-1	BOL	1982	1	COL	2008	-1
ARG	2001	1	BOL	1998	-1	CRI	1961	-1
ARG	2003	-1	BRA	1999	-1	<i>CRI</i>	<i>1966</i>	<i>1</i>
ARG	2010	-1	BRA	2002	-1	<i>CRI</i>	<i>1969</i>	<i>-1</i>
ARG	2011	1	BRA	2008	-1	<i>CRI</i>	<i>1971</i>	<i>1</i>
ARG	2016	-1	BRA	2015	1	CRI	1980	-1
ARG	2017	-1	BRN	2008	1	CRI	1994	-1
<i>ARG</i>	<i>2019</i>	<i>1</i>	<i>BWA</i>	<i>1999</i>	<i>-1</i>	<i>CRI</i>	<i>2011</i>	<i>-1</i>
<i>ARM</i>	<i>1998</i>	<i>-1</i>	<i>CAF</i>	<i>1967</i>	<i>-1</i>	CZE	1995	-1
<i>ARM</i>	<i>2000</i>	<i>1</i>	<i>CAF</i>	<i>1968</i>	<i>1</i>	<i>CZE</i>	<i>2001</i>	<i>-1</i>
AUS	1983	-1	CAF	1999	1	<i>CZE</i>	<i>2006</i>	<i>1</i>
AUS	1984	-1	<i>CAN</i>	<i>1966</i>	<i>1</i>	<i>DEU</i>	<i>1958</i>	<i>-1</i>
AUT	1950	1	CHE	1976	-1	<i>DEU</i>	<i>1959</i>	<i>-1</i>
<i>AUT</i>	<i>1955</i>	<i>-1</i>	<i>CHE</i>	<i>1979</i>	<i>-1</i>	DEU	1996	-1
<i>AUT</i>	<i>1989</i>	<i>-1</i>	CHL	1961	1	<i>DMA</i>	<i>2005</i>	<i>-1</i>
AZE	1994	-1	CHL	1978	-1	DNK	1973	-1
AZE	1995	-1	CHL	1999	-1	DNK	1988	-1
AZE	1996	1	<i>CHL</i>	<i>2001</i>	<i>-1</i>	DOM	1964	1
BDI	1998	1	<i>CHL</i>	<i>2006</i>	<i>-1</i>	DOM	1987	-1
BDI	2010	-1	CHN	1996	-1	DOM	2000	-1
<i>BEL</i>	<i>1990</i>	<i>-1</i>	CHN	2017	1	DOM	2001	-1
DOM	2003	-1	GRC	1953	-1	<i>IRQ</i>	<i>2006</i>	<i>-1</i>
DOM	2004	-1	GRC	1996	-1	<i>ISR</i>	<i>1996</i>	<i>-1</i>
<i>ECU</i>	<i>1961</i>	<i>1</i>	GRC	2015	1	<i>ISR</i>	<i>1998</i>	<i>-1</i>
ECU	1996	-1	<i>GRC</i>	<i>2019</i>	<i>-1</i>	<i>ISR</i>	<i>1999</i>	<i>-1</i>
ECU	2003	-1	<i>GTM</i>	<i>1962</i>	<i>1</i>	ITA	1990	-1
<i>ECU</i>	<i>2014</i>	<i>-1</i>	<i>GTM</i>	<i>1963</i>	<i>1</i>	JAM	1991	-1
EGY	1994	-1	GTM	1973	-1	JAM	2007	-1
EGY	2003	1	<i>GTM</i>	<i>1980</i>	<i>1</i>	<i>JPN</i>	<i>1972</i>	<i>-1</i>
EGY	2004	-1	GTM	1988	1	JPN	1979	-1

EGY	2014	1	GTM	1989	-1	JPN	1998	-1
ERI	1996	-1	GTM	2001	-1	JPN	2003	1
ERI	2004	1	HKG	1972	-1	KAZ	1993	-1
ESP	1967	1	HND	1969	1	KAZ	1995	-1
ESP	1986	-1	HND	1980	1	KAZ	2000	-1
ESP	1989	-1	HND	1992	-1	KEN	1995	-1
ESP	2002	-1	HND	2000	-1	KEN	1996	-1
EST	1994	-1	HND	2010	1	KGZ	1999	1
ETH	1959	1	HRV	2001	1	KHM	1971	-1
ETH	1997	1	HRV	2003	-1	KOR	1981	-1
FIN	1991	-1	HTI	1979	-1	KOR	1995	-1
FIN	1994	-1	HTI	1981	1	KOR	2016	-1
FRA	1965	-1	HTI	1984	-1	KWT	1972	-1
FRA	1967	-1	HTI	1987	-1	LAO	1958	-1
FRA	1968	1	HTI	1996	-1	LAO	1962	1
FRA	1990	-1	HUN	1998	-1	LAO	1988	-1
FRA	2001	-1	HUN	2000	-1	LAO	2003	1
GAB	1967	-1	IDN	1982	-1	LAO	2008	-1
GAB	1968	1	IRL	1965	1	LBN	2002	-1
GAB	2006	-1	IRL	1980	-1	LBN	2004	1
GBR	1979	-1	IRL	1990	-1	LBR	1986	1
GBR	1980	-1	IRL	1992	-1	LBR	1998	-1
GEO	2012	-1	IRL	1993	-1	LKA	1977	-1
GMB	1989	-1	IRQ	1994	1	LKA	1992	-1
GMB	1990	-1	IRQ	2004	-1	LKA	1993	-1
GNB	2006	1	IRQ	2005	1	MAR	1961	1
MAR	1976	1	NIC	1962	-1	PER	1997	-1
MDA	1993	-1	NIC	1978	1	PHL	1960	-1
MDA	2001	1	NIC	1986	-1	PHL	1966	1
MDG	1967	-1	NIC	1992	-1	PNG	1989	1
MDG	1968	1	NIC	2004	1	PNG	1993	1
MDG	1973	-1	NLD	1953	-1	PNG	2001	1
MDG	1997	-1	NLD	1954	-1	PNG	2005	-1
MDV	1982	-1	NLD	1977	-1	PNG	2016	1
MDV	2009	1	NLD	1992	-1	POL	2002	-1
MEX	1982	1	NOR	1973	-1	POL	2008	-1
MEX	1991	-1	NOR	1991	-1	PRT	1992	-1
MEX	1992	-1	NPL	1964	1	PRY	1950	1
MLI	1986	-1	NPL	1993	-1	PRY	1951	-1
MLI	2000	1	NPL	2017	1	PRY	1956	-1
MLI	2004	1	NZL	1984	-1	PRY	1957	-1
MMR	1991	-1	NZL	1985	-1	PRY	1971	1
MNG	2000	1	OMN	1973	-1	PRY	1973	-1
MOZ	1995	-1	PAK	1996	-1	PRY	1997	-1
MRT	1967	-1	PAK	1998	1	PRY	2002	1
MRT	1968	1	PAK	2000	-1	PRY	2003	-1
MRT	1996	-1	PAK	2007	-1	PRY	2007	-1
MRT	2001	-1	PAK	2008	1	ROU	1989	-1
MWI	1988	-1	PAN	1997	-1	ROU	1991	-1

MWI	1995	-1	PAN	2007	1	ROU	2002	-1
MWI	1997	1	PER	1959	-1	RUS	1998	1
MWI	2003	-1	PER	1960	-1	RUS	2002	-1
MWI	2005	1	PER	1966	1	RUS	2007	-1
MYS	2014	-1	PER	1967	1	RWA	1973	1
NAM	1995	-1	PER	1969	1	RWA	2009	-1
NER	1967	-1	PER	1978	-1	SAU	1959	-1
NER	1968	1	PER	1979	-1	SDN	1993	1
NER	1994	-1	PER	1987	1	SDN	1996	-1
NER	1996	-1	PER	1988	-1	SDN	1999	-1
NER	2009	1	PER	1991	-1	SDN	2007	-1
NGA	1986	-1	PER	1993	-1	SEN	1967	-1
SEN	1968	1	UGA	1998	-1			
SGP	1978	-1	UKR	1993	1			
SLE	1993	-1	UKR	1995	1			
SLE	1996	1	UKR	1996	-1			
SLE	2005	-1	UKR	1997	1			
SLV	1961	1	UKR	1998	-1			
SLV	1990	-1	UKR	2018	-1			
SLV	1992	-1	UZB	1997	1			
SLV	1996	-1	UZB	2000	1			
SVK	1961	1	UZB	2003	-1			
SVK	1990	-1	UZB	2017	1			
SVK	1992	-1	VEN	1963	-1			
SVK	1996	-1	VEN	1966	1			
SVN	1996	-1	VEN	1983	1			
SVN	2003	-1	VEN	1989	-1			
SWE	1984	-1	VEN	1996	-1			
SWE	1989	-1	VEN	1997	-1			
SWE	1996	-1	VEN	2002	1			
TCD	1967	-1	VEN	2014	1			
TCD	1968	1	VNM	1976	-1			
TCD	2006	-1	YEM	1994	-1			
TCD	2008	1	YEM	1996	-1			
THA	2004	-1	YEM	2001	1			
TJK	1995	-1	ZAF	1976	1			
TJK	2002	-1	ZAF	1983	-1			
TKM	2004	1	ZAF	1996	1			
TON	1989	-1	ZMB	1992	-1			
TUN	1994	-1	ZMB	1993	-1			
TUN	1996	-1	ZMB	1995	-1			
TUR	1989	-1	ZMB	1996	-1			
TZA	1993	-1	ZMB	1997	1			
TZA	1994	-1	ZWE	1995	-1			
TZA	2000	1	ZWE	1999	1			
UGA	1992	-1	ZWE	2008	-1			
UGA	1993	-1	ZWE	2010	-1			

Appendix Table A1.5 Exogenous Changes in MATR

Country	Year	Sign	Description of episode	Link
Angola	2018	Liberalization	The measure is created to facilitate long-term investment and not to solve short term economic issues: "On August 10, 2018, the Angolan Government enacted a private investment law aimed at facilitating investment. The law removed the previous requirement that foreign investors identify a local partner with a 35 percent stake prior to investing in priority sectors, thereby allowing foreign investors to own investments in their entirety. The law also eliminated minimum levels of foreign direct investment and established firm sunset clauses for tax incentives. In addition to changes to the investment legal framework, the government created the Agency for Private Investment and Exports Promotion, a state-run agency with the goal of facilitating investment and export processes."	https://ustr.gov/sites/default/files/files/reports/2021/2021NTE.pdf (p.16)
Austria	1955	Liberalization	Austrian Independence Treaty is signed.	https://2001-2009.state.gov/r/pa/h/o/time/lw/107185.htm
Austria	1989	Liberalization	Austria applied for the EC in this year.	https://www.austria.org/austria-in-the-eu
Bahrain	2004	Increase in restrictions	Bahrain signs a Foreign Trade Agreement with the United States.	https://ustr.gov/about-us/policy-offices/press-office/press-releases/archives/2004/september/united-states-and-bahrain-sign-free-trade-agreement
Belarus	2006	Liberalization	Exchange Rate measures lifted. Previously, foreign exchange controls were in place to limit imports in the context of balance-of-payments problem.	https://hrcak.srce.hr/18634
Belgium	1990	Liberalization	Part of reforms related to The Schengen Agreement on the elimination of border checks, signed in 1985.	https://www.schengenvisainfo.com/schengen-agreement/

Bosnia and Herzegovina	1997	Liberalization	The country adopted a new law on Foreign Trade Policy (1997) focused on liberalizing laws. The laws aimed at improving existing and future economic collaboration between BIH and its entities, neighboring and other states and international organizations.	https://www.researchgate.net/publication/297550578_Non-tariff_barriers_and_their_impact_on_trade_flows_within_CEF_TA_2006_The_case_study_of_Bosnia_and_Herzegovina
Bosnia and Herzegovina	2001	Liberalization	Part of EU ascension road map.	http://pdc.ceu.hu/archive/00003190/01/economic_challenges_for_bosnia_and_herzegovina_on_the_road_to_membership_in_the_eu.pdf
Botswana	1999	Liberalization	The liberalization is part of an export-led strategy for the country that started in 1998. "Botswana has shown its commitment to promoting diversification of its economy through export-led industrialization (World Trade Organization, 1998b)."	https://www.researchgate.net/publication/287111055_The_Evolution_of_Trade_Policy_in_Botswana (p.23)
Bulgaria	2006	Liberalization	Reforms related to EU accession.	https://oxfordre.com/politics/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-508
Costa Rica	1966	Increase in restrictions	The country started a long-term plan to develop an Import Substitution Industrialization (ISI) to enhance growth in the country.	http://www.fao.org/3/I8308EN/i8308en.pdf
Costa Rica	2011	Liberalization	Foreign Trade Agreements with the European Union China and Singapore entered into force.	http://www.fao.org/3/I8308EN/i8308en.pdf https://www.econstor.eu/handle/10419/57577
Croatia	2003	Liberalization	Croatia signed its ascension to the Central European Union Free Trade Agreement in December 2002.	http://www.mvep.hr/en/foreign-politics/multilateral-relationsold/central-european-free-trade-agreement-(cefta)/
Eritrea	1996	Liberalization	Continuity of the trade liberalization process of Eritrea over the system it inherited from Ethiopia.	https://www.imf.org/external/pubs/ft/scr/1996/cr9666.pdf

France	1967	Liberalization	The European Communities signs the final Act of the General Agreement on Tariffs and Trade (GATT) multilateral negotiations (Kennedy round).	https://europa.eu/european-union/about-eu/history/1960-1969/1967_en
Gabon	1968	Increase in restrictions	strategy of protectionism-including tariff barriers, quota restrictions on imports-to foster the development of the industrial sector after the country's independence.	https://www.europarl.europa.eu/RegData/etudes/briefing_note/join/2013/491518/EXPO-INTA_SP(2013)491518_EN.pdf
Gambia, The	1989	Liberalization	Part of the trade liberalization efforts that started in 1986 to foster long-term developments.	https://www.gafspfund.org/sites/default/files/inline-files/Attachment%2011%20The%20Gambia%20Trade%20Policy%202011.pdf
Gambia, The	1990	Liberalization	As above.	As above.
Germany	1958	Liberalization	West Germany enters the European Union Monetary Agreement. During the 50's the country started a liberalization process to integrate in western world.	https://www.econstor.eu/bitstream/10419/47235/1/255419112.pdf
Haiti	1996	Liberalization	The country joined the World Trade Organization.	https://www.wto.org/english/thewto_e/countries_e/haiti_e.htm
Hungary	1998	Liberalization	Hungary underwent major macroeconomic and structural adjustment in its transition to a market economy.	https://www.wto.org/english/tratop_e/tp_e/tp077_e.htm
Hungary	2000	Liberalization	In 2000, Hungary and the European Union reached agreement on further liberalization of trade in agricultural products.	https://ustr.gov/archive/assets/Document_Library/Reports_Publications/2001/2001_NTE_Report/asset_upload_file569_6574.pdf https://www.elibrary.imf.org/view/books/084/03193-9781557757098-en/ch09.xml

Ireland	1992	Liberalization	In 1992, the Single European Union Act removed other barriers to trade, especially in services.	https://publications.iadb.org/publications/english/document/Trade-Agreement-and-Tax-Incentives-The-Irish-Experience.pdf
Israel	1996	Liberalization	The country signed an agreement with the US to liberalize non-tariff barriers in their agricultural and food sector. Policies related to World Trade Organization accession.	https://www.ers.usda.gov/webdocs/publications/40898/32574_aer771m_002.pdf?v=0
Israel	1998	Liberalization	Part of medium-term capital account liberalization that started in 1990.	https://www.boi.org.il/deptdata/neumim/neum190e.pdf
Japan	2003	Increase in restrictions	Japan bans beef imports after the outbreak of mad cow disease.	https://www.nytimes.com/2013/01/29/business/global/japan-to-ease-restrictions-on-us-beef.html
Country	Year	Sign	Description of episode	Link
Korea	1995	Liberalization	"In the financial sector, Korea is radically reforming the foreign exchange system by relaxing its foreign exchange controls and easing restrictions on portfolio investments and capital movement under the five-year Foreign Exchange System Reform Plan from 1995 to 1999. In December 1995, the Foreign Exchange Management Act was amended to better facilitate the liberalization measures in the future."	https://www.wto.org/english/tratop_e/tpre/tp040_e.htm
Korea	2016	Liberalization	The country signs a Free Trade Agreement with Vietnam.	https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=236246,235687,235686,235681,234860,233827,233394,233277,232654,230836&CurrentCatalogueIdIndex=3&FullTextHasH=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True

Lebanon	2002	Liberalization	The country signs a Trade Agreement with the European Union.	https://research.hktdc.com/en/article/MzU3OTk3Nzcy
Liberia	1986	Increase in restrictions	Liberia signs a new constitution. Restrictions on imports of rice were imposed to avoid rice smuggling	https://pdf.usaid.gov/pdf_docs/PNABD584.pdf
Malawi	1988	Liberalization	Part of broader structural adjustment program as the country tried to change its development strategy from planned economy.	https://www.wto.org/english/tratop_e/tp088_e.htm https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.577.9356&rep=rep1&type=pdf https://www.cbd.int/financial/fiscalenviron/mali-structural.pdf
Malawi	1997	Increase in restrictions	Malawi accepted the obligations under Article VIII of the International Monetary Fund's Articles of Agreement. The external trading environment was significantly liberalized with a phased reduction of the temporary export levy and import duties, and a decrease of the weighted average tariff rate from 18 per cent in 1994 to about 15 per cent in 1996.	As above.
Malawi	2003	Liberalization	Malawi was set to start liberalizing against other members of the South African Development Community in 2003.	https://openknowledge.worldbank.org/bitstream/handle/10986/18645/ACS75340P1336010Box385206B00PUBLIC00.pdf?sequence=1&isAllowed=y
Malaysia	2014	Liberalization	The government implemented structural reforms on a wide front in support of Malaysia's goal of achieving high-income status by 2020.	https://www.imf.org/external/pubs/ft/scr/2015/cr1558.pdf
Mozambique	1995	Liberalization	The country joined the World Trade Organization.	https://www.wto.org/english/thewto_e/countries_e/mozambique_e.htm
Namibia	1995	Liberalization	The country joined the World Trade Organization.	Trade Policy Framework: Namibia (unctad.org)

Netherlands	1953	Liberalization	Reforms agreed related to the formation of the Organization for European Union Economic Cooperation (OEEC). In signing the Convention that gave birth to the OEEC, the contracting parties agreed, inter alia, to “develop ... the maximum possible interchange of goods and services ..., [to] continue the efforts already initiated to achieve ... a multilateral system of payments among themselves ..., [to] cooperate in relaxing restrictions on trade and payments between one another....” ² The members of the OEEC are Austria, Belgium, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, and the United Kingdom.	https://www.elibrary.imf.org/view/journals/024/1955/001/article-A001-en.xml (p.181)
Netherlands	1954	Liberalization	As above.	In addition to above: https://www.un.org/en/development/desa/policy/wess/wess_archive/searchable_archive/1954_WESS_Full.pdf
Netherlands	1977	Liberalization	Deregulation to foster trade linkages with other industrialized countries.	https://www.imf.org/external/pubs/ft/wp/wp9819.pdf
Netherlands	1992	Liberalization	As above.	As above.
Niger	1996	Liberalization	The country joined the World Trade Organization.	https://www.wto.org/english/thewto_e/countries_e/niger_e.htm
Paraguay	2007	Liberalization	Memoranda of Understanding on the promotion of trade and investment have been signed by MERCOSUR countries with the Republic of Korea (2009); Singapore (2007); Russia (2006); Guyana (1999); and Trinidad and Tobago (1999).	https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:WT/TPR/S245-03.pdf
Peru	1960	Liberalization	Part of the economic program to improved fiscal and monetary management and remove remaining exchange and trade restrictions.	https://www.imf.org/external/pubs/ft/wp/2012/wp12166.pdf

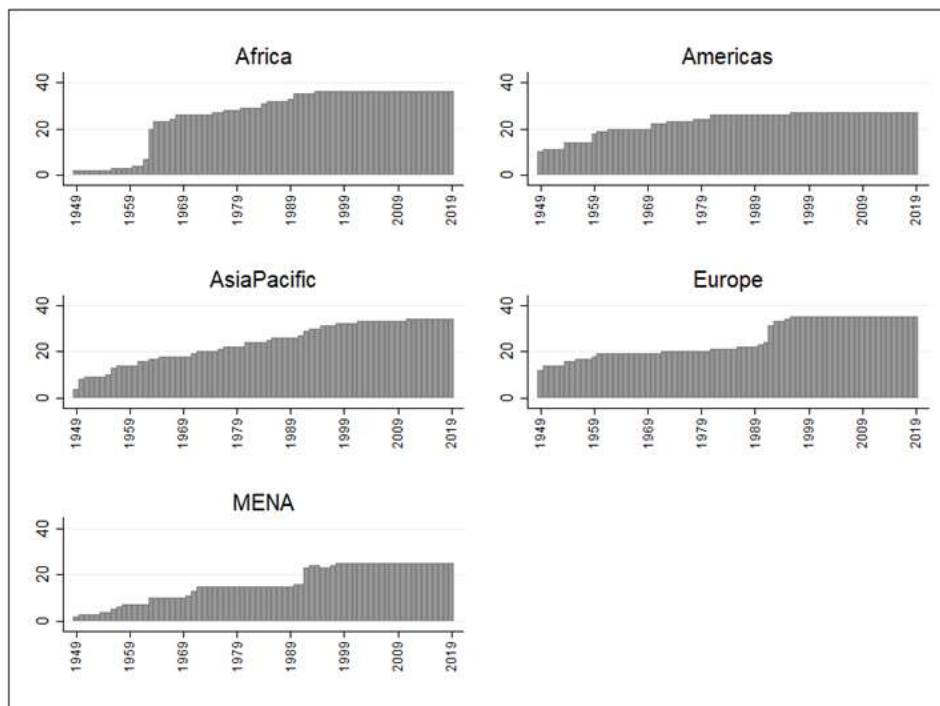
Philippines	1960	Liberalization	The start of import decontrolling.	https://www.nber.org/system/files/chapters/c9049/c9049.pdf https://www.bworldonline.com/content.php?section=Opinion&title=philippine-exports-growth-from-1960-2014&id=129148
Philippines	1966	Increase in restrictions	Unwinding of the 1960 reform and more favorable view toward economic planning and government market interventions. An outgrowth of this sentiment was the enactment of a comprehensive system of industrial incentives in 1967, as well as a financial facility for distressed firms set up at DBP in 1966. The Philippine government also intervened more actively in allocating resources among industries after the decontrol episode. The Board of Investments (BOI) that was established by the Industrial Incentives Act of 1967 had substantial discretion in administering the incentives, as well as the authority to limit investments in industries with excess capacity.	Page 9 of: https://www.nber.org/system/files/chapters/c9049/c9049.pdf
Poland	2002	Liberalization	Liberalization efforts related to accession to EU	https://www.wto.org/english/tratop_e/tpr_e/tp136_e.htm https://www.ce.uw.edu.pl/pliki/pw/y4-2000_Michalek.pdf
Slovak Republic	1990	Liberalization	Part of reforms to achieve a market-based economy. Slovakia decontrolled prices opened the economy to foreign investment and liberalized its foreign exchange regime. It has also relaxed/eliminated foreign trade restrictions and privatized many state enterprises.	https://www.wto.org/english/tratop_e/tpr_e/tp019_e.htm
Slovak Republic	1996	Liberalization	The Slovak Republic formally applied in June 1995 for European Union membership.	As above.
Slovenia	2003	Liberalization	The country joined the European Union in 2004.	https://european-union.europa.eu/principles-countries-history/country-profiles/slovenia_en

Spain	1989	Liberalization	The liberalization is part of a process that started in the 60's, in line with the accession to the European Union Community and the European Union.	http://www.realinstitutoelcano.org/wps/portal/rielcano_en/contenido?WCM_GLOBAL_CONTEXT=/elcano/elcano_in/zonas_in/dt10-2002
Sudan	1999	Liberalization	Part of Sudan application/accession to the World Trade Organization membership.	https://www.researchgate.net/publication/264440643_The_effects_of_trade_policy_reforms_on_the_agricultural_sector_of_Sudan . See Table A1-1 of the report.
Sweden	1984	Liberalization	Prior to accession to the European Union in 1995, Sweden took unilateral/bilateral efforts to further trading interests and support multilateralism	https://ecipe.org/wp-content/uploads/2014/12/sweden-2013-from-free-trade-to-protectionism.pdf . For structural reforms: https://academic.oup.com/wbro/article/34/2/274/5522304
Sweden	1989	Liberalization	As above.	As above.
Sweden	1996	Liberalization	Accession to the European Union in 1995.	As above.
Tajikistan	2002	Liberalization	Part of broader reforms plan and access to WTO.	https://www.imf.org/external/np/pfp/1999/tajik/
Uganda	1992	Liberalization	A first generation of trade policy reforms. This was related to the structural reforms to limit state intervention and impose a free market-oriented economy open to international trade.	https://freit.org/WorkingPapers/Papers/Development/FREIT437.pdf
Uganda	1998	Liberalization	Reforms aimed at simplifying the tariff structure.	As above.
Ukraine	2018	Liberalization	In 2017, Ukraine acceded to the Pan-Euro-Med Convention, which sets uniform rules of origin for trade in products manufactured in countries with which the EU has FTAs and customs unions. The Pan-Euro-Med Convention entered into force for Ukraine in February 2018.	https://uk.practicallaw.thomsonreuters.com/6-621-3097?transitionType=Default&contextData=(sc.Default)&firstPage=true

Appendix Table A1.6 Exogenous Changes in MATR, Not Part of Broader Reform Packages

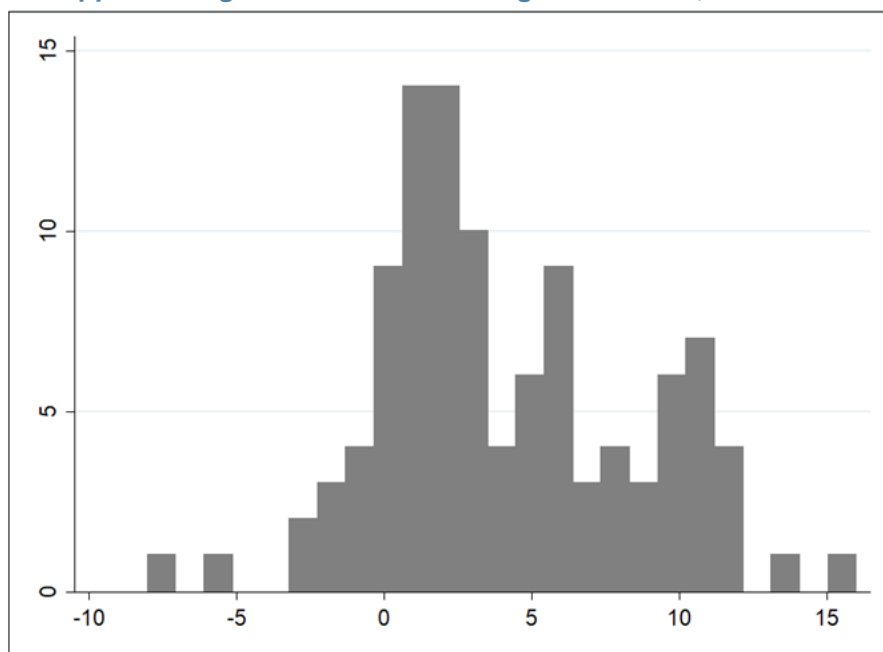
Country Code (ISO3)	Year of the Episode	Sign of the Change	Country Code (ISO3)	Year of the Episode	Sign of the Change
AGO	2018	-1	LBR	1986	1
AUT	1955	-1	MOZ	1995	-1
AUT	1989	-1	MWI	1988	-1
BGR	2006	-1	MWI	1997	1
BHR	2004	1	MWI	2003	-1
BIH	1997	-1	MYS	2014	-1
BIH	2001	-1	NAM	1995	-1
BLR	2006	-1	NER	1996	-1
BWA	1999	-1	NLD	1953	-1
CRI	1966	1	NLD	1954	-1
CRI	2011	-1	NLD	1977	-1
DEU	1958	-1	NLD	1992	-1
ERI	1996	-1	PER	1960	-1
ESP	1989	-1	PHL	1960	-1
FRA	1967	-1	PHL	1966	1
GAB	1968	1	PRY	2007	-1
GMB	1989	-1	SDN	1999	-1
GMB	1990	-1	SVK	1990	-1
HRV	2003	-1	SVK	1996	-1
HTI	1996	-1	SVN	2003	-1
HUN	1998	-1	SWE	1984	-1
HUN	2000	-1	SWE	1989	-1
ISR	1996	-1	SWE	1996	-1
JPN	2003	1	TJK	2002	-1
KOR	1995	-1	UGA	1998	-1
KOR	2016	-1	UKR	2018	-1
LBN	2002	-1			

Appendix Figure A1.1: MATR country coverage over time, by region



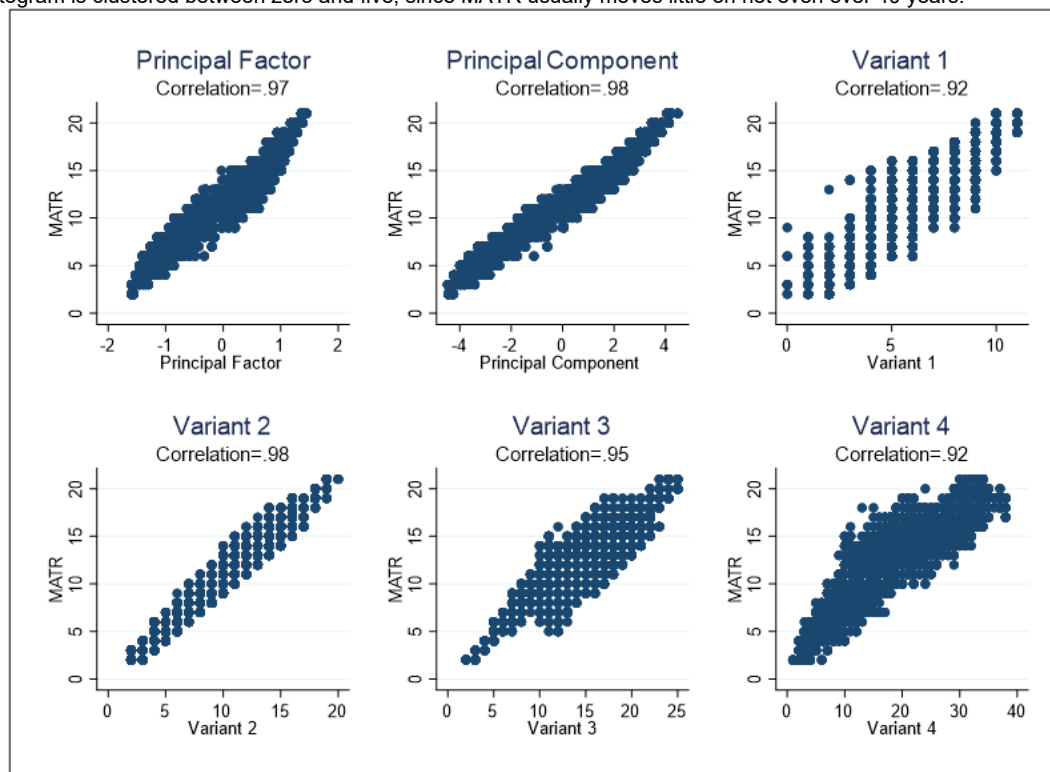
Y axis indicates the number of countries that have data for that particular year.

Appendix Figure A1.2: MATR changes over time, 1976-2016



Appendix Figure A1.3: Perturbations of MATR

Figure presents a histogram of the net changes in MATR between 1976 and 2016 for the 106 economies with data in both years. The histogram is clustered between zero and five, since MATR usually moves little on net even over 40 years.



The figure above shows scatterplots of MATR (on the Y axis) versus alternative aggregations of the Index.

Variant 1 includes sum of: VII_A;VII_B;VII_C;VII_D;VII_E;VII_F;VIII_A;VIII_B;VIII_C;VIII_D and VIII_E.

Variant 2 includes sum of: IV_A;IV_B;IV_C;IV_D;IV_E;IV_F;VII_A;VII_B;VII_C;VII_D;VII_E;VII_F;IX_A_1;VIII_A;VIII_B;VIII_C;VIII_D;VIII_E;X_A and X_B.

Variant 3 includes sum of: II_A;II_B;IV_A;IV_B;IV_C;IV_D;IV_E;IV_F;VII_A;VII_B;VII_C;VII_D;VII_E;VII_F;IX_A_1;IX_A_2;IX_A_3;IX_A_4;IX_A_5;IX_A_6;IX_A_7;VIII_A;VIII_B;VIII_C;VIII_D and VIII_E.

Variant 4 includes sum of: III_F;III_G;III_A;III_B;IV_A_1;IV_A_2;IV_B_1;IV_B_2;IV_C;IV_D_1;IV_D_2;IV_E_1;IV_E_2;IV_F_1;IV_F_2;VII_B_1;VII_B_2;VII_B_3;VII_C_1;VII_C_2;VII_C_3;VII_C_4;VII_C_5;VII_D_1;VII_D_2;VII_D_3;VII_D_4;VII_D_5;VII_E_1;VII_F;VIII_A_1;VIII_C_1;VIII_B;VIII_C_2;VIII_C_3;VIII_C_4;VIII_C_5;VIII_D_1;VIII_D_2;VIII_E_1;VIII_E_2;IX_A_1;IX_A_2;IX_A_3;IX_A_4;IX_A_5;IX_A_6;IX_A_7;X_B;X_A_1 a and X_A_1 b.

Appendix II. Other Data

Appendix Table A2.1 Other Trade Indicators

Database	Coverage		Key indicators	Link to data
	Countries	Time		
MATR (Measure of Aggregated Trade Restrictions)	157	1949 – 2019	Exchange measures, payments arrangements, import restrictions, export restrictions and payments for invisibles	
World Economic Forum	135	2016	Index of trade enablement, 1-7	https://reports.weforum.org/global-enabling-trade-report-2016/
Overall Trade Restrictiveness Indices (Kee et al.)	160	2009	Market Access Trade Restrictiveness Index	https://datacatalog.worldbank.org/dataset/overall-trade-restrictiveness-indices-and-import-demand-elasticities
	103	2009	Overall Trade Restrictiveness Index	
Services Trade Restrictiveness Index	48	2014 – 2020	Services Trade Restrictiveness Index (by sector)	https://qdd.oecd.org/subject.aspx?Subject=063bee63-475f-427c-8b50-c19bffa7392d
Fraser Institute: Economic Freedom of the World	162	1970 – 2018	Freedom to Trade Internationally	https://www.fraserinstitute.org/economic-freedom/dataset?geozone=world&page=dataset&min-year=2&max-year=0&filter=0
Current Account Openness (Quinn et al.)	89	1973 – 2014	Current Account Openness	
Heritage Foundation: Trade Freedom	181	1995 – 2021	Trade Freedom Index	https://www.heritage.org/index/trade-freedom
World Bank: Services Trade Restrictions Index	104	2008 – 2011	Services Trade Restrictions Index	https://www.worldbank.org/en/research/brief/services-trade-restrictions-database

KOF: Trade Globalization Index	201	1970 – 2018	Trade Globalization Index	https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html
The Chinn-Ito Index (Kaopen)	182	1970 – 2019	Chinn-Ito index	http://web.pdx.edu/~ito/Chinn-Ito_website.htm
World Bank Trade Cost Database	124	1995 – 2018	ESCAP import/export weighted trade costs (using DoTS)	https://data.imf.org/?sk=9d6028d4-f14a-464c-a2f2-59b2cd424b85 https://www.unescap.org/resources/escap-world-bank-trade-cost-database#

Appendix Table A2.2 Other Data

Database	Coverage		Indicator
	Economies	Time	
Penn World Table (PWT 10.0)	213	1950–2019	Real GDP. Constant 2017 prices
	212	1950–2019	Employment (no. of people employed)
	211	1950–2019	Productivity (Real GDP/ Employment)
	212	1950–2019	Investment. Constant 2017 prices
	213	1950–2019	GDP Deflator Index. 2017=100
	212	1950–2019	Household Consumption. Constant 2017 prices
World Economic Outlook (April 2021)	172	1950–2019	Trade Balance (Exports (real, LCU)-Imports (real, LCU)/ Real GDP)
	178	1950–2019	Volume of total exports of goods, USD
	178	1950–2019	Volume of total imports of goods, USD
World Economic Outlook	196	1995–2020	Real GDP forecasted in that year Oct. WEO
Furceri, Hannan, Ostry and Rose (2021)	168	1960–2014	Tariffs
UNCTAD EORA Database	158	1990–2018	GVC
World Bank (WDI Indicators)	209	1960–2019	Total Population
	195	1960–2019	Trade %GDP
	195	1960–2019	Imports of G&S %GDP
	190	1990–2019	Real GDP per capita PPP
	187	1988–2018	Tariff rate applied weighted mean all products
Systemic Peace: Polity IV project	180	1950–2020	polity 2: Democracy-Autocracy Index
	180	1950–2020	Constraints on Executive (higher=more)
The Standardized World Income Inequality Database (SWIID)	194	1960–2019	Inequality in disposable (GINI net)
Alesina et al. 2020	90	1973–2014	Structural Reforms

Index of Economic Freedom

The Heritage Foundation's Index of Economic Freedom (IEF) contains a component, trade freedom (TF), which is freely available with the rest of the IEF. TF is one of three components, which together constitute "open markets" (the others being investment and financial freedoms), itself one of four broad categories of economic freedom (the others being rule of law, government size, and regulatory efficiency). Trade freedom – like the other eleven freedoms – is graded on a scale of 0 to 100. It is described on the Heritage foundation's website (<https://www.heritage.org/index/trade-freedom>) as follows:

"Trade freedom is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. The trade freedom score is based on two inputs:

- The trade-weighted average tariff rate and
- Non-tariff barriers (NTBs).

Different imports entering a country can, and often do, face different tariffs. The weighted average tariff uses weights for each tariff based on the share of imports for each good. Weighted average tariffs are a purely quantitative measure and account for the basic calculation of the score using the following equation:

$$\text{Trade Freedom}_i = (((\text{Tariff}_{\max} - \text{Tariff}_i) / (\text{Tariff}_{\max} - \text{Tariff}_{\min})) * 100) - \text{NTB}_i$$

where Trade Freedom_i represents the trade freedom in country i ; Tariff_{\max} and Tariff_{\min} represent the upper and lower bounds for tariff rates (%); and Tariff_i represents the weighted average tariff rate (%) in country i . The minimum tariff is naturally zero percent, and the upper bound was set as 50 percent. An NTB penalty is then subtracted from the base score. The penalty of 5, 10, 15, or 20 points is assigned according to the following scale:

- **20**—NTBs are used extensively across many goods and services and/or act to effectively impede a significant amount of international trade.
- **15**—NTBs are widespread across many goods and services and/or act to impede a majority of potential international trade.
- **10**—NTBs are used to protect certain goods and services and impede some international trade.
- **5**—NTBs are uncommon, protecting few goods and services, and/or have very limited impact on international trade.
- **0**—NTBs are not used to limit international trade.

We determine the extent of NTBs in a country's trade policy regime using both qualitative and quantitative information. Restrictive rules that hinder trade vary widely, and their overlapping and shifting nature makes their complexity difficult to gauge. The categories of NTBs considered in our penalty include:

- **Quantity restrictions**—import quotas; export limitations; voluntary export restraints; import–export embargoes and bans; countertrade, etc.
- **Price restrictions**—antidumping duties; countervailing duties; border tax adjustments; variable levies/tariff rate quotas.
- **Regulatory restrictions**—licensing; domestic content and mixing requirements; sanitary and phytosanitary standards (SPSs); safety and industrial standards regulations; packaging, labeling, and trademark regulations; advertising and media regulations.
- **Investment restrictions**—exchange and other financial controls.
- **Customs restrictions**—advance deposit requirements; customs valuation procedures; customs classification procedures; customs clearance procedures.

- **Direct government intervention**—subsidies and other aid; government industrial policy and regional development measures; government-financed research and other technology policies; national taxes and social insurance; competition policies; immigration policies; government procurement policies; state trading, government monopolies, and exclusive franchises.

As an example, Botswana received a trade freedom score of 79.7. By itself, Botswana's weighted average tariff of 5.2 percent would have yielded a score of 89.7, but the existence of NTBs in Botswana reduced the score by 10 points.

Gathering tariff statistics to make a consistent cross-country comparison is a challenging task. Unlike data on inflation, for instance, countries do not report their weighted average tariff rate or simple average tariff rate every year; in some cases, the most recent year for which a country reported its tariff data could be as far back as 2002. To preserve consistency in grading the trade policy component, the *Index* uses the most recently reported weighted average tariff rate for a country from our primary source. If another reliable source reports more updated information on the country's tariff rate, this fact is noted, and the grading of this component may be reviewed if there is strong evidence that the most recently reported weighted average tariff rate is outdated.

The World Bank publishes the most comprehensive and consistent information on weighted average applied tariff rates. When the weighted average applied tariff rate is not available, the *Index* uses the country's average applied tariff rate; and when the country's average applied tariff rate is not available, the weighted average or the simple average of most favored nation (MFN) tariff rates is used.¹In the very few cases where data on duties and customs revenues are not available, data on international trade taxes or an estimated effective tariff rate are used instead. In all cases, an effort is made to clarify the type of data used and the different sources for those data in the corresponding write-up for the trade policy component.

Sources. Unless otherwise noted, the *Index* relies on the following sources to determine scores for trade policy, in order of priority: World Bank, *World Development Indicators 2012*; World Trade Organization, *Trade Policy Review*, 1995–2012; Office of the U.S. Trade Representative, *2012 National Trade Estimate Report on Foreign Trade Barriers*; World Bank, *Doing Business 2011* and *2012*; U.S. Department of Commerce, *Country Commercial Guide*, 2008–2012; Economist Intelligence Unit, *Country Commerce*, 2009–2012; World Bank, *Data on Trade and Import Barriers: Trends in Average Applied Tariff Rates in Developing and Industrial Countries, 1981–2010*; and official government publications of each country."

Even ignoring the somewhat arbitrary functional form of this measure, the data sources are the issue. We have repeatedly contacted both authors specified on the IEF website for further details on the underlying NTB data sources, so far without success.

Appendix III. MATR and the Literature

There are other measures of trade policy that are related and similar. Ours is different. In this appendix we provide a brief survey of the literature, and where MATR fits in.

At the outset, we stress that summary measures of trade policy are just that; summaries. They cannot hope to provide the detail and color available in more disaggregated analyses of trade policy, such as the reviews of national trade policy provided by the WTO. Still, measures of aggregate trade restrictions are useful, especially to distracted policymakers and economists preoccupied with or focused on other matters. Indeed, often a measure of aggregate trade restrictions is not an object of intrinsic interest, merely a control or instrumental variable. A recent review of the literature is provided by Cerdeiro and Nam (2018).

From the general to the specific, a simple taxonomy of aggregate trade restrictions includes measures of: a) openness; b) trade costs; and c) artificial trade barriers.

The most general measures are based on trade outcomes, such as “openness”, the ratio of exports and imports (or just imports) to output. Since the national accounts are measured accurately for most countries, this is a natural place to start. The problem with openness is that it is strongly affected by a large number of confounding factors that above and beyond reflect trade policy, such as national tastes, technologies, institutions, and geography.³³ So while a good aggregate measure of trade restrictions should be correlated with openness, the two are different, both empirically and conceptually.

A narrower measure is trade costs, the costs associated with international trade; relevant discussions include, among others, Anderson and van Wincoop (2003, 2004) and Waugh and Ravikumar (2016). Unfortunately, trade costs are still too broad for our purposes, since they include both natural and artificial trade costs. Natural trade costs between countries are affected by proximity and transportation costs, including geographic remoteness, cultural and linguistic differences, the availability of deep-water ports, railways, roads, airports, and so forth. By way of contrast, artificial trade barriers are caused by protectionist policies, such as tariffs, quotas, regulations, bureaucratic red tape, security policies, and so forth. Novy (2012) created a measure of trade costs that has been implemented by the United Nations ESCAP in conjunction with the World Bank, from 1995 through 2016 for over 180 countries. The Novy measure is bilateral, based on microeconomic theory, and is intended to be a comprehensive all-inclusive measure of the costs of international trade, including both natural and artificial barriers to international trade.³⁴ Novy's measure is thus, by design, larger in scope and intent than MATR, which only focuses on policy-driven trade barriers.

Two levels down from trade costs are measures based only on trade policy but not all important elements of policy. Even ignoring measurement problems, tariff rates are too narrow for our interest since they ignore non-tariff barriers (hereafter “NTBs”) such as quotas, sanitary/phytosanitary measures, technical trade barriers, customs procedures, subsidies, standards, distribution requirements, competition measures, licenses, procurement policies, health, product and environmental regulations, and so forth. By way of contrast, Ederington and Ruta (2016) consider only NTBs; many aggregate NTB measures exist such as the coverage

³³ For instance, given the desire for diversified consumption, smaller countries are systematically more open than large ones, even though they frequently have more trade barriers.

³⁴ Details are available at <https://www.unescap.org/resources/escap-world-bank-trade-cost-database>.

ratio, or the OECD's trade facilitation indices. Restricting attention to either tariffs or NTBs is too narrow for our focus; the same is true of restricting attention to services to the exclusion of goods, or vice versa.³⁵

The right way to proceed, in principle, is to construct Trade Restrictiveness Indices (TRIs), developed in the literature by Jim Anderson and Peter Neary, and carefully surveyed in their (2005) book. TRIs are well-grounded theoretically, easy to understand, and the most desirable way to judge protectionism; they are natural to use in, e.g., studies linking the level or growth of income to trade policy. As Anderson and Neary forcefully argue, TRIs represent a conceptual improvement over the average (or coefficient of variation of) trade-weighted tariff rate, NTB coverage ratio, and the like.

Unfortunately, TRIs are difficult to implement in the data, as manifestly demonstrated by the presence of their absence. Constructing a TRI requires dis-aggregated data on protectionism (associated with both tariffs and all NTBs) for many goods, countries and years, along with the associated import levels and demand elasticities. Accordingly, it is little surprise that few TRIs are available; those that do exist are only available for a limited number of countries and years. Even in their excellent (2005) book, Anderson and Neary are forced to make a number of substantive assumptions in order to proceed empirically. They measure TRIs in chapter 15, using a simple Computable General Equilibrium (CGE) model, but only: (i) for a set of 25 countries; (ii) in a single two-year cross-section (they are able to estimate TRIs over time for just five countries); (iii) assuming that all tariffs are constant ad valorem (not specific) and at their bound (rather than applied) rates while all NTBs are assumed to be binding quotas; (iv) without any other domestic distortions; with (v) inputs can be measured at the four-digit HS level; and (vi) production elasticities of substitution assumed (p 284) "with little empirical foundation".

This has not stopped scholars from trying to produce TRIs. Kee, Nicita and Olarreaga (2009) are perhaps the best known TRI producers. Kee et al. (2009) are able to provide estimates of trade restrictiveness for 78 countries; they combine tariffs and ad-valorem tariff equivalents of NTBs at the tariff line level, and aggregate these data in a number of ways. Still, their analysis is limited in scope across countries and especially by time; indeed, their estimates are derived for different years between 2000 and 2004 based on national data availability. It seems reasonable to conclude that the demands associated with their construction has precluded the comprehensive analysis of trade policy across countries and time with TRIs.³⁶ TRIs remain the Gatsby green light of aggregate commercial policy.

Perhaps the closest measure to MATR is the Trade Freedom component of the Heritage Foundation's Index of Economic Freedom, which incorporates both NTBs and tariffs and is available for a large number of countries annually back until 1995. The methodology behind this is fundamentally unclear, and is handled in a separate appendix.

To summarize: we believe that there is room for another aggregate measure of trade restrictions in the literature. Our measure is more narrowly focused than either openness or trade costs, and broader than either the average tariff rate or the NTB coverage ratio. More generally, compared to the literature, MATR has some advantages, some disadvantages, and some differences. Its advantages are many: it is a) simple, b) based on plausible, relevant policy inputs, which are c) quantitative and objective, d) timely and easily updateable, e)

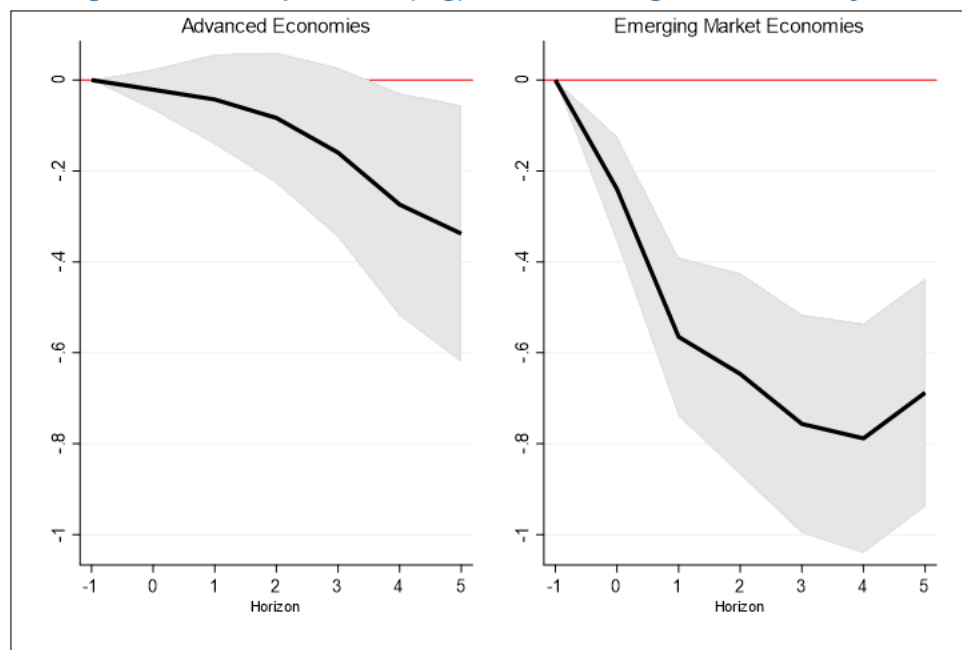
³⁵ The World Bank produces an index of service trade restrictions.

³⁶ For instance, Anderson and Neary write (2005, p 275) "The evidence presented here is not as comprehensive as we would like, because systematic detailed panel data for trade policies are not available ..."

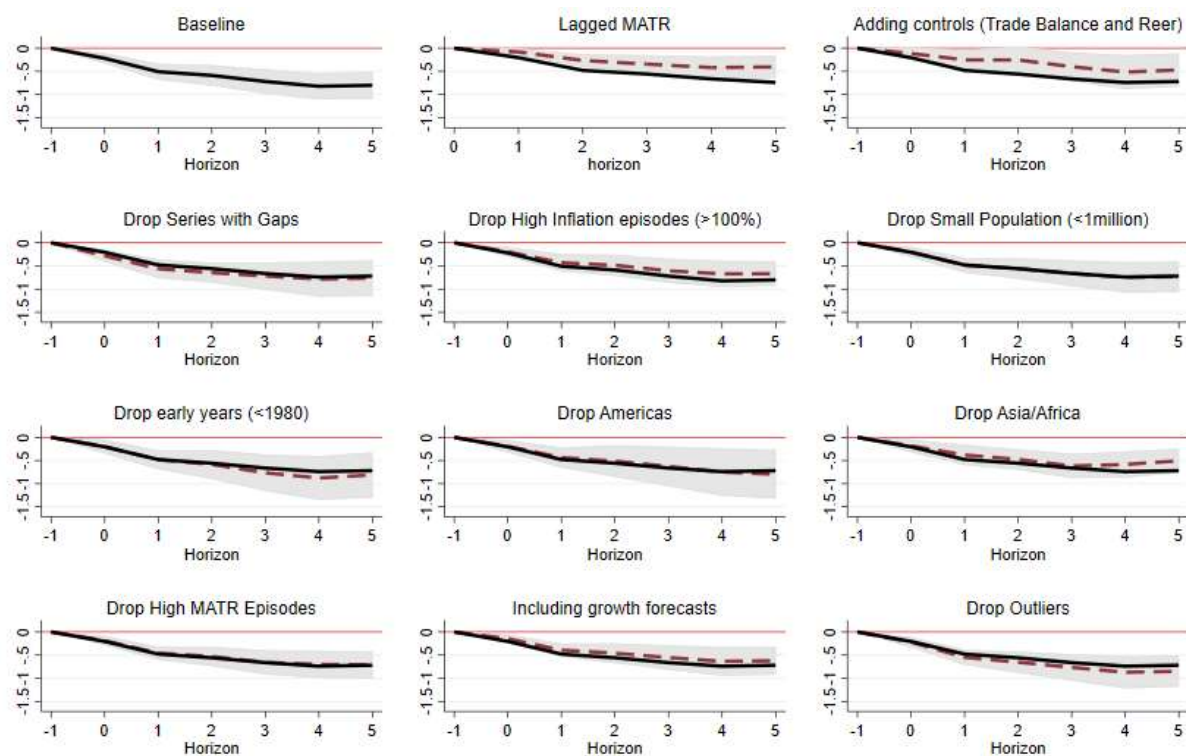
available for a large number of countries, for f) a substantial period of time, and cover both g) tariff and non-tariff barriers. It has one substantive issue: it is theoretically *ad hoc*. And it differs from the literature in not being built from the ground up; it is not an aggregation of industry- or product-level measures. Thus, we do not consider MATR to be a panacea, but rather a useful complimentary measure of aggregate trade restrictions.

Appendix IV. Robustness Checks and Extensions

Appendix Figure A4.1: Response of (log) GDP to Changes in MATR, by income group

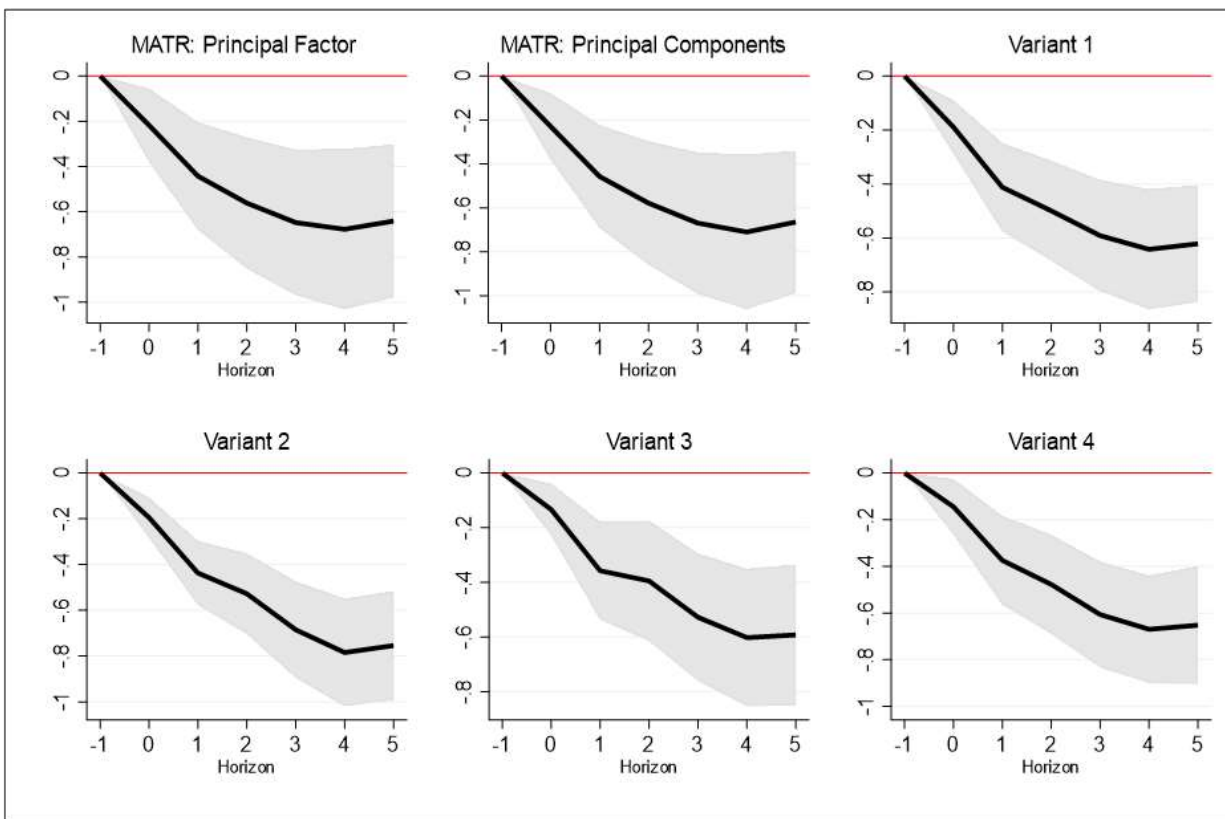


Cumulative IRFs after one standard deviation increase in MATR; shaded area is 90 percent confidence interval; Driscoll-Kraay standard errors.

Appendix Figure A4.2: Response of (log) GDP to Changes in MATR: Robustness Checks

Cumulative IRFs after one standard deviation increase in MATR; shaded area is 90 percent confidence interval; Driscoll-Kraay standard errors.

Appendix Figure A4.3: Response of (log) GDP to Changes in MATR: Alternative Measures



Cumulative IRFs after one standard deviation increase in MATR; shaded area is 90 percent confidence interval; Driscoll-Kraay standard errors.

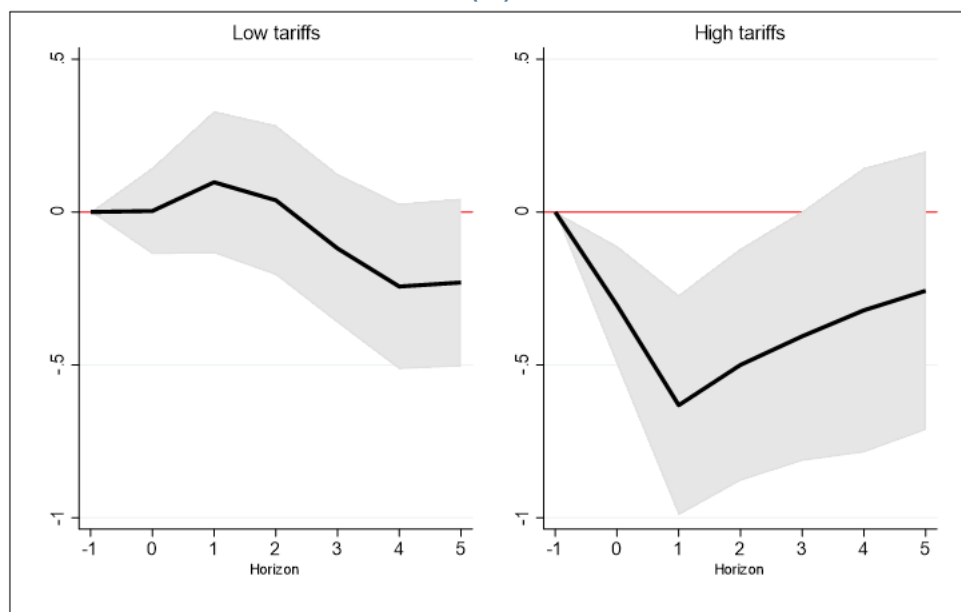
Variant 1 includes sum of: VII_A;VII_B;VII_C;VII_D;VII_E;VII_F;VIII_A;VIII_B;VIII_C;VIII_D and VIII_E.

Variant 2 includes sum of: IV_A;IV_B;IV_C;IV_D;IV_E;IV_F;VII_A;VII_B;VII_C;VII_D;VII_E;VII_F;IX_A_1;VIII_A;VIII_B;VIII_C;VIII_D;VIII_E;X_A and X_B.

Variant 3 includes sum of: II_A;II_B;IV_A;IV_B;IV_C;IV_D;IV_E;IV_F;VII_A;VII_B;VII_C;VII_D;VII_E;VII_F;IX_A_1;IX_A_2;IX_A_3;IX_A_4;IX_A_5;IX_A_6;IX_A_7;VIII_A;VIII_B;VIII_C;VIII_D and VIII_E.

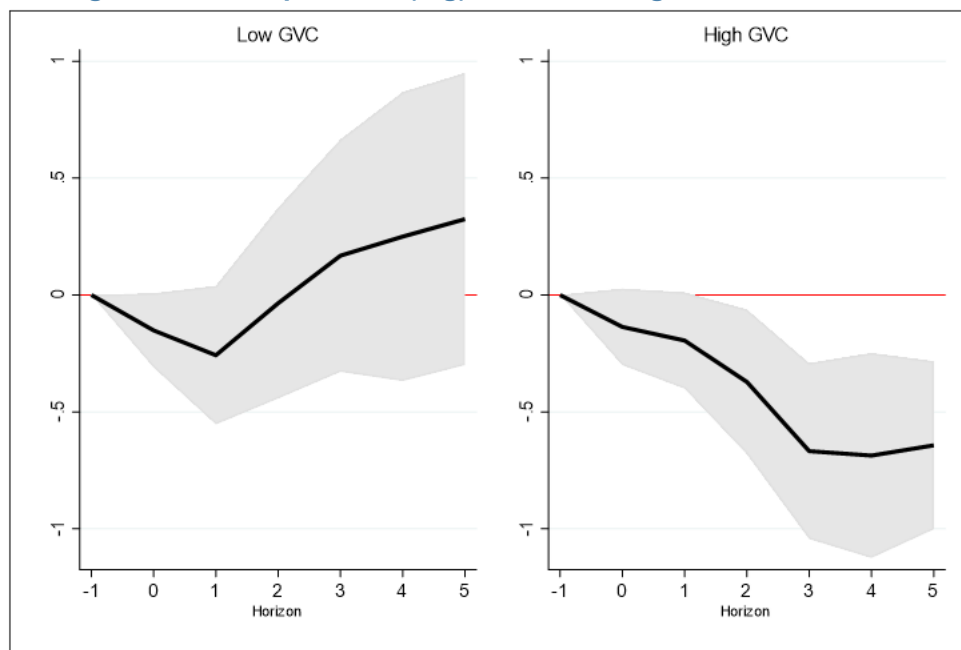
Variant 4 includes sum of: III_F;III_G;II_A;II_B;IV_A_1;IV_A_2;IV_B_1;IV_B_2;IV_C;IV_D_1;IV_D_2;IV_E_1;IV_E_2;IV_F_1;IV_F_2;VII_B_1;VII_A;VII_B_2;VII_B_3;VII_C_1;VII_C_2;VII_C_3;VII_C_4;VII_C_5;VII_D_1;VII_D_2;VII_D_3;VII_D_4;VII_D_5;VII_E_1;VII_F;VIII_A_1;VIII_C_1;VIII_B;VIII_C_2;VIII_C_3;VIII_C_4;VIII_C_5;VIII_D_1;VIII_D_2;VIII_E_1;VIII_E_2;IX_A_1;IX_A_2;IX_A_3;IX_A_4;IX_A_5;IX_A_6;IX_A_7;X_B;X_A_1 a and X_A_1 b.

Appendix Figure A4.4: Response of (log) GDP to Changes in MATR, tariff complementarity (%)

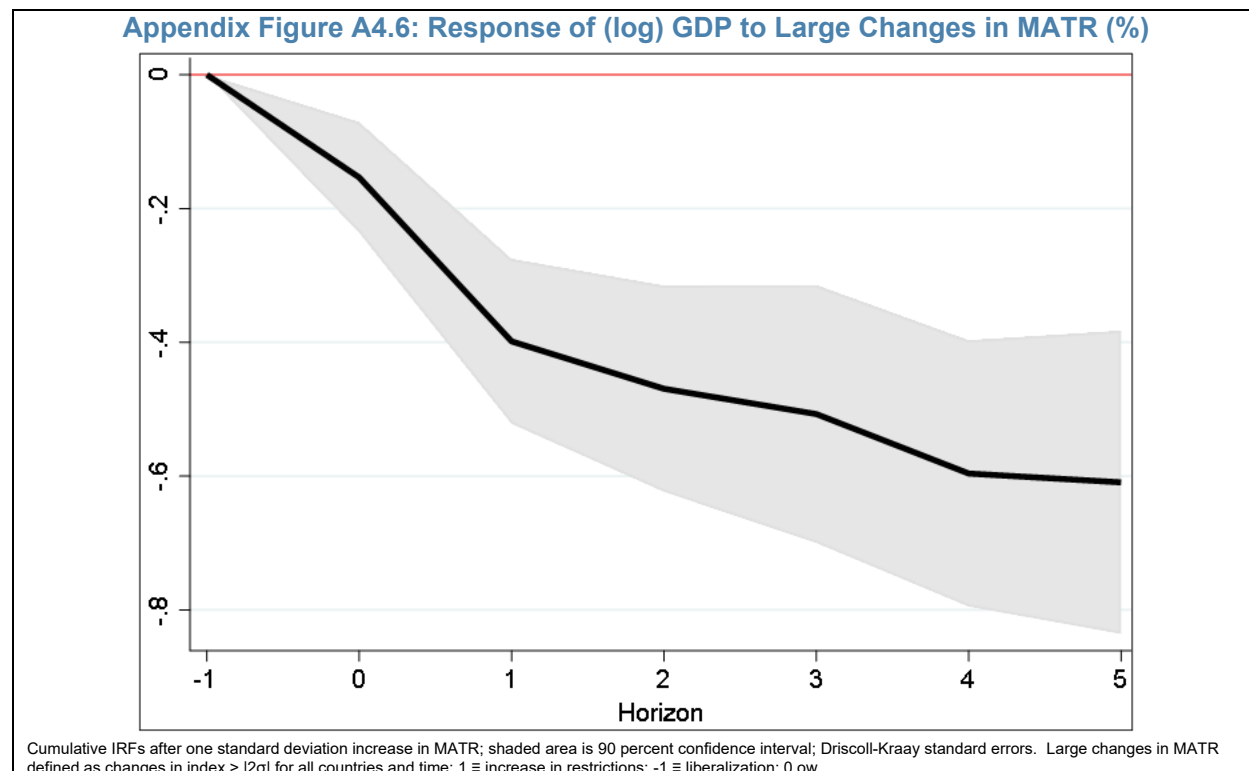


Cumulative IRFs after one standard deviation increase in MATR; shaded area is 90 percent confidence interval; Driscoll-Kraay standard errors. Heterogenous effects for tariffs calculated using interaction of smooth transition function of tariffs with MATR.

Appendix Figure A4.5: Response of (log) GDP to Changes in MATR, role of GVCs (%)



Cumulative IRFs after one standard deviation increase in MATR; shaded area is 90 percent confidence interval; Driscoll-Kraay standard errors. Heterogenous effects for GVC calculated using interaction of smooth transition function of GVC with MATR.



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